

	1	2	3	4	5	6	7	8	
A									A
B									B
C									C
D									D
E									E
F									F
	1	2	3	4	5	6	7	8	

Bremen 10G

MP build(A02)

2010.04.15

<b>INVENTEC</b>			
TITLE <b>Bremen10G</b>			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A
SHEET		1	OF 63

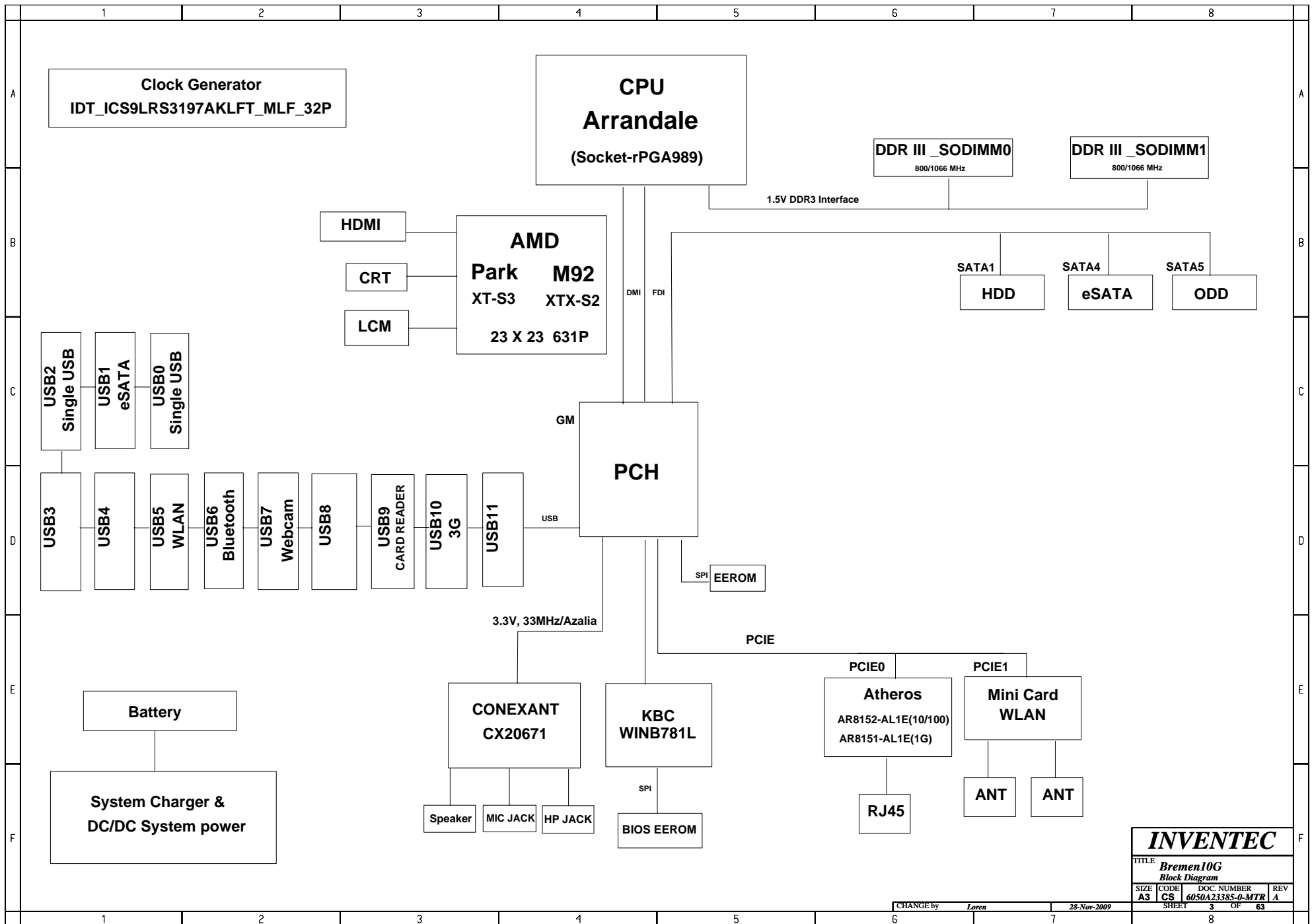
# TABLE OF CONTENTS

PAGE	PAGE	PAGE
1. COVER PAGE	31. HALL SENSOR	61. Touch pad switch board
2. INDEX	32. LED	62. Power board
3. BLOCK DIAGRAM	33. CLOCK GENERATOR	63. USB/Card Reader board
4. POWER SEQUENCE BLOCK	34. DDR DIMM0	
5. PCB	35. DDR DIMM1	
6. SYSTEM POWER	36. CPU 1	
7. SYSTEM POWER	37. CPU 2	
8. SYSTEM POWER	38. CPU 3	
9. SYSTEM POWER	39. CPU 4	
10. SYSTEM POWER	40. CPU 5	
11. SYSTEM POWER	41. CPU 6	
12. SYSTEM POWER	42. PCH 1	
13. SYSTEM POWER	43. PCH 2	
14. SYSTEM POWER	44. PCH 3	
15. SUPER I/O(KBC)	45. PCH 4	
16. K/B & TP/B CONN	46. PCH 5	
17. FAN & THERMAL	47. PCH 6	
18. LAN	48. PCH 7	
19. RJ45 & TRANSFORMER	49. PCH 8	
20. CODEC	50. PCH 9	
21. AUDIO JACK	51. 3D sensor	
22. LCM	52. GPU 1	
23. RGB CONN	53. GPU 2	
24. HDMI CONN	54. GPU 3	
25. SATA HDD & ODD	55. GPU 4	
26. CONNECTOR	56. GPU 5	
27. USB/eSATA CONN	57. GPU 6	
28. BLUE TOOTH	58. VRAM 1	
29. WLAN	59. VRAM 2	
30. 3G	60. EMI	

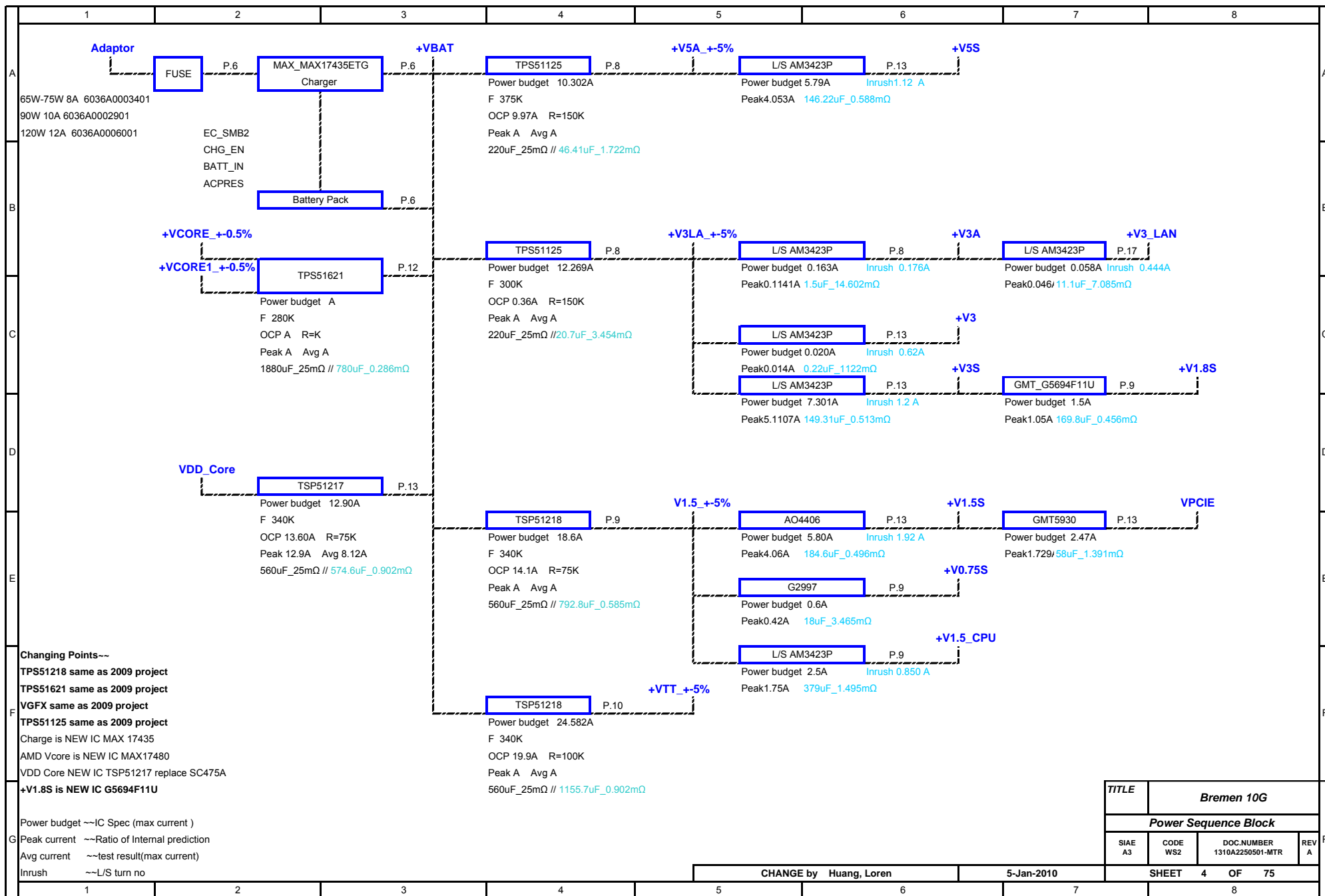
**INVENTEC**

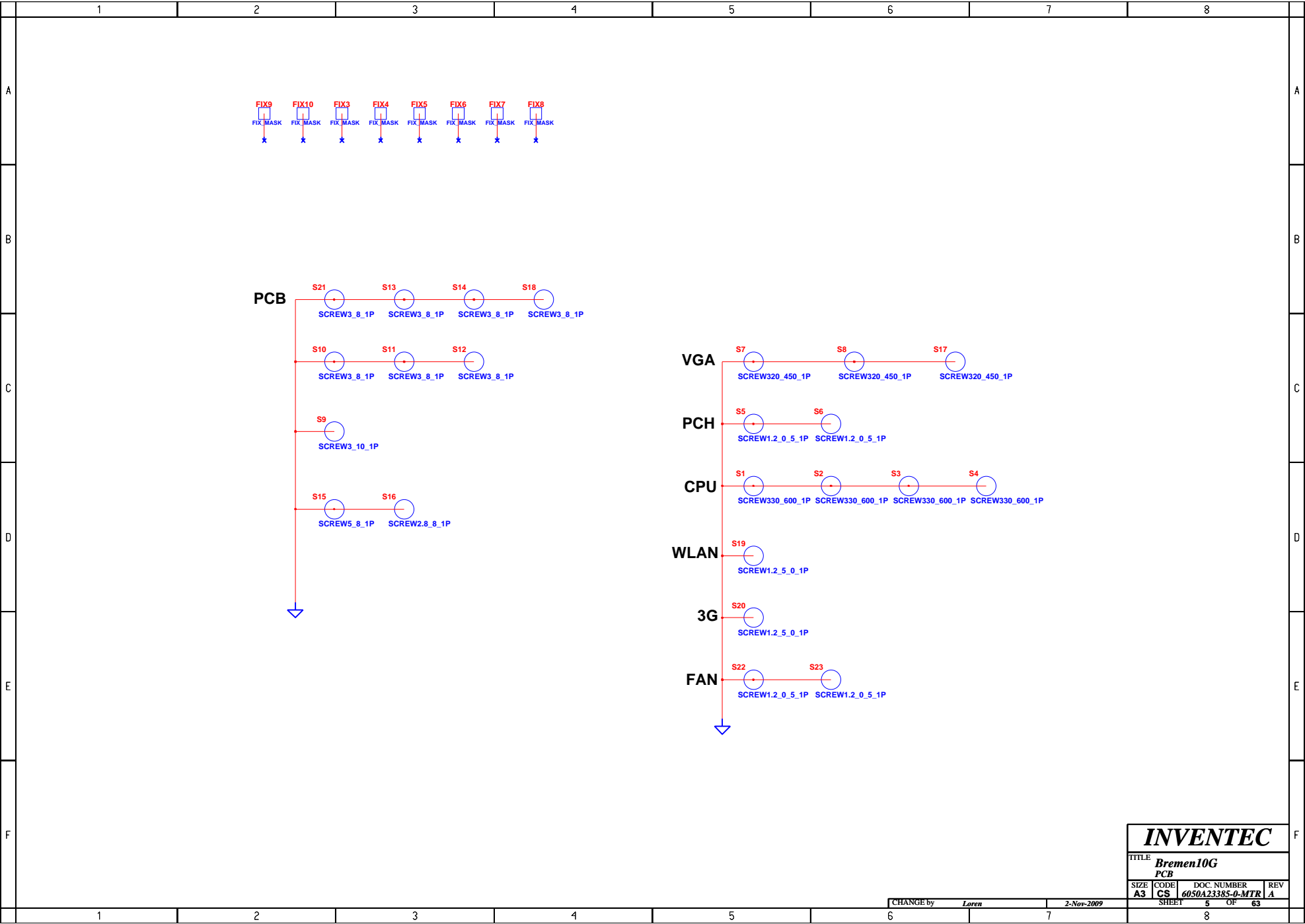
TITLE <b>Bremen10G</b> <i>Index</i>			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
SHEET <b>2</b>		OF <b>63</b>	

CHANGE by *Loren* 1-Dec-2009



INVENTEC			
TITLE <b>Bremen10G</b> Block Diagram			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
CHANGE by <i>Loren</i>		28-Nov-2009	
SHEET		3	OF 63





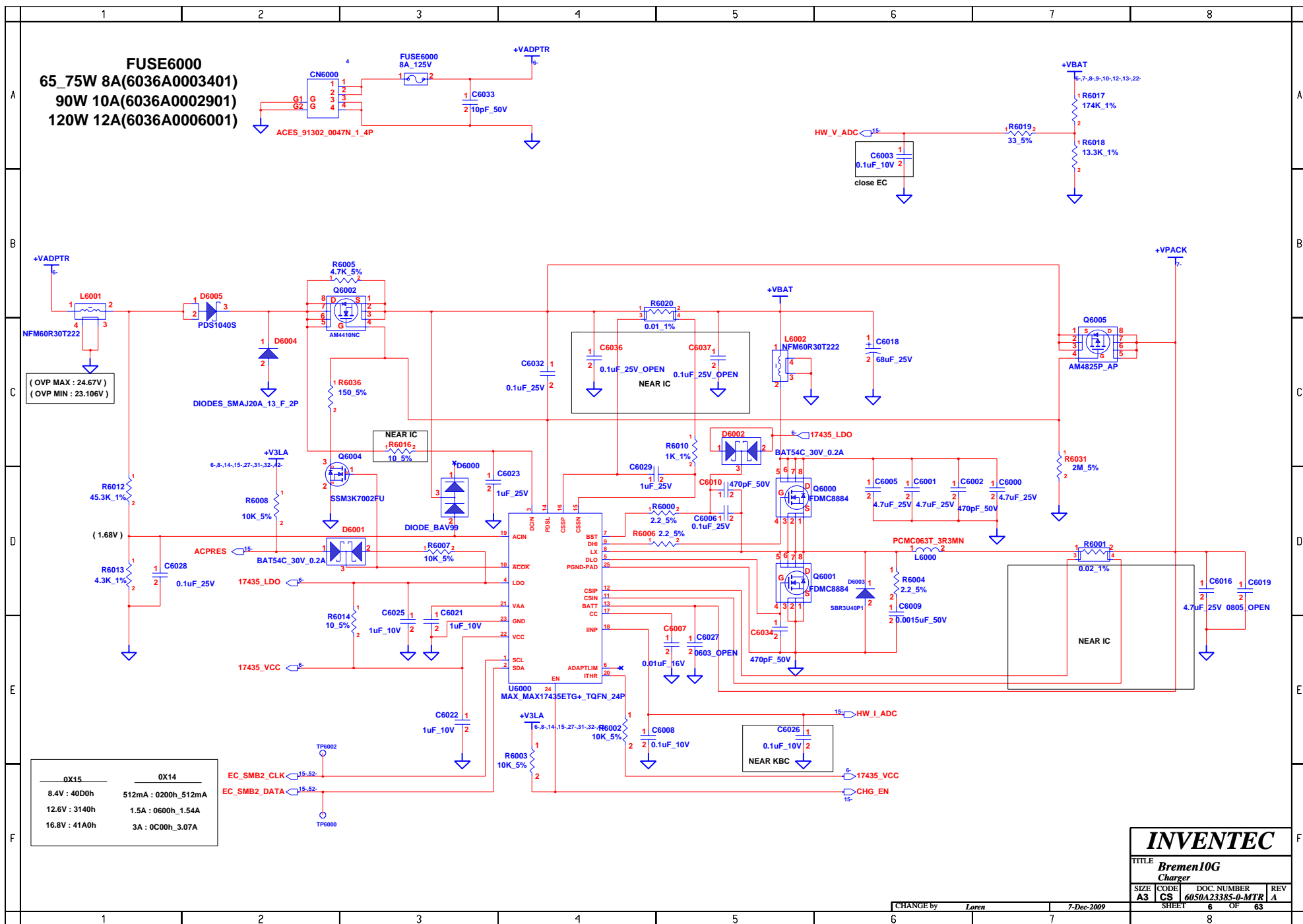
**INVENTEC**

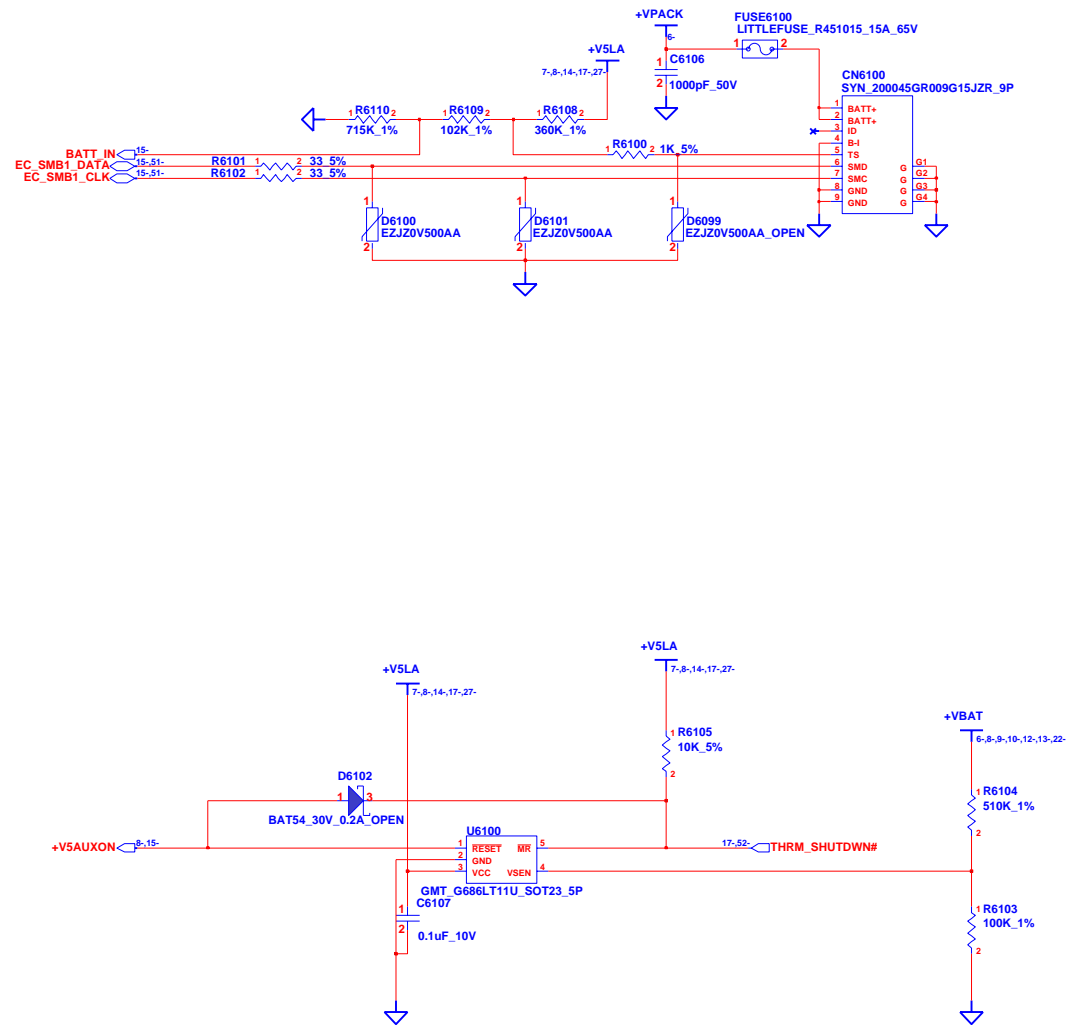
TITLE  
**Bremen10G**  
**PCB**

SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
-------------------	-------------------	--	-----------------

CHANGE by *Loren* 2-Nov-2009

SHEET 5 OF 63

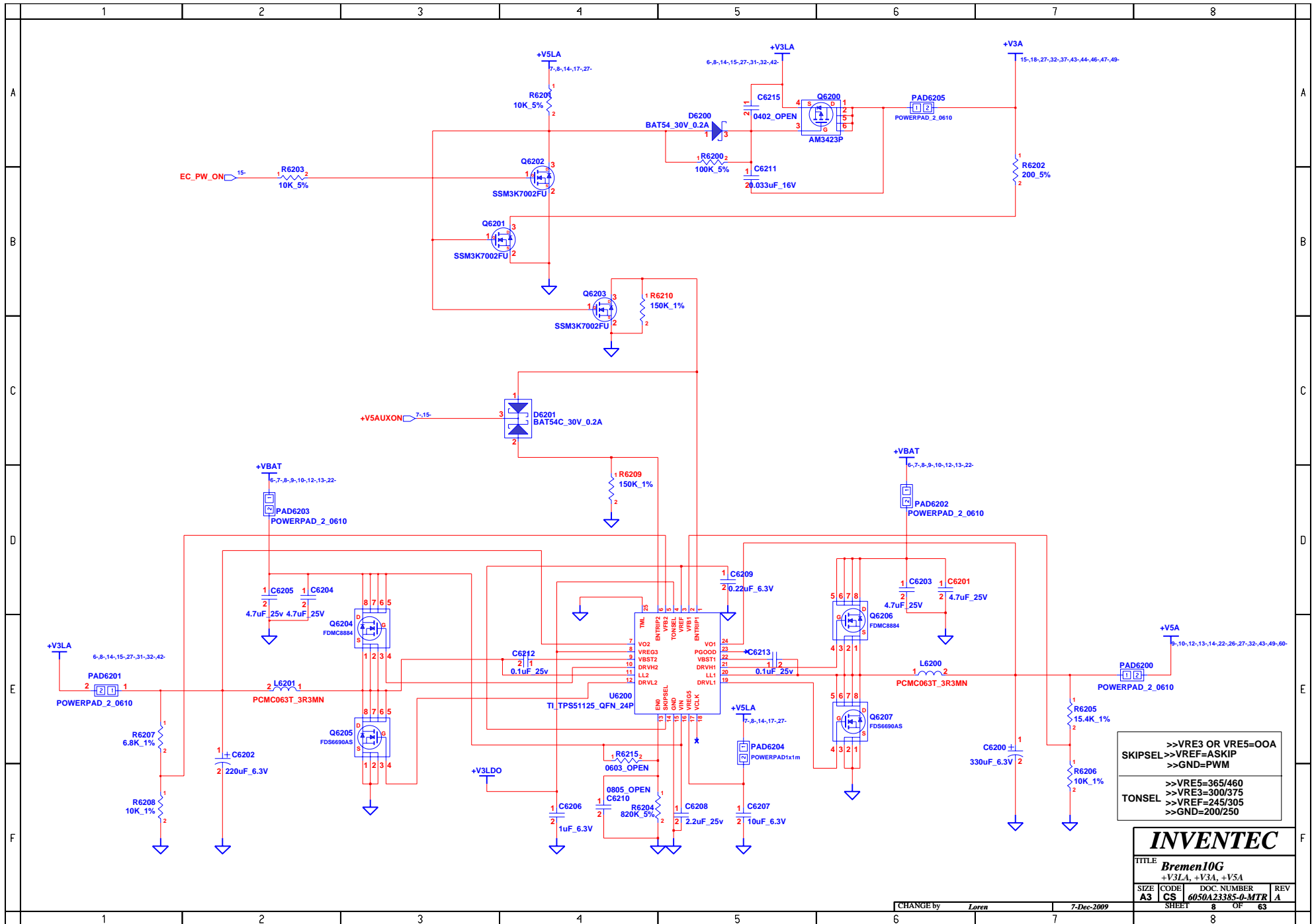




**INVENTEC**

TITLE			
Bremen10G			
Battery, Reset IC			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A
SHEET		7	OF 63

CHANGE by Loren 2-Nov-2009



>>VRE3 OR VRE5=OOA  
 SKIPSEL>>VREF=ASKIP  
 >>GND=PWM  
 >>VRE5=365/460  
 >>VRE3=300/375  
 TONSEL >>VREF=245/305  
 >>GND=200/250

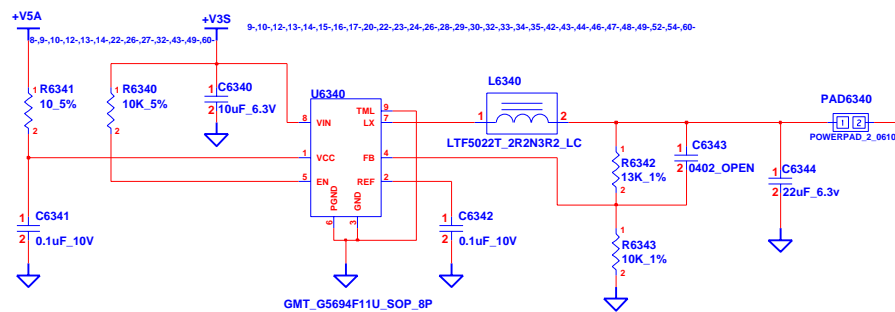
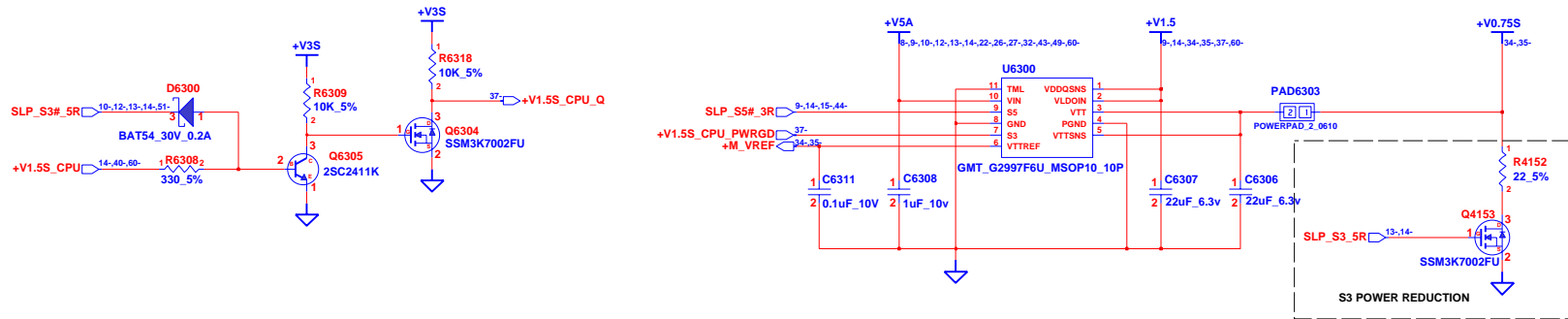
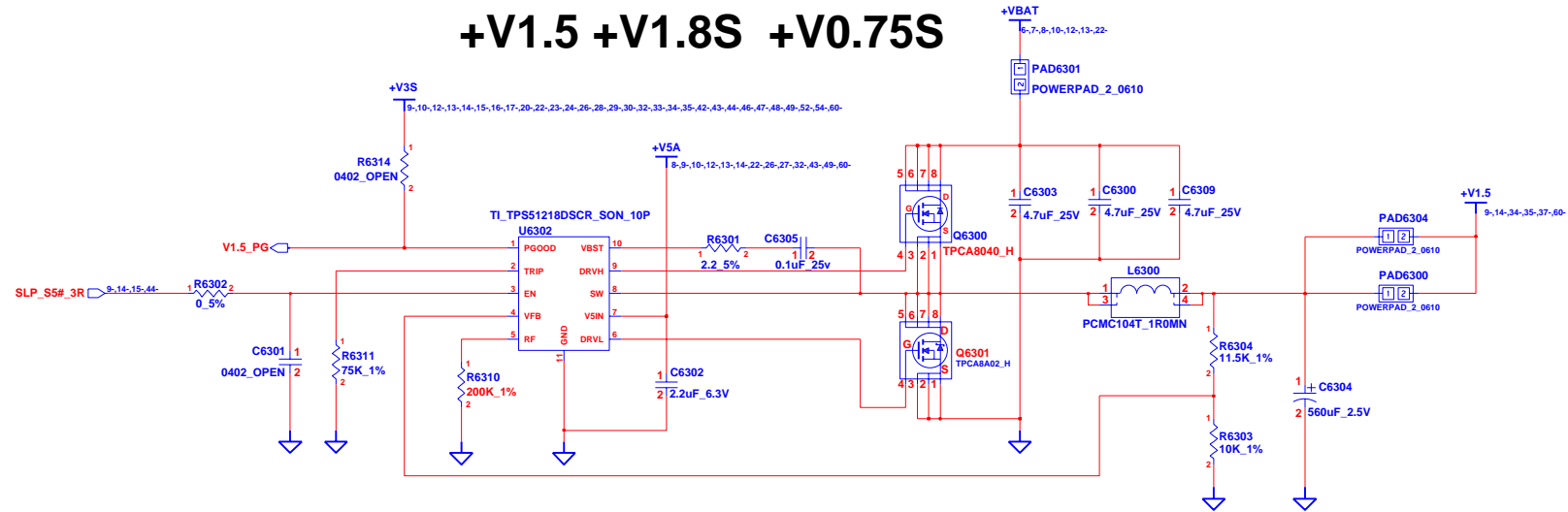
**INVENTEC**

TITLE <b>Bremen10G</b>			
+V3LA, +V3A, +V5A			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
SHEET <b>8</b>		OF <b>63</b>	

CHANGE by **Loren** 7-Dec-2009



# +V1.5 +V1.8S +V0.75S



**INVENTEC**

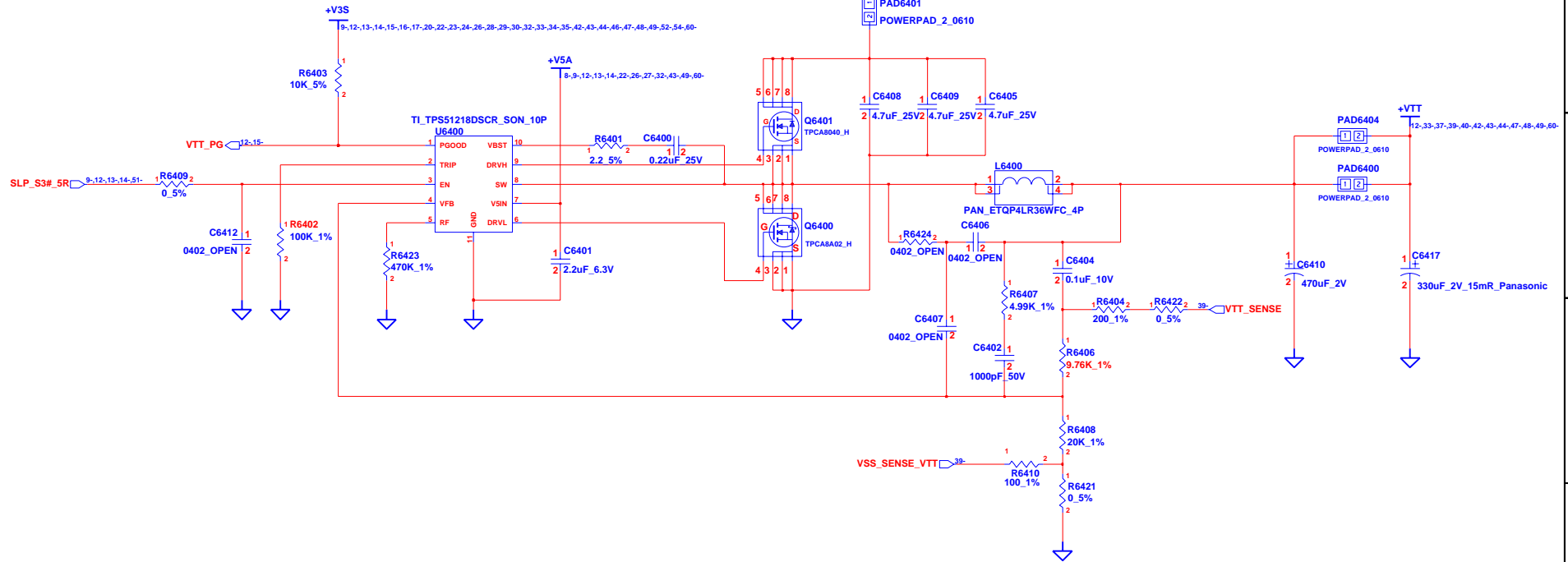
TITLE  
**Bremen10G**  
+V1.5, +V1.8S, +V0.75S

SIZE CODE DOC NUMBER REV  
**A3 CS 6050A23385-0-MTR A**

CHANGE by **Loren** 7-Dec-2009

SHEET 9 OF 63

# +VTT +V1.05S



## INVENTEC

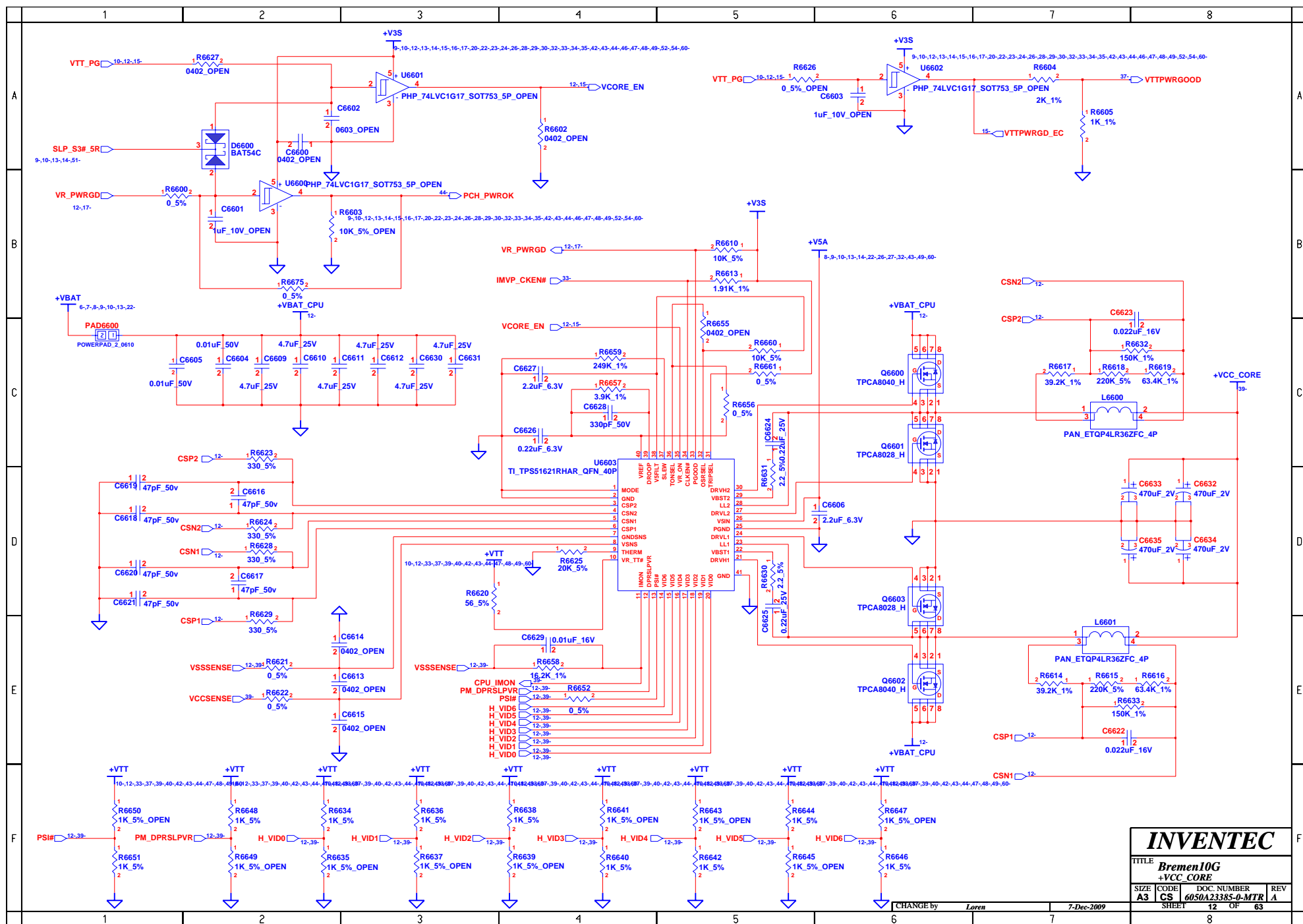
TITLE			
Bremen10G			
+VTT, +V1.05S			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A
SHEET		10	OF 63

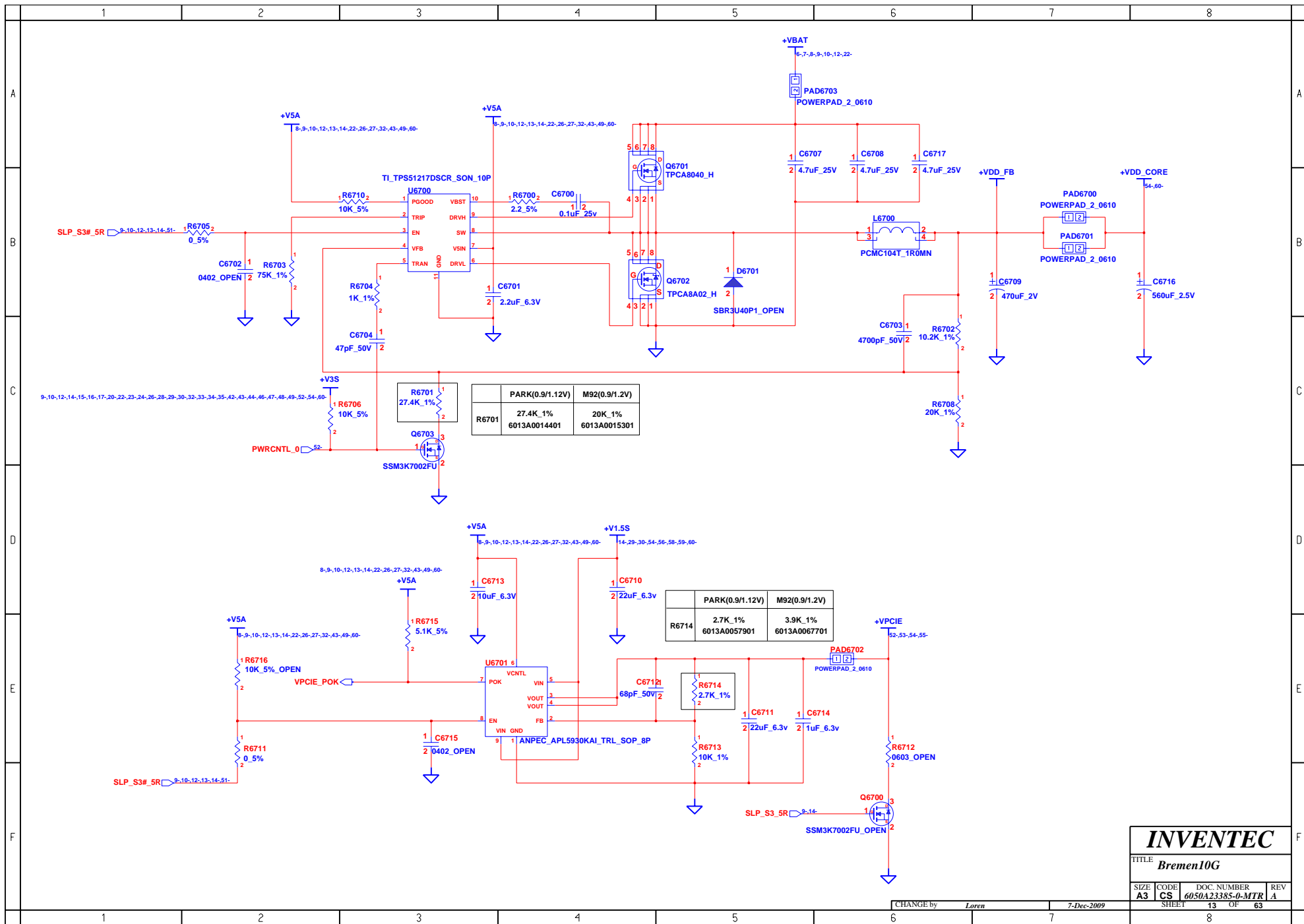
CHANGE by Loren 7-Dec-2009

	1	2	3	4	5	6	7	8	
A	<div>BLANK</div>								A
B									B
C									C
D									D
E									E
F									F
	1	2	3	4	5	6	7	8	

INVENTEC			
TITLE <i>Bremen10G</i> +VGFX_CORE			
SIZE A3	CODE CS	DOC. NUMBER 6050A23385-0-MTR	REV A
SHEET		11	OF 63

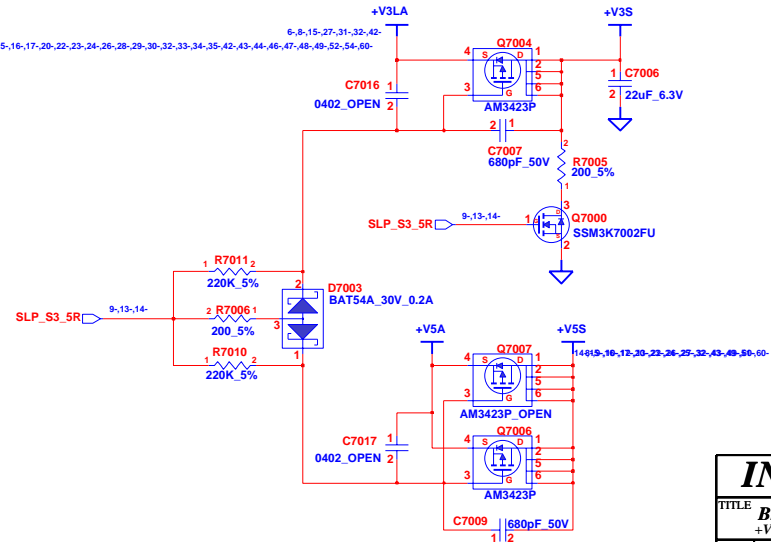
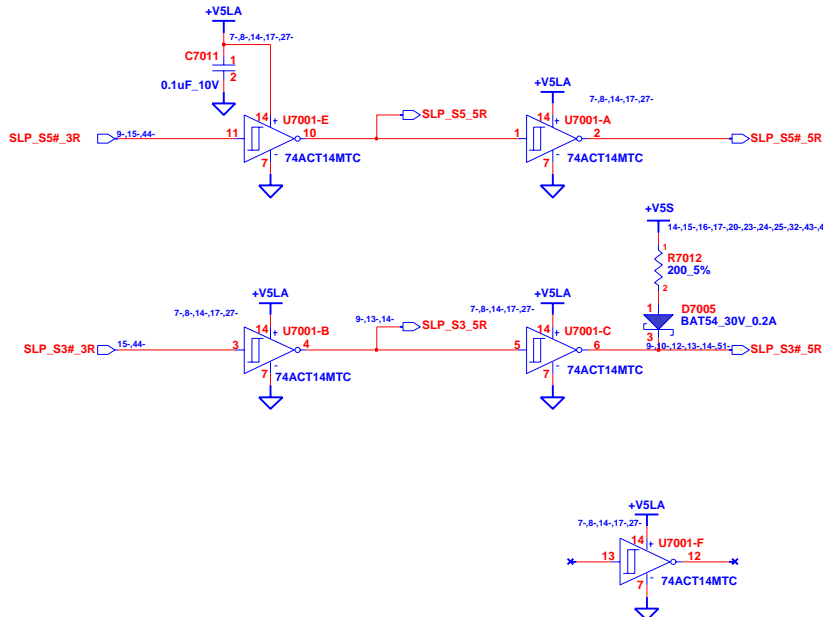
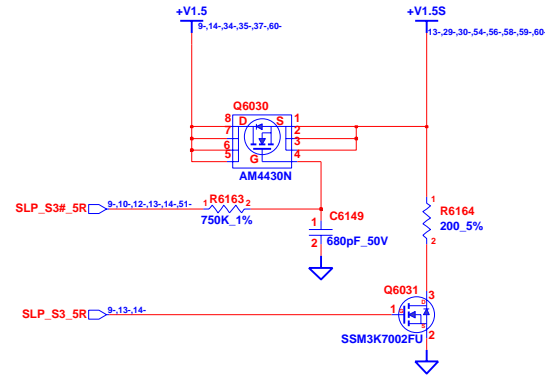
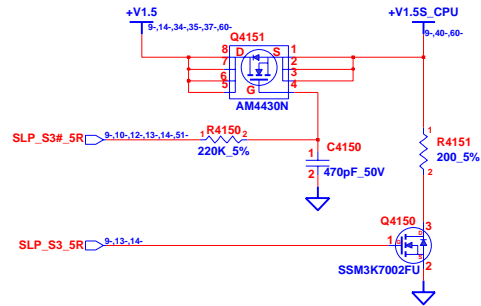
CHANGE by *Loren* 2-Nov-2009





# +V5S +V3S +V1.5S +V1.5S\_CPU

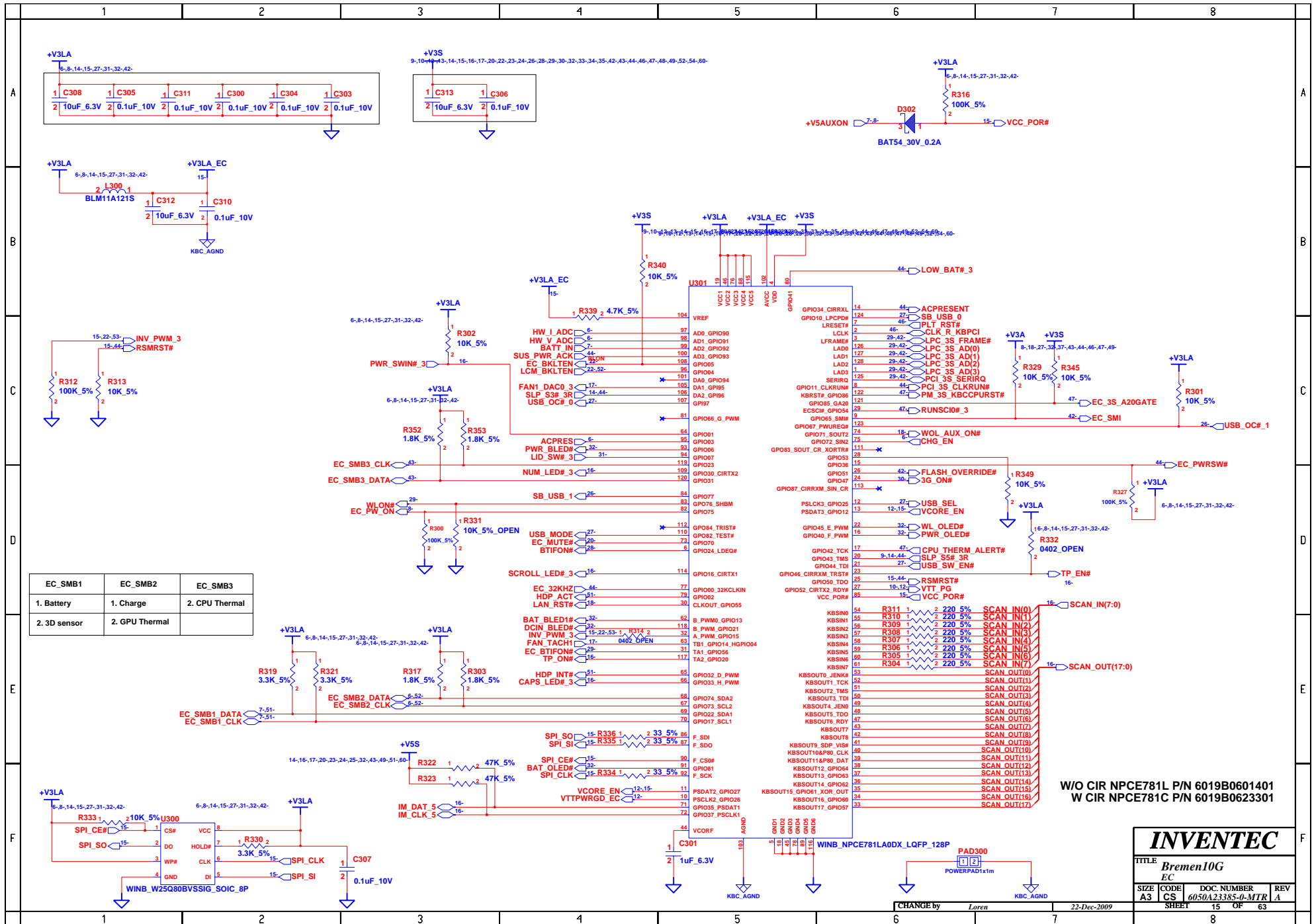
## S3 POWER REDUCTION

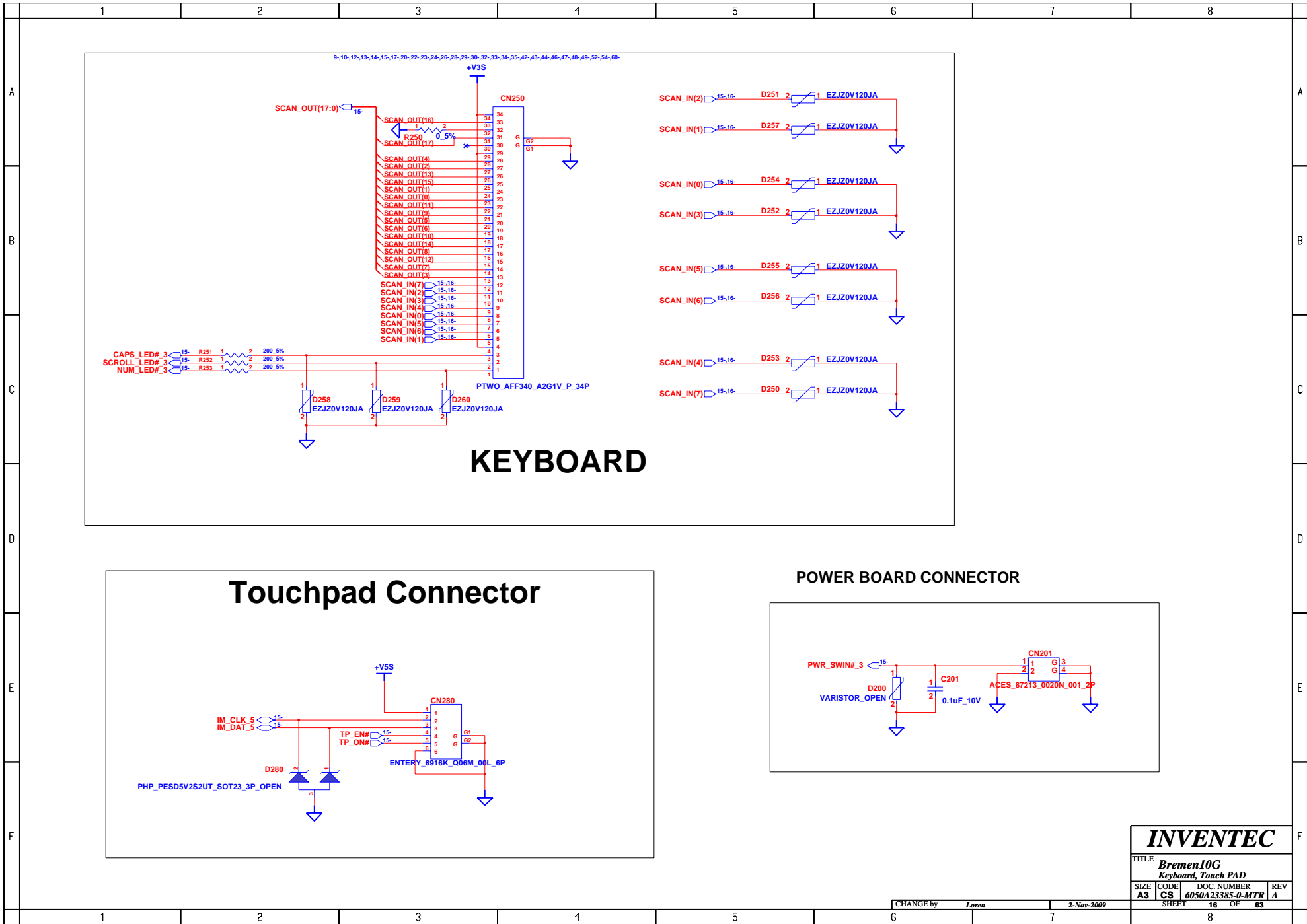


**INVENTEC**

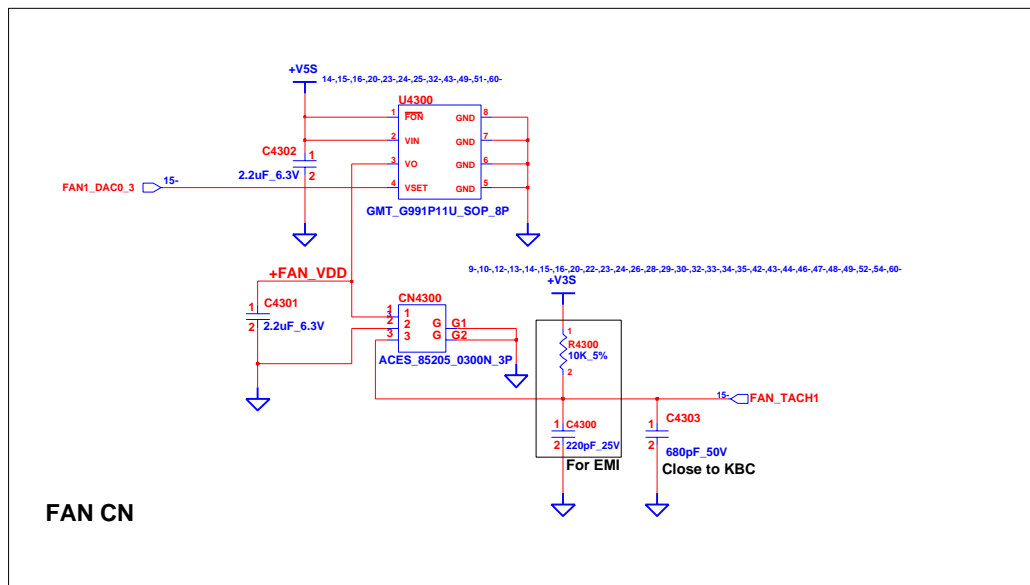
TITLE			
Bremen10G			
+V5S +V3S +V1.5S			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A
SHEET		14	OF 63

CHANGE by *Loren* 2-Nov-2009

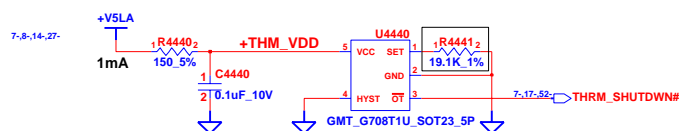








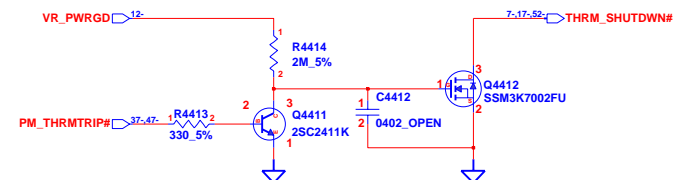
### Board Thermal Sensor



Thermal shutdown at 94 C° +/- 3 C° from 60 C° to 100 C°

$$RSET = 0.0012 * T^2 - 0.9308 * T + 96.147$$

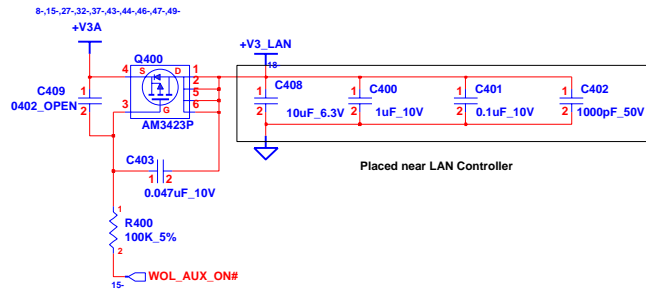
Hysteresis is 30C



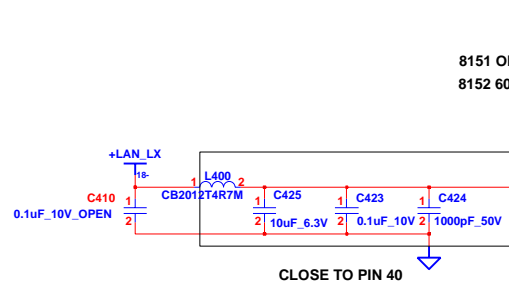
**INVENTEC**

TITLE			
Bremen10G			
FAN, Thermal controller			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A
SHEET		17	OF 63

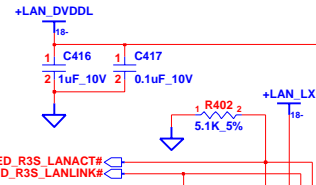
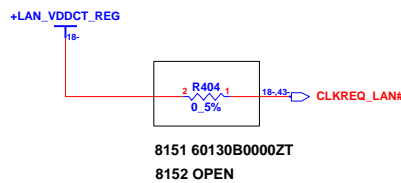
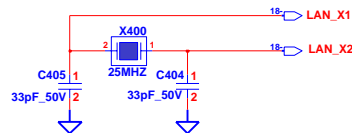
CHANGE by Loren 2-Nov-2009



Placed near LAN Controller



CLOSE TO PIN 40



LED\_R3S\_LANACT#  
LED\_R3S\_LANLINK#



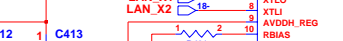
LAN\_RST#  
PCIE\_WAKE#



LAN\_X1  
LAN\_X2



LAN\_TRD0P  
LAN\_TRD0N  
LAN\_TRD1P  
LAN\_TRD1N  
LAN\_TRD2P  
LAN\_TRD2N  
LAN\_TRD3P  
LAN\_TRD3N



LAN\_RST#  
PCIE\_WAKE#



LAN\_RST#  
PCIE\_WAKE#



LAN\_RST#  
PCIE\_WAKE#



LAN\_RST#  
PCIE\_WAKE#



LAN\_RST#  
PCIE\_WAKE#



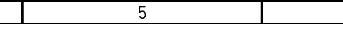
LAN\_RST#  
PCIE\_WAKE#



LAN\_RST#  
PCIE\_WAKE#



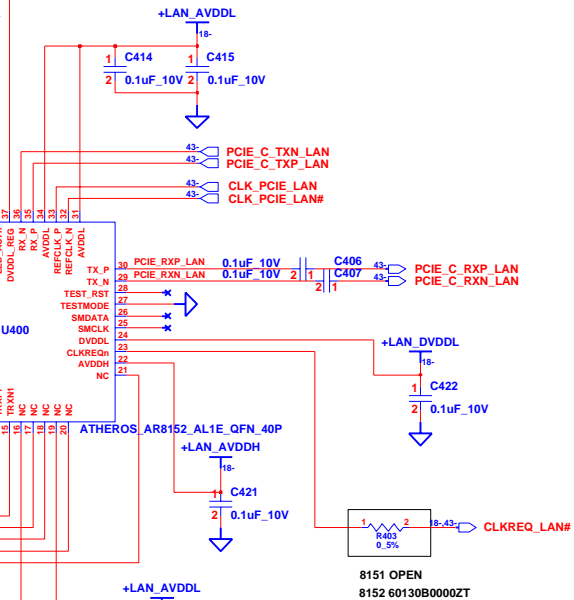
LAN\_RST#  
PCIE\_WAKE#



LAN\_RST#  
PCIE\_WAKE#



LAN\_RST#  
PCIE\_WAKE#



PCIE\_C\_TXN\_LAN  
PCIE\_C\_TXP\_LAN  
CLK\_PCIE\_LAN  
CLK\_PCIE\_LAN#



PCIE\_C\_TXN\_LAN  
PCIE\_C\_TXP\_LAN  
CLK\_PCIE\_LAN  
CLK\_PCIE\_LAN#



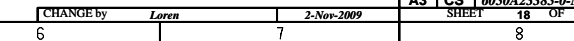
PCIE\_C\_TXN\_LAN  
PCIE\_C\_TXP\_LAN  
CLK\_PCIE\_LAN  
CLK\_PCIE\_LAN#



PCIE\_C\_TXN\_LAN  
PCIE\_C\_TXP\_LAN  
CLK\_PCIE\_LAN  
CLK\_PCIE\_LAN#



PCIE\_C\_TXN\_LAN  
PCIE\_C\_TXP\_LAN  
CLK\_PCIE\_LAN  
CLK\_PCIE\_LAN#



PCIE\_C\_TXN\_LAN  
PCIE\_C\_TXP\_LAN  
CLK\_PCIE\_LAN  
CLK\_PCIE\_LAN#



PCIE\_C\_TXN\_LAN  
PCIE\_C\_TXP\_LAN  
CLK\_PCIE\_LAN  
CLK\_PCIE\_LAN#

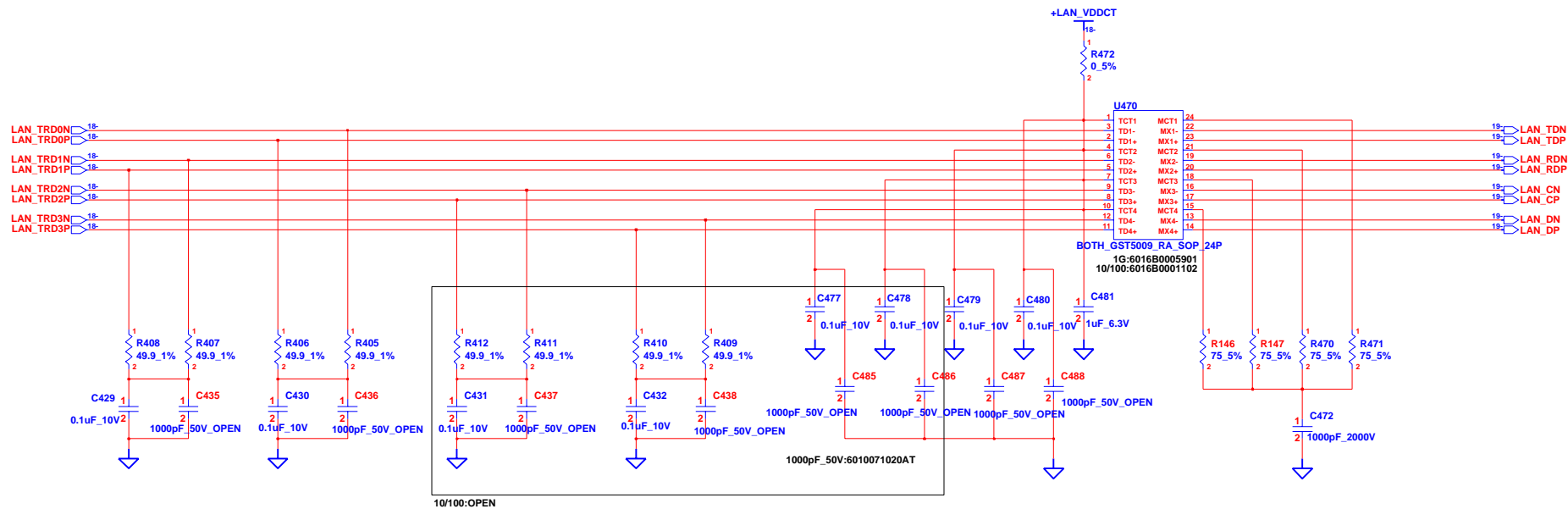
**INVENTEC**

TITLE  
**Bremen10G**  
LAN

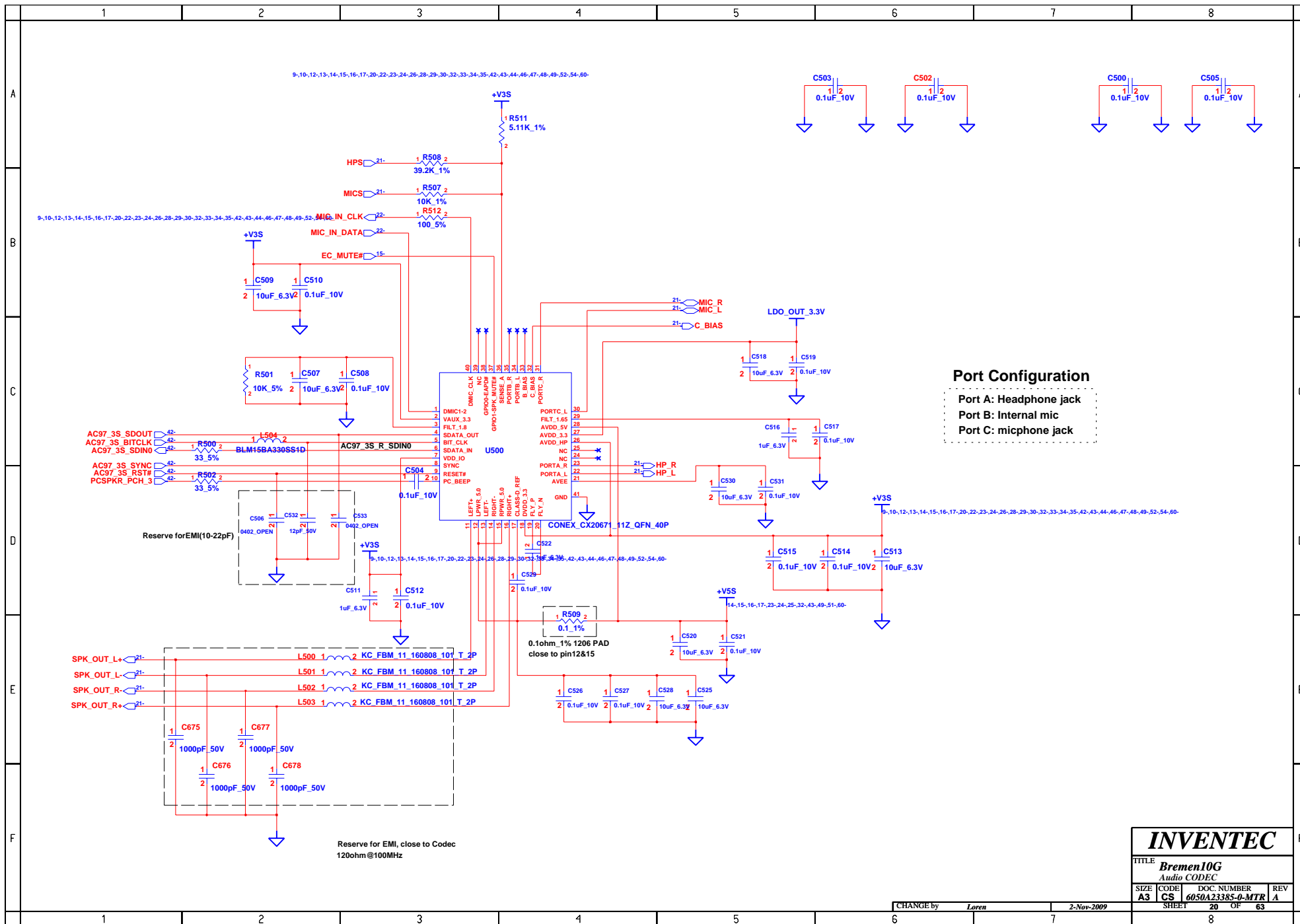
SIZE CODE CS DOC. NUMBER REV  
**A3** **CS** **6050A23385-0-MTR** **A**

CHANGE by **Loren** 2-Nov-2009

SHEET 18 OF 63



CHANGE by	<i>Loren</i>	2-Nov-2009
-----------	--------------	------------

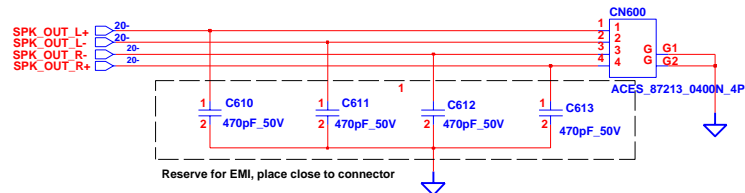


# INVENTEC

TITLE			
Bremen10G			
Audio CODEC			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A
SHEET		20	OF 63

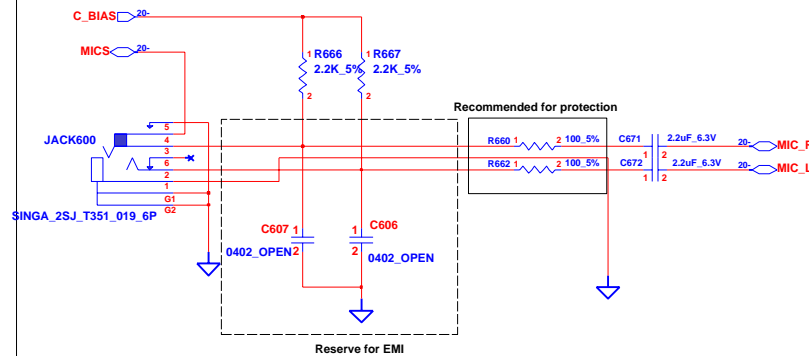
CHANGE by Loren 2-Nov-2009

## INTERNAL SPEAKERS

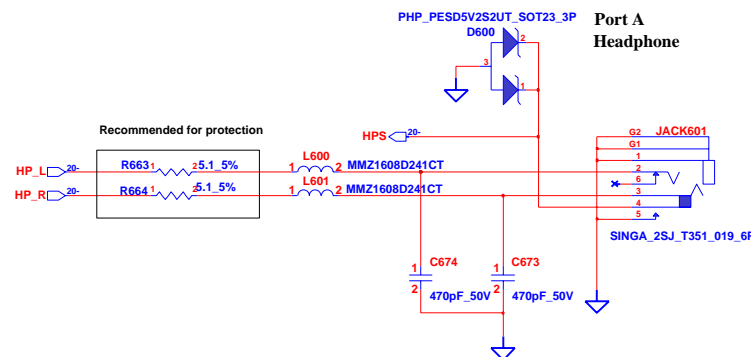


## AUDIO JACKS

Port C  
External microphone



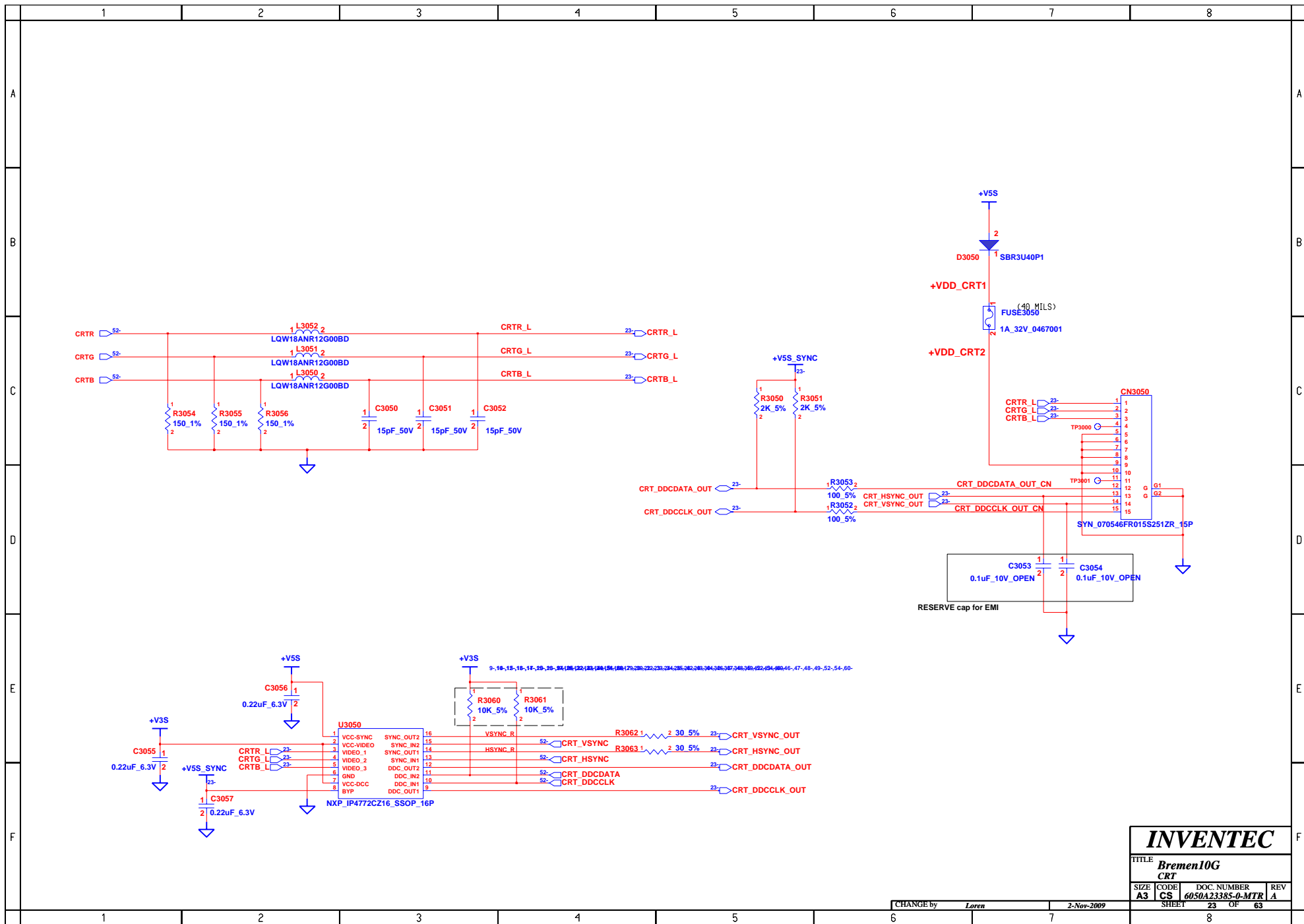
Port A  
Headphone



**INVENTEC**

TITLE <b>Bremen10G</b> JACK			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
CHANGE by <b>Loren</b>		2-Nov-2009	
SHEET <b>21</b>		OF <b>63</b>	

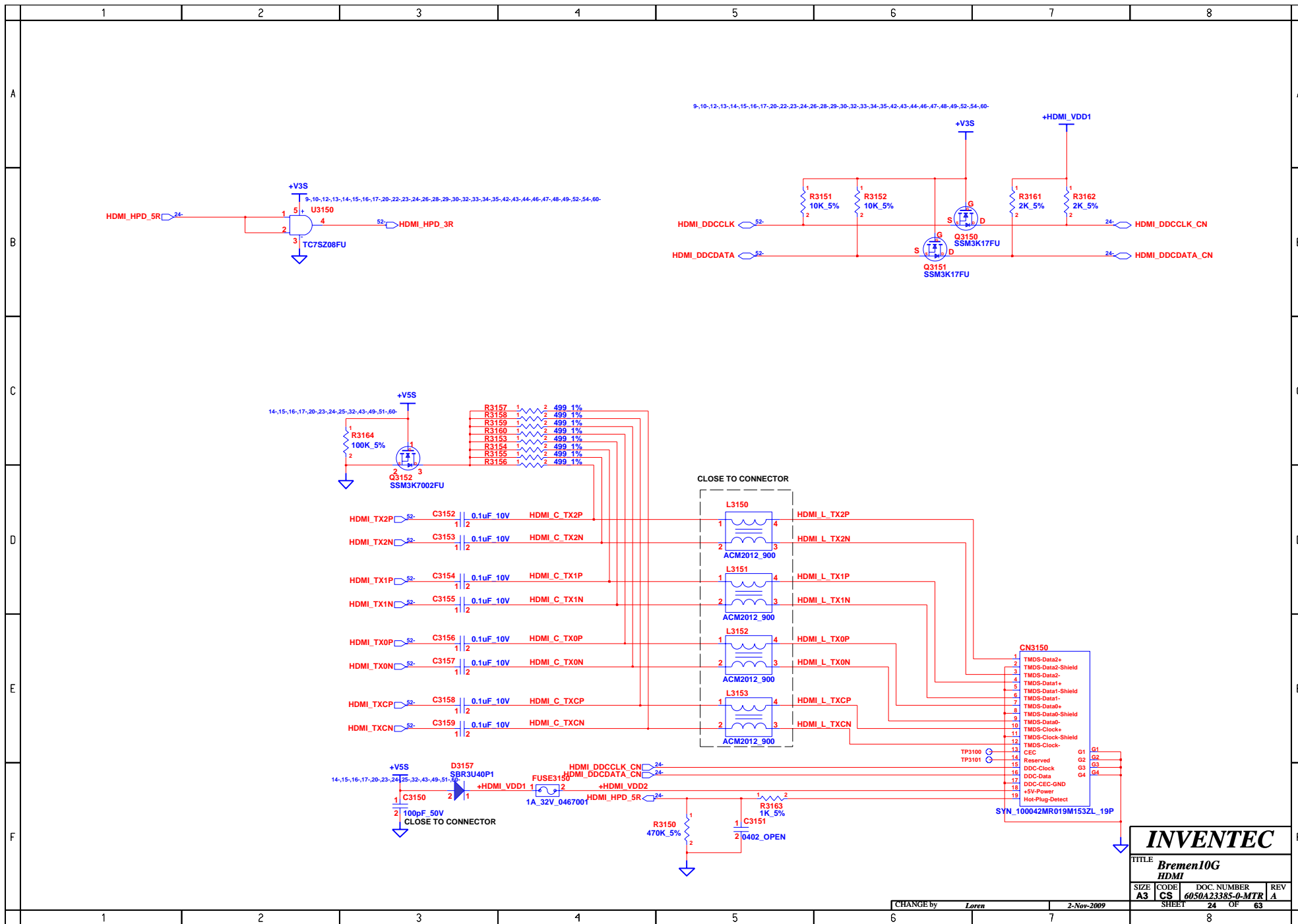




# INVENTEC

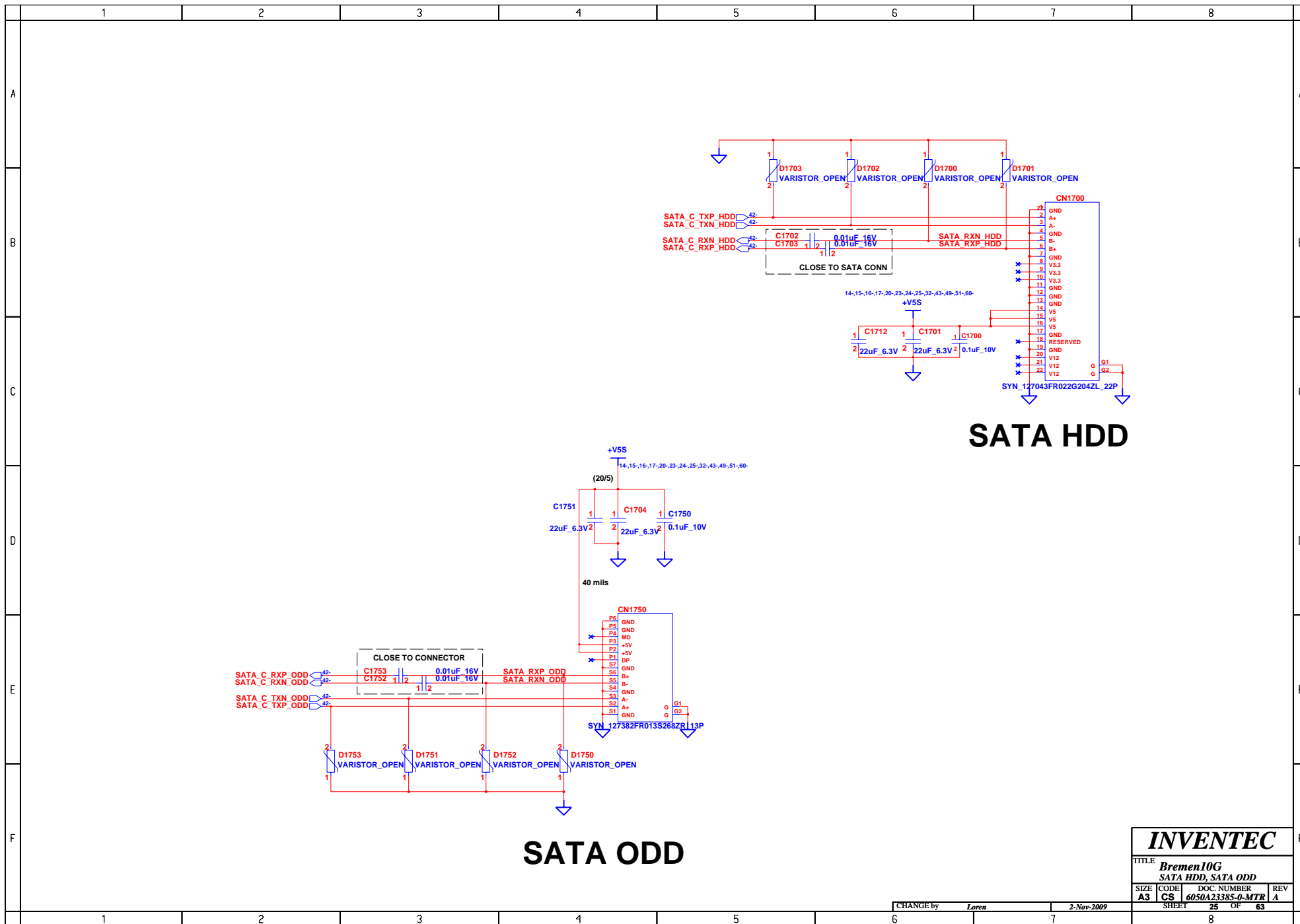
TITLE			
Bremen10G			
CRT			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A
SHEET		23	OF 63

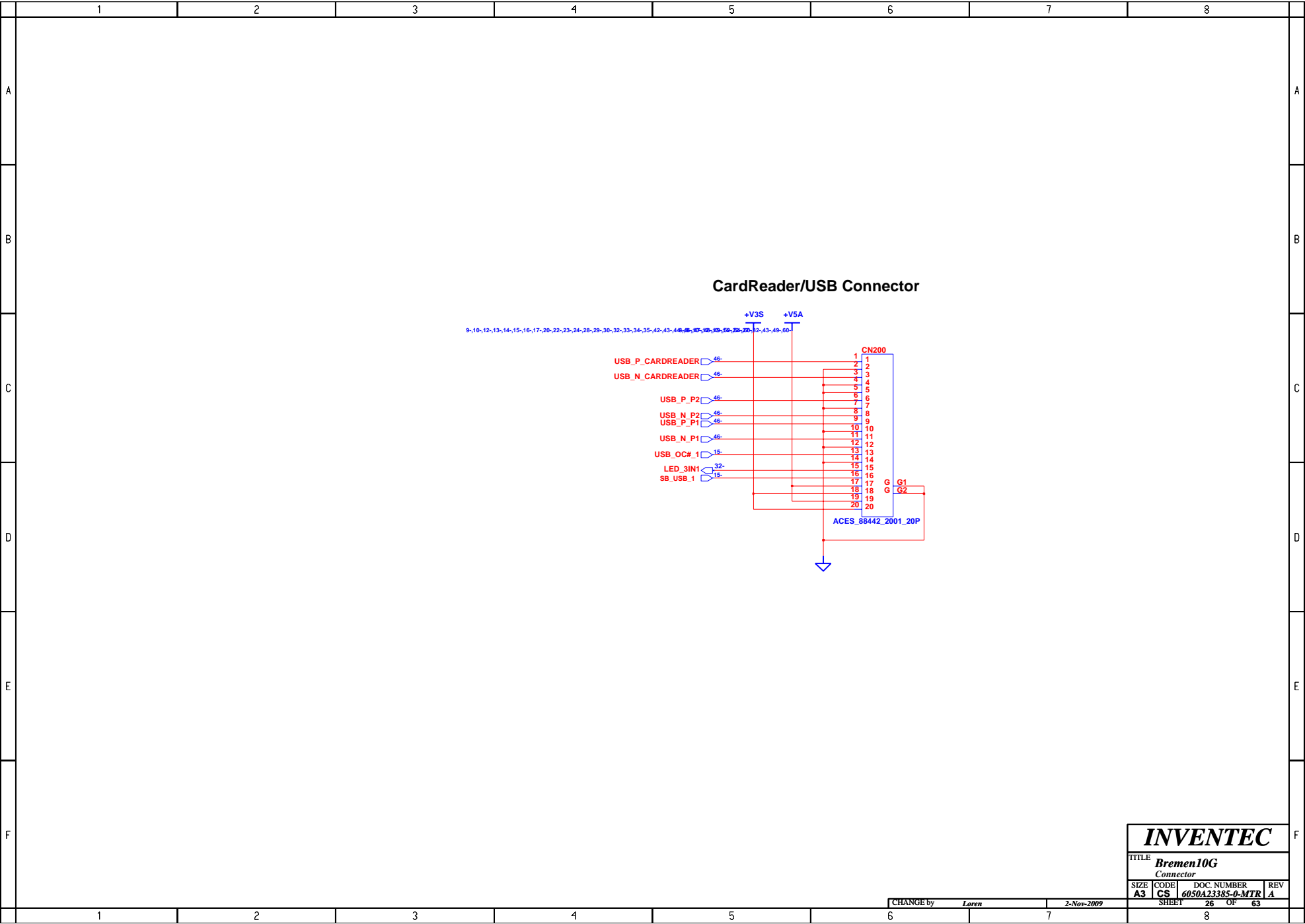
CHANGE by Loren 2-Nov-2009



INVENTEC			
TITLE Bremen10G HDMI			
SIZE A3	CODE CS	DOC. NUMBER 6050A23385-0-MTR	REV A
CHANGE by Loren		2-Nov-2009	
SHEET 24		OF 63	



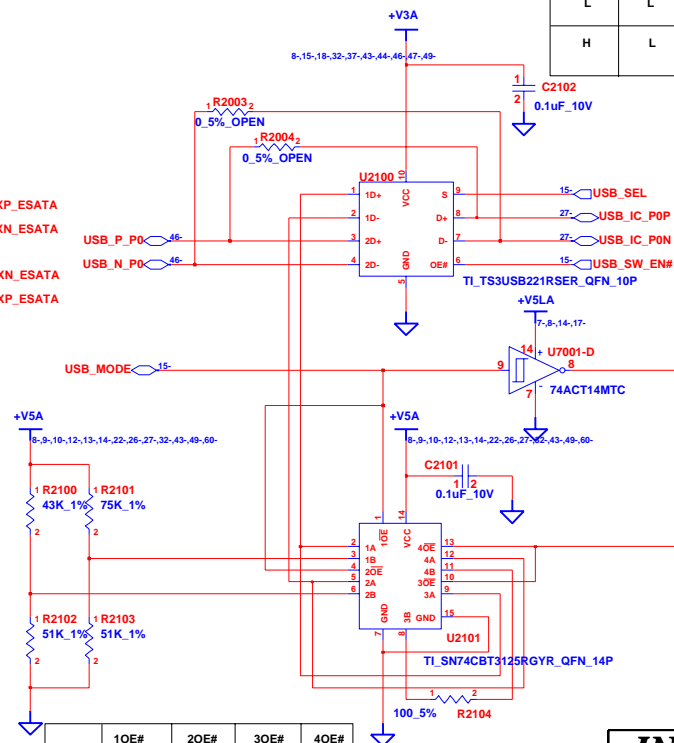
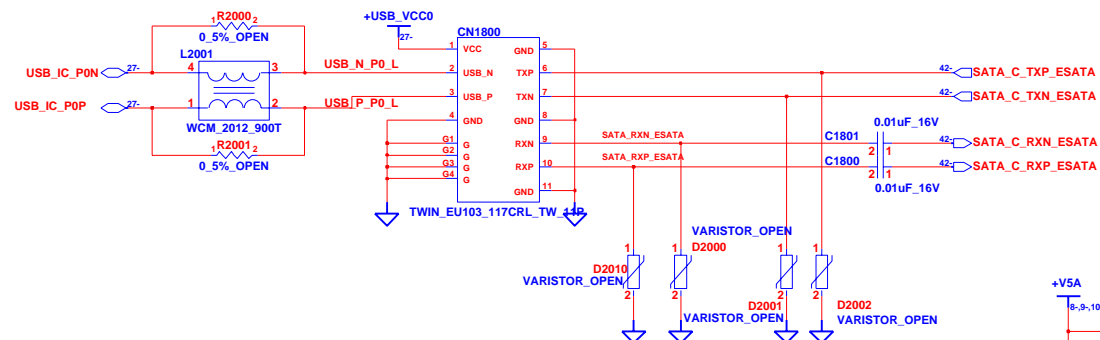
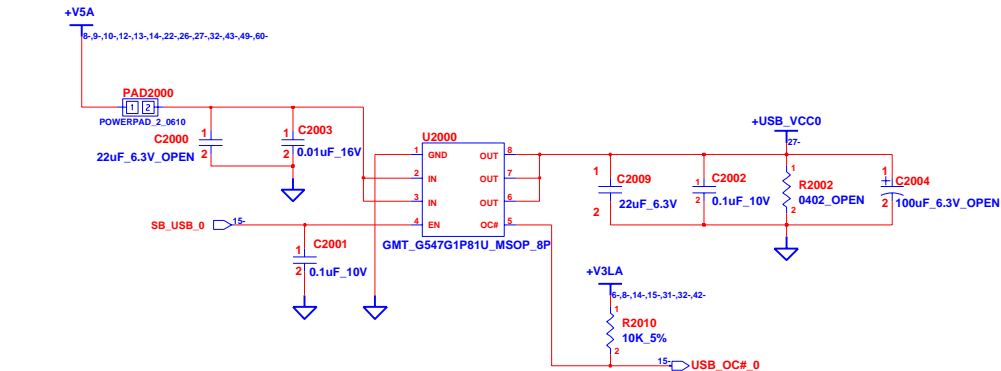




# USB/eSATA COMBO

EN	D0	D1	FUNCTION
0	X	X	STANDBY
1	0	0	DEFAULT
1	1	0	CH0->5DB
1	0	1	CH1->5DB
1	1	1	CH0,1->5DB

S	OE#	Function
X	H	Disconnect
L	L	D=1D
H	L	D=2D



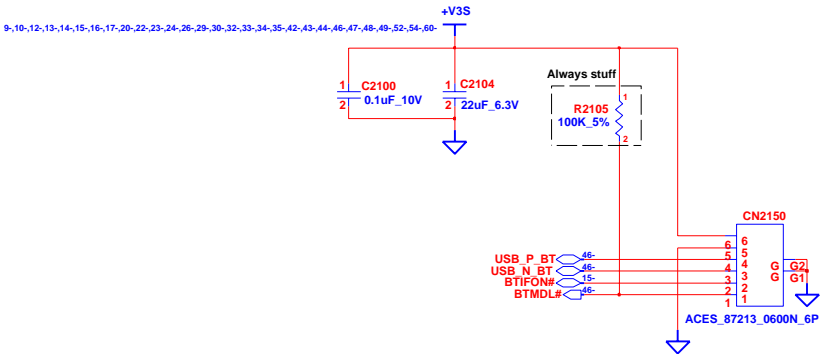
	1OE#	2OE#	3OE#	4OE#
Mode3	High	High	Low	Low
Mode4	Low	Low	High	High

**INVENTEC**

TITLE <b>Bremen10G</b> USB/eSATA combo			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
SHEET <b>27</b>		OF <b>63</b>	

CHANGE by **Loren** 2-Nov-2009

BLUEBOOTH

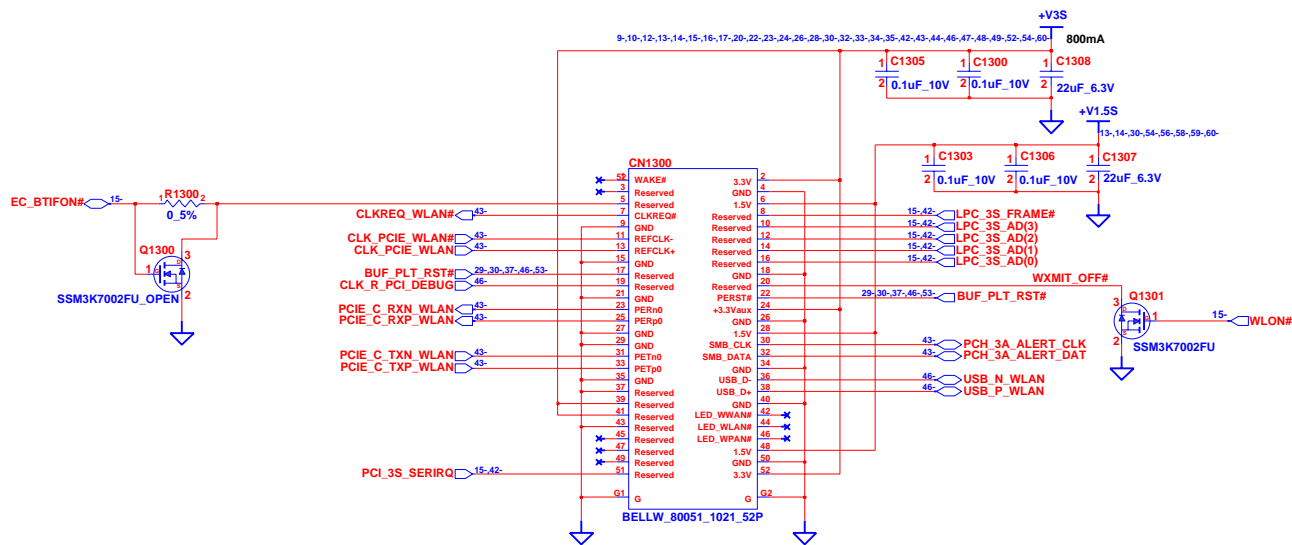


**INVENTEC**

TITLE			
Bremen10G			
BlueTooth			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A
SHEET		28	OF 63

CHANGE by Loren 2-Nov-2009

# Wireless & Debug card



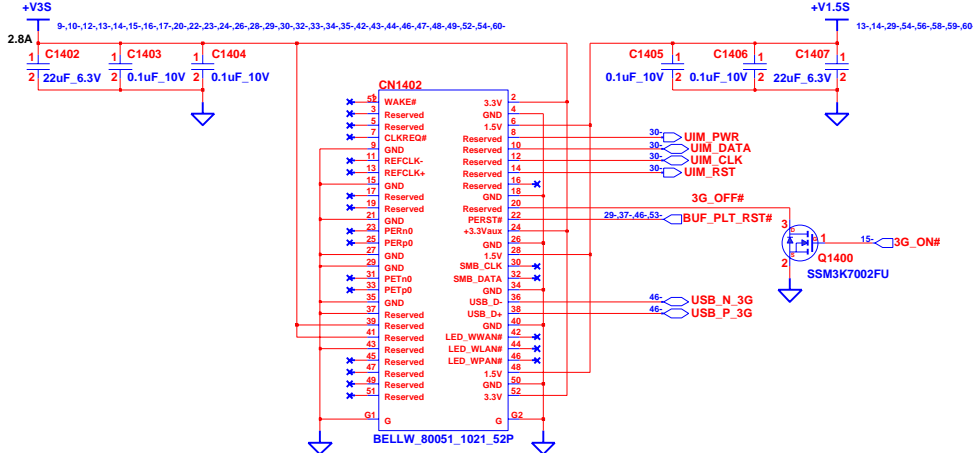
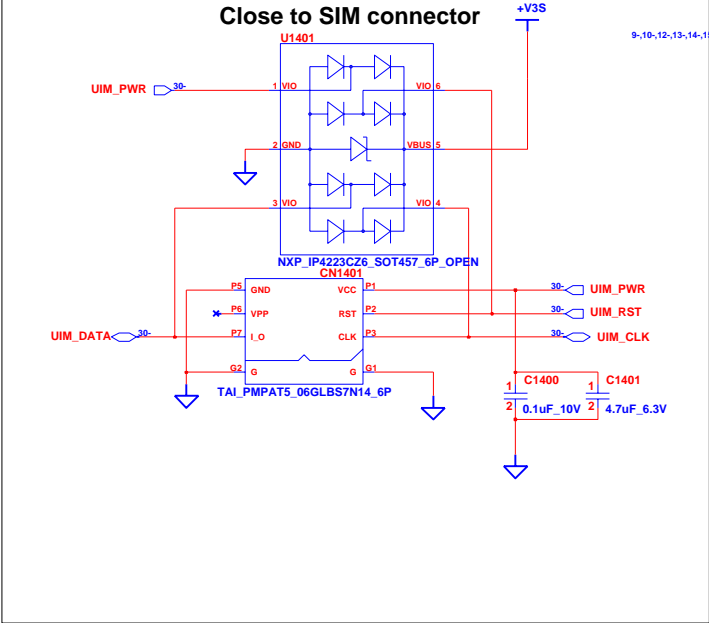
**INVENTEC**

TITLE			
Bremen10G			
WLAN			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A
SHEET		29	OF 63

CHANGE by Loren 2-Nov-2009

8

# 3G

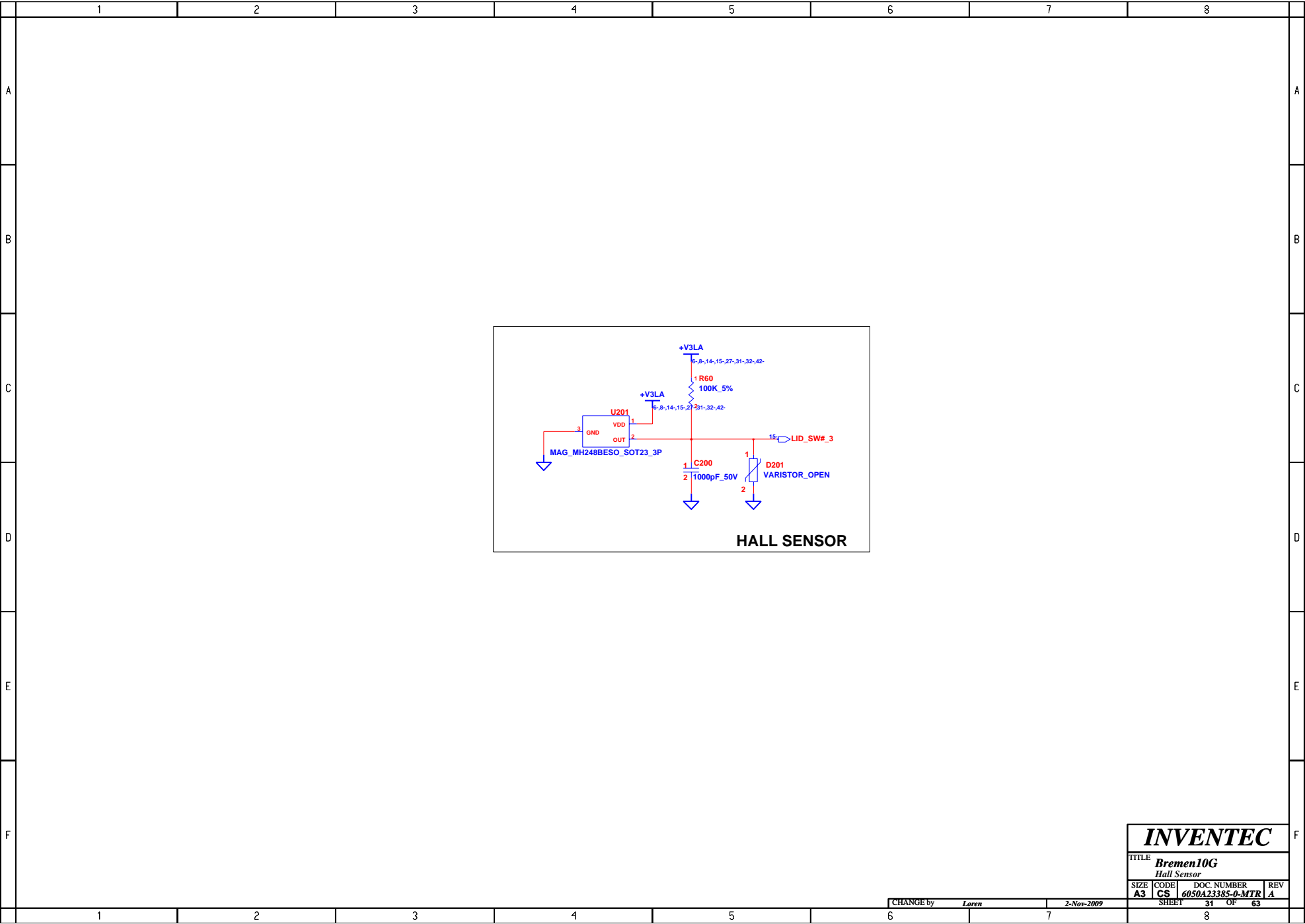
**INVENTEC**

TITLE	<b>Bremen10G 3G</b>
-------	-------------------------

SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
SHEET		30	OF 63

CHANGE by	Loren	2-Nov-2009
-----------	-------	------------

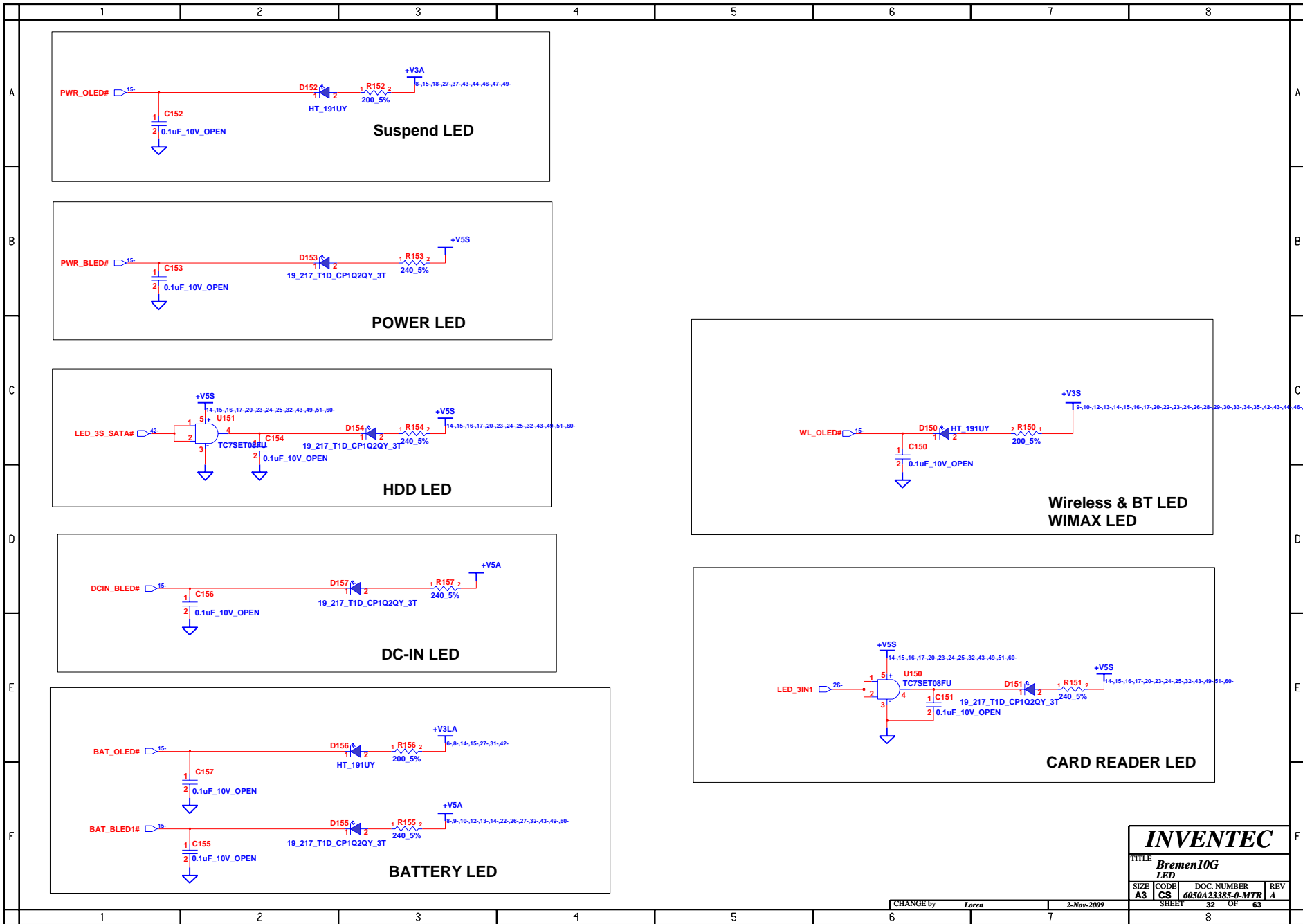
8



**INVENTEC**

TITLE  
**Bremen10G**  
Hall Sensor

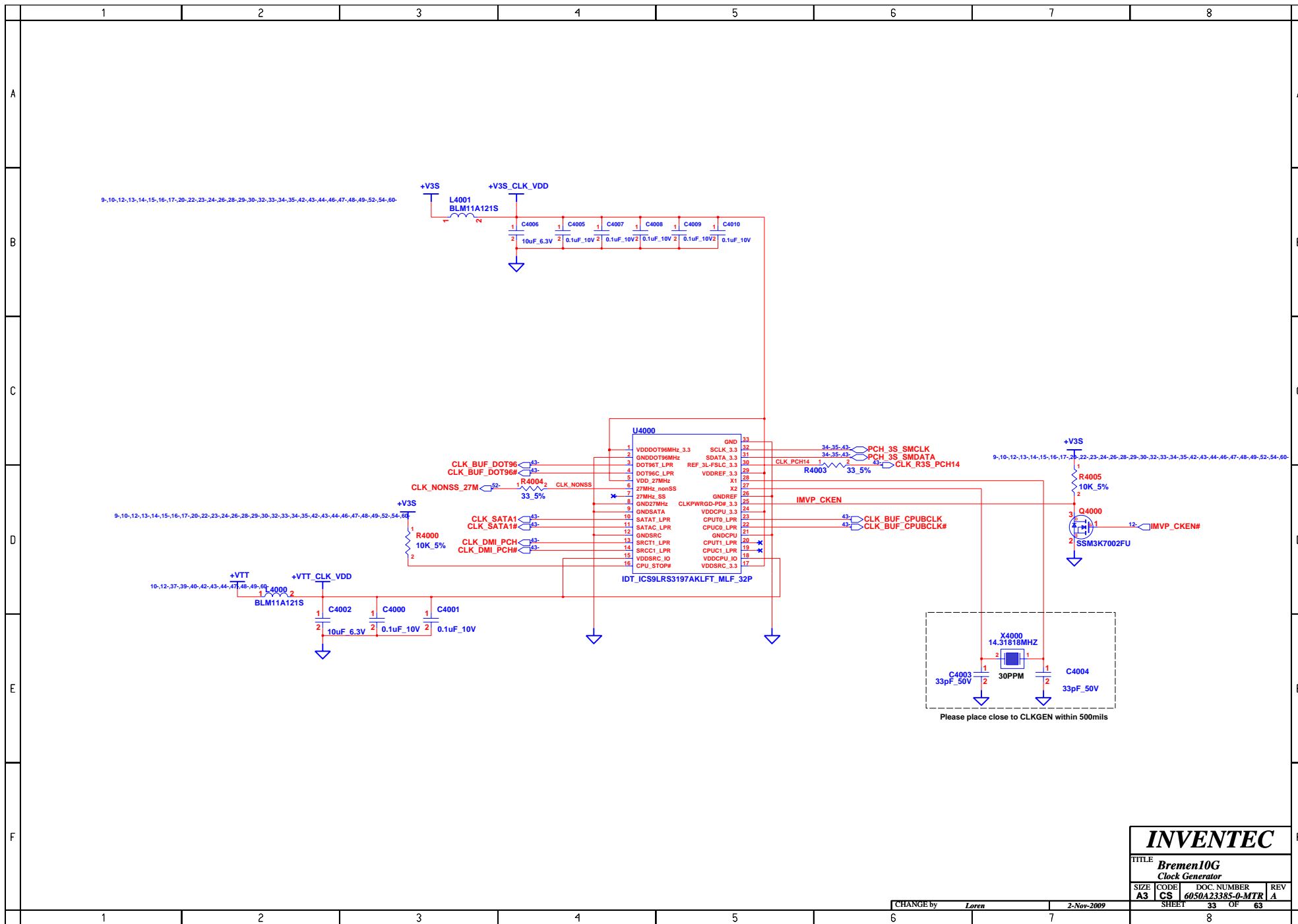
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A



INVENTEC			
TITLE Bremen10G LED			
SIZE A3	CODE CS	DOC. NUMBER 6050423385-0-MTR	REV A
SHEET 32		OF 63	

CHANGE by *Loren* 2-Nov-2009





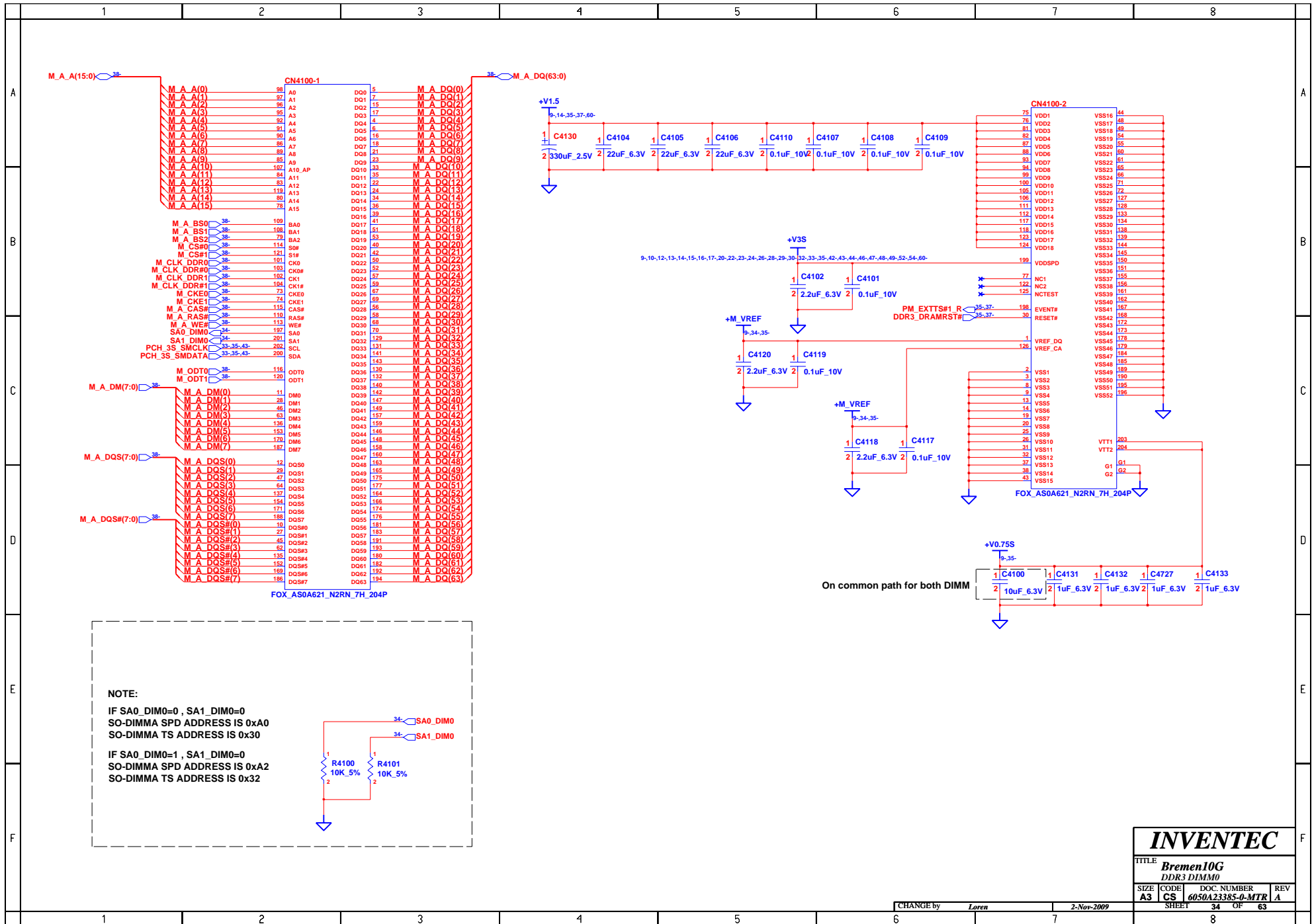
# INVENTEC

TITLE  
**Bremen10G**  
Clock Generator

SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A

CHANGE by *Loren* 2-Nov-2009

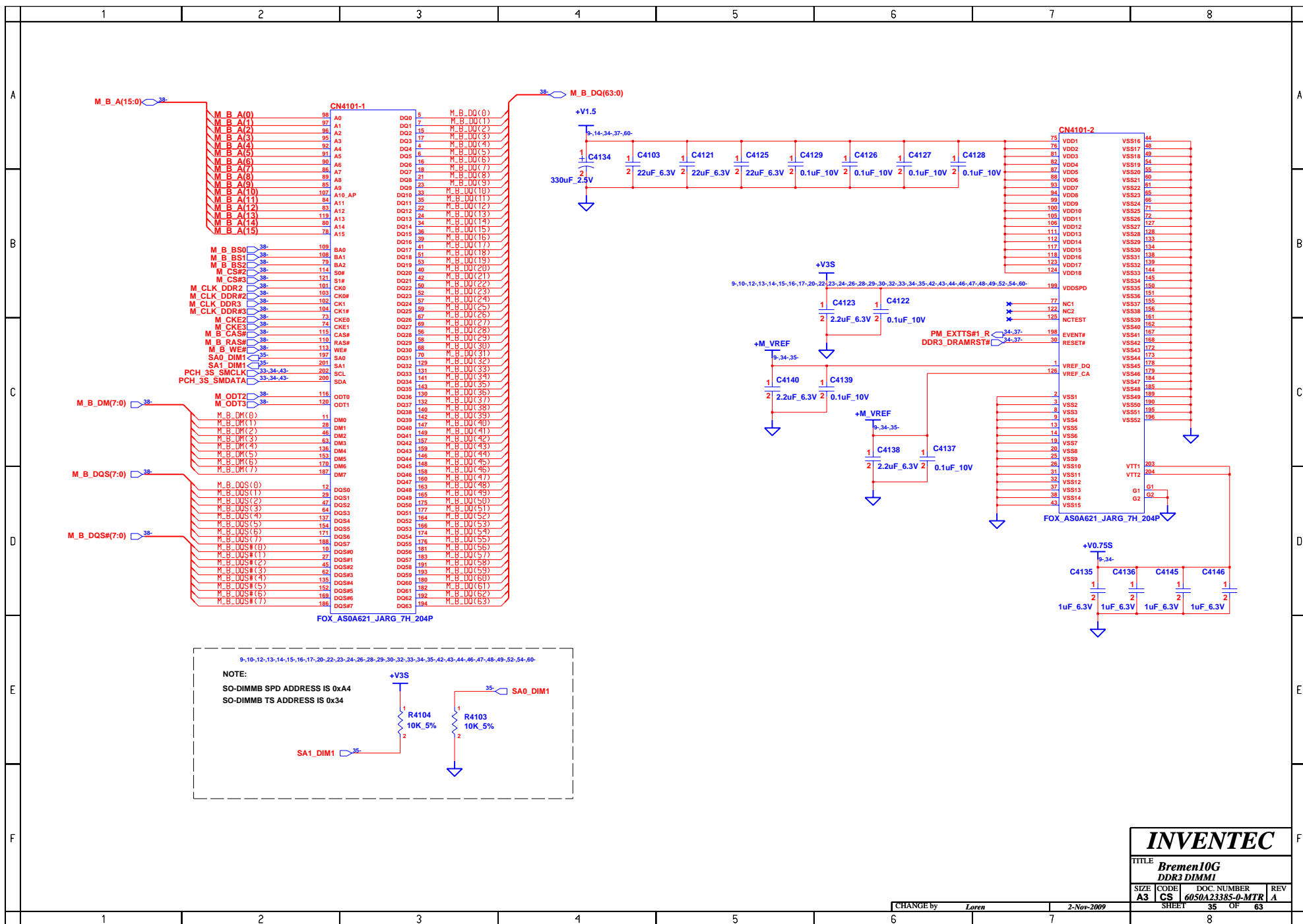
SHEET 33 OF 63



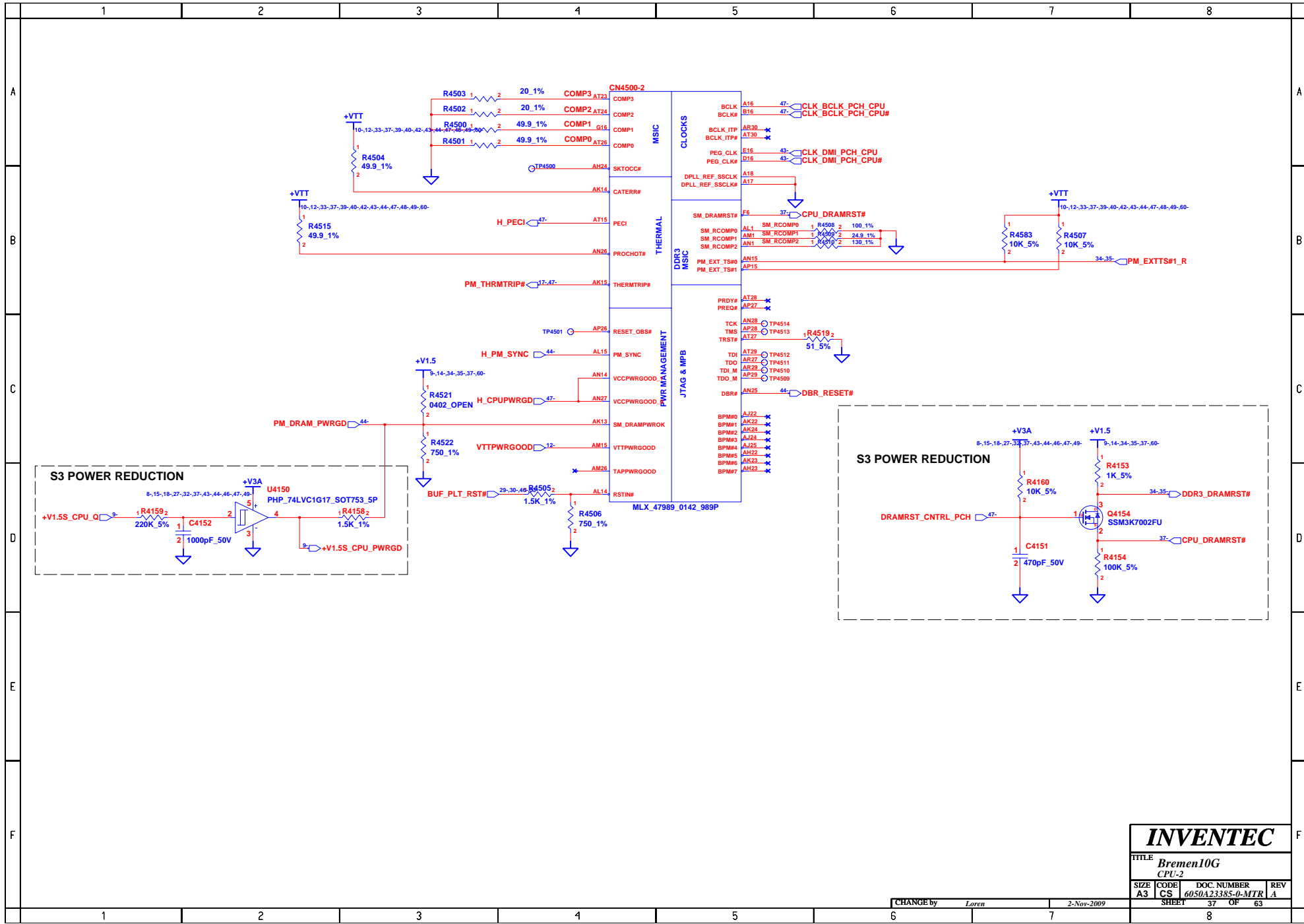
**INVENTEC**

TITLE <b>Bremen10G</b> DDR3 DIMM0			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
SHEET <b>34</b>		OF <b>63</b>	

CHANGE by **Loren** 2-Nov-2009







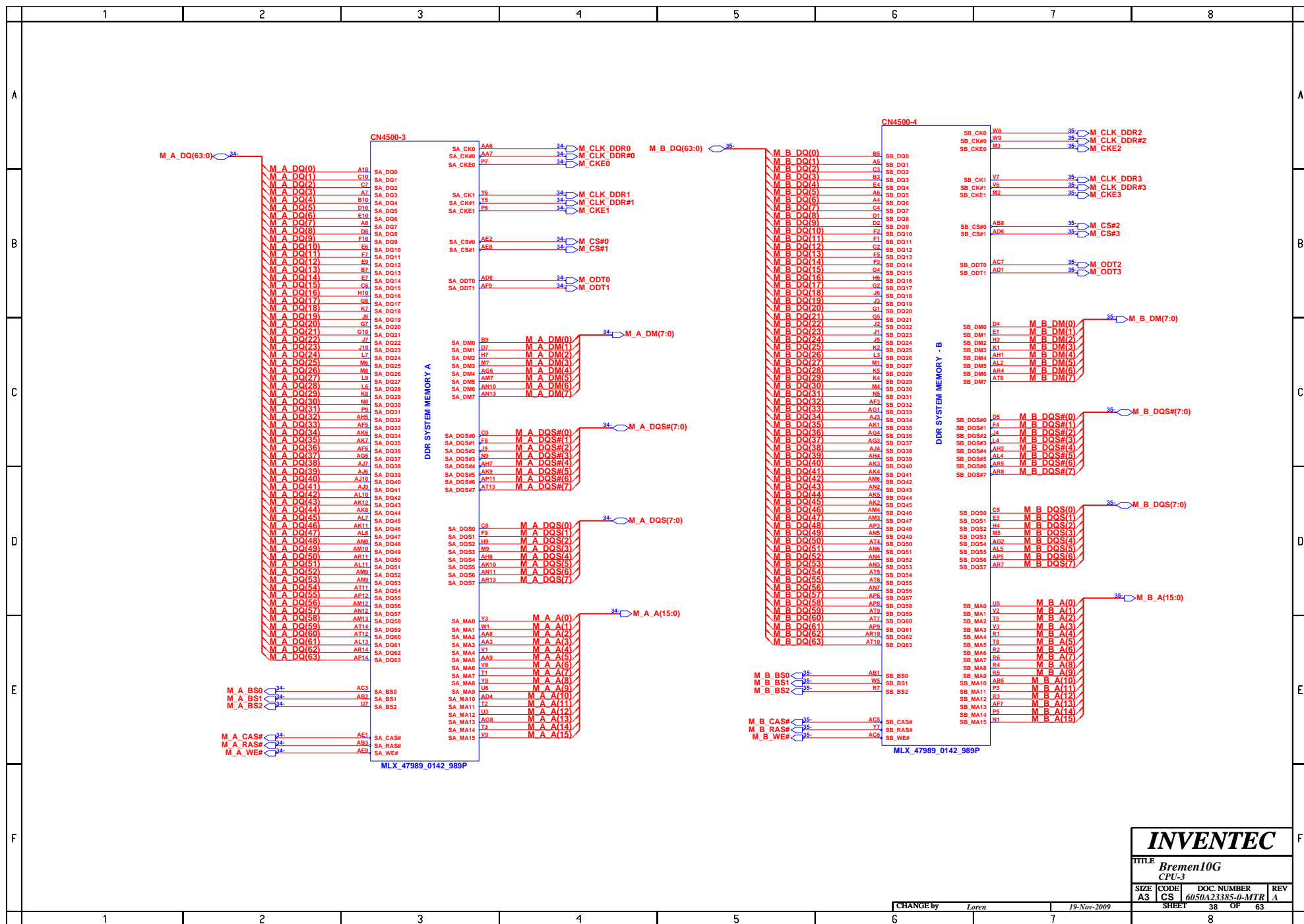
# INVENTEC

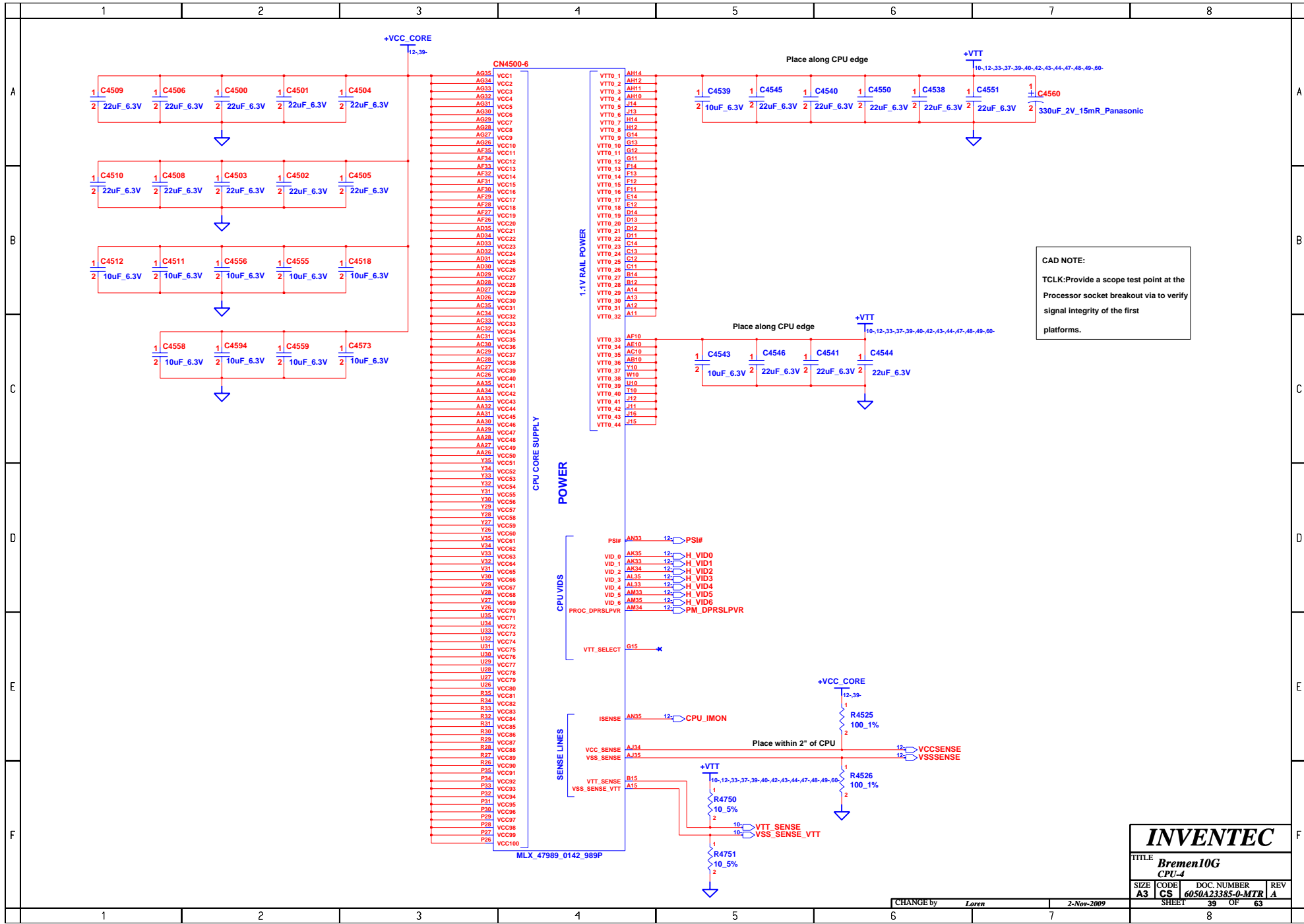
TITLE  
Bremen10G  
CPU-2

SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A

CHANGE by Loren 2-Nov-2009

SHEET 37 OF 63



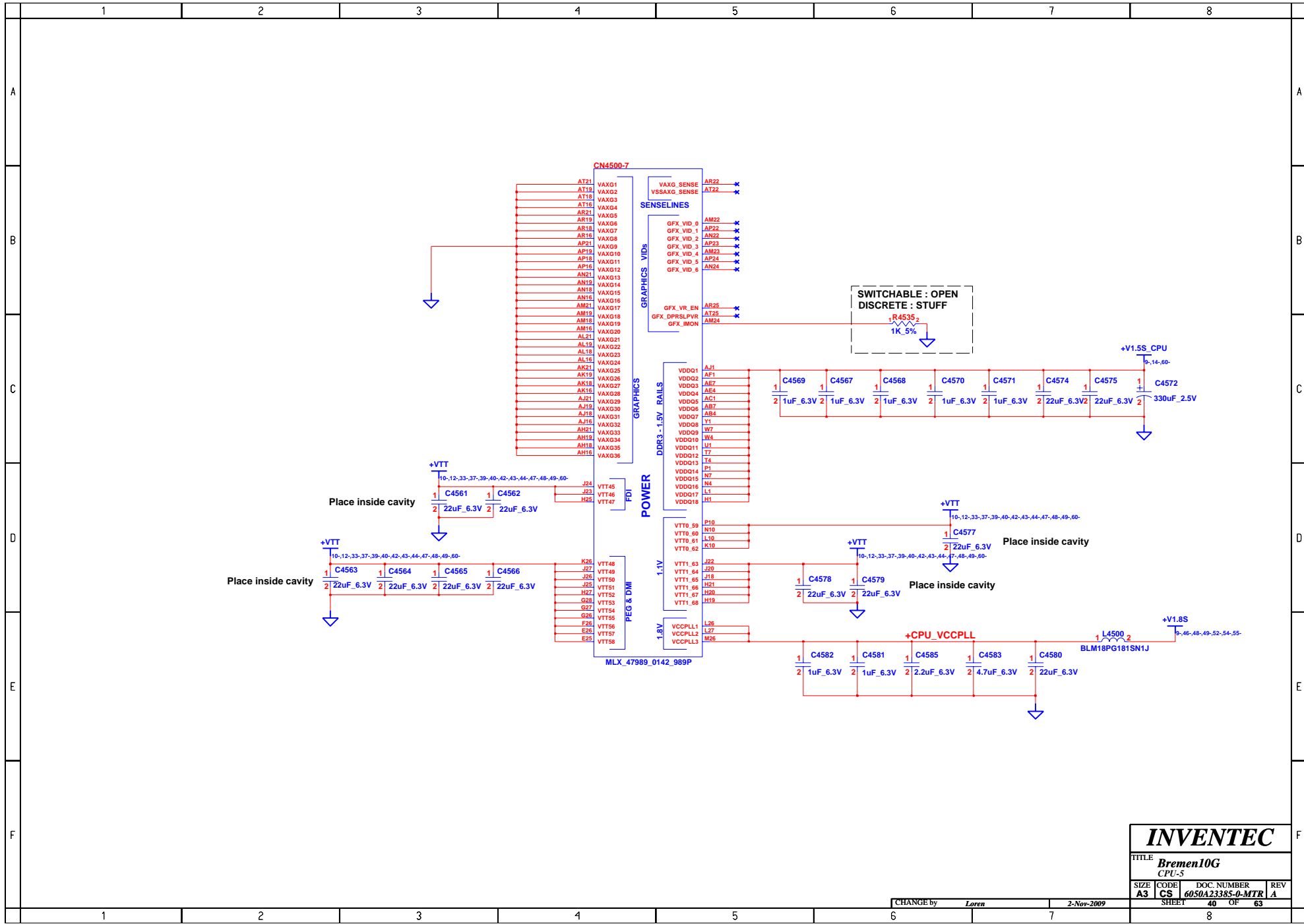


CAD NOTE:  
TCLK:Provide a scope test point at the Processor socket breakout via to verify signal integrity of the first platforms.

# INVENTEC

TITLE <b>Bremen10G CPU-4</b>			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
SHEET <b>39</b>		OF <b>63</b>	

CHANGE by *Loren* 2-Nov-2009

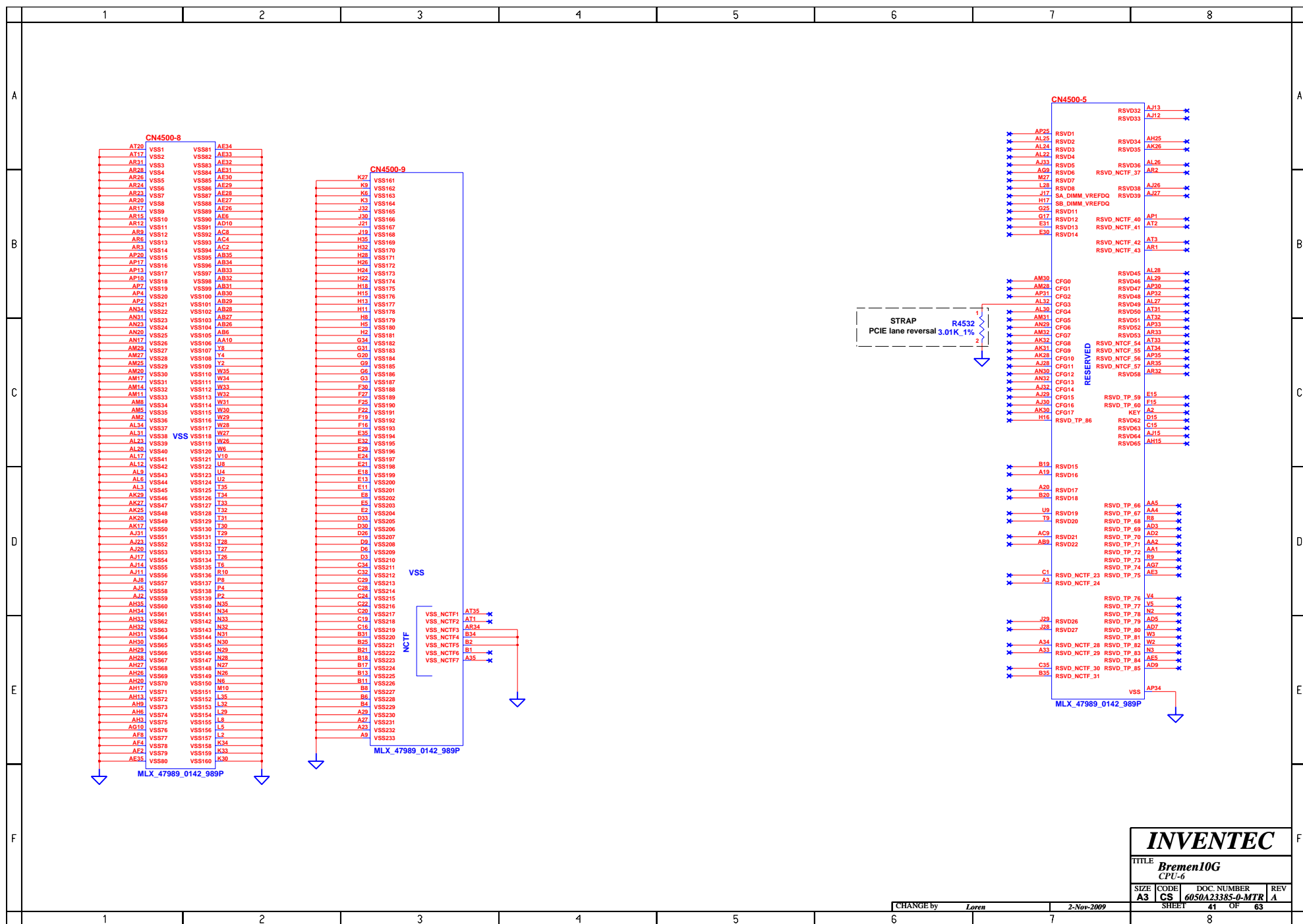


**INVENTEC**

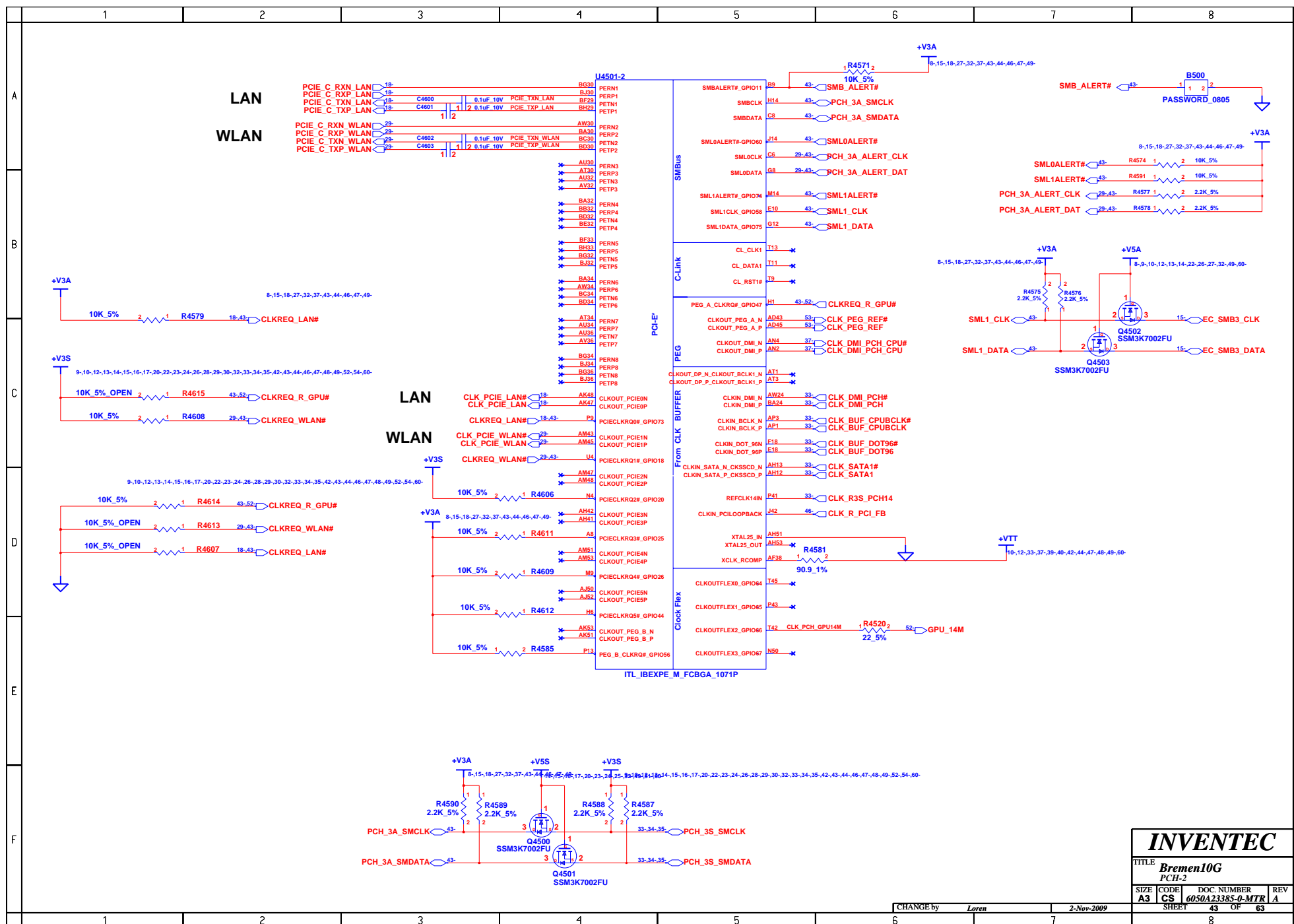
TITLE <b>Bremen10G</b> CPU-5			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
SHEET <b>40</b>		OF <b>63</b>	

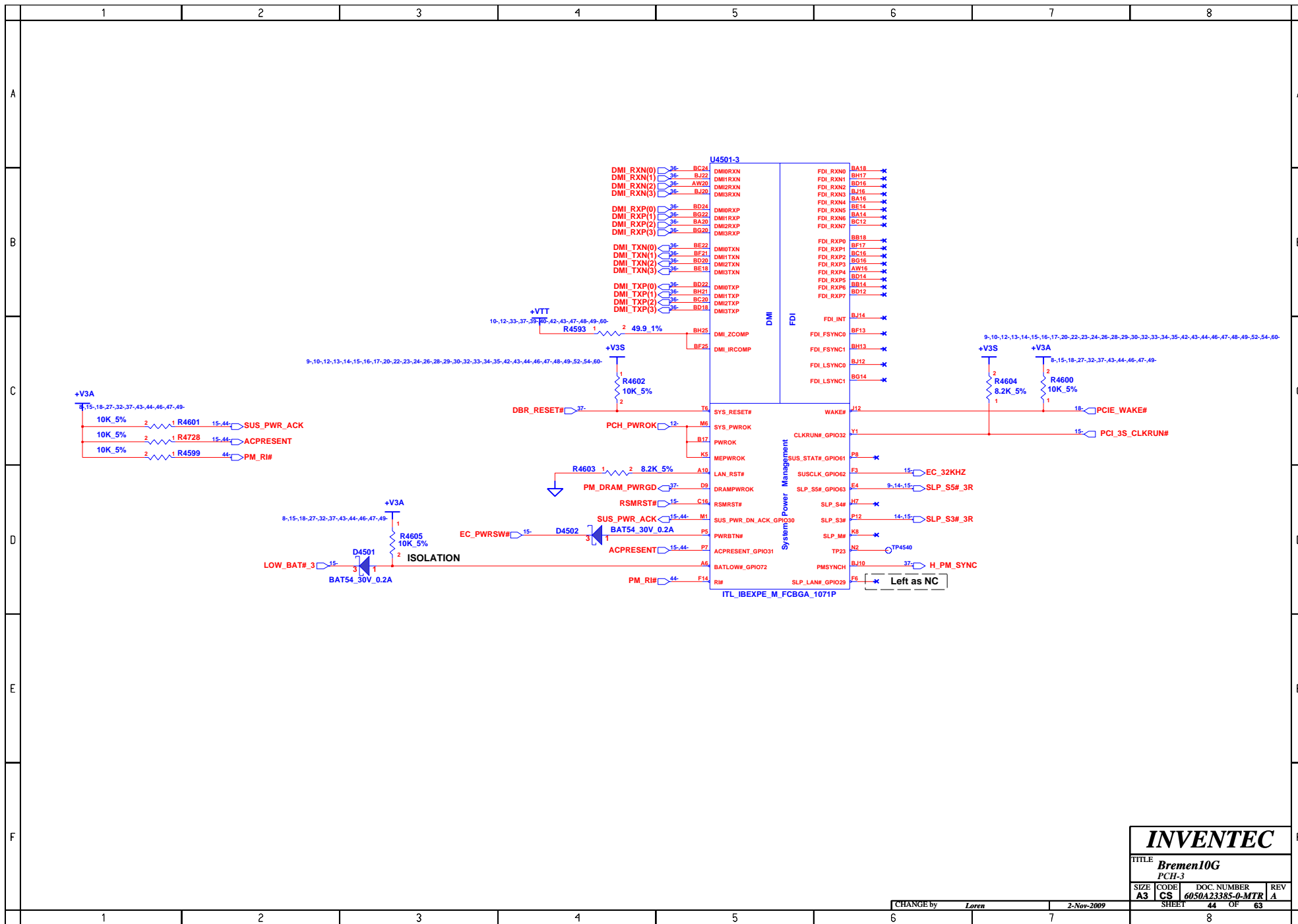
CHANGE by *Loren* 2-Nov-2009

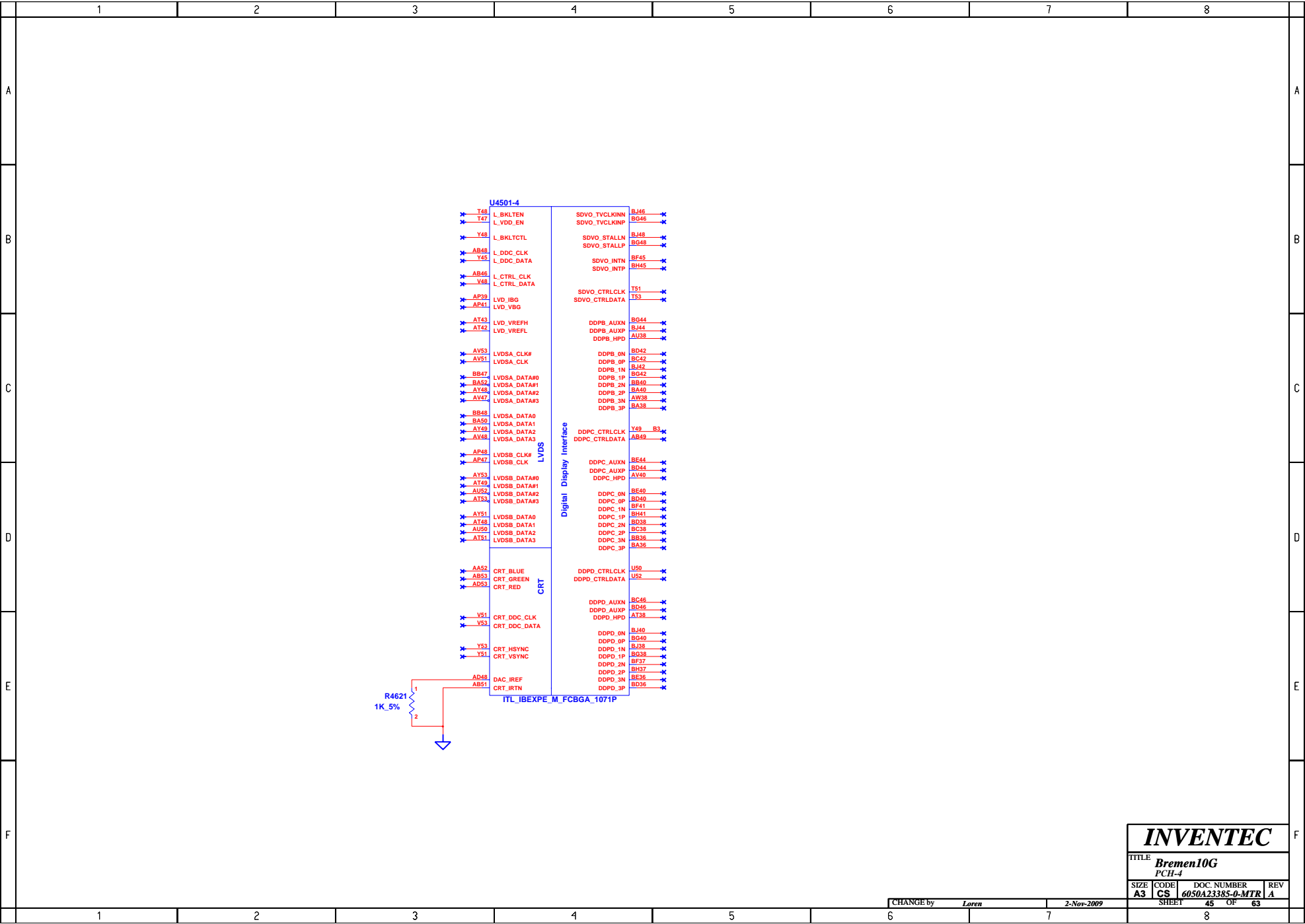


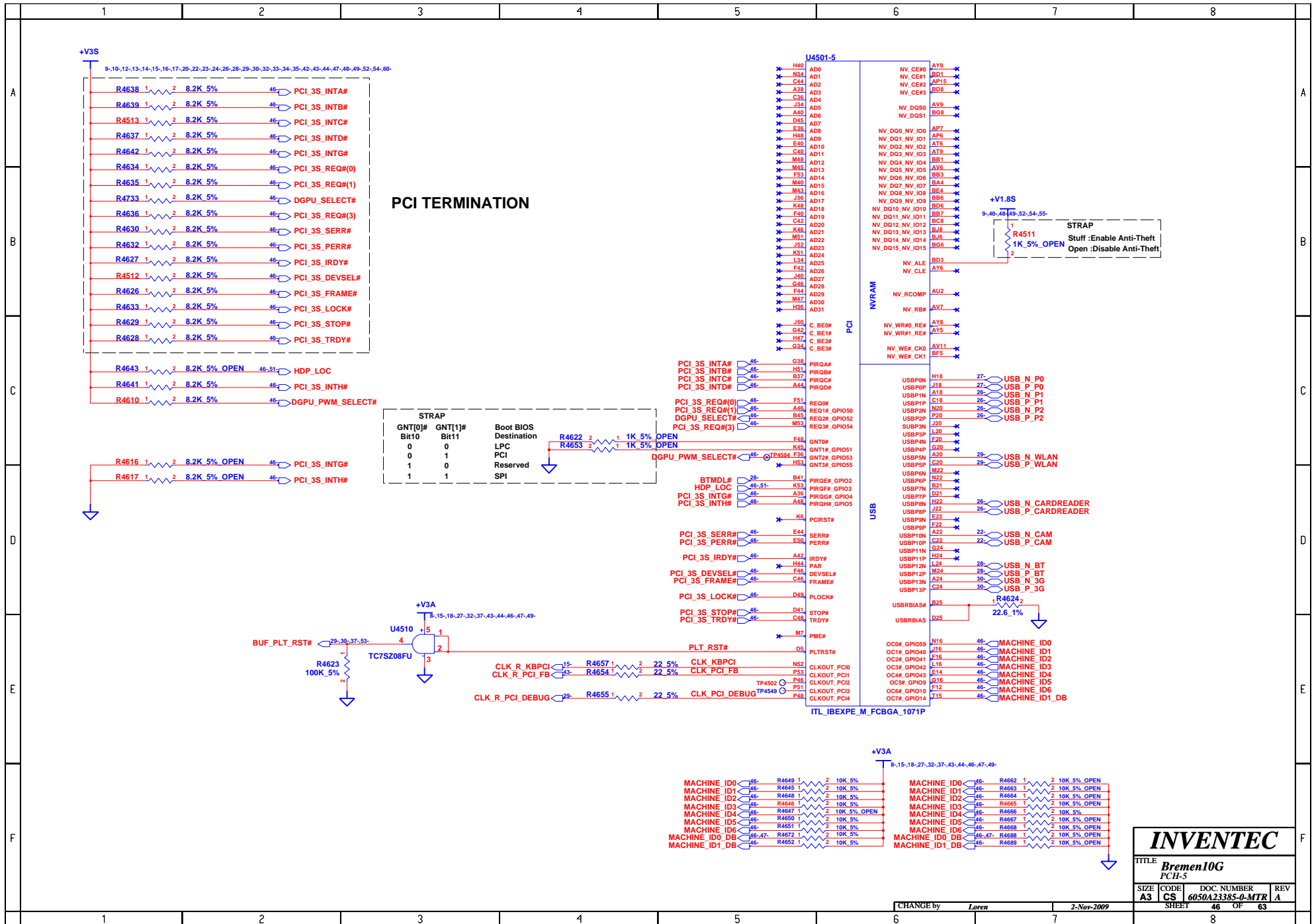


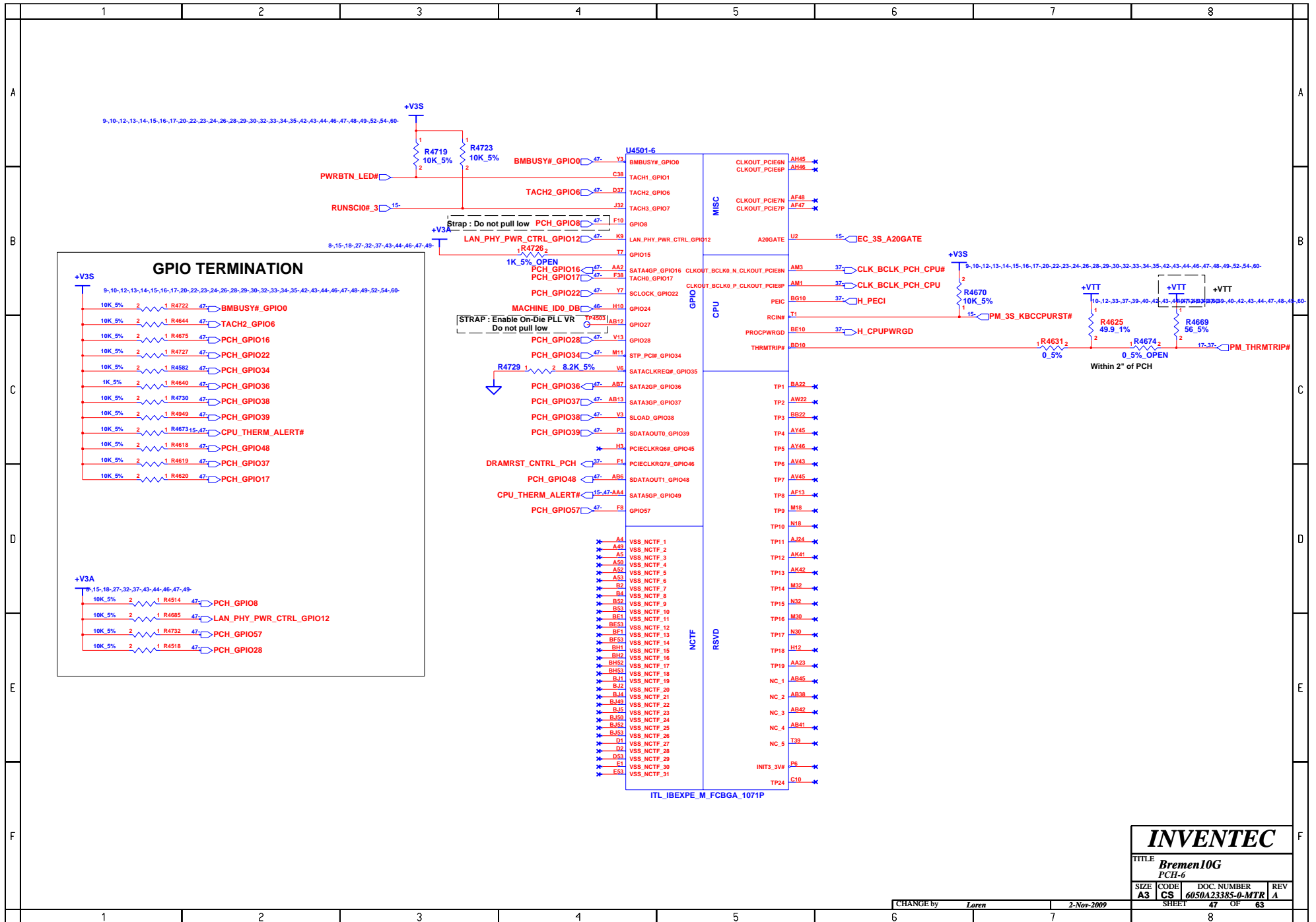


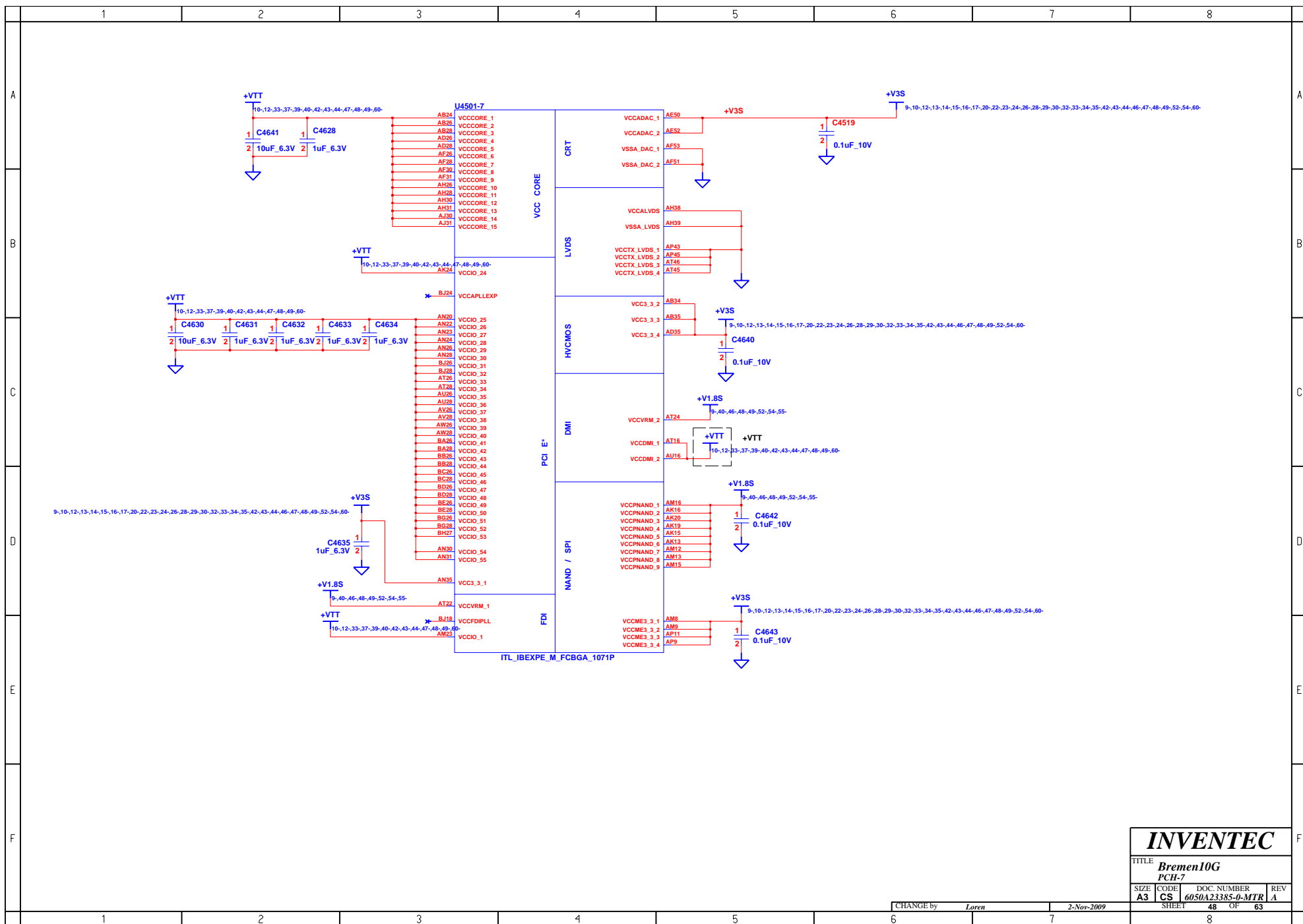




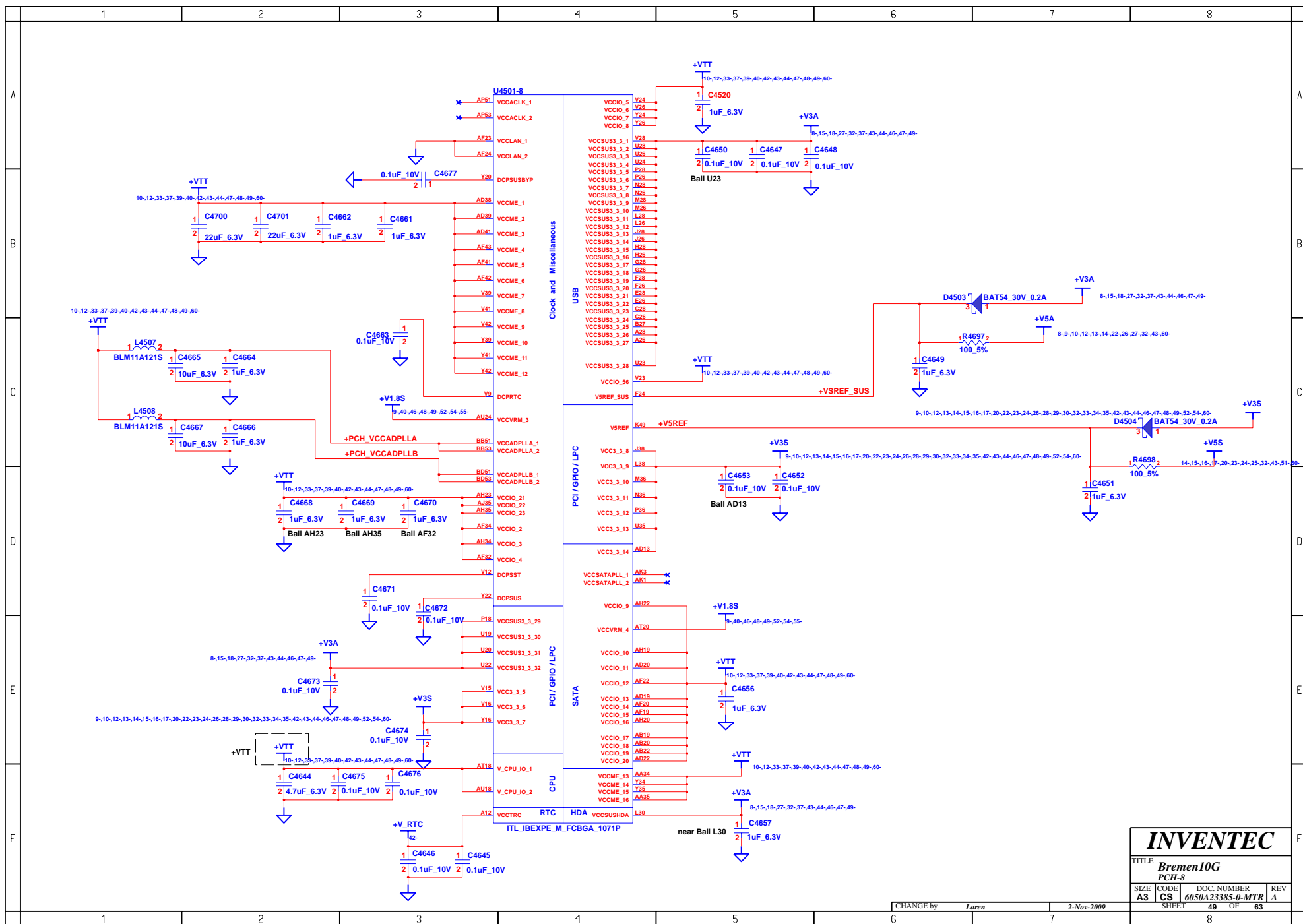












**U4501-9**

AB16 VSS\_0

AA19 VSS\_1

AA20 VSS\_2

AA22 VSS\_3

AM19 VSS\_4

AA24 VSS\_5

AA26 VSS\_6

AA28 VSS\_7

AA30 VSS\_8

AA31 VSS\_9

AA32 VSS\_10

AB11 VSS\_11

AB15 VSS\_12

AB23 VSS\_13

AB30 VSS\_14

AB31 VSS\_15

AB32 VSS\_16

AB33 VSS\_17

AB34 VSS\_18

AB35 VSS\_19

AB36 VSS\_20

AB37 VSS\_21

AB38 VSS\_22

AC52 VSS\_23

AD11 VSS\_24

AD12 VSS\_25

AD16 VSS\_26

AD22 VSS\_27

AD30 VSS\_28

AD31 VSS\_29

AD32 VSS\_30

AD34 VSS\_31

AU22 VSS\_32

AD42 VSS\_33

AD48 VSS\_34

AD49 VSS\_35

AD7 VSS\_36

AE2 VSS\_37

AE4 VSS\_38

AF12 VSS\_39

Y13 VSS\_40

AH49 VSS\_41

AU4 VSS\_42

AF35 VSS\_43

AP13 VSS\_44

AN24 VSS\_45

AF45 VSS\_46

AF46 VSS\_47

AF49 VSS\_48

AF5 VSS\_49

AF8 VSS\_50

AQ2 VSS\_51

AQ52 VSS\_52

AH11 VSS\_53

AH15 VSS\_54

AH16 VSS\_55

AH24 VSS\_56

AH32 VSS\_57

AV18 VSS\_58

AH43 VSS\_59

AH7 VSS\_60

AJ19 VSS\_61

AJ2 VSS\_62

AJ2 VSS\_63

AJ20 VSS\_64

AJ22 VSS\_65

AJ23 VSS\_66

AJ26 VSS\_67

AJ28 VSS\_68

AJ32 VSS\_69

AJ34 VSS\_70

AT5 VSS\_71

AJ4 VSS\_72

AK12 VSS\_73

AM41 VSS\_74

AM19 VSS\_75

AK26 VSS\_76

AK22 VSS\_77

AK23 VSS\_78

AK28 VSS\_79

AK30 VSS\_80

AK31 VSS\_81

AK32 VSS\_82

AK34 VSS\_83

AK35 VSS\_84

AK38 VSS\_85

AK43 VSS\_86

AK46 VSS\_87

AK49 VSS\_88

AK5 VSS\_89

AL2 VSS\_90

AL2 VSS\_91

AL52 VSS\_92

AM11 VSS\_93

AD24 VSS\_94

AM20 VSS\_95

AM22 VSS\_96

AM24 VSS\_97

AM26 VSS\_98

AM28 VSS\_99

BA42 VSS\_100

AM30 VSS\_101

AM31 VSS\_102

AM32 VSS\_103

AM34 VSS\_104

AM35 VSS\_105

AM38 VSS\_106

AM39 VSS\_107

AM42 VSS\_108

AU20 VSS\_109

AM46 VSS\_110

AV22 VSS\_111

AM49 VSS\_112

AM7 VSS\_113

AA50 VSS\_114

BB10 VSS\_115

AN32 VSS\_116

AN50 VSS\_117

AN52 VSS\_118

AP12 VSS\_119

AP12 VSS\_120

AP42 VSS\_121

AP46 VSS\_122

AP49 VSS\_123

AP5 VSS\_124

AP9 VSS\_125

AR2 VSS\_126

AR52 VSS\_127

AT11 VSS\_128

BA12 VSS\_129

AM48 VSS\_130

AT32 VSS\_131

AT36 VSS\_132

AT41 VSS\_133

AT47 VSS\_134

AT7 VSS\_135

AV12 VSS\_136

AV16 VSS\_137

AV20 VSS\_138

AV24 VSS\_139

AV30 VSS\_140

AV34 VSS\_141

AV38 VSS\_142

AV42 VSS\_143

AV46 VSS\_144

AV49 VSS\_145

AV5 VSS\_146

AV8 VSS\_147

AW14 VSS\_148

AW18 VSS\_149

AW2 VSS\_150

BF9 VSS\_151

AW32 VSS\_152

AW36 VSS\_153

AW40 VSS\_154

AW52 VSS\_155

AY11 VSS\_156

AY43 VSS\_157

AY47 VSS\_158

ITL\_IBEXPE\_M\_FCBGA\_1071P

**U4501-10**

AY7 VSS\_159

B11 VSS\_160

B15 VSS\_161

B19 VSS\_162

B23 VSS\_163

B24 VSS\_164

B25 VSS\_165

B26 VSS\_166

B27 VSS\_167

B28 VSS\_168

B29 VSS\_169

B30 VSS\_170

B31 VSS\_171

B32 VSS\_172

B33 VSS\_173

B34 VSS\_174

B35 VSS\_175

B36 VSS\_176

B37 VSS\_177

B38 VSS\_178

B39 VSS\_179

B40 VSS\_180

B41 VSS\_181

B42 VSS\_182

B43 VSS\_183

B44 VSS\_184

B45 VSS\_185

B46 VSS\_186

B47 VSS\_187

B48 VSS\_188

B49 VSS\_189

B50 VSS\_190

B51 VSS\_191

B52 VSS\_192

B53 VSS\_193

B54 VSS\_194

BE14 VSS\_195

BE15 VSS\_196

BE20 VSS\_197

BE24 VSS\_198

BE30 VSS\_199

BE34 VSS\_200

BE38 VSS\_201

BE42 VSS\_202

BE46 VSS\_203

BE48 VSS\_204

BE50 VSS\_205

BE56 VSS\_206

BE58 VSS\_207

BF3 VSS\_208

BF49 VSS\_209

BF51 VSS\_210

BG18 VSS\_211

BG24 VSS\_212

BG4 VSS\_213

BG59 VSS\_214

BH11 VSS\_215

BH15 VSS\_216

BH19 VSS\_217

BH24 VSS\_218

BH31 VSS\_219

BH35 VSS\_220

BH39 VSS\_221

BH43 VSS\_222

BH47 VSS\_223

BH7 VSS\_224

C12 VSS\_225

C50 VSS\_226

D51 VSS\_227

E12 VSS\_228

E16 VSS\_229

E20 VSS\_230

E24 VSS\_231

E30 VSS\_232

E34 VSS\_233

E38 VSS\_234

E42 VSS\_235

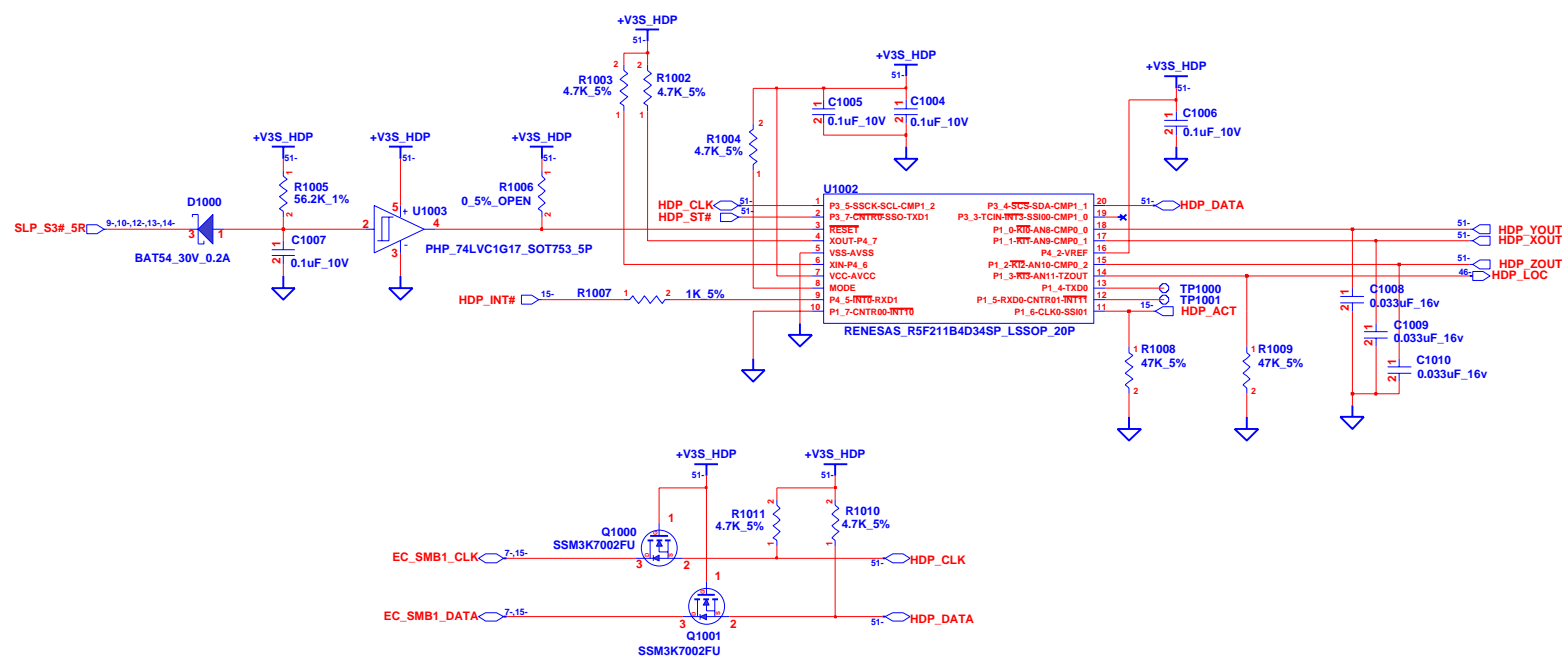
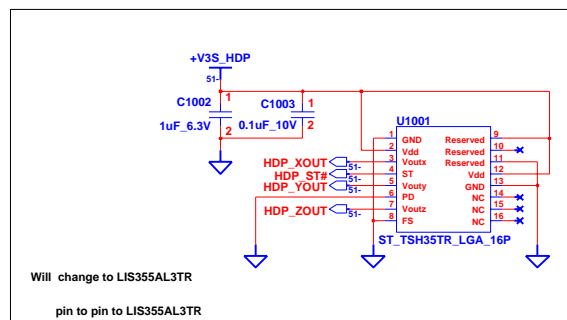
E46 VSS\_236

E49 VSS\_237

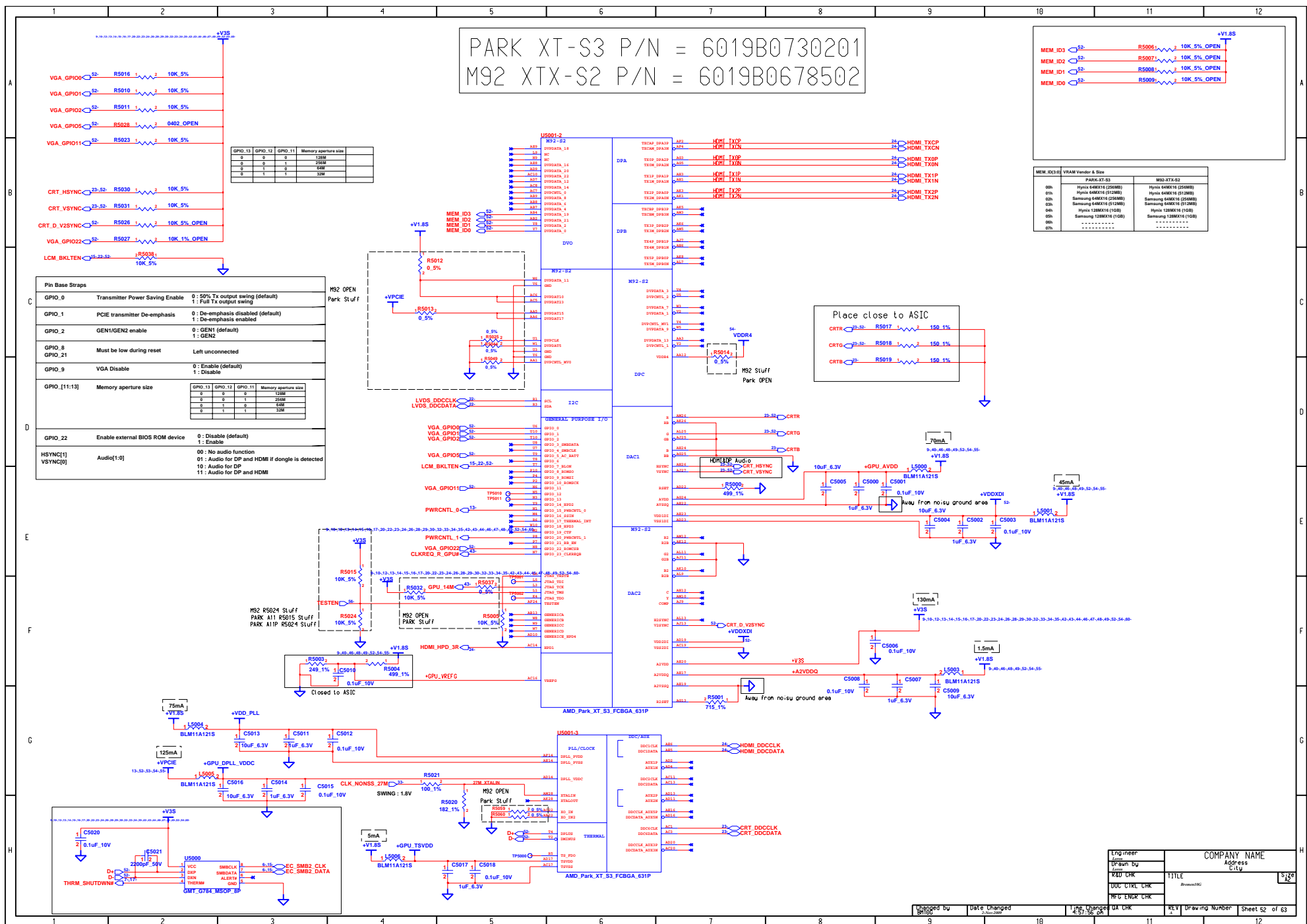
E5 VSS\_238

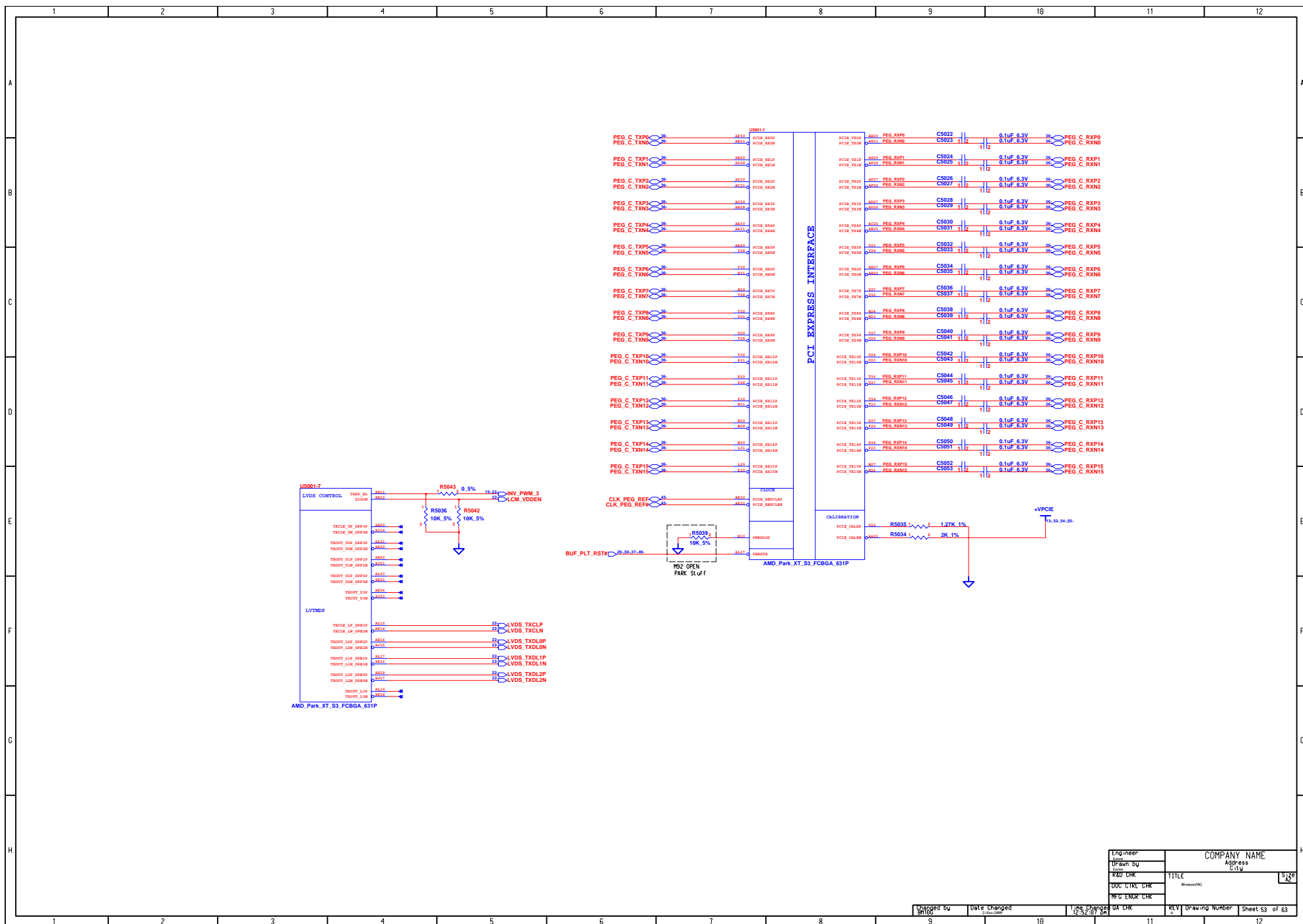
E9 VSS\_239

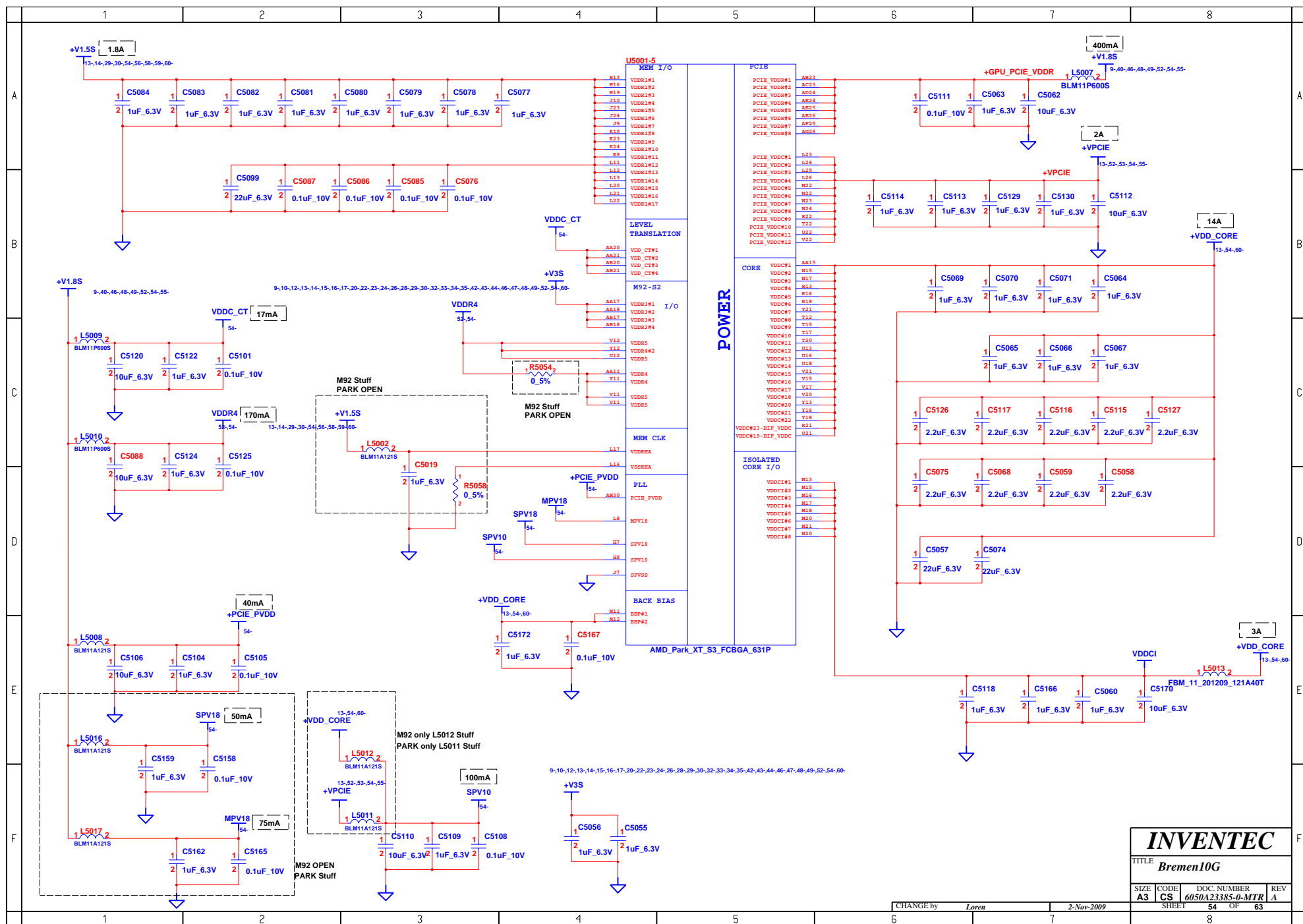
F49 VSS

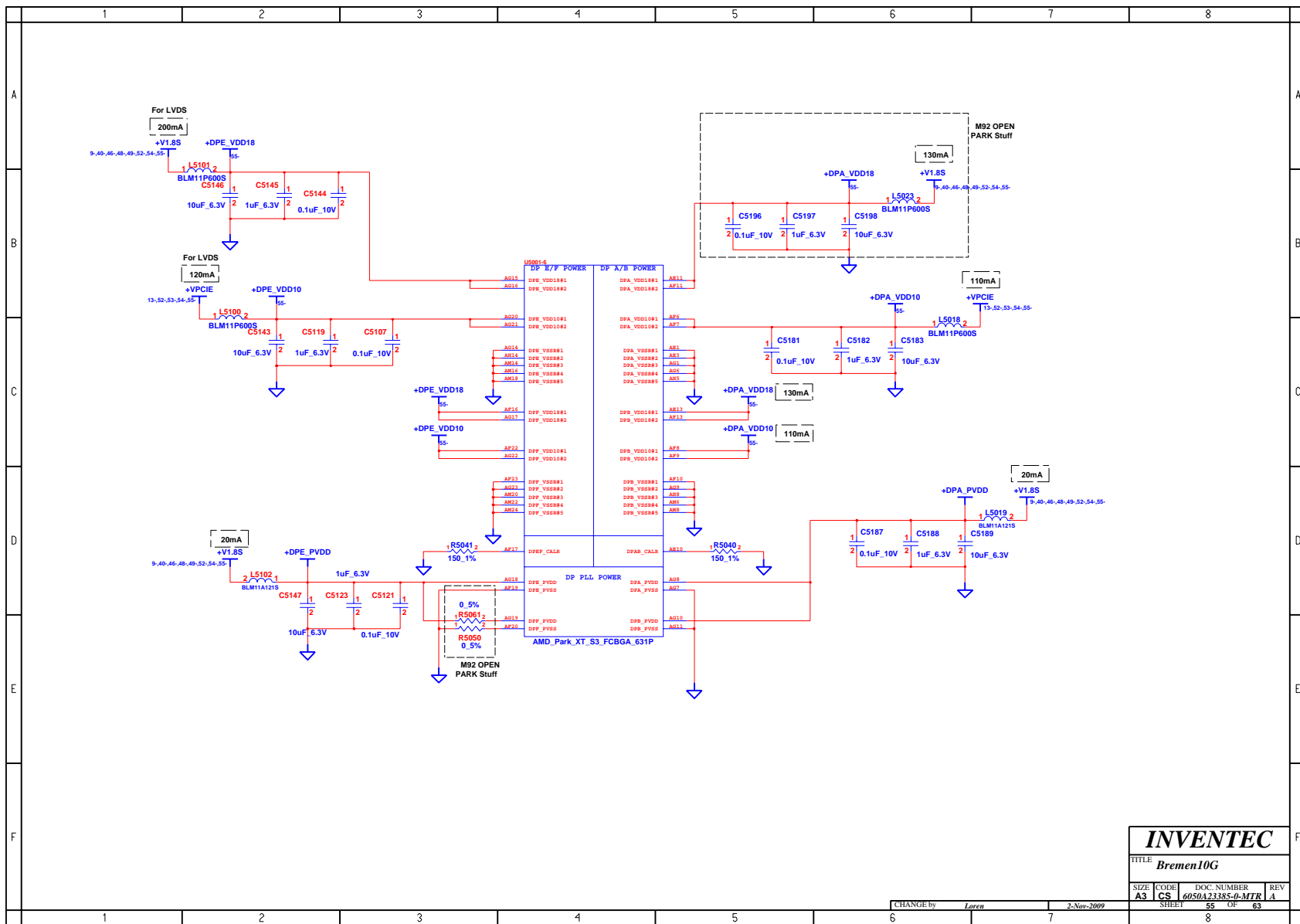


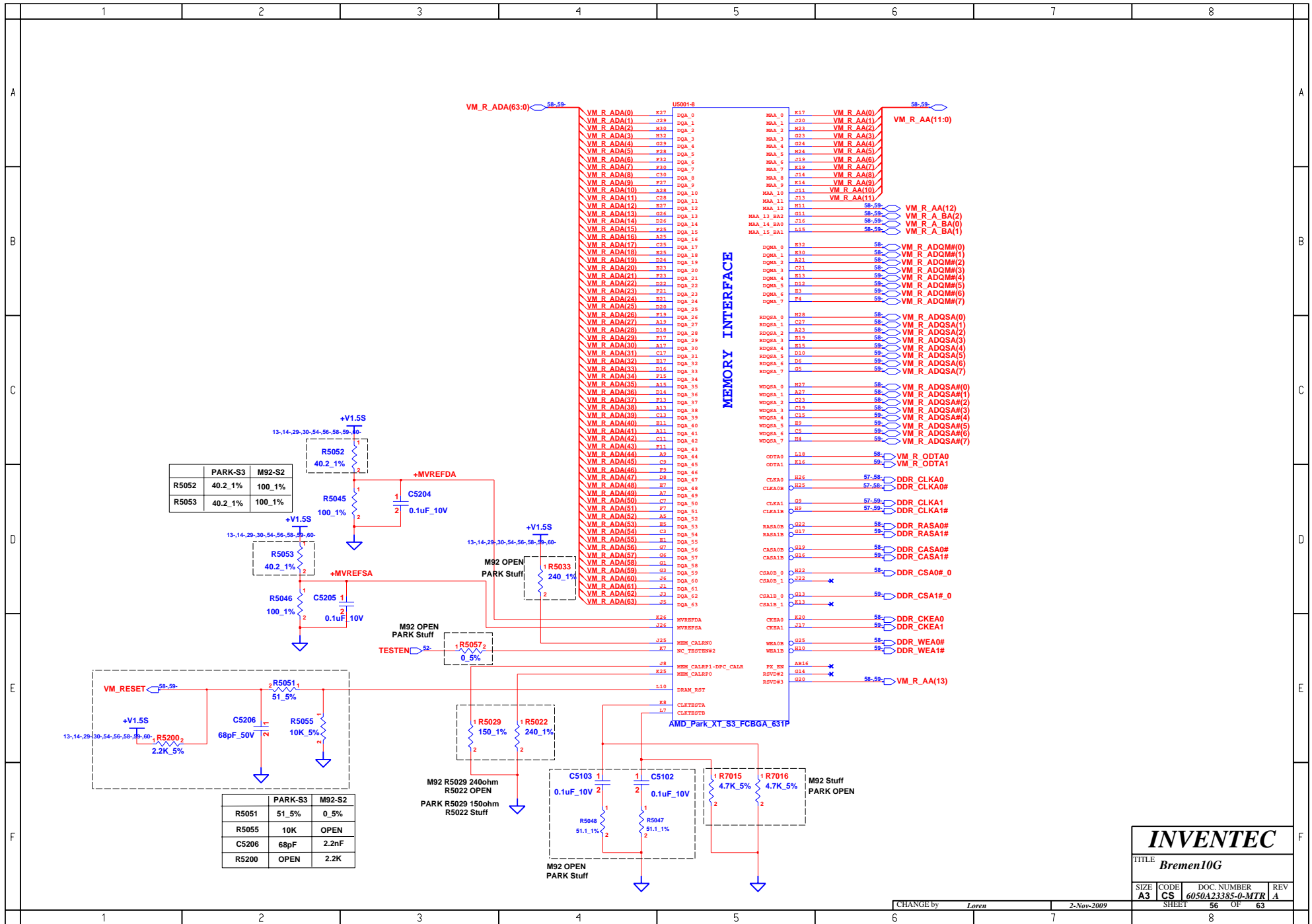
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER	REV
SHEET		51	OF 63



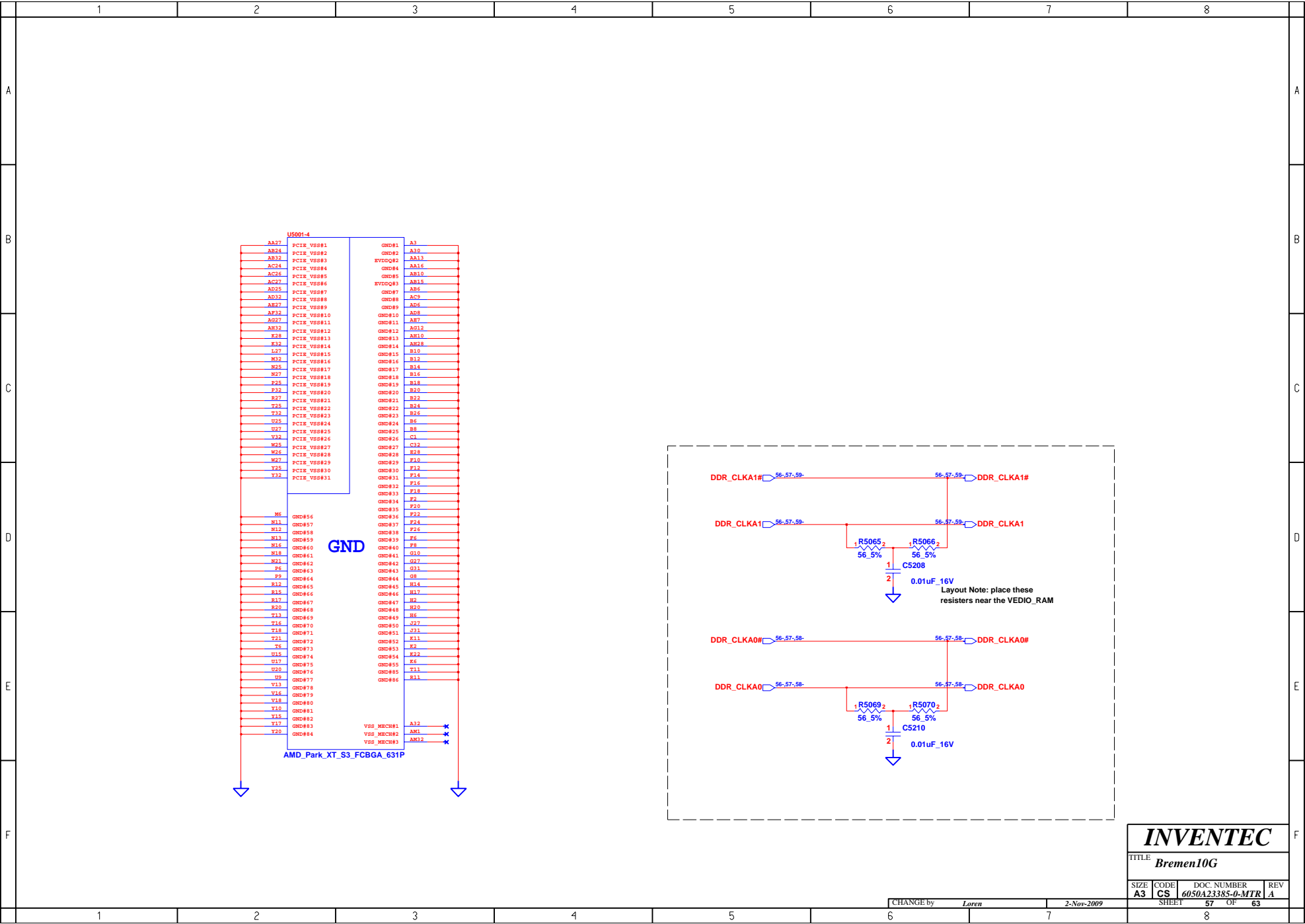












**INVENTEC**

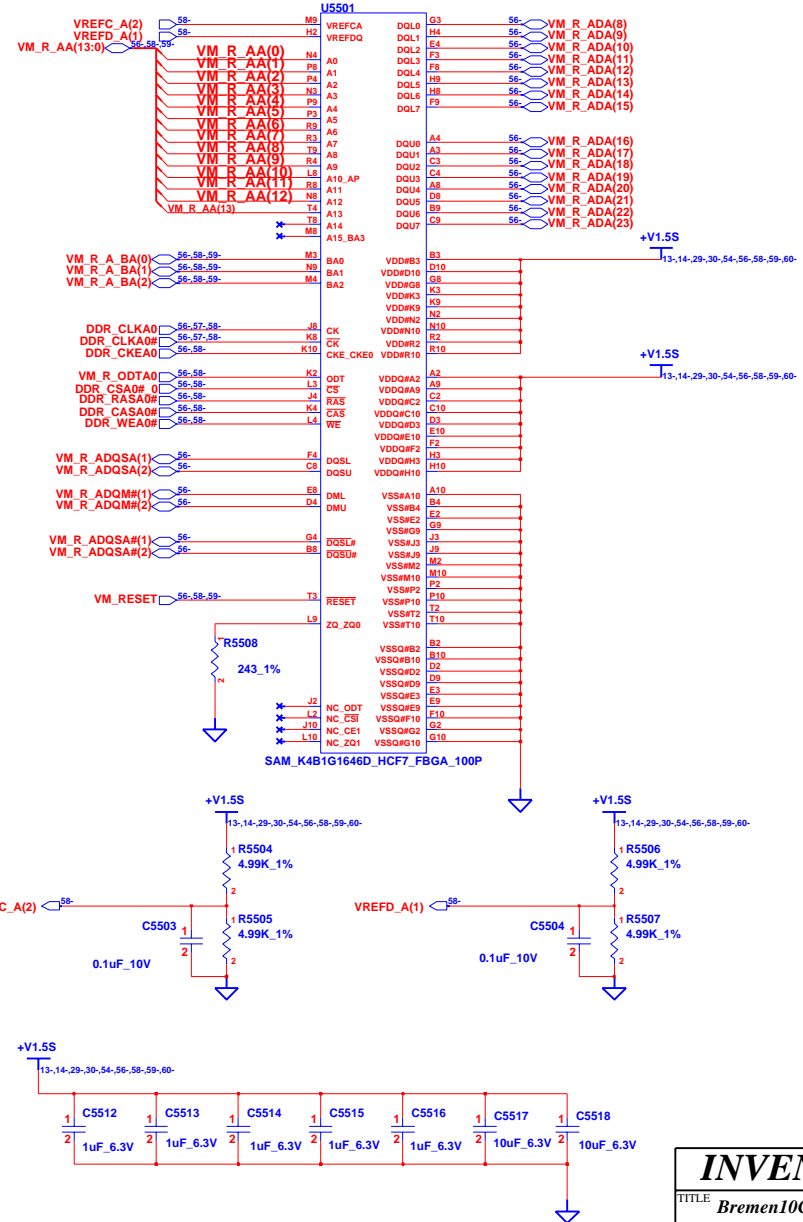
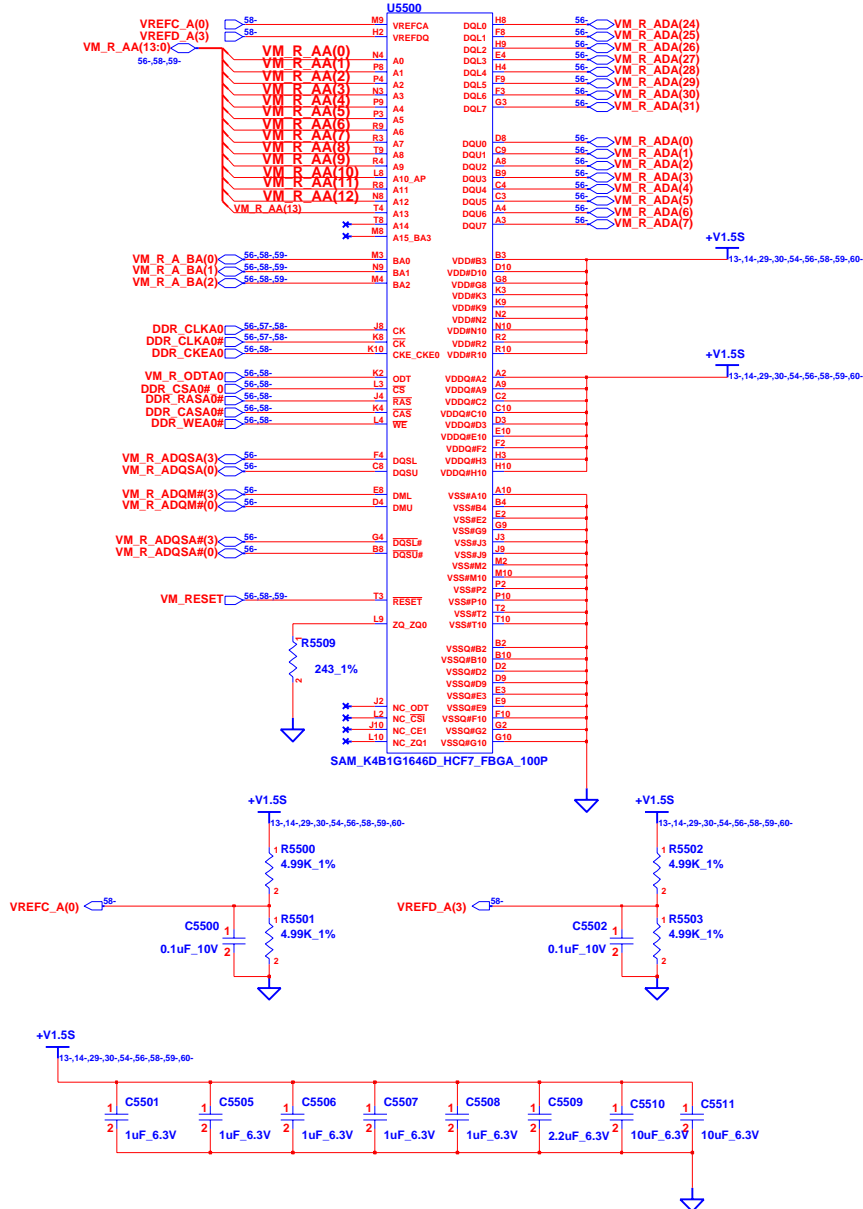
TITLE  
**Bremen10G**

SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A

CHANGE by *Loren* 2-Nov-2009

SHEET 57 OF 63

# PARK Use channel A



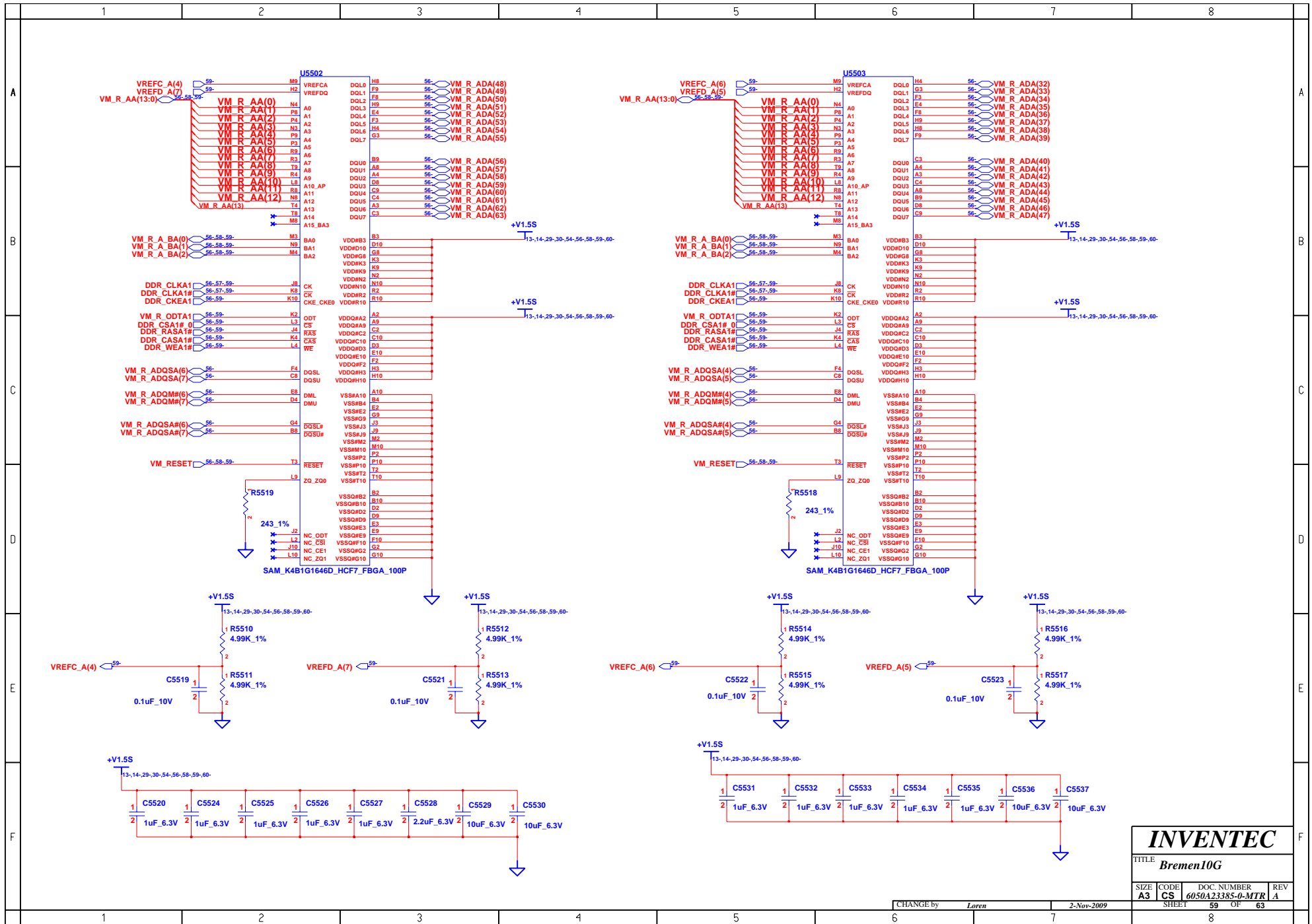
**INVENTEC**

TITLE  
Bremen10G

SIZE A3	CODE CS	DOC. NUMBER 6050A23385-0-MTR	REV A
SHEET 58		OF 63	

CHANGE by Loren 2-Nov-2009

8



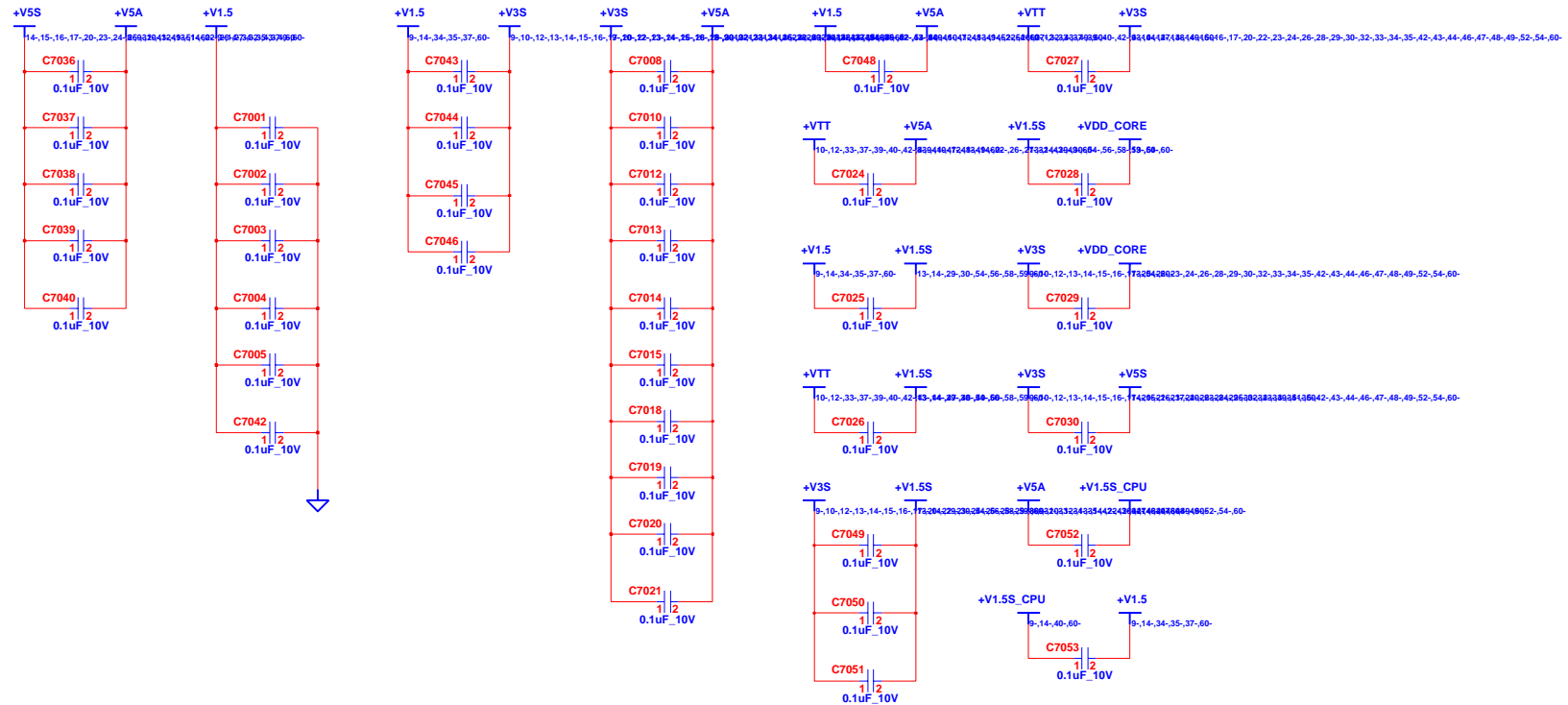
**INVENTEC**

TITLE  
**Bremen10G**

SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
SHEET <b>59</b>		OF <b>63</b>	

CHANGE by *Loren* 2-Nov-2009

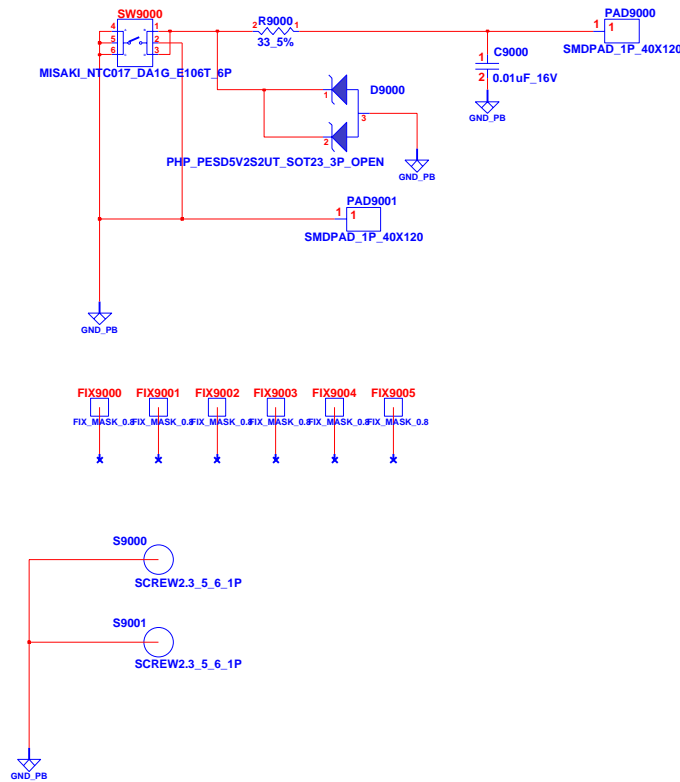
# EMI



INVENTEC				
TITLE Bremen10G EMI				
SIZE A3	CODE CS	DOC. NUMBER 6050A23385-0-MTR	REV A	
SHEET		60	OF	63

CHANGE by Loren 14-Nov-2009

# TOUCHPAD SWITCH BOARD



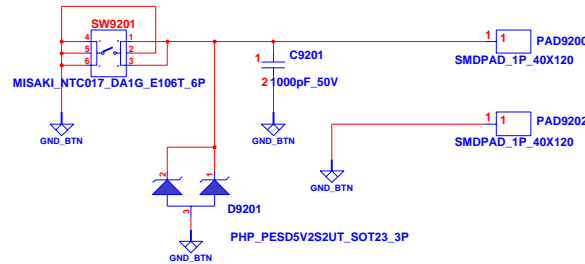
**INVENTEC**

TITLE <b>Bremen10G</b> Touch board			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>6050A23385-0-MTR</b>	REV <b>A</b>
SHEET		61	OF 63

CHANGE by *Loren* 8-Jan-2010

8

POWER BOARD



INVENTEC

TITLE			
Bremen10G			
Power board			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	6050A23385-0-MTR	A
SHEET		62	OF 63

CHANGE by Loren 1-Mar-2010

63 OF 63