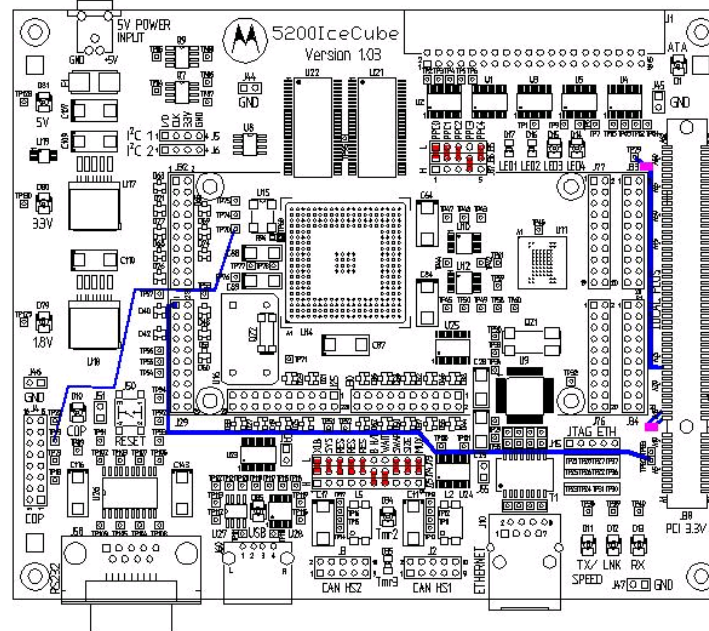


MGT5200 Evaluation Board - Lite5200™



General Notes:

If property Mounted Part Number and Mounted Vendor is shown the part indicated by these properties is mounted on the board and not the one shown in the schematics. The symbols shown in these schematics is used for maximum footprint compatibility only.

Revision History:

Comment	Rev.	Date	Owner
First Release	A	07/21/2003	Bibel, O / Santo, D/ Sridharan, M



MOTOROLA

Author
Bibel, O. - Santo, D.

Friday, August 01, 2003

Motorola GmbH

SPS TSPG DART
Schatzbogen 7
81829 Munich
GERMANY

MGT5200 Evaluation Board

Titlepage

Size
A3

Motorola General Business Information

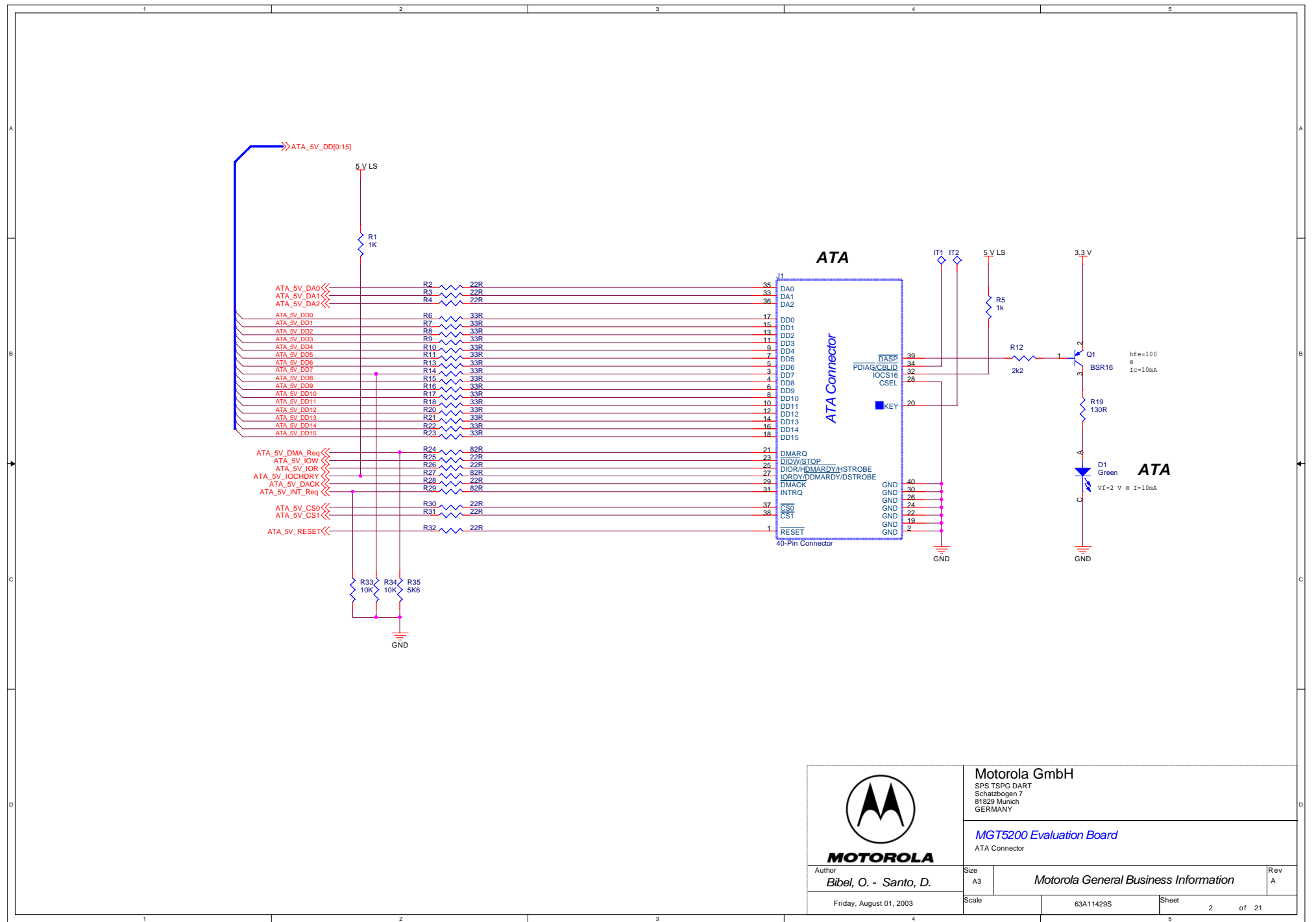
Rev
A

Scale

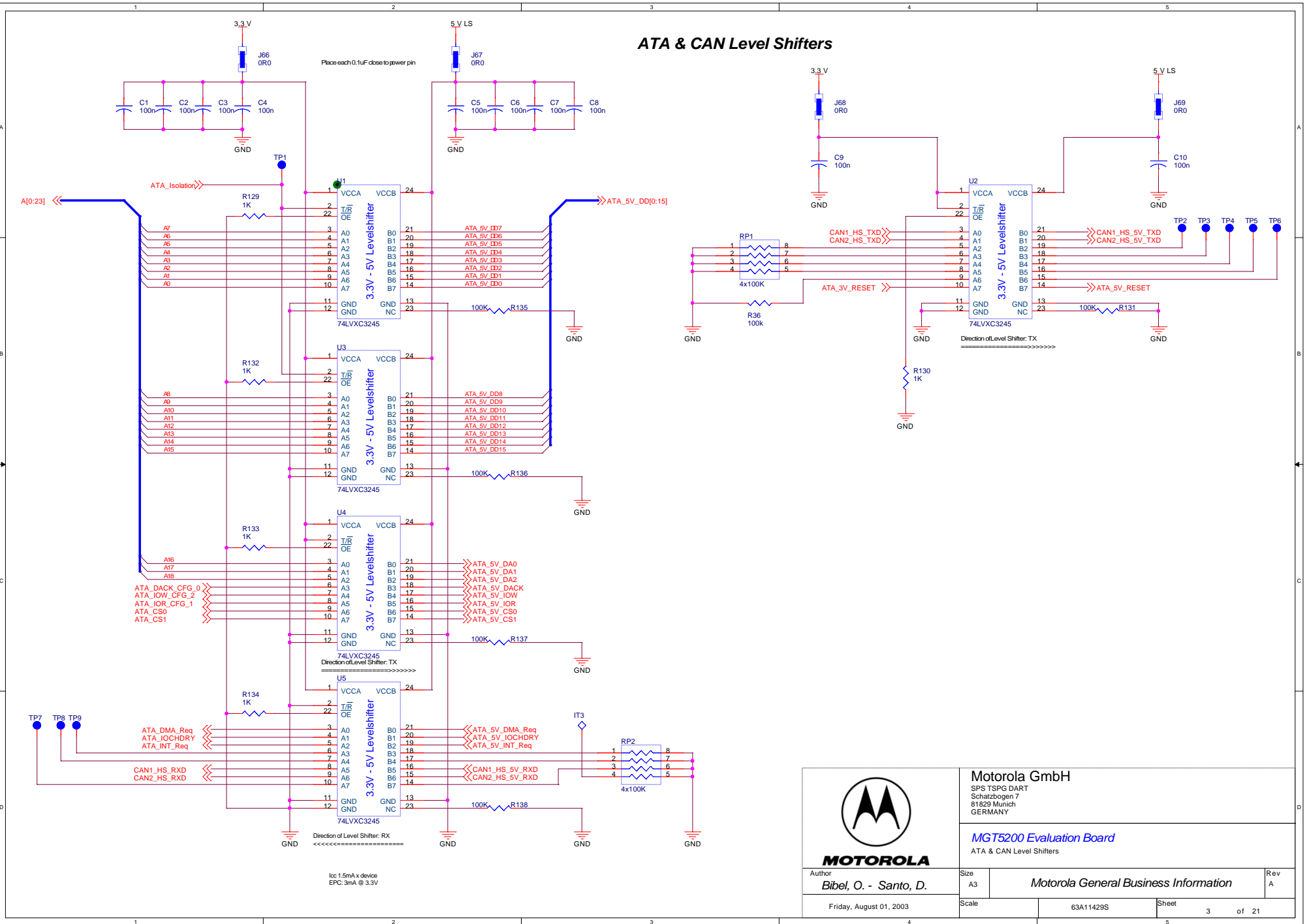
63A11429S

Sheet

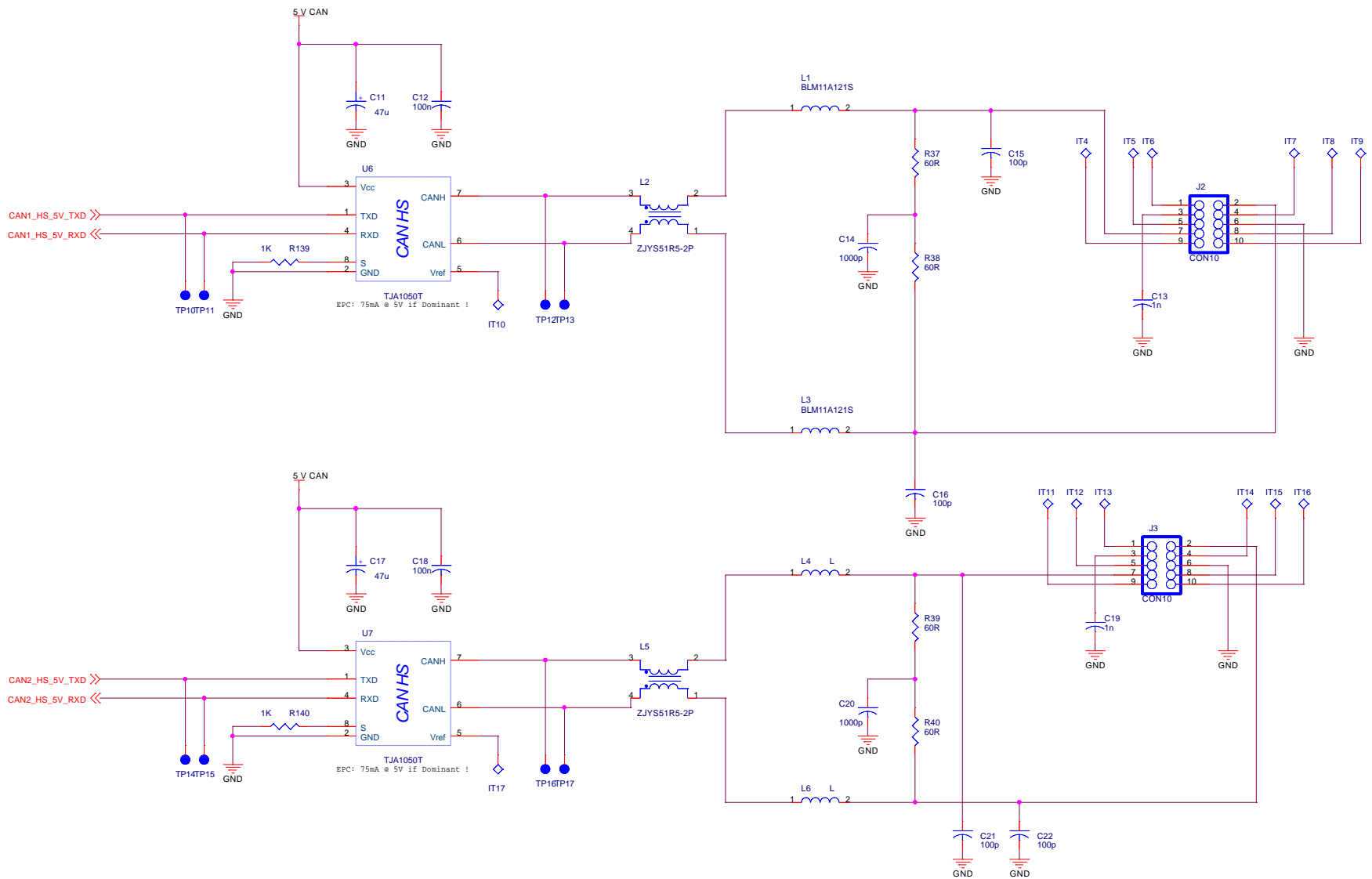
1 of 21



ATA & CAN Level Shifters



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MGT5200 Evaluation Board ATA & CAN Level Shifters			
Author Bibl, O. - Santo, D.	Size A3	Motorola General Business Information	
Friday, August 01, 2003	Scale	63A11429S	Sheet 3 of 21



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MGT5200 Evaluation Board

High Speed CAN transceivers

Size
A3

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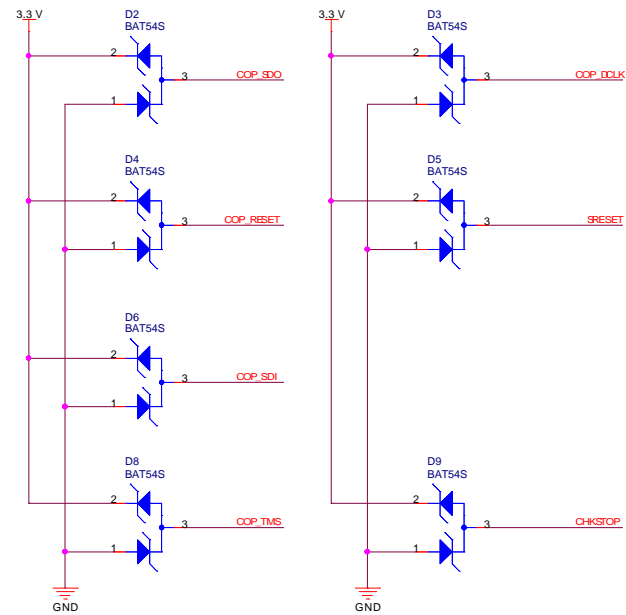
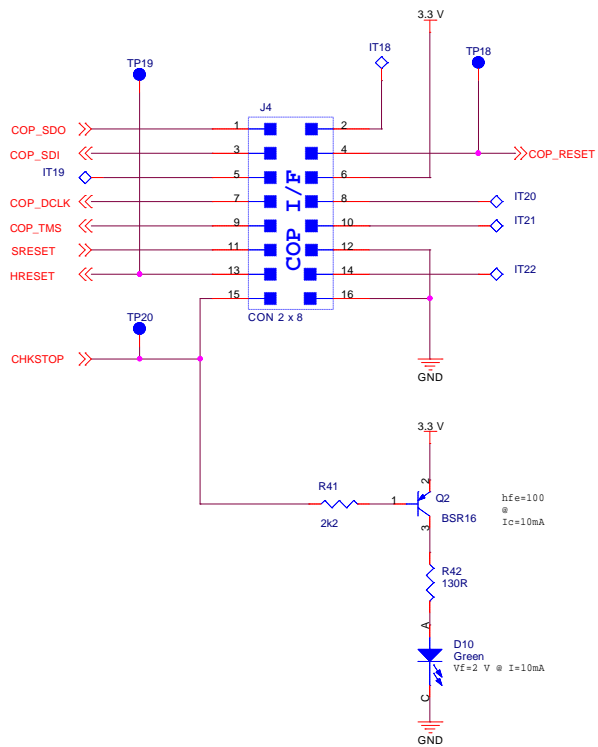
Scale

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Rev
A

COP INTERFACE
For external hardware debuggers



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COP Interface

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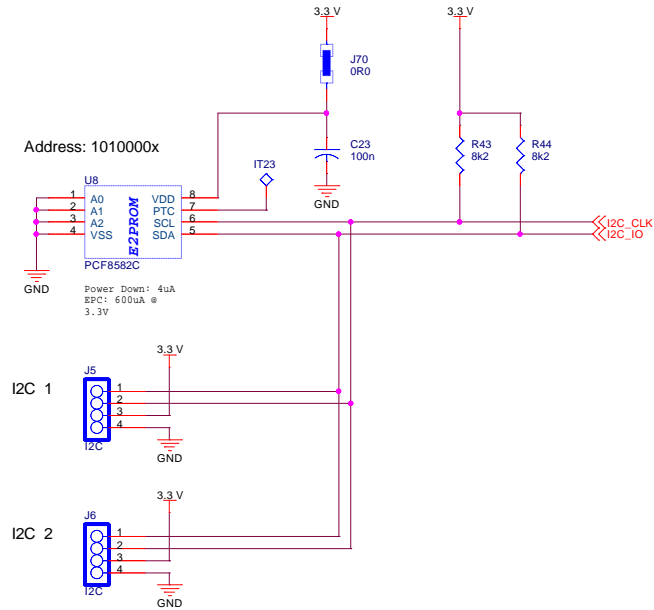
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Sheet 5 of 21

E2PROM & I2C Connector

E2PROM used to save configuration info of the Board as UART Baud Rate, Ethernet MAC Address, IP Address, etc.



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E2PROM & I2C Connectors

Size
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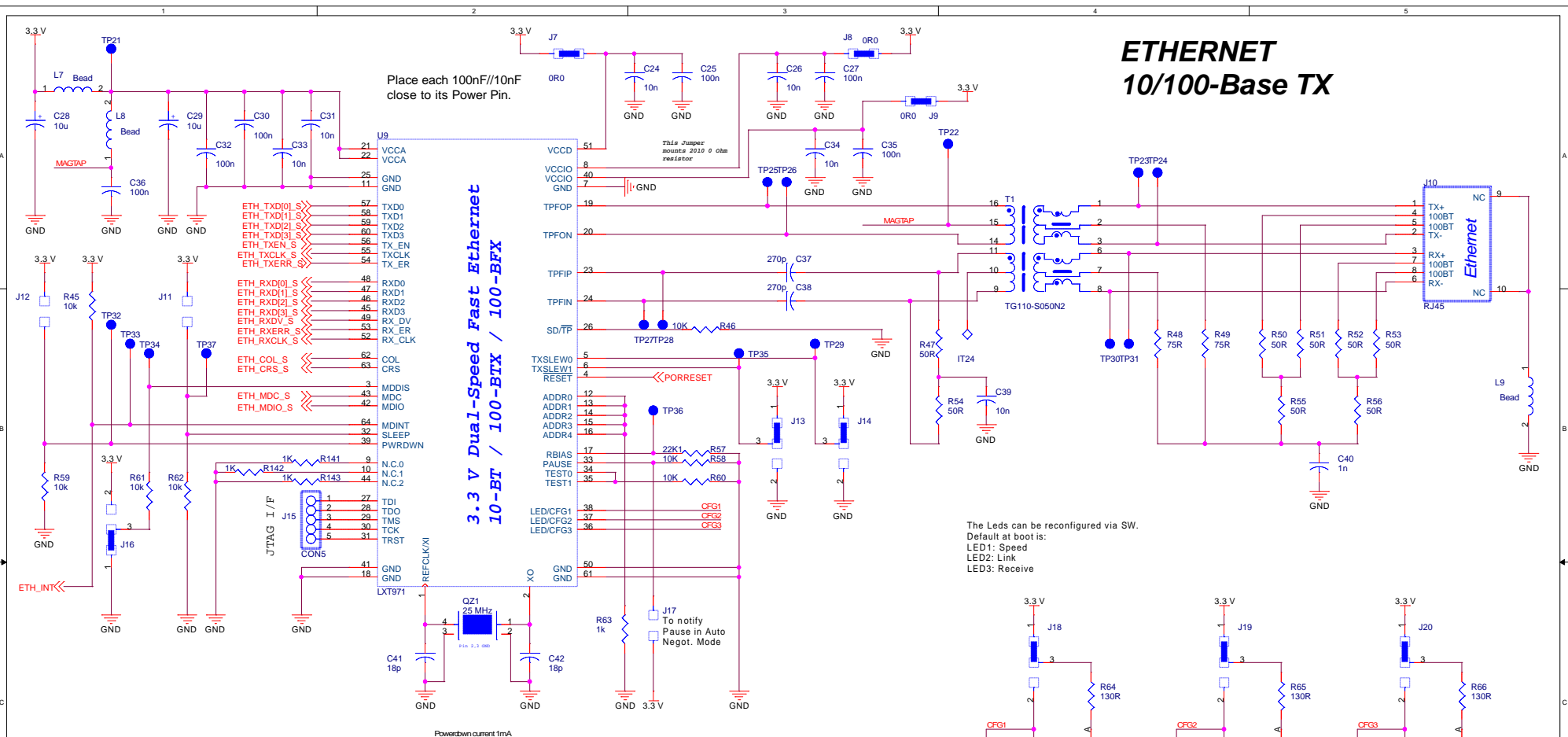
63A11429S

Sheet
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ETHERNET 10/100-Base TX

Place each 100nF/10nF close to its Power Pin.

3.3 V Dual-Speed Fast Ethernet
10-BT / 100-BTX / 100-BFX



The Leds can be reconfigured via SW.
Default at boot is:
LED1: Speed
LED2: Link
LED3: Receive

CONFIGURATION MODES

Auto Negot.	Speed (Mbps)	Duplex	CFG1	CFG2	CFG3
Disabled	10	Half	Low	Low	Low
		Full	Low	Low	High
	100	Half	Low	High	Low
		Full	Low	High	High
Enabled	100 only	Half	High	Low	Low
		Full	High	Low	High
	10/100	Half	High	High	Low
		Half/Full	High	High	High

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MGT5200 Evaluation Board
Ethernet 10/100 Base-T

Author
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Size
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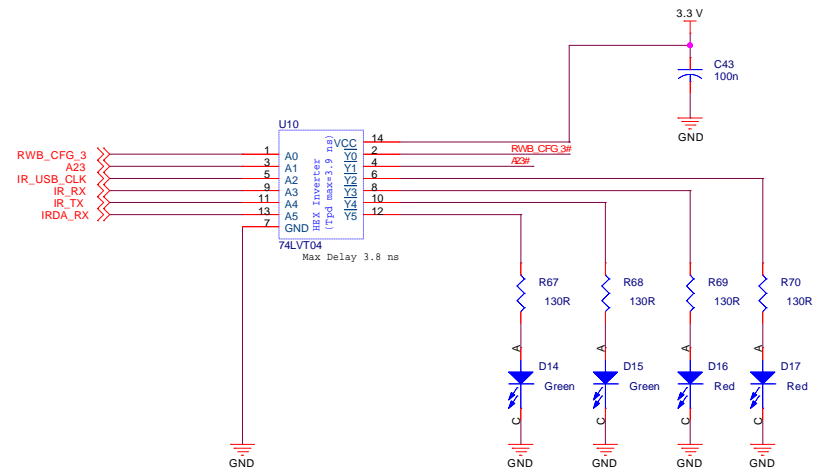
Sheet
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Rev
A

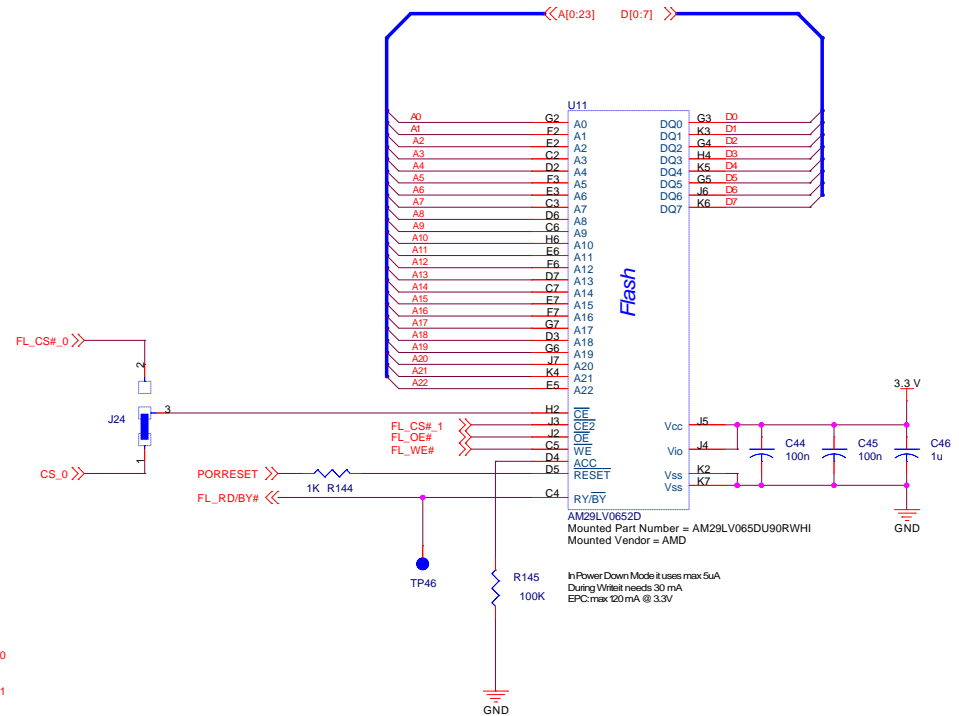
Motorola General Business Information

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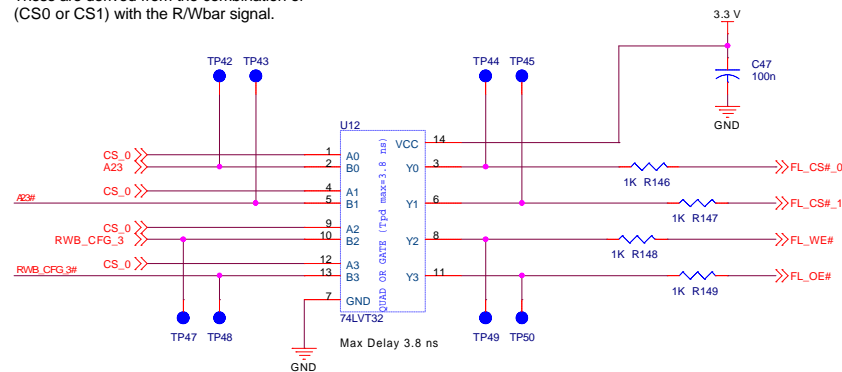
HEX INVERTER: 4 inverter to drive 4 LEDs to allow visual 'Help' during SW Debug



8 MBytes: 0xFF800000--0xFFFFFFFF on CS0 or
16 MBytes: 0xFF000000-0xFFFFFFFF on CS_FL0 and CS_FL_1



Logic to generate flash WRITE ENABLE and OUTPUT ENABLE signals, and the CS. These are derived from the combination of (CS0 or CS1) with the R/Wbar signal.

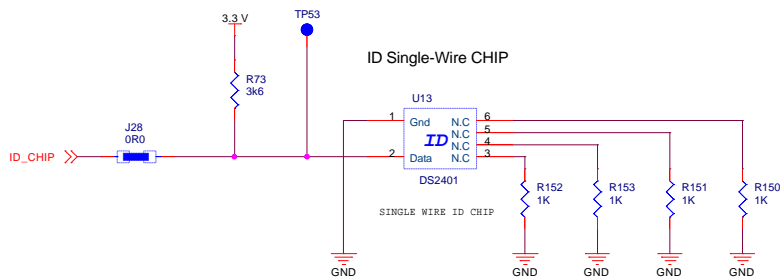
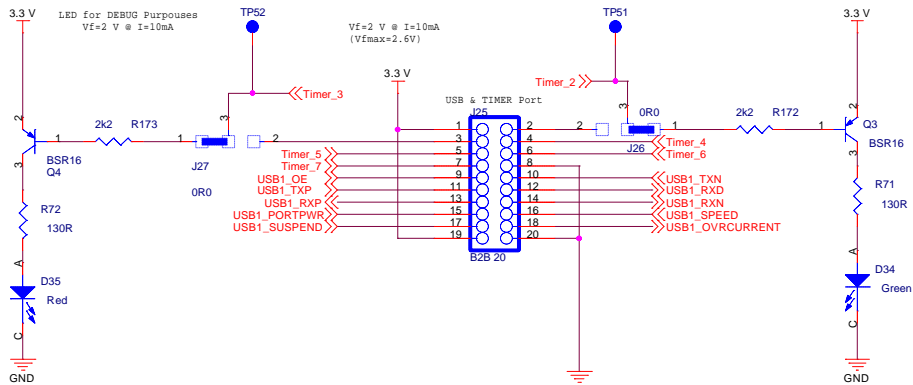
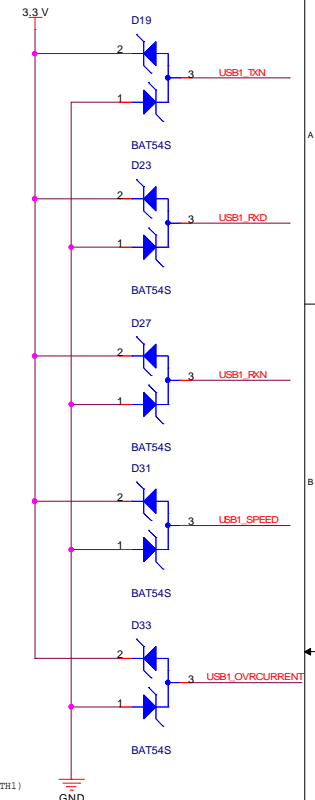
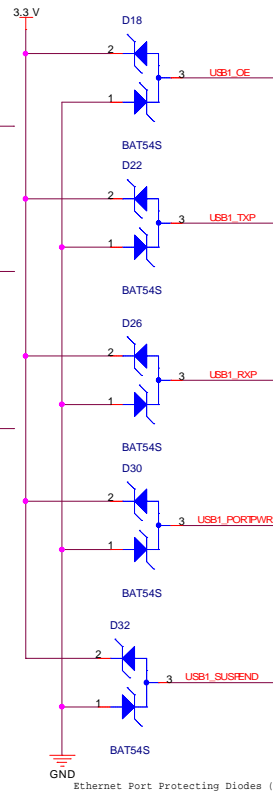
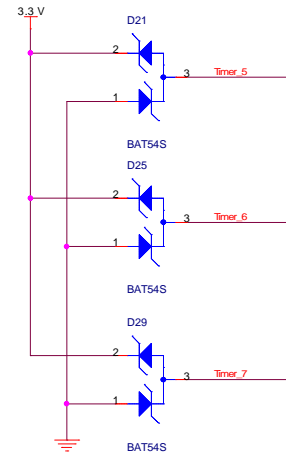
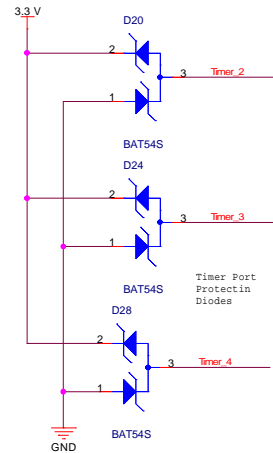



<p>MOTOROLA</p>		<p>Motorola GmbH</p> <p>SPS TSPG DART</p> <p>Schatzbogen 7</p> <p>81829 Munich</p> <p>GERMANY</p>	
		<p>MGT5200 Evaluation Board</p> <p>Flash , Glue Logic & LEDs</p>	
<p>Author</p> <p>Bibel, O. - Santo, D.</p>	<p>Size</p> <p>A3</p>	<p>Motorola General Business Information</p>	
<p>Friday, August 01, 2003</p>	<p>Scale</p>	<p>63A11429S</p>	<p>Sheet 8 of 21</p>

GPIOs Page #1: USB & TIMER PORT

These Schottky Diodes give ONLY a limited protection against short circuits.

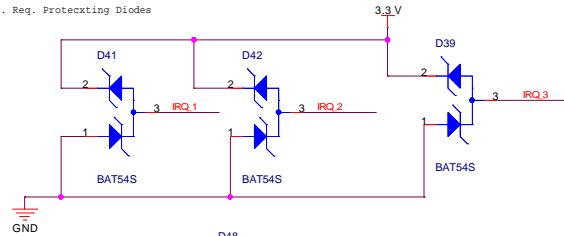
Max Continuous Forward Current	200mA
Max repetitive peak forward current	300mA
Max non-repetitive peak forward current	600mA
Max total power dissipation (per package)	230mW
Max diode capacitance	10pF
Max. Reverse Current	2uA
Vf @ 0.1mA	240mV
Vf @ 100mA	800mV



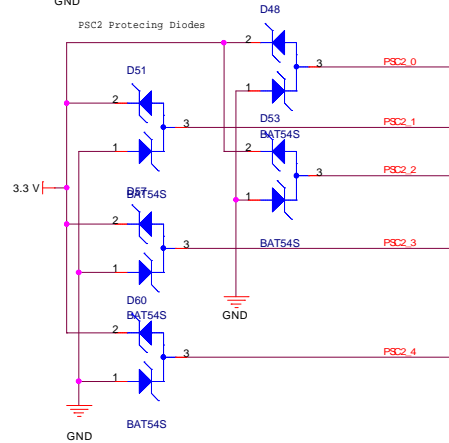
 MOTOROLA		Motorola GmbH SPS TSPG DART Schatzbogen 7 81829 Munich GERMANY	
		MGT5200 Evaluation Board GPIO-PAGE1	
Author Bibel, O. - Santo, D.	Size A3	Motorola General Business Information	
Friday, August 01, 2003	Scale	63A11429S	Sheet 9 of 21

GPIOs Page #2: ETHERNET & CS/IRQ/PSC2 PORT

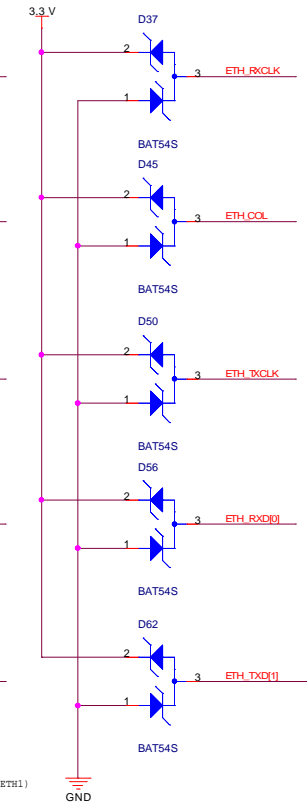
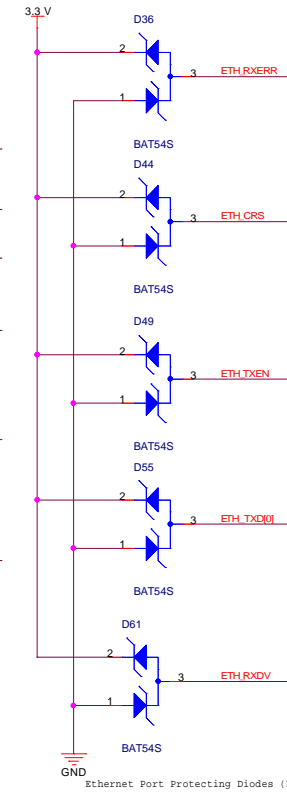
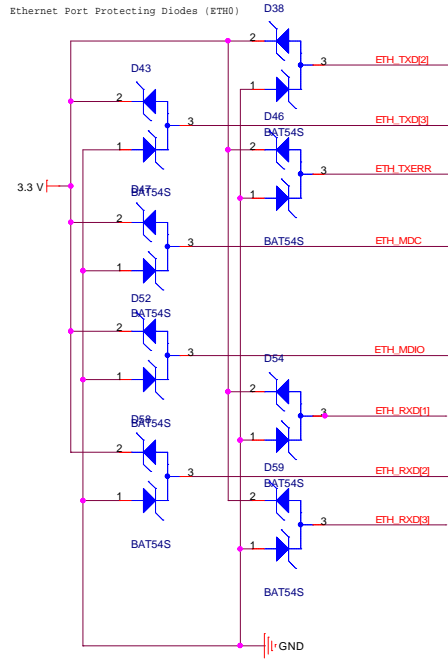
External Int. Req. Protecting Diodes



PSC2 Protecting Diodes



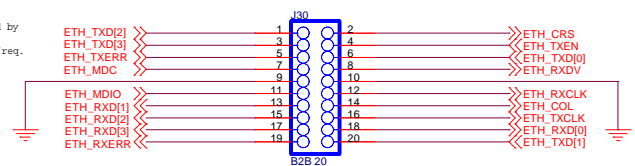
Ethernet Port Protecting Diodes (ETH0)



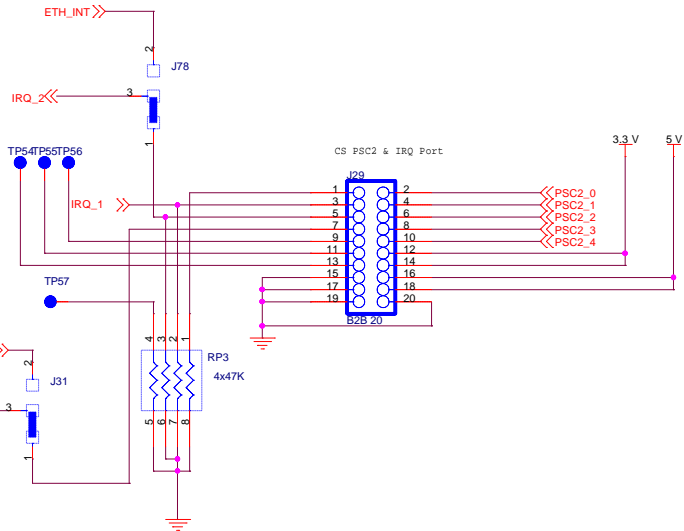
Ethernet Port Protecting Diodes (ETH1)

GND

Ethernet Port

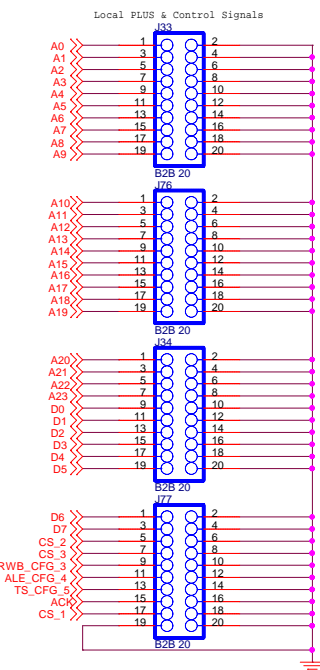
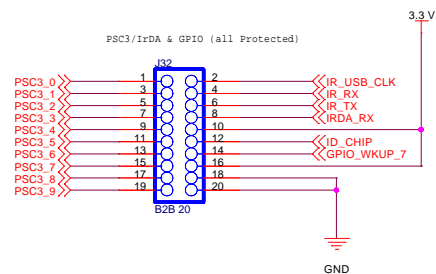


Ethernet Pins driving capacity is limited by the Schottky Diodes and by the Connector Capacity. Assuming a Connector pin with 10pF then max freq. on a single line is 50 MHz
 1 pin = 5mA
 Cpin 10pF
 Cswitch 10 pF
 C Schottky 10 pF

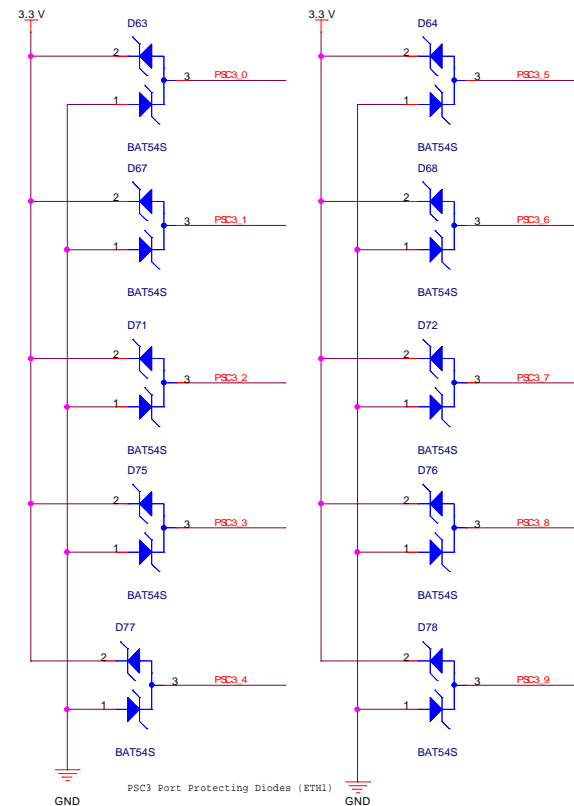
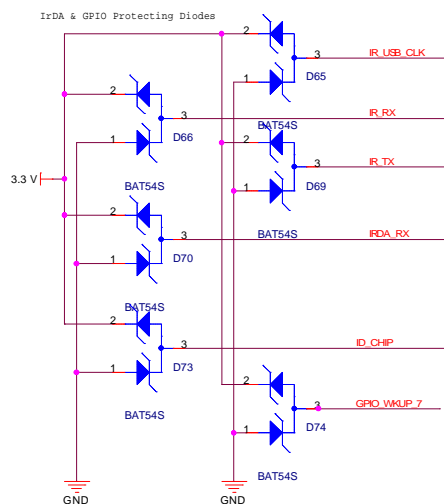


		Motorola GmbH SPS TSPG DART Schatzbogen 7 81829 Munich GERMANY	
		MGT5200 Evaluation Board GPIO-PAGE 2	
Author Bibel, O. - Santo, D.	Size A3	Motorola General Business Information	
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GPIOs Page #3: PSC3/IrDA/GPIO PORT & Local PLUS



LP signals are NOT Protected (with Diodes) to allow max frequency switching (66MHz)



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GPIO-PAGE 3

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Rev
A

Scale

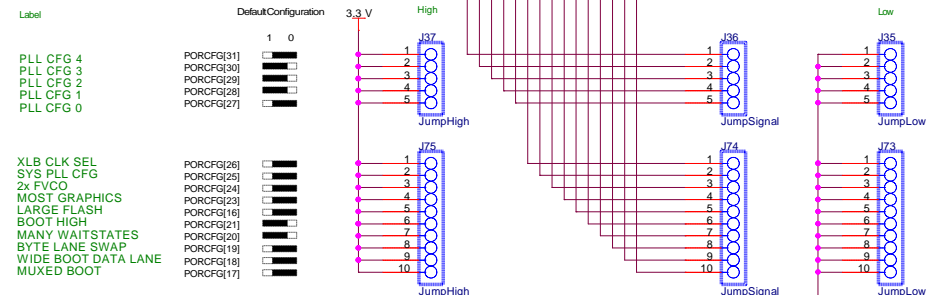
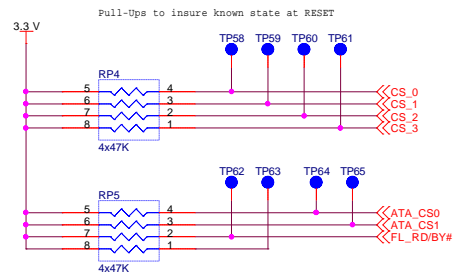
63A11429S

Sheet

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1		2		3	
rst_cfg bit	Tabasco Package Ball	Output Signal Name	CDM Reset Configuration Register Bit	Tabasco Configuration Signal from CDM	Description
0	Y18	ATA_DACK_B	PORCFG[31]	ppc_pll_cfg_4	Tabasco's PPC Harpo Core PLL Configuration
1	Y17	ATA_IOR_B	PORCFG[30]	ppc_pll_cfg_3	
2	W17	ATA_IOW_B	PORCFG[29]	ppc_pll_cfg_2	
3	W16	LP_R/WB	PORCFG[28]	ppc_pll_cfg_1	
4	V14	LP_ALE_B	PORCFG[27]	ppc_pll_cfg_0	
5	Y13	LP_TS_B	PORCFG[26]	x1b_clk_sel	bit = 0: XLB_CLK = SYS_PLL_FVCO/4 bit = 1: XLB_CLK = SYS_PLL_FVCO/8
6	H02	USB1	PORCFG[25]	sys_pll_cfg_0	bit = 0 : SYS_PLL_FVCO = 16x SYS_PLL_FREF bit = 1 : SYS_PLL_FVCO = 12x SYS_PLL_FREF
7	H03	USB2	PORCFG[24]	2x_Fvco	bit = 0: Fvco = 12x or 16x sys_xtal_in (default) bit = 1: Fvco = 24x or 32x sys_xtal_in
8	K01	ETH0	PORCFG[23]	most_graphics_sel	bit = 0: Most Graphics boot not enabled bit = 1: Most Graphics boot enabled. Note 3
9	K02	ETH1	PORCFG[16]	large_flash_sel	bit = 0: Large Flash boot not enabled bit = 1: Large Flash boot enabled. Note 3.
10	K03	ETH2	PORCFG[21]	ppc_msrip	PPC Boot Address / Exception Table Loc. bit = 0: 0000 0100 (hex) bit = 1: ff00 0100 (hex)
11	J01	ETH3	PORCFG[20]	boot_rom_wait	bit = 0: 4 IPbus clocks of waitstate* bit = 1: 48 IPbus clocks of waitstate*
12	J02	ETH4	PORCFG[19]	boot_rom_swap	bit = 0: no byte lane swap - same endian ROM image bit = 1: byte lane swap - different endian ROM image (This option is typically not used because Harpo can boot from either endian)
13	L03	ETH5	PORCFG[18]	boot_rom_size	For "non-muxed" boot ROMs bit = 0: 8-bit boot ROM data bus 24-bit boot ROM address bit = 1: 16-bit boot ROM data bus 16-bit boot ROM address For "muxed" boot ROMs boot ROM addr is max 25 significant bits during address transfer bit = 0: 16-bit ROM data bus bit = 1: 32-bit ROM data bus For "large flash" boot case boot Flash addr is 25 bits. bit = 0: 8-bit Flash data bus bit = 1: 16-bit Flash data bus
14	N02	ETH6	PORCFG[17]	boot_rom_type	bit = 0: non-muxed boot ROM bus, single tenure transfer. bit = 1: muxed boot ROM bus, PPC like with address & data tenures, ALE_b & TS_b active. Note 3.

BOOT CONFIGURATION SETTING



Place this two groupes of three Connectors side by side, so that you can put a Jumper either on to adjacent pins of

JumpLow and JumpSignal
or
JumpSignal and JumpHigh.

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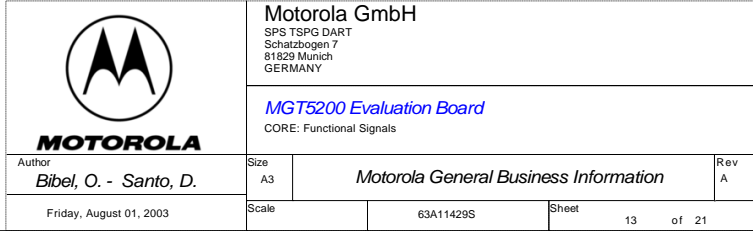
HW Reset Word

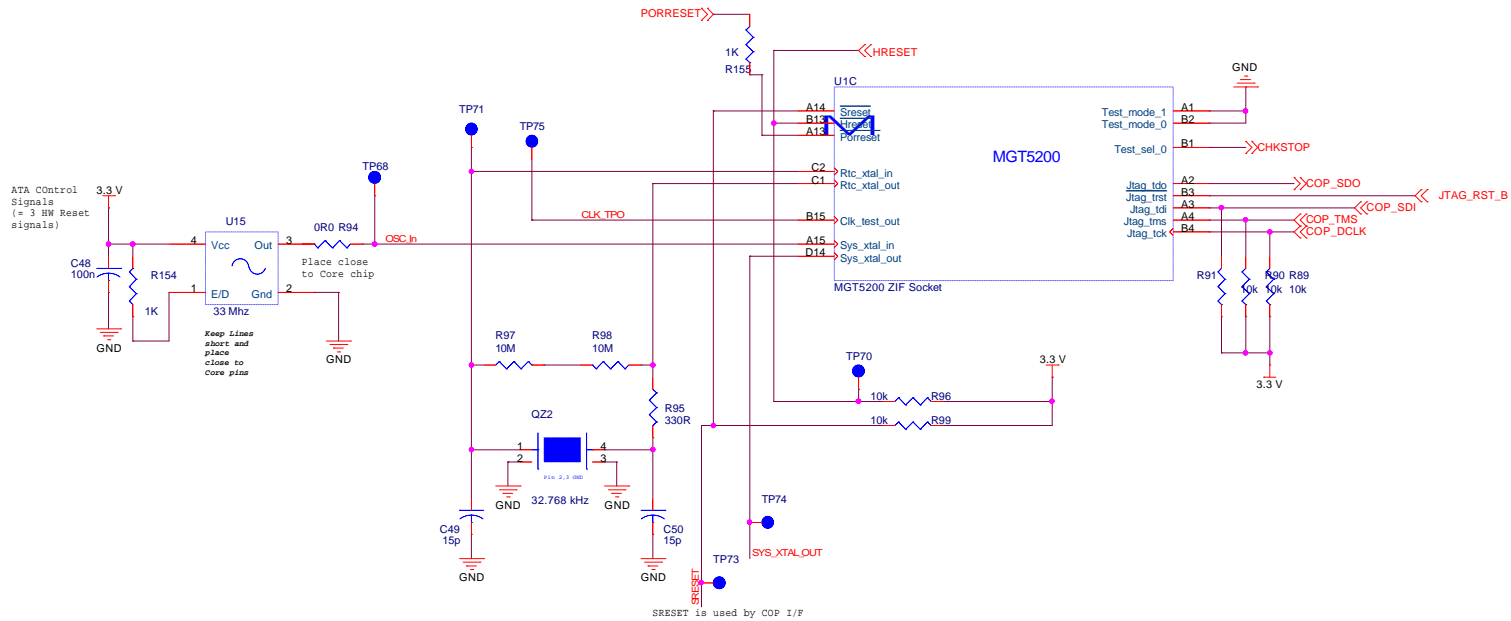
Size	
A3	<i>Motorola General Business Information</i>

Scale	63A11429S
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EPC= 1.13 A @ 1.8V & 0.11 A @ 3.3V
In Deep Sleep Mode max 2mA @ 1.8V !!





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MGT5200 Evaluation Board

CORE: Clock/JTAG

Size
A3

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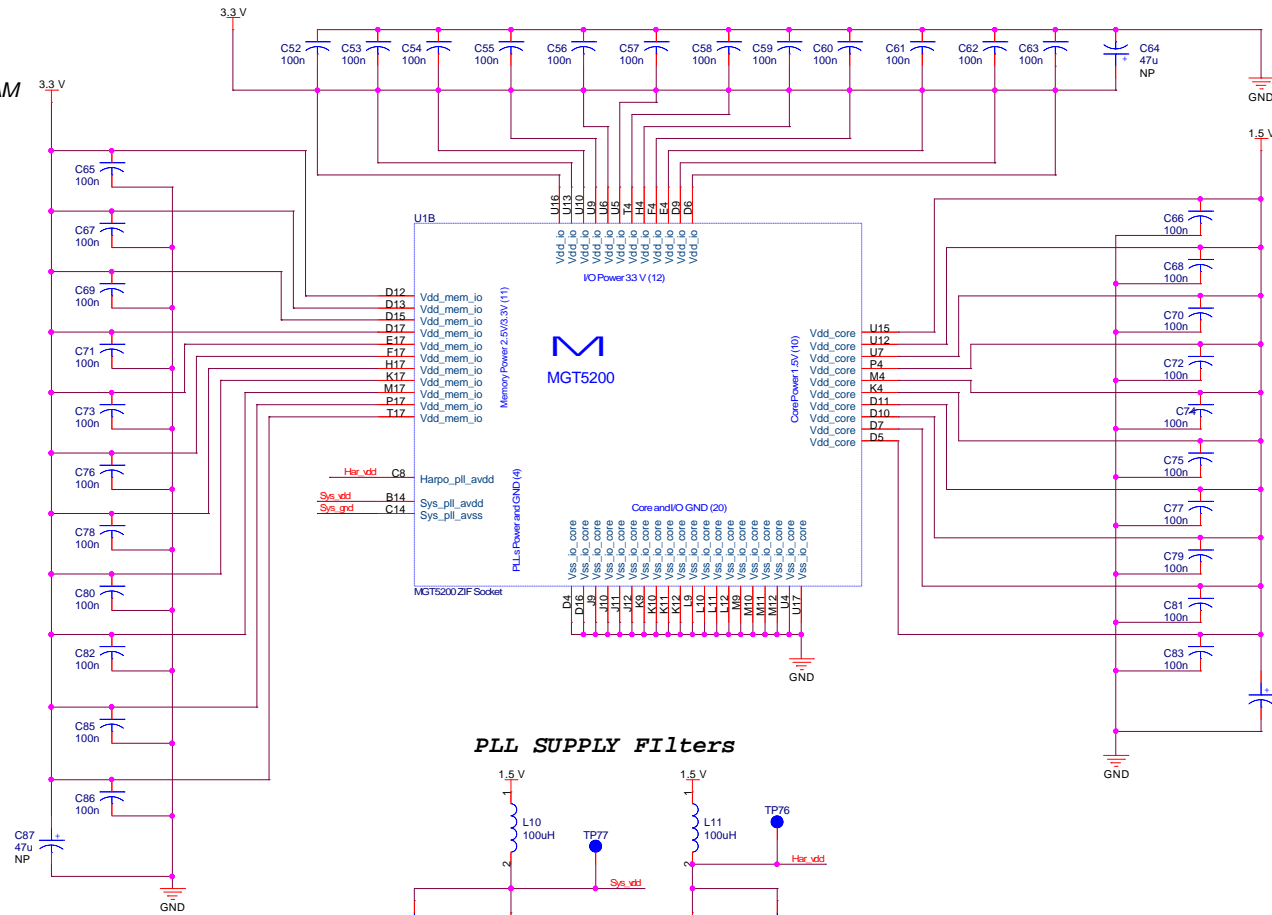
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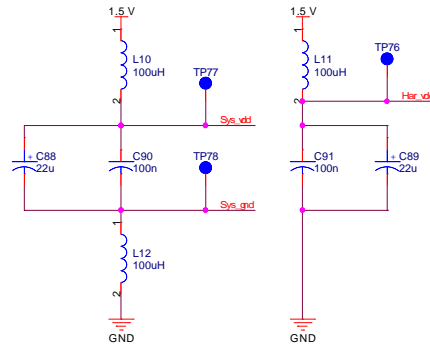
Sheet
13 of 21

CORE POWER SECTION

3.3V for SDR SDRAM



PLL SUPPLY Filters



Place filters as close as possible to Part



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CORE: Power Pins

Size
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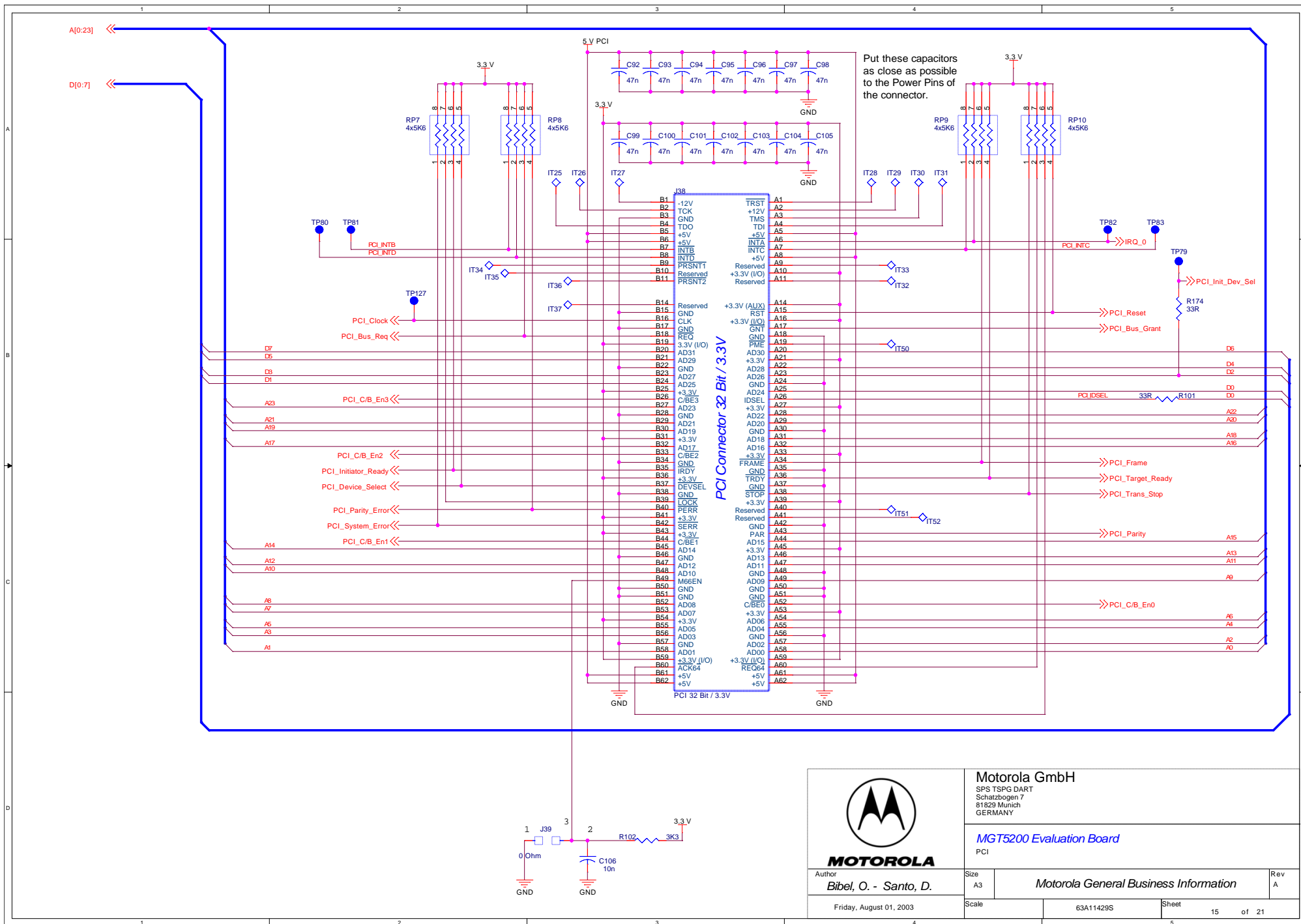
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Sheet

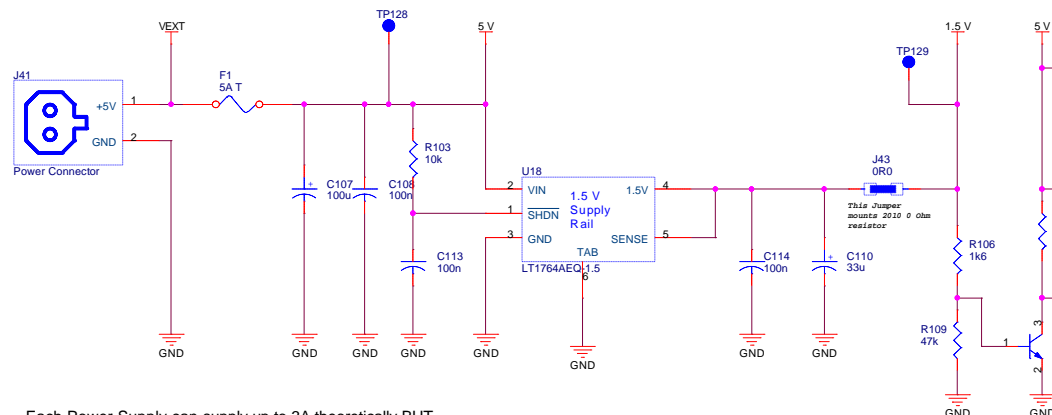
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		MGT5200 Evaluation Board PCI		
Author Bibel, O. - Santo, D.	Size A3	Motorola General Business Information		Rev A
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1.5V Power Supply



Each Power Supply can supply up to 3A theoretically BUT
Maximum Termal Junction Temperature (T_{jmax} 125 C) will prevent it.
A Copper Area of 2500 sq mm. is required to have 23 C/W

Thermal Calculation:

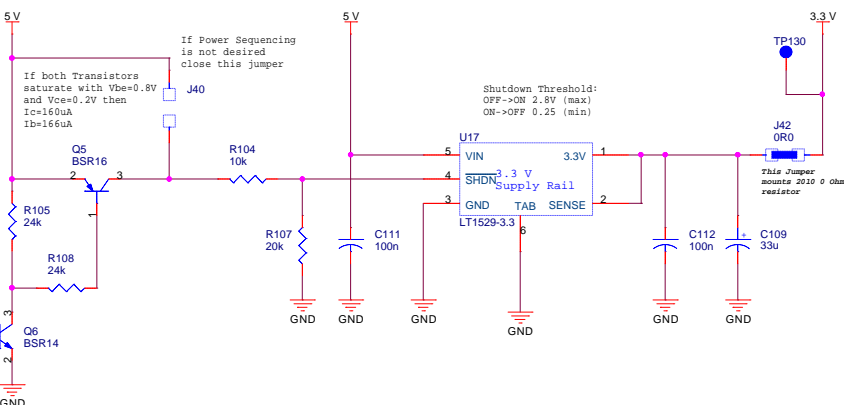
$$P = I_{out(max)} \times (V_{max} - V_{out}) + (I_{qnd} \times V_{in(max)})$$

For $I_{out}=2A$ and $V_{in(max)}=5.5V$ assuming $I_{qnd} = 20mA$ and 23 C/W we get:

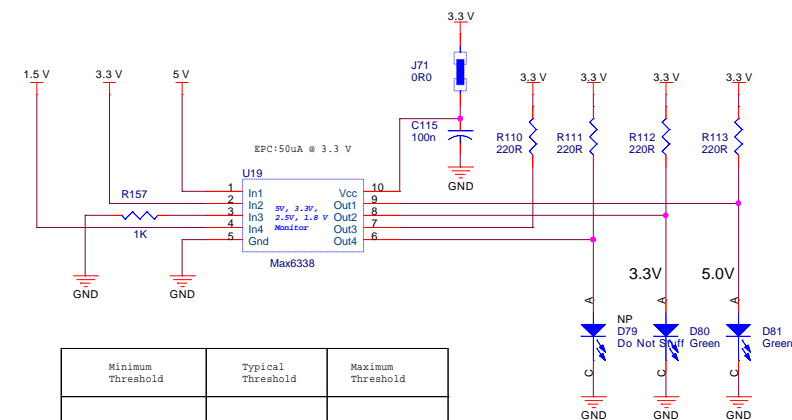
Delta T = $P \times 23 \text{ C/W} = 103.73$, which is OK at $T_{\text{amb}} = 25 \text{ C}$

For the 1.8V the computation will yield 172 C, which is too much, so the 1.8V will be limited by the Thermal dissipation to 1.1 A

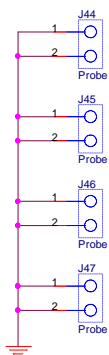
3.3V Power Supply



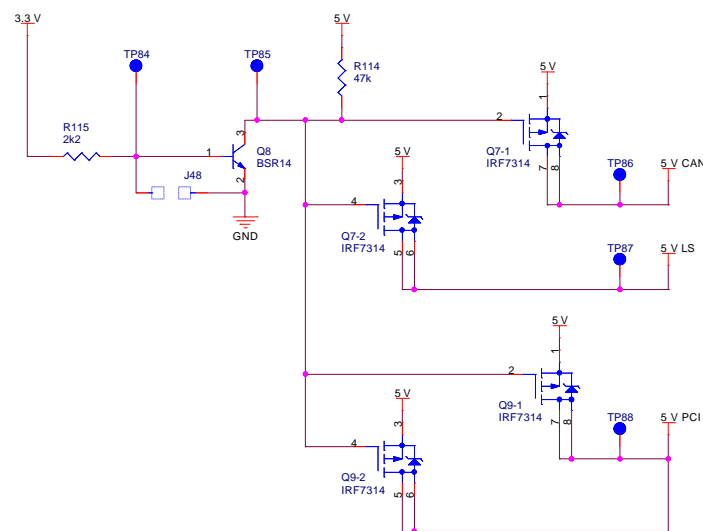
Power Supply Monitoring



Minimum Threshold	Typical Threshold	Maximum Threshold
4.5 V	4.63 V	4.75 V
3.0 V	3.08 V	3.15 V
2.13 V	2.19 V	2.25 V
1.53 V	1.58 V	1.62 V



Delayed 5.0V

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MGT5200 Evaluation Board

Power Supply

Size	<i>Motorola General Business Information</i>
A3	

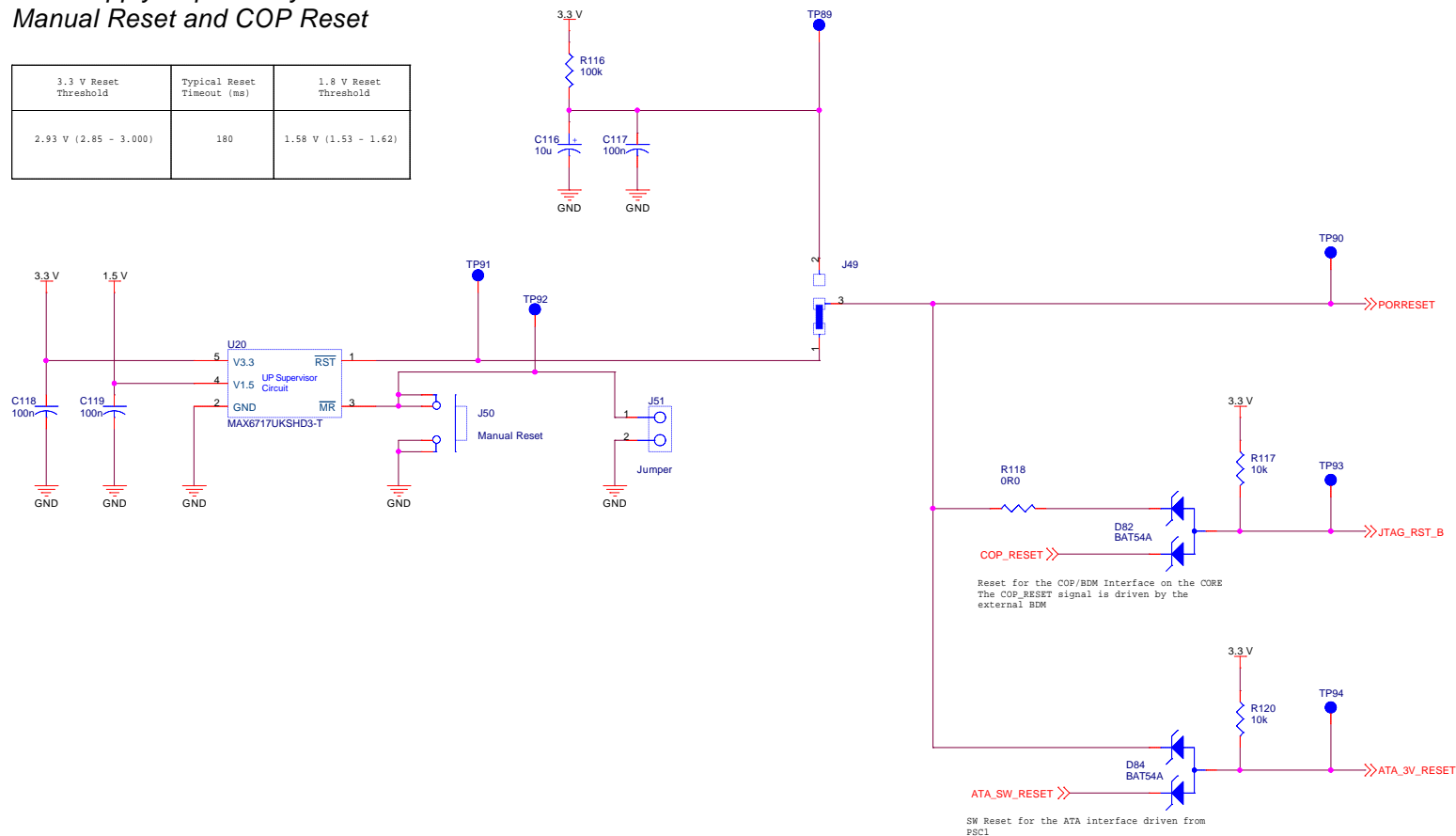
Rev
A

Scale	63A11429S
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Dual Supply Supervisory Circuit Manual Reset and COP Reset

3.3 V Reset Threshold	Typical Reset Timeout (ms)	1.8 V Reset Threshold
2.93 V (2.85 - 3.000)	180	1.58 V (1.53 - 1.62)



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Reset Circuitry & Supervisor Circuitry

Size
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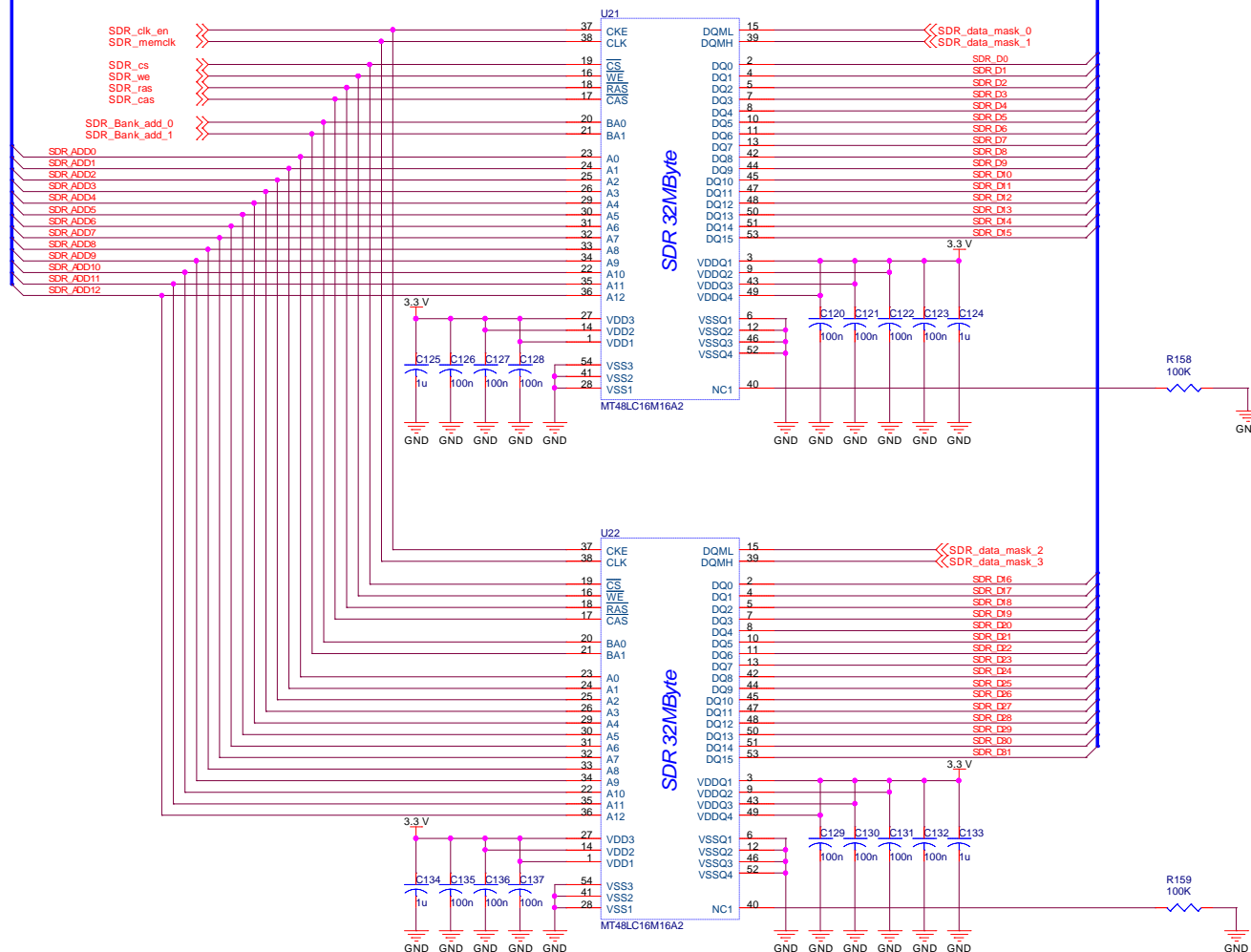
Scale

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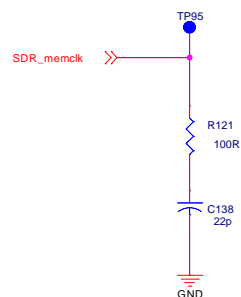
Sheet

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SDR_D[0:31] >>
SDR_ADD[0:12] >>



Put these termination at the physical end of the clock line.

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SDRAM Memory

	Size
--	------

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De-coupling SWITCHES

USB De-coupling Switch (U23)

Use Jumper to open switch U23 (to de-couple USB transceiver from external Connector)

3.3V

47K

10-bit FET BUS Switch (SN74688TLV3384)

CORE SIDE

1A1, 1A2, 1A3, 1A4, 1A5, 2A1, 2A2, 2A3, 2A4, 2A5, 1B1, 1B2, 1B3, 1B4, 1B5, 2B1, 2B2, 2B3, 2B4, 2B5, 13, 12, 24

TRANSCEIVER SIDE

USB1_OE_S, USB1_TXN_S, USB1_TXP_S, USB1_RXD_S, USB1_RXP_S, USB1_RXN_S, USB1_PORTPWR_S, USB1_SPEED_S, USB1_SUSPEND_S, USB1_OVRCURRENT_S

Ethernet De-coupling Switch (U24)

Use Jumper to open switch U24 and U25 (to de-couple Ethernet transceiver from external Connector)

3.3V

47K

10/100 Base-T Ethernet De-coupling Switch

CORE SIDE

1A1, 1A2, 1A3, 1A4, 1A5, 2A1, 2A2, 2A3, 2A4, 2A5, 1B1, 1B2, 1B3, 1B4, 1B5, 2B1, 2B2, 2B3, 2B4, 2B5, 13, 12, 24

TRANSCEIVER SIDE

ETH_TXEN_S, ETH_TXD[0]_S, ETH_RXDV_S, ETH_COL_S, ETH_RXD[0]_S, ETH_TXD[1]_S, ETH_RXD[2]_S, ETH_TXD[3]_S, ETH_TXERR_S, ETH_MDC_S, ETH_MDIO_S, ETH_RXD[1]_S, ETH_RXD[2]_S, ETH_RXD[3]_S, ETH_RXERR_S, ETH_CRS_S

Ethernet De-coupling Switch (U25)

10/100 Base-T Ethernet De-coupling Switch

CORE SIDE

1A1, 1A2, 1A3, 1A4, 1A5, 2A1, 2A2, 2A3, 2A4, 2A5, 1B1, 1B2, 1B3, 1B4, 1B5, 2B1, 2B2, 2B3, 2B4, 2B5, 13, 12, 24

TRANSCEIVER SIDE

ETH_TXD[2]_S, ETH_TXD[3]_S, ETH_TXERR_S, ETH_MDC_S, ETH_MDIO_S, ETH_RXD[1]_S, ETH_RXD[2]_S, ETH_RXD[3]_S, ETH_RXERR_S, ETH_CRS_S

ETH_RXCLK_S

ETH_TXCLK_S

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MGT5200 Evaluation Board

Switches

Author: Bibel, O. - Santo, D.

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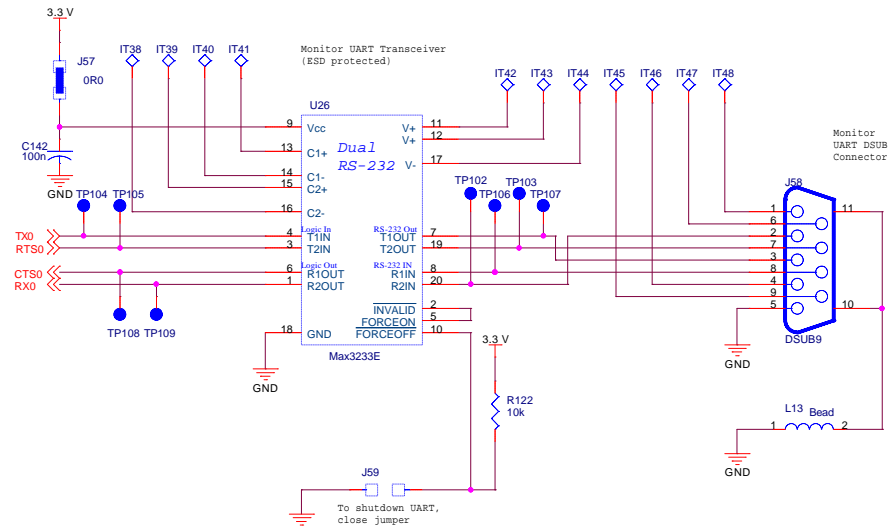
Switches

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MONITOR UART
Controlled by PSC1 Port
Implements only HW Handshake



Author
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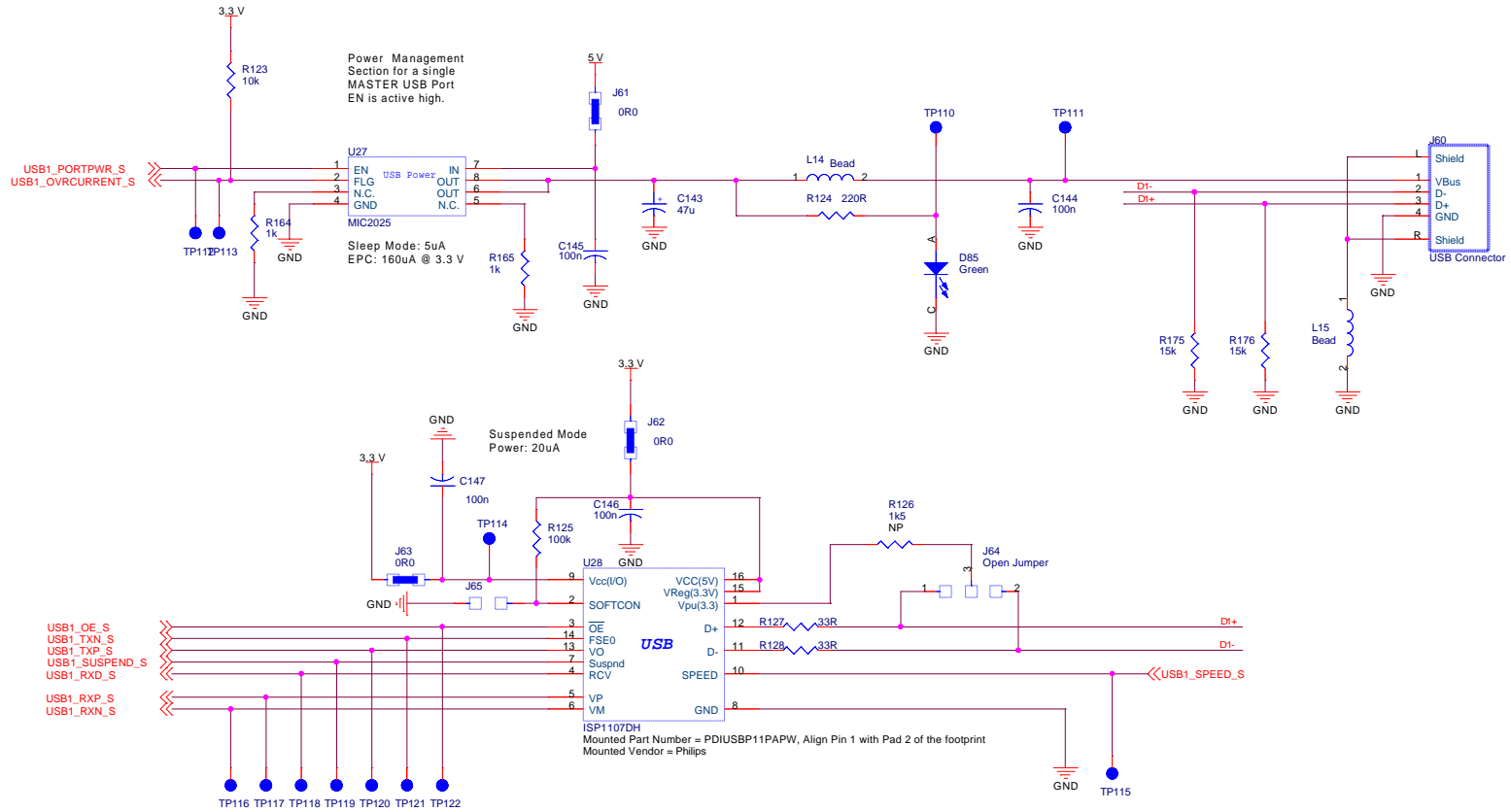
MGT5200 Evaluation Board
 MONITOR Uart

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USB Port plus Power Management



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USB

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