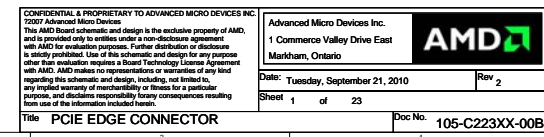
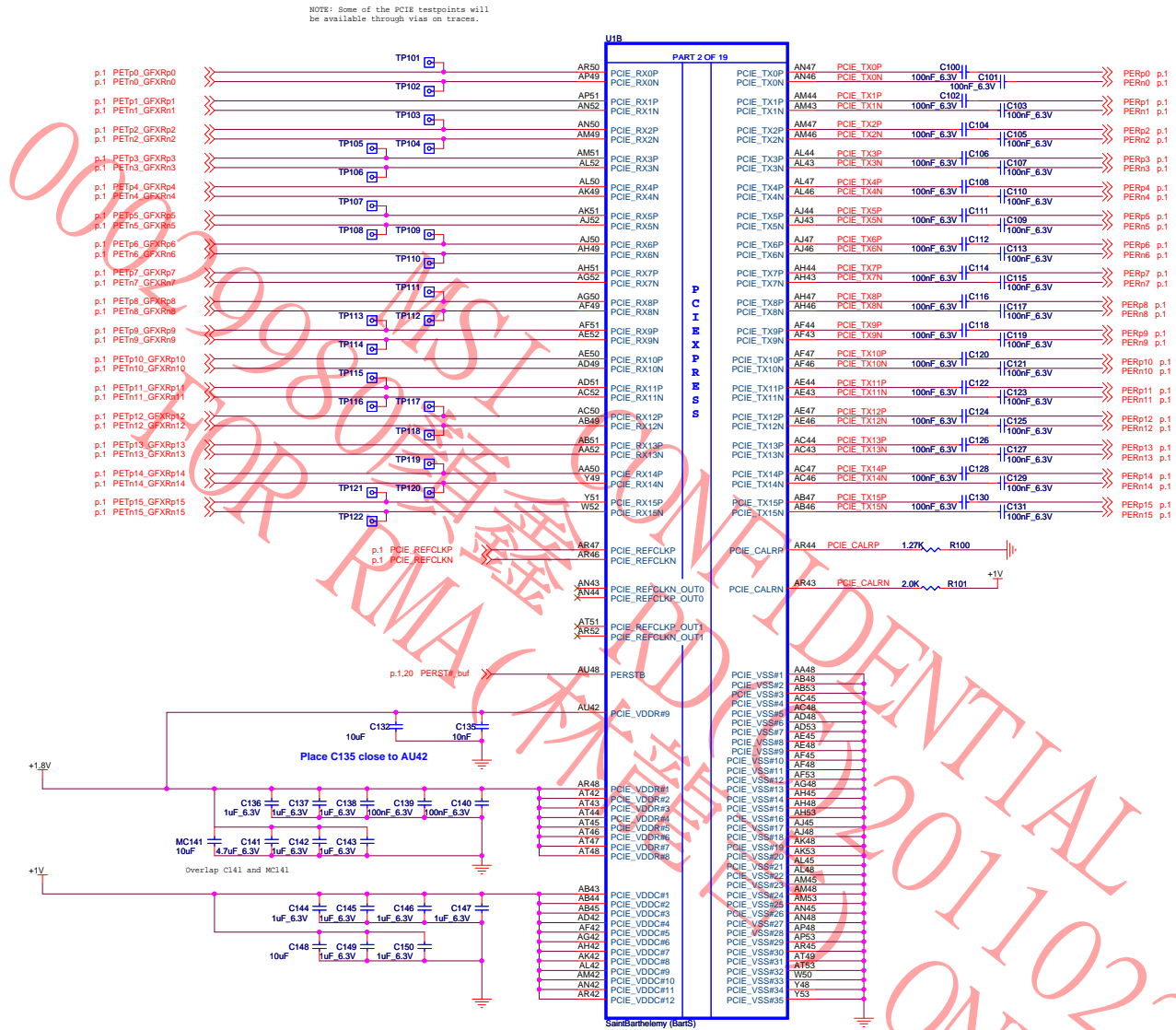


## Koopa

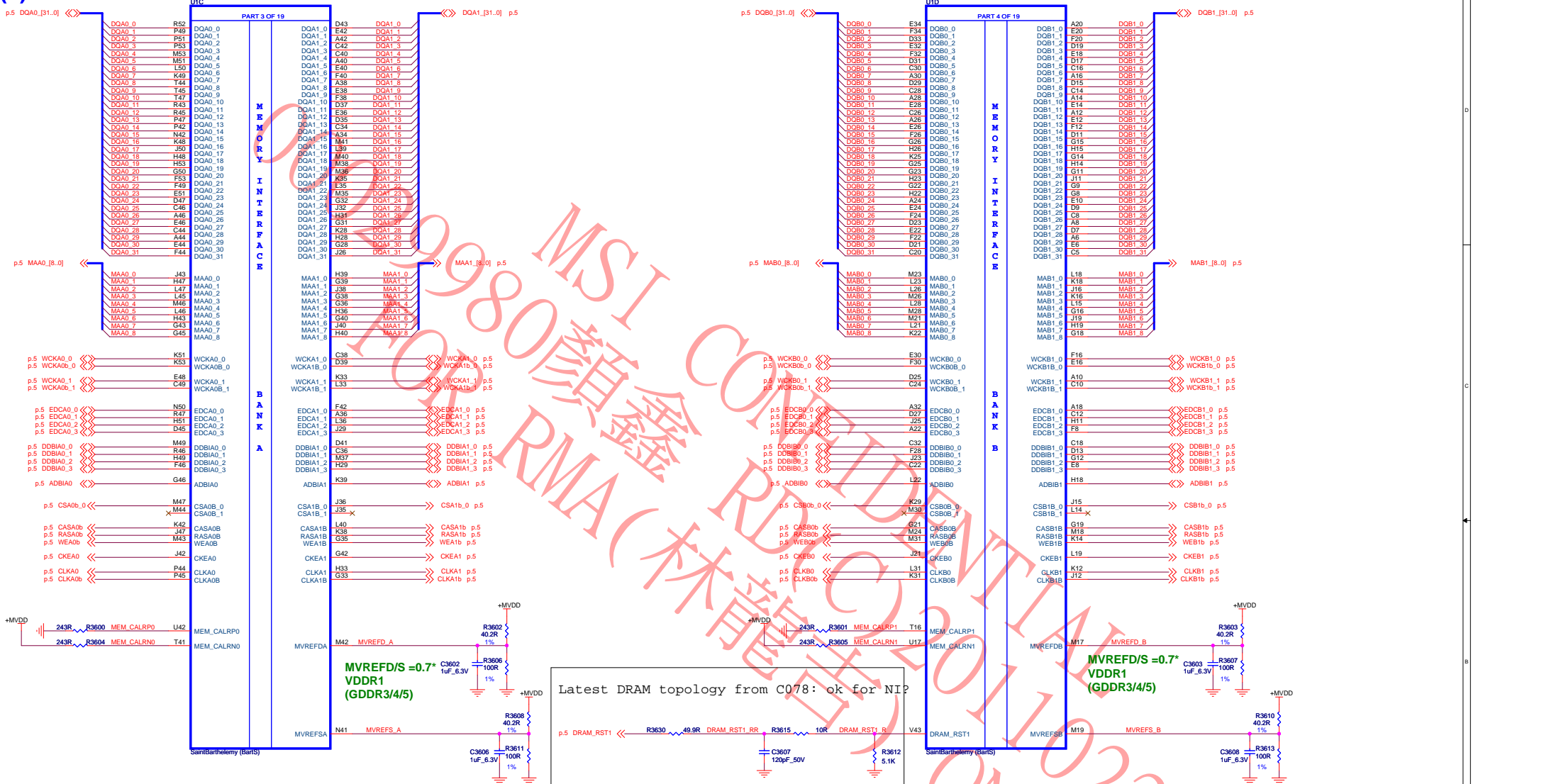




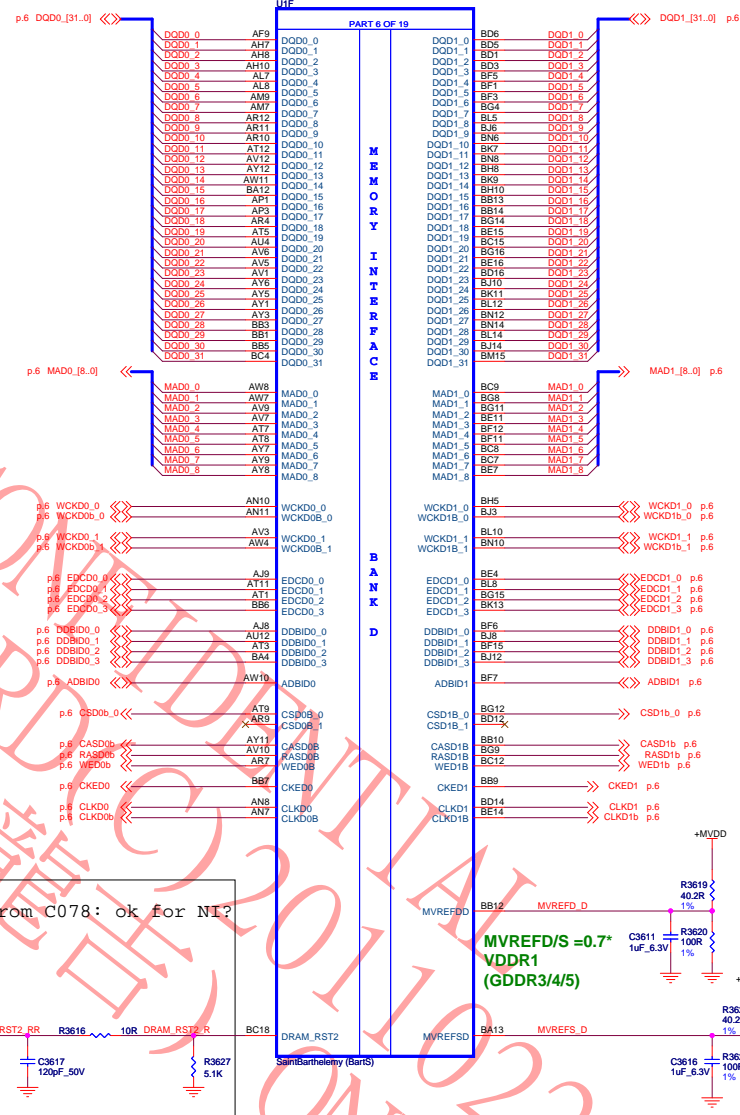
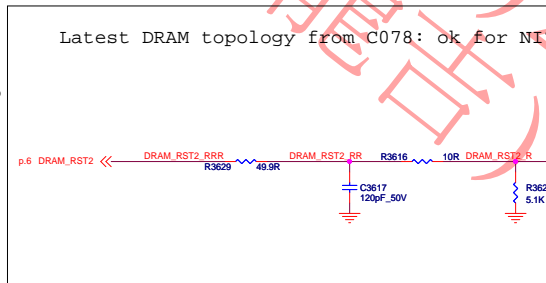
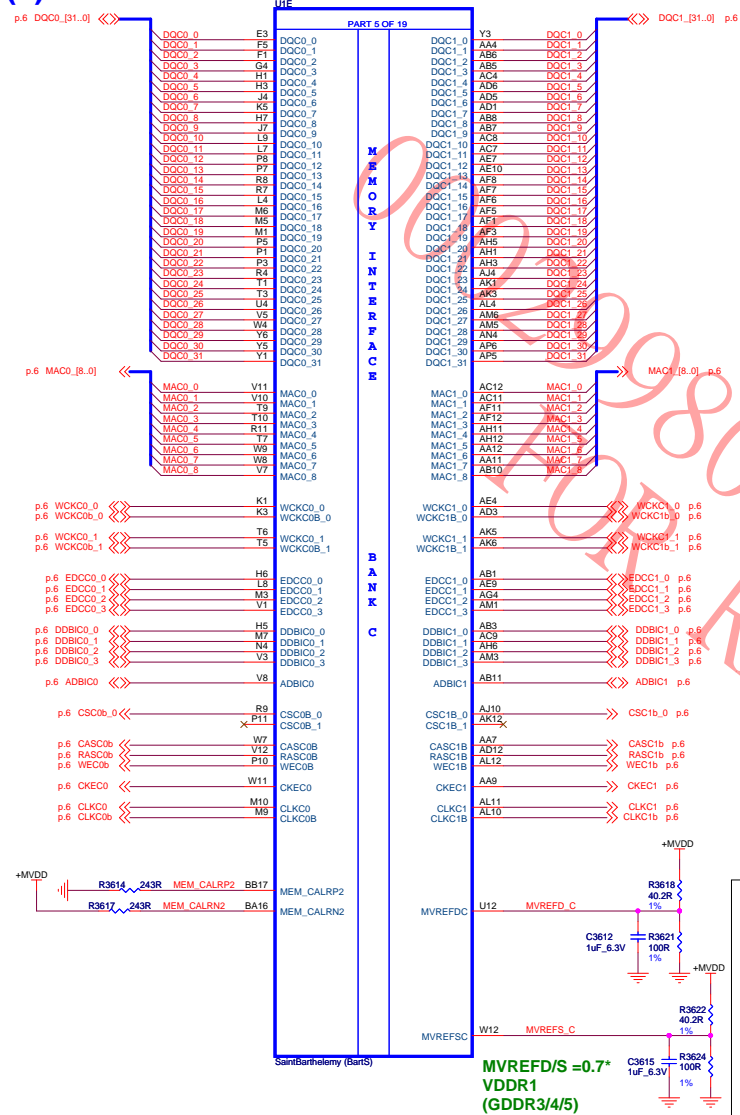
(2) BARTS PCIE Interface



(3) BARTS MEM Interface Ch A&B

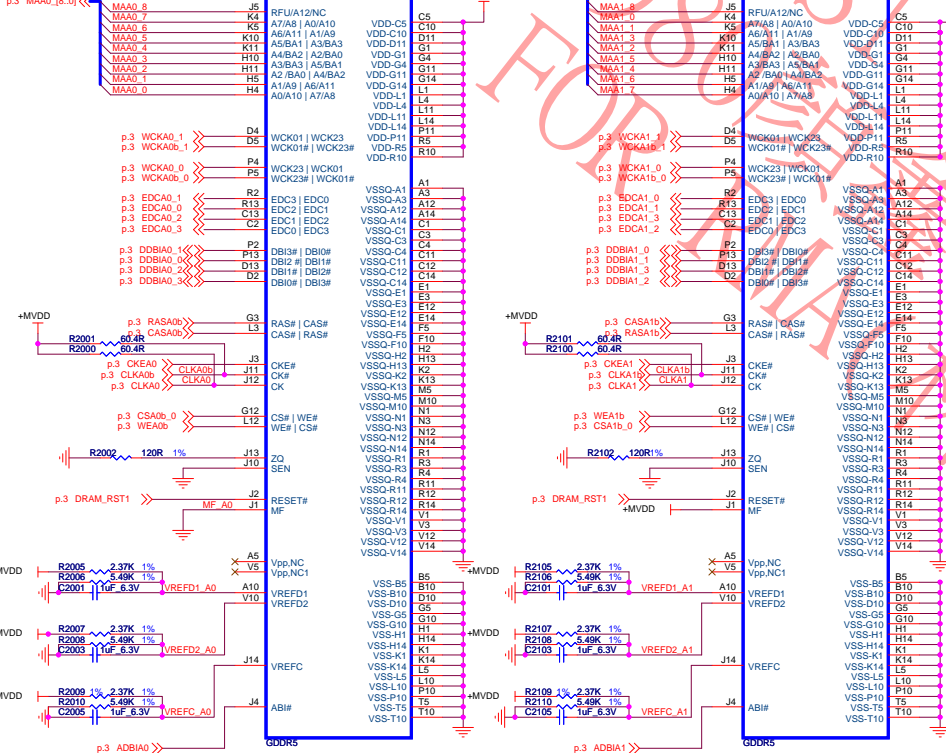
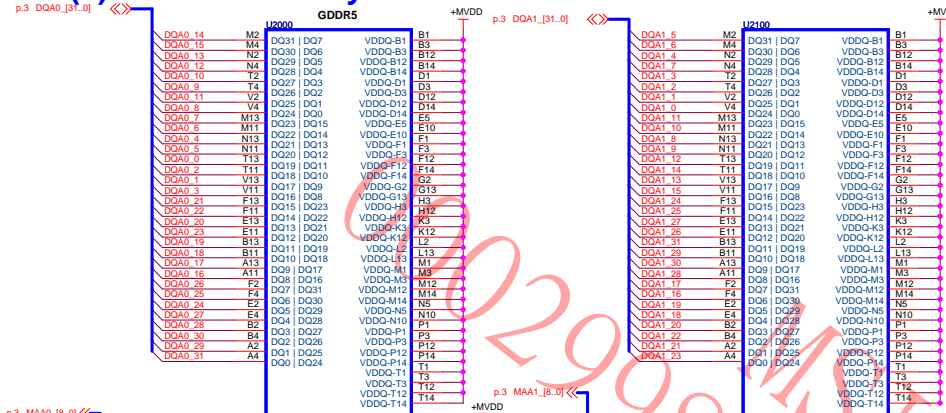


#### (4) BARTS MEM Interface Ch C&D

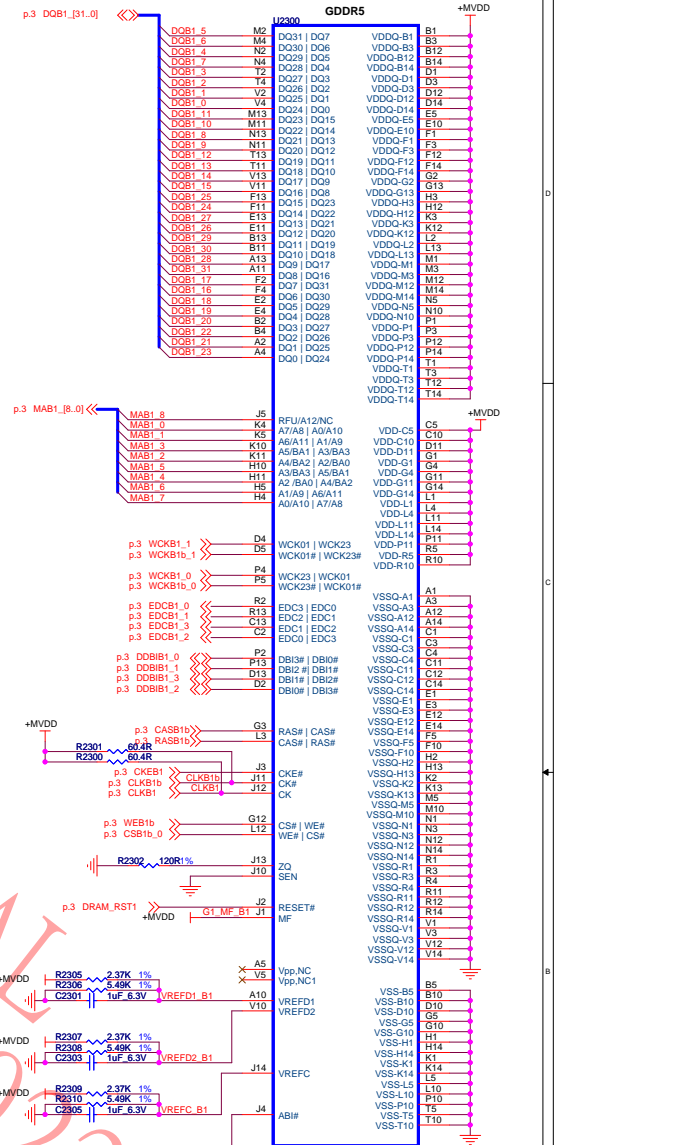
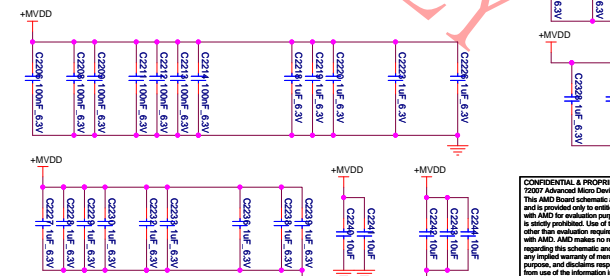
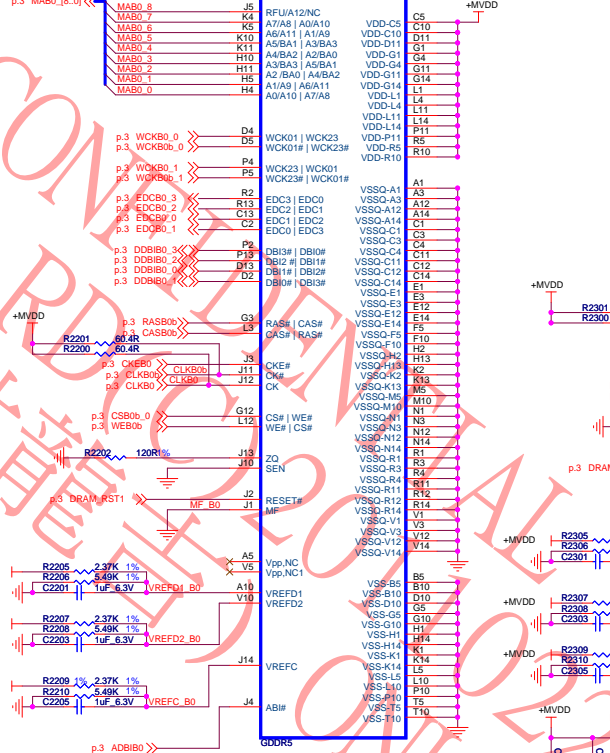
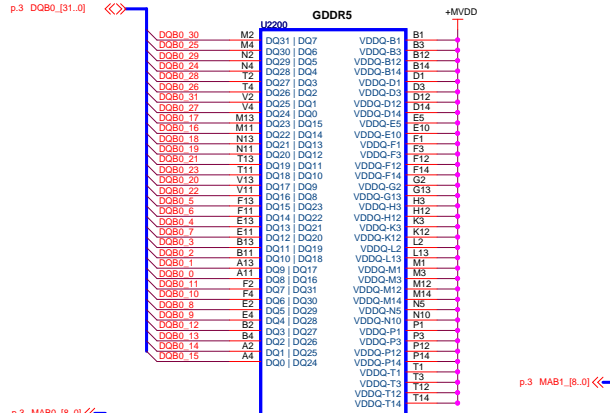
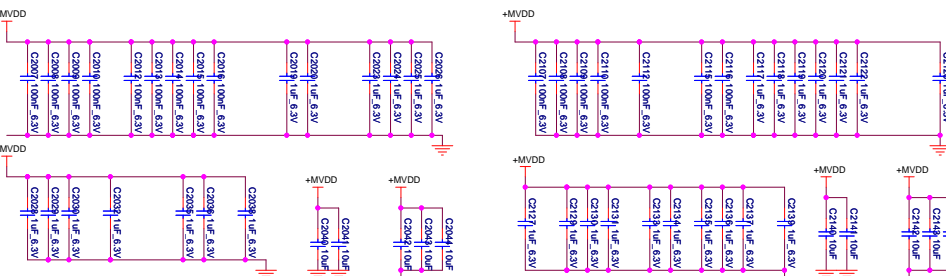




## (5) GDDR5 Memory Channel A&B




**Use internal Vref memory voltage**

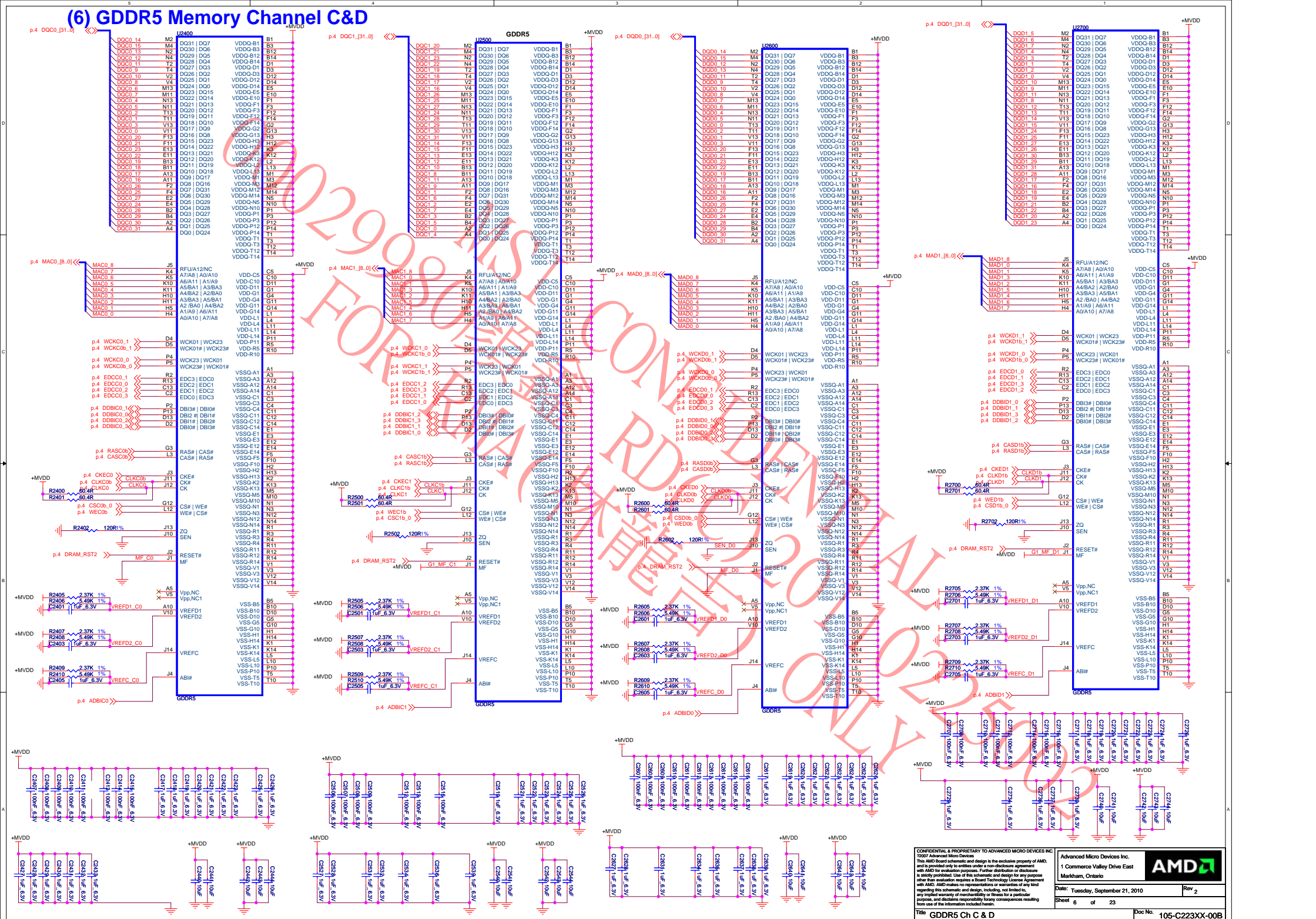


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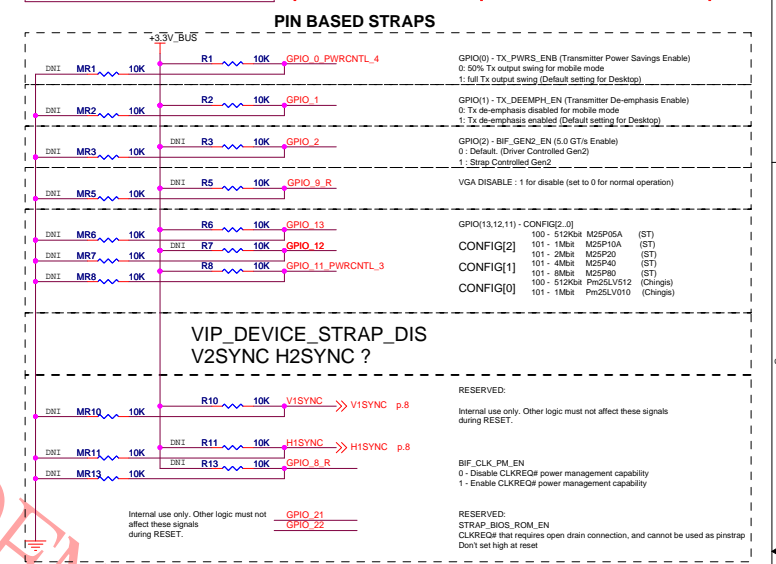
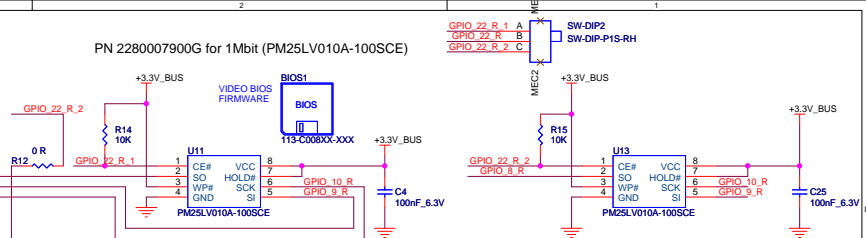
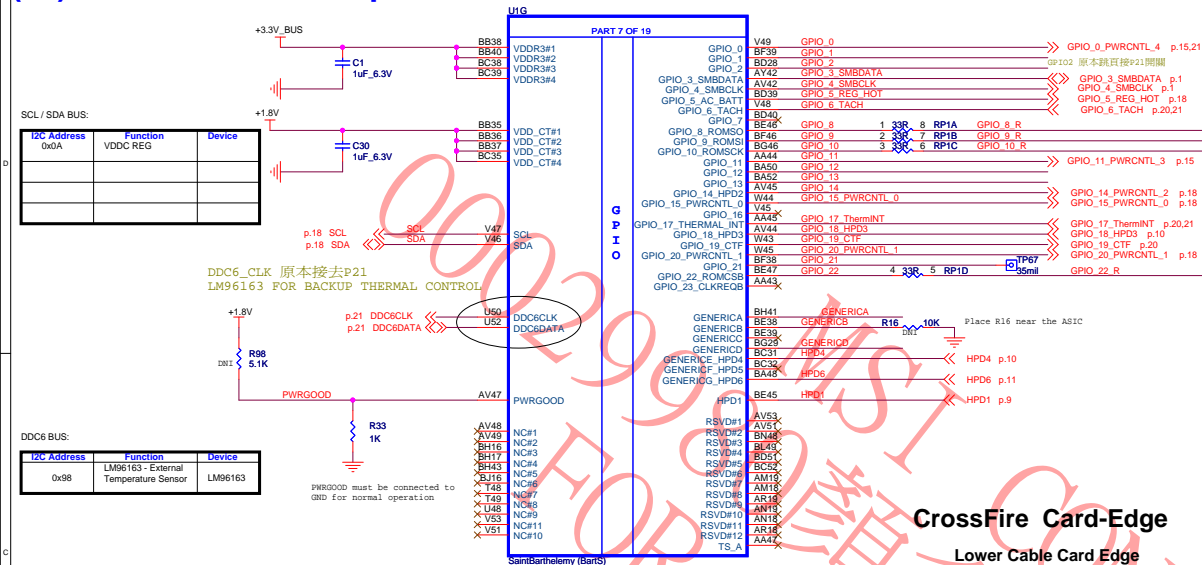
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## (6) GDDR5 Memory Channel C&D

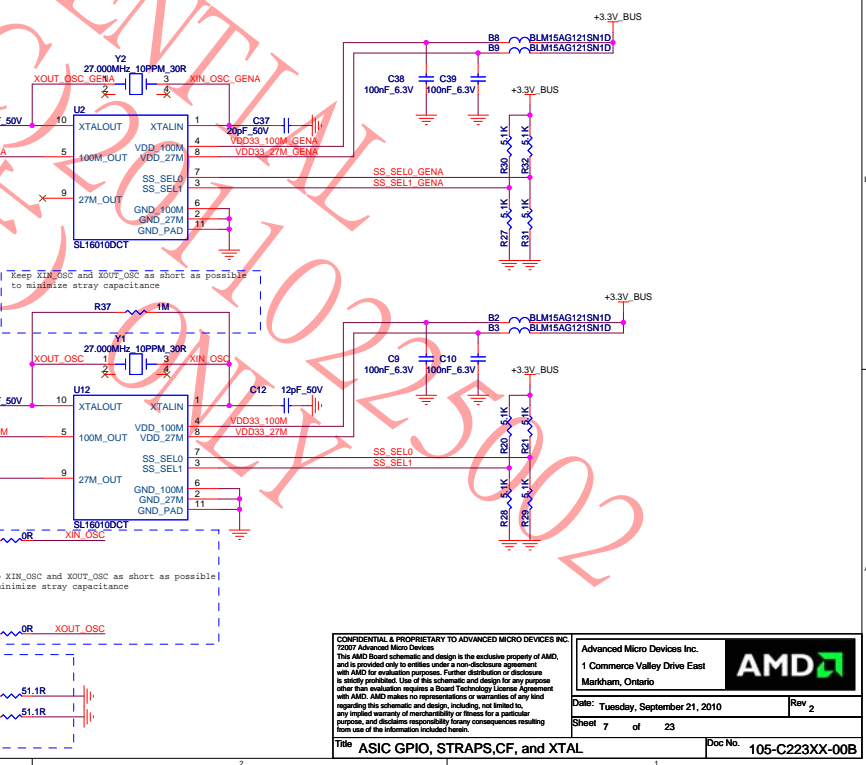
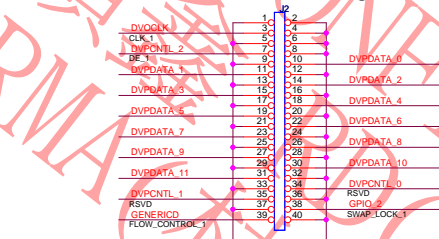
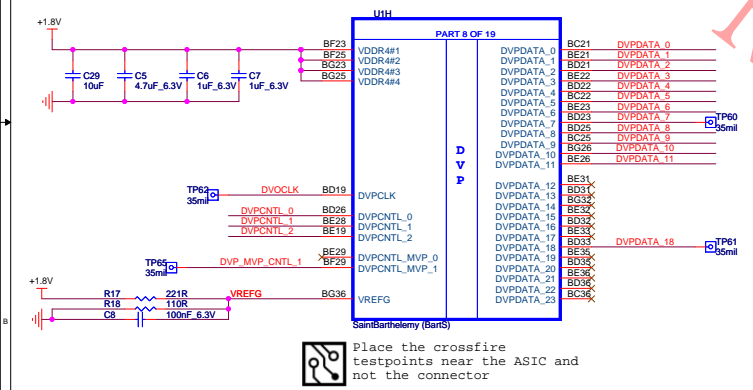



**(07) BARTS GPIOs Strap CF XTAL OSC**




## CrossFire Card-Edge

### Lower Cable Card Edge



 Place the crossfire testpoints near the ASIC and not the connector

 Please pay attention to the grounding strategies for these filter capacitors to maintain a close loop for current.

Keep XIN\_OSC and XOUT\_OSC as short as possible to minimize stray capacitance

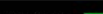
```

Keep XIN_OSC and XOUT_OSC as short as possible |
to minimize stray capacitance                  |
|                                              |
|                                              |

```

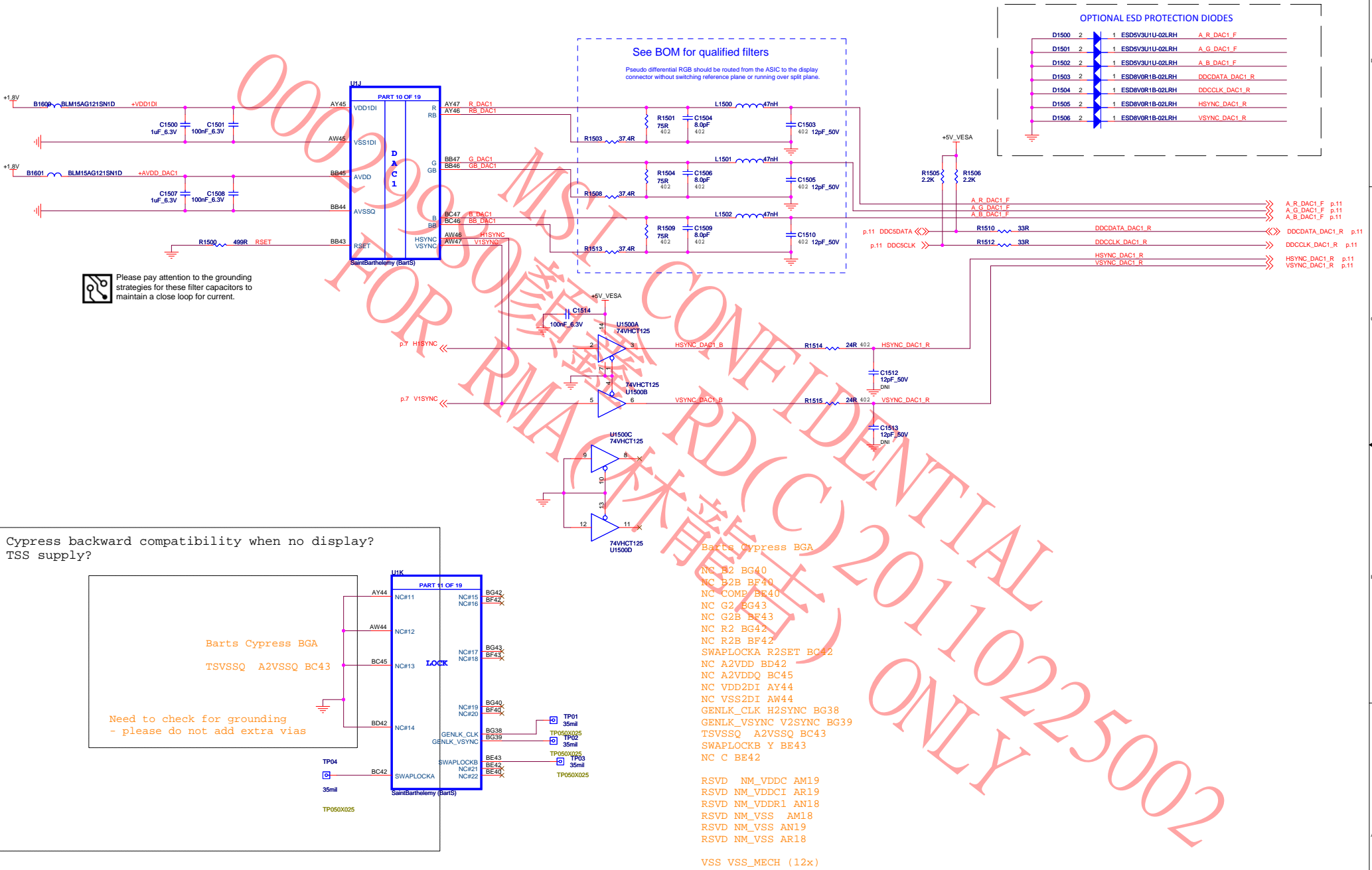
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(08) BARTS DAC1



Cypress backward compatibility when no display?  
TSS supply?

Barts Cypress BGA  
TSVSSQ A2VSSQ BC43

Need to check for grounding  
- please do not add extra vias

- Barts Cypress BGA
- NC B2 BG40
  - NC B2B BF40
  - NC COMB BE40
  - NC G2 BG43
  - NC G2B BF43
  - NC R2 BG42
  - NC R2B BF42
  - SWAPLOCKA R2SET BC42
  - NC A2VDD BD42
  - NC A2VDDQ BC45
  - NC VDD2DI AY44
  - NC VSS2DI AW44
  - GENLK\_CLK H2SYNC BG38
  - GENLK\_VSYNC V2SYNC BG39
  - TSVSSQ A2VSSQ BC43
  - SWAPLOCKB Y BE43
  - NC C BE42

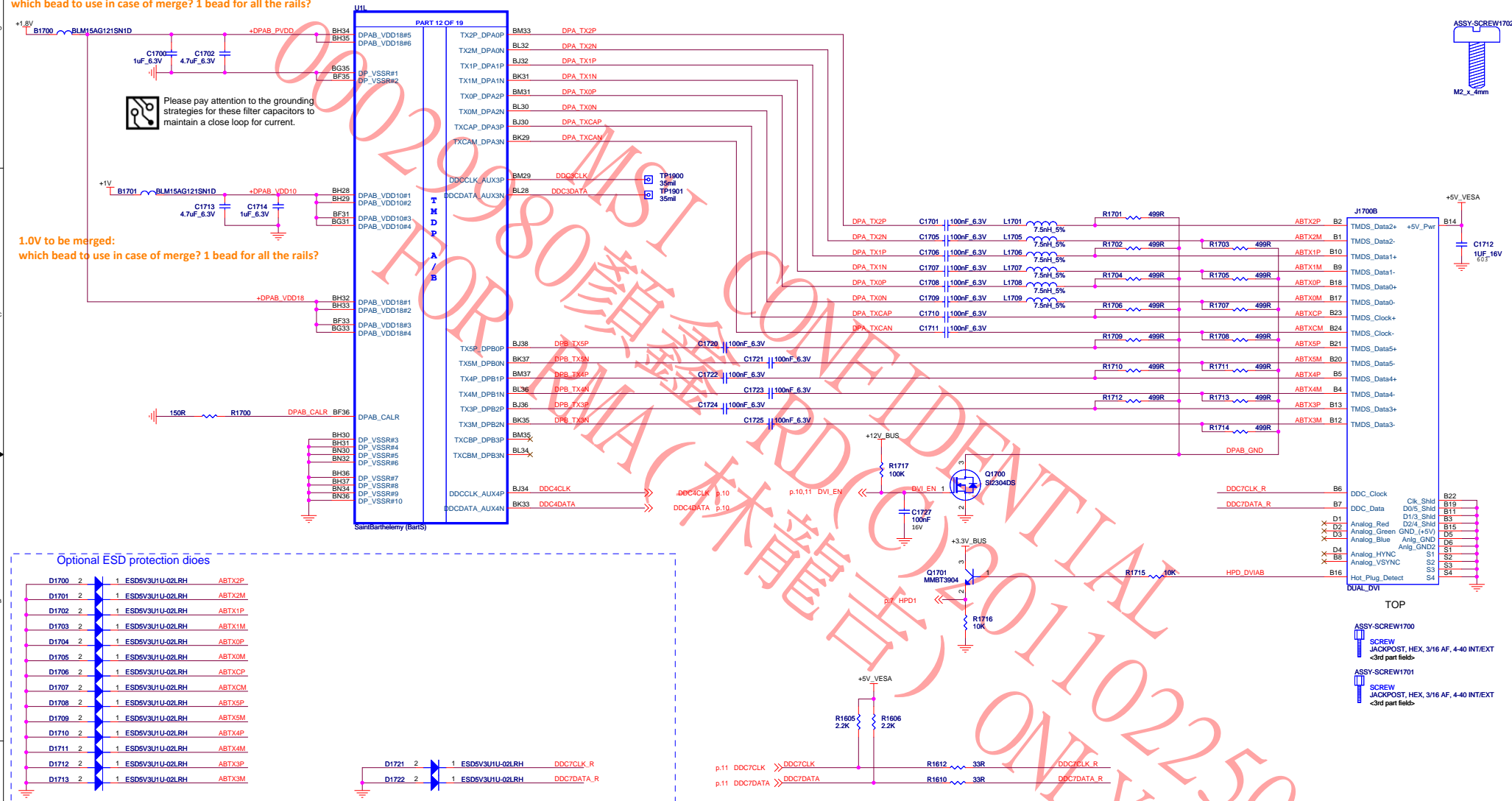
- RSVD NM\_VDDC AM19
- RSVD NM\_VDDCI AR19
- RSVD NM\_VDDR1 AN18
- RSVD NM\_VSS AM18
- RSVD NM\_VSS AN19
- RSVD NM\_VSS AR18

VSS VSS\_MECH (12x)

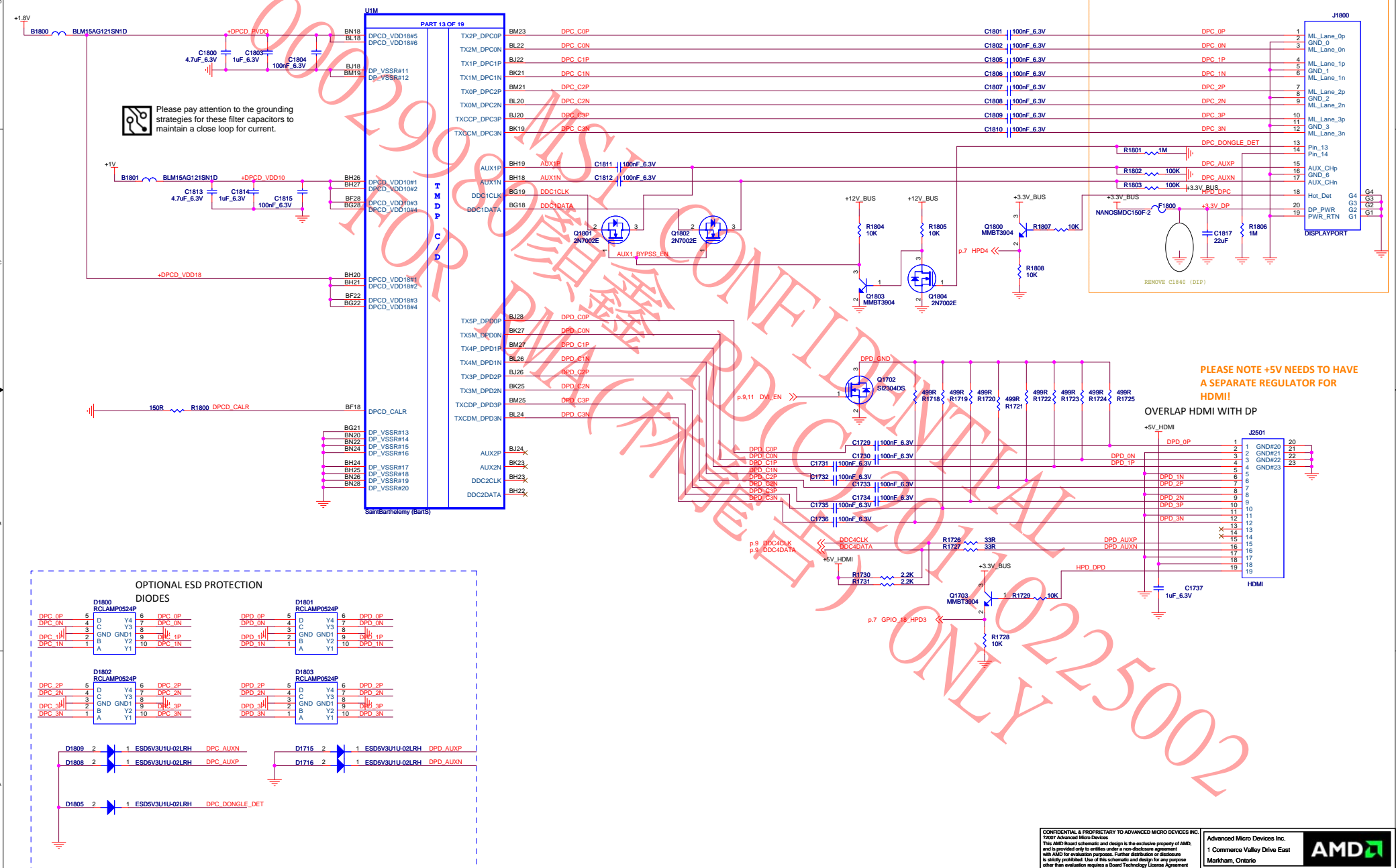
OPTIONAL ESD PROTECTION DIODES									
D1500	2	1	ESDSV3U1U-02LRH	A_R_DAC1_F					
D1501	2	1	ESDSV3U1U-02LRH	A_G_DAC1_F					
D1502	2	1	ESDSV3U1U-02LRH	A_B_DAC1_F					
D1503	2	1	ESD8VOR1B-02LRH	DDCDATA_DAC1_R					
D1504	2	1	ESD8VOR1B-02LRH	DDCCLK_DAC1_R					
D1505	2	1	ESD8VOR1B-02LRH	HSYNC_DAC1_R					
D1506	2	1	ESD8VOR1B-02LRH	VSYNC_DAC1_R					

**(09) BARTS TMDS A&B**


**1.8V to be merged:**  
**which bead to use in case of merge? 1 bead for all the rails?**



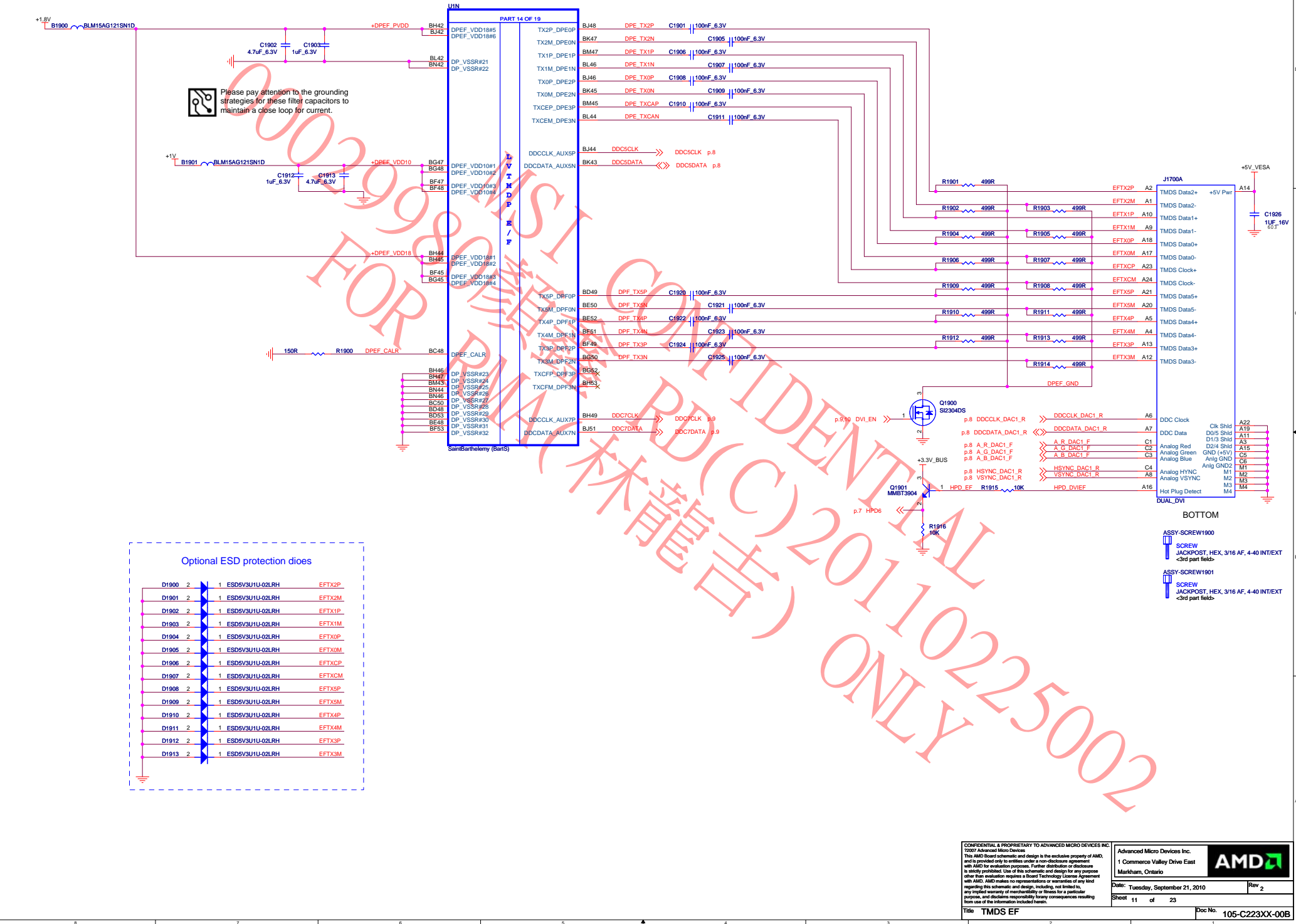
## (10) BARTS Display Port/HDMI C&D



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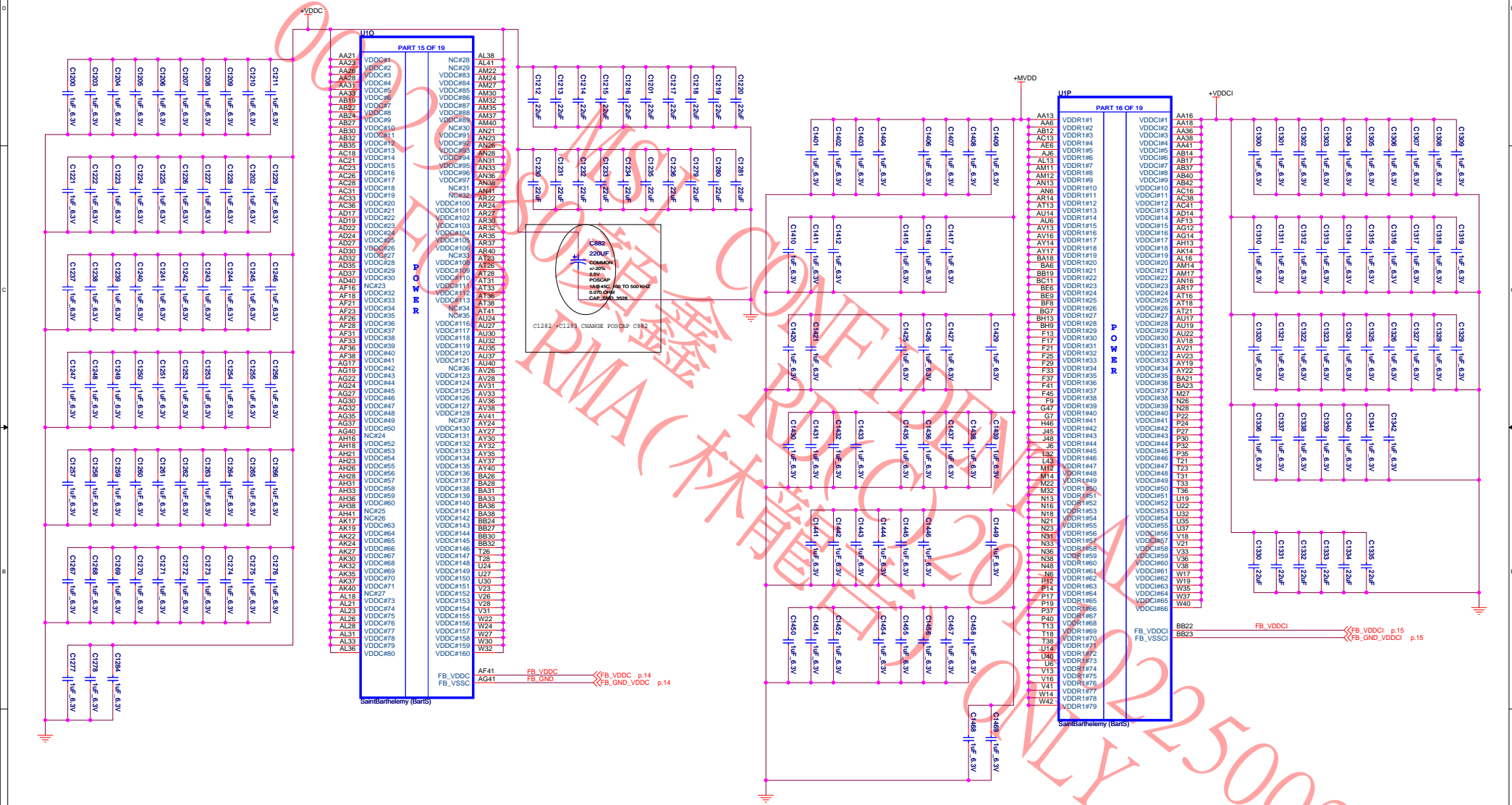
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(11) BARTS LVTMDP E&F





(12) BARTS Power

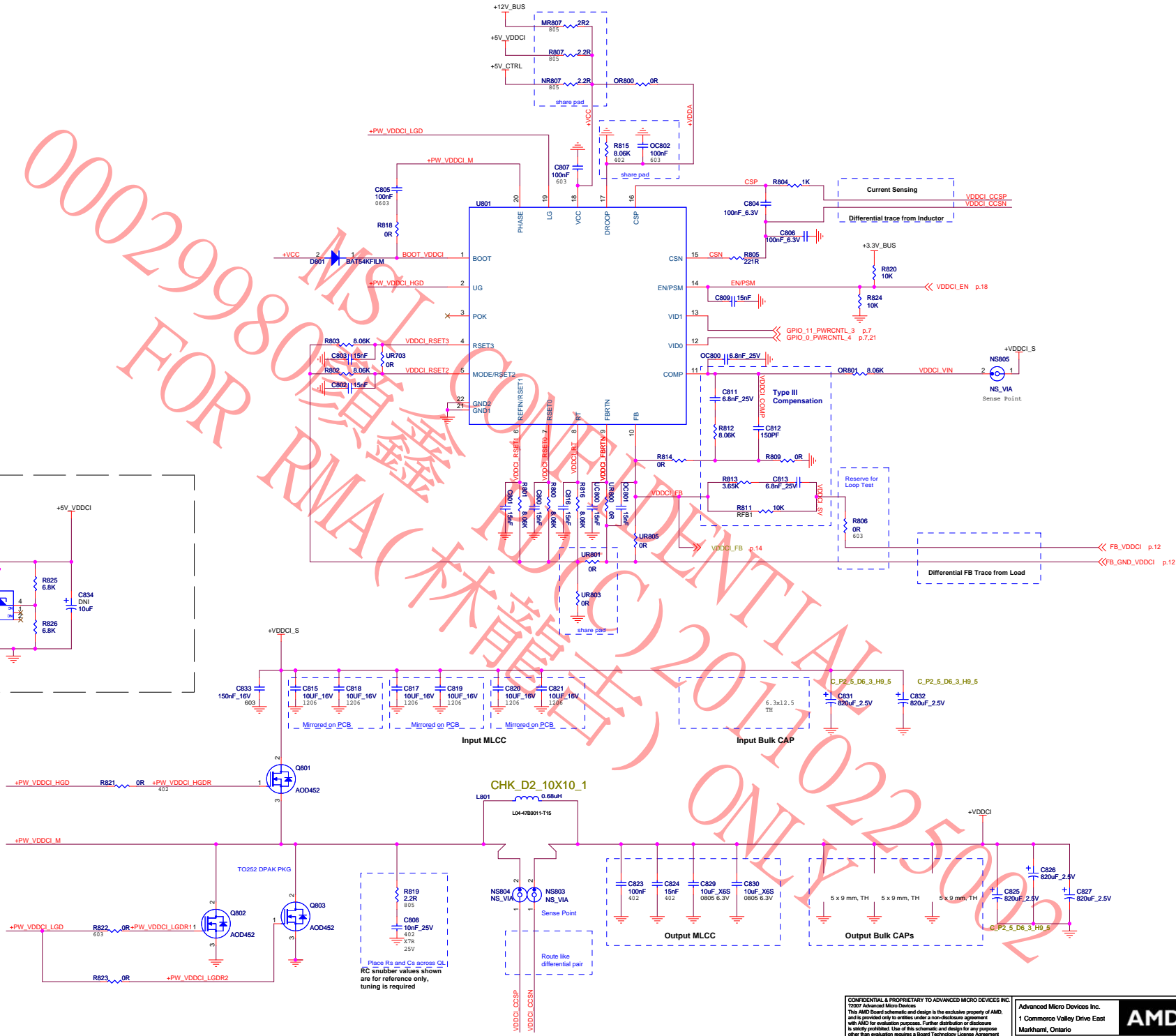
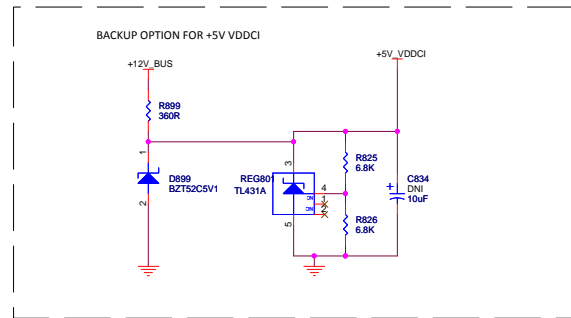


(13) BARTS GND

U10			U18		
PART 17 OF 19			PART 18 OF 19		
A46	VSS#1	VSS#126	BA17	VSS#251	VSS#376
AA10	VSS#2	AM13	BA10	VSS#252	L48
AA14	VSS#3	AM16	BA2	VSS#253	VSS#377
AA17	VSS#4	AM21	BA22	VSS#254	L2
AA19	VSS#5	AM23	BA24	VSS#255	VSS#379
AA2	VSS#6	AM26	BA27	VSS#256	M13
AA22	VSS#7	AM28	BA30	VSS#257	VSS#380
AA24	VSS#8	AM31	BA32	VSS#258	M16
AA27	VSS#9	AM33	BA35	VSS#259	VSS#383
AA30	VSS#10	AM36	BA37	VSS#260	VSS#384
AA32	VSS#11	AM38	BA40	VSS#261	VSS#385
AA35	VSS#12	AM41	BA41	VSS#262	N12
AA37	VSS#13	AM44	BA43	VSS#263	VSS#387
AA39	VSS#14	AM46	BA44	VSS#264	N14
AA40	VSS#15	AM48	BA45	VSS#265	VSS#388
AA42	VSS#16	AM51	BA46	VSS#266	VSS#389
AA44	VSS#17	AM53	BA47	VSS#267	N2
AB13	VSS#18	AM56	BA48	VSS#268	VSS#391
AB16	VSS#19	AM58	BA49	VSS#269	N24
AB18	VSS#20	AM61	BA50	VSS#270	VSS#392
AB21	VSS#21	AM63	BA51	VSS#271	VSS#393
AB23	VSS#22	AM66	BA52	VSS#272	N30
AB24	VSS#23	AM68	BA53	VSS#273	N32
AB28	VSS#24	AM71	BA54	VSS#274	N35
AB31	VSS#25	AM73	BA55	VSS#275	VSS#397
AB33	VSS#26	AM76	BA56	VSS#276	VSS#398
AB35	VSS#27	AM78	BA57	VSS#277	N40
AB36	VSS#28	AM81	BA58	VSS#278	N42
AB37	VSS#29	AM83	BA59	VSS#279	P13
AB38	VSS#30	AM86	BA60	VSS#280	VSS#401
AB41	VSS#31	AM88	BA61	VSS#281	VSS#402
AB43	VSS#32	AM91	BA62	VSS#282	P21
AB44	VSS#33	AM93	BA63	VSS#283	VSS#403
AB46	VSS#34	AM96	BA64	VSS#284	P23
AB47	VSS#35	AM98	BA65	VSS#285	VSS#405
AB48	VSS#36	AM101	BA66	VSS#286	P28
AB49	VSS#37	AM103	BA67	VSS#287	VSS#407
AB50	VSS#38	AM106	BA68	VSS#288	VSS#408
AB51	VSS#39	AM108	BA69	VSS#289	P33
AB52	VSS#40	AM111	BA70	VSS#290	VSS#409
AB53	VSS#41	AM113	BA71	VSS#291	P36
AB54	VSS#42	AM116	BA72	VSS#292	VSS#410
AB55	VSS#43	AM118	BA73	VSS#293	P41
AB56	VSS#44	AM121	BA74	VSS#294	VSS#412
AB57	VSS#45	AM123	BA75	VSS#295	P43
AB58	VSS#46	AM126	BA76	VSS#296	VSS#413
AB59	VSS#47	AM128	BA77	VSS#297	P46
AB60	VSS#48	AM131	BA78	VSS#298	VSS#414
AB61	VSS#49	AM133	BA79	VSS#299	P6
AB62	VSS#50	AM136	BA80	VSS#300	VSS#416
AB63	VSS#51	AM138	BA81	VSS#301	P8
AB64	VSS#52	AM141	BA82	VSS#302	R10
AB65	VSS#53	AM143	BA83	VSS#303	R2
AB66	VSS#54	AM146	BA84	VSS#304	R44
AB67	VSS#55	AM148	BA85	VSS#305	VSS#420
AB68	VSS#56	AM151	BA86	VSS#306	R48
AB69	VSS#57	AM153	BA87	VSS#307	R50
AB70	VSS#58	AM156	BA88	VSS#308	VSS#422
AB71	VSS#59	AM158	BA89	VSS#309	VSS#423
AB72	VSS#60	AM161	BA90	VSS#310	T11
AB73	VSS#61	AM163	BA91	VSS#311	VSS#424
AB74	VSS#62	AM166	BA92	VSS#312	R50
AB75	VSS#63	AM168	BA93	VSS#313	P6
AB76	VSS#64	AM171	BA94	VSS#314	VSS#425
AB77	VSS#65	AM173	BA95	VSS#315	T12
AB78	VSS#66	AM176	BA96	VSS#316	VSS#426
AB79	VSS#67	AM178	BA97	VSS#317	T17
AB80	VSS#68	AM181	BA98	VSS#318	VSS#427
AB81	VSS#69	AM183	BA99	VSS#319	VSS#428
AB82	VSS#70	AM186	BA100	VSS#320	T24
AB83	VSS#71	AM188	BA101	VSS#321	VSS#429
AB84	VSS#72	AM191	BA102	VSS#322	T27
AB85	VSS#73	AM193	BA103	VSS#323	VSS#431
AB86	VSS#74	AM196	BA104	VSS#324	T30
AB87	VSS#75	AM198	BA105	VSS#325	T32
AB88	VSS#76	AM201	BA106	VSS#326	VSS#433
AB89	VSS#77	AM203	BA107	VSS#327	VSS#434
AB90	VSS#78	AM206	BA108	VSS#328	T40
AB91	VSS#79	AM208	BA109	VSS#329	VSS#435
AB92	VSS#80	AM211	BA110	VSS#330	T42
AB93	VSS#81	AM213	BA111	VSS#331	VSS#437
AB94	VSS#82	AM216	BA112	VSS#332	VSS#438
AB95	VSS#83	AM218	BA113	VSS#333	T46
AB96	VSS#84	AM221	BA114	VSS#334	VSS#439
AB97	VSS#85	AM223	BA115	VSS#335	T53
AB98	VSS#86	AM226	BA116	VSS#336	VSS#441
AB99	VSS#87	AM228	BA117	VSS#337	T8
AB100	VSS#88	AM231	BA118	VSS#338	VSS#442
AB101	VSS#89	AM233	BA119	VSS#339	T13
AB102	VSS#90	AM236	BA120	VSS#340	VSS#443
AB103	VSS#91	AM238	BA121	VSS#341	VSS#444
AB104	VSS#92	AM241	BA122	VSS#342	VSS#445
AB105	VSS#93	AM243	BA123	VSS#343	U21
AB106	VSS#94	AM246	BA124	VSS#344	U23
AB107	VSS#95	AM248	BA125	VSS#345	U26
AB108	VSS#96	AM251	BA126	VSS#346	VSS#448
AB109	VSS#97	AM253	BA127	VSS#347	U28
AB110	VSS#98	AM256	BA128	VSS#348	VSS#449
AB111	VSS#99	AM258	BA129	VSS#349	U31
AB112	VSS#100	AM261	BA130	VSS#350	VSS#451
AB113	VSS#101	AM263	BA131	VSS#351	U33
AB114	VSS#102	AM266	BA132	VSS#352	VSS#452
AB115	VSS#103	AM268	BA133	VSS#353	U36
AB116	VSS#104	AM271	BA134	VSS#354	VSS#453
AB117	VSS#105	AM273	BA135	VSS#355	U41
AB118	VSS#106	AM276	BA136	VSS#356	VSS#454
AB119	VSS#107	AM278	BA137	VSS#357	VSS#455
AB120	VSS#108	AM281	BA138	VSS#358	V17
AB121	VSS#109	AM283	BA139	VSS#359	VSS#457
AB122	VSS#110	AM286	BA140	VSS#360	VSS#458
AB123	VSS#111	AM288	BA141	VSS#361	V22
AB124	VSS#112	AM291	BA142	VSS#362	VSS#459
AB125	VSS#113	AM293	BA143	VSS#363	V24
AB126	VSS#114	AM296	BA144	VSS#364	VSS#461
AB127	VSS#115	AM298	BA145	VSS#365	V30
AB128	VSS#116	AM301	BA146	VSS#366	V32
AB129	VSS#117	AM303	BA147	VSS#367	V35
AB130	VSS#118	AM306	BA148	VSS#368	V37
AB131	VSS#119	AM308	BA149	VSS#369	VSS#463
AB132	VSS#120	AM311	BA150	VSS#370	V40
AB133	VSS#121	AM313	BA151	VSS#371	V42
AB134	VSS#122	AM316	BA152	VSS#372	V44
AB135	VSS#123	AM318	BA153	VSS#373	VSS#467
AB136	VSS#124	AM321	BA154	VSS#374	VSS#468
AB137	VSS#125	AM323	BA155	VSS#375	V9
AB138	VSS#126	AM326	BA156	VSS#376	VSS#470
AB139	VSS#127	AM328	BA157	VSS#377	VSS#471
AB140	VSS#128	AM331	BA158	VSS#378	W16
AB141	VSS#129	AM333	BA159	VSS#379	VSS#473
AB142	VSS#130	AM336	BA160	VSS#380	W18
AB143	VSS#131	AM338	BA161	VSS#381	W21
AB144	VSS#132	AM341	BA162	VSS#382	W23
AB145	VSS#133	AM343	BA163	VSS#383	VSS#477
AB146	VSS#134	AM346	BA164	VSS#384	W28
AB147	VSS#135	AM348	BA165	VSS#385	VSS#478
AB148	VSS#136	AM351	BA166	VSS#386	W29
AB149	VSS#137	AM353	BA167	VSS#387	VSS#479
AB150	VSS#138	AM356	BA168	VSS#388	W31
AB151	VSS#139	AM358	BA169	VSS#389	VSS#481
AB152	VSS#140	AM361	BA170	VSS#390	W33
AB153	VSS#141	AM363	BA171	VSS#391	VSS#482
AB154	VSS#142	AM366	BA172	VSS#392	W36
AB155	VSS#143	AM368	BA173	VSS#393	VSS#483
AB156	VSS#144	AM371	BA174	VSS#394	W41
AB157	VSS#145	AM373	BA175	VSS#395	VSS#484
AB158	VSS#146	AM376	BA176	VSS#396	W48
AB159	VSS#147	AM378	BA177	VSS#397	VSS#485
AB160	VSS#148	AM381	BA178	VSS#398	W6
AB161	VSS#149	AM383	BA179	VSS#399	
AB162	VSS#150	AM386	BA180	VSS#400	
AB163	VSS#151	AM388	BA181	VSS#401	
AB164	VSS#152	AM391	BA182	VSS#402	
AB165	VSS#153	AM393	BA183	VSS#403	
AB166	VSS#154	AM396	BA184	VSS#404	
AB167	VSS#155	AM398	BA185	VSS#405	
AB168	VSS#156	AM401	BA186	VSS#406	
AB169	VSS#157	AM403	BA187	VSS#407	
AB170	VSS#158	AM406	BA188	VSS#408	
AB171	VSS#159	AM408	BA189	VSS#409	
AB172	VSS#160	AM411	BA190	VSS#410	
AB173	VSS#161	AM413	BA191	VSS#411	
AB174	VSS#162	AM416	BA192	VSS#412	
AB175	VSS#163	AM418	BA193	VSS#413	
AB176	VSS#164	AM421	BA194	VSS#414	
AB177	VSS#165	AM423	BA195	VSS#415	
AB178	VSS#166	AM426	BA196	VSS#416	
AB179	VSS#167	AM428	BA197	VSS#417	
AB180	VSS#168	AM431	BA198	VSS#418	
AB181	VSS#169	AM433	BA199	VSS#419	
AB182	VSS#170	AM436	BA200	VSS#420	
AB183	VSS#171	AM438	BA201	VSS#421	
AB184	VSS#172	AM441	BA202	VSS#422	
AB185	VSS#173	AM443	BA203	VSS#423	
AB186	VSS#174	AM446	BA204	VSS#424	
AB187	VSS#175	AM448	BA205	VSS#425	
AB188	VSS#176	AM451	BA206	VSS#426	
AB189	VSS#177	AM453	BA207	VSS#427	
AB190	VSS#178	AM456	BA208	VSS#428	
AB191	VSS#179	AM458	BA209	VSS#429	
AB192	VSS#180	AM461	BA210	VSS#430	
AB193	VSS#181	AM463	BA211	VSS#431	
AB194	VSS#182	AM466	BA212	VSS#432	
AB195	VSS#183	AM468	BA213	VSS#433	
AB196	VSS#184	AM471	BA214	VSS#434	
AB197	VSS#185	AM473	BA215	VSS#435	
AB198	VSS#186	AM476	BA216	VSS#436	
AB199	VSS#187	AM478	BA217	VSS#437	
AB200	VSS#188	AM481	BA218	VSS#438	
AB201	VSS#189	AM483	BA219	VSS#439	
AB202	VSS#190	AM486	BA220	VSS#440	
AB203	VSS#191	AM488	BA221	VSS#441	
AB204	VSS#192	AM491	BA222	VSS#442	
AB205	VSS#193	AM493	BA223	VSS#443	
AB206	VSS#194	AM496	BA224	VSS#444	
AB207	VSS#195	AM498	BA225	VSS#445	
AB208	VSS#196	AM501	BA226	VSS#446	
AB209	VSS#197	AM503	BA227	VSS#447	
AB210	VSS#198	AM506	BA228	VSS#448	
AB211	VSS#199	AM508	BA229	VSS#449	
AB212	VSS#200	AM511	BA230	VSS#450	
AB213	VSS#201	AM513	BA231	VSS#451	
AB214	VSS#202	AM516	BA232	VSS#452	
AB215	VSS#203	AM518	BA233	VSS#453	
AB216	VSS#204	AM521	BA234	VSS#454	
AB217	VSS#205	AM523	BA235	VSS#455	
AB218	VSS#206	AM526	BA236	VSS#456	
AB219	VSS#207	AM528	BA237	VSS#457	
AB220	VSS#208	AM531	BA238	VSS#458	
AB221	VSS#209	AM533	BA239	VSS#459	
AB222	VSS#210	AM536	BA240	VSS#460	
AB223	VSS#211	AM538	BA241	VSS#461	
AB224	VSS#212	AM541	BA242	VSS#462	
AB225	VSS#213	AM543	BA243	VSS#463	
AB226	VSS#214	AM546	BA244	VSS#464	
AB227	VSS#215</				



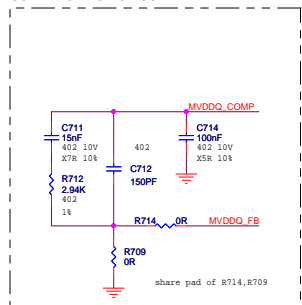
# (15) VDDCI



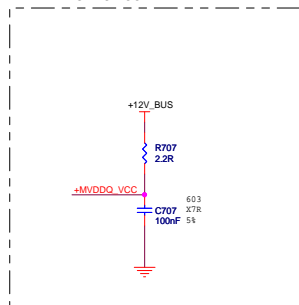




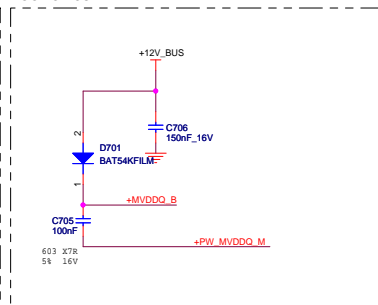
### COMPENSATION CIRCUIT



**FILTERED SMPS VCC**



### BOOT CIRCUIT



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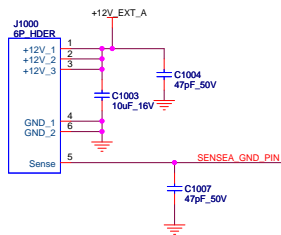
Sheet 16 of 23

Doc No. 105 C222XY 00B

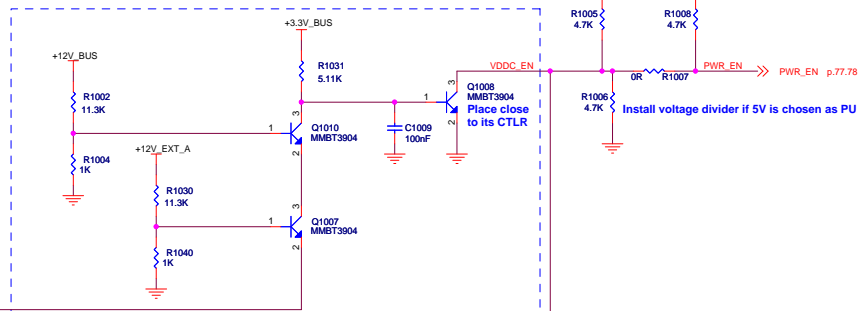
Title MVDD

105-C223XX-00B

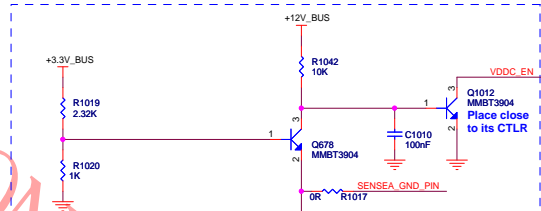
(17) BARTS POWER MGMNT



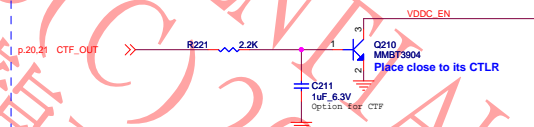
Multi footprint



BUS 12V and AUX A Power up Seq



BUS 3.3V Power up Seq



Shutdown for CTF

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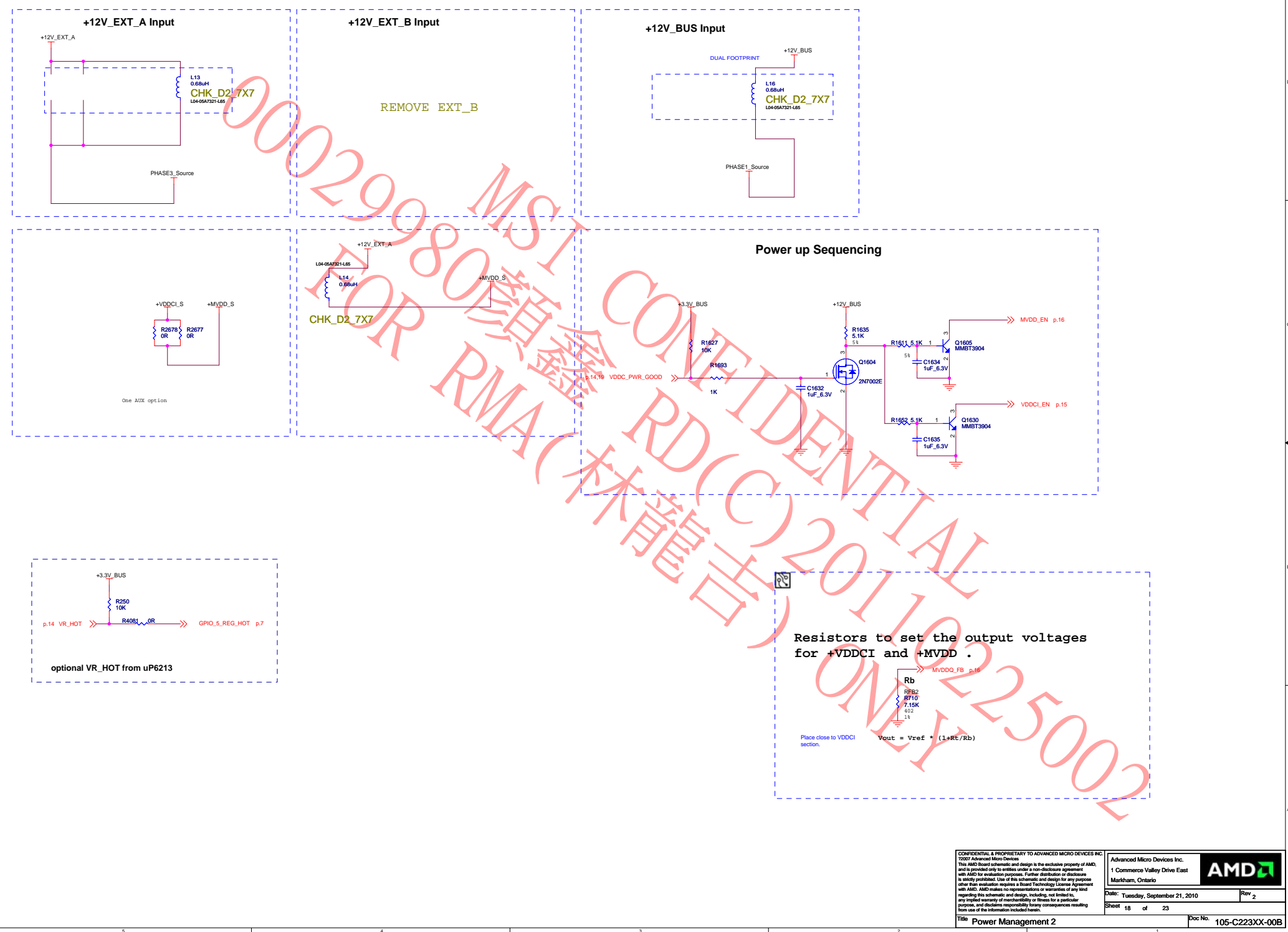
Rev 2

Sheet 17 of 23

Title Power Management

Doc No. 105-C223XX-00B

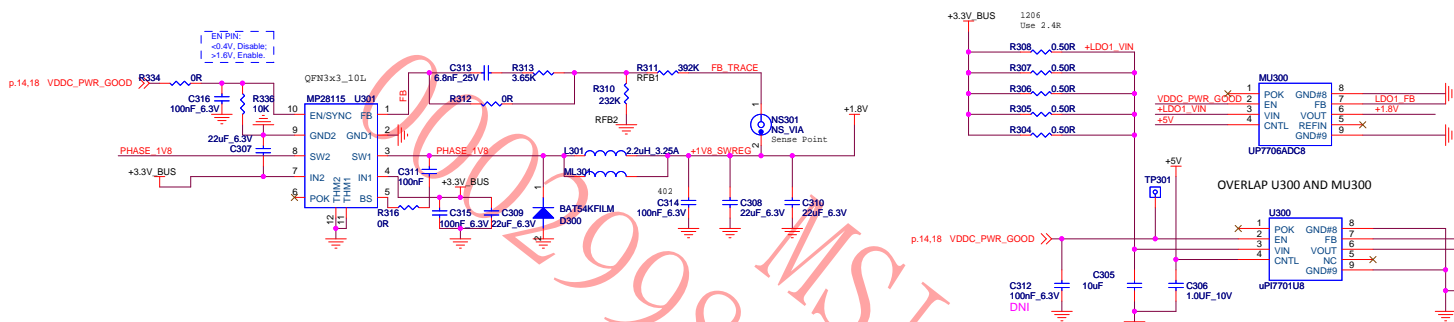
(18) BARTS VDDCI POWER PLAY



## (18) BARTS Small Rail Regulators

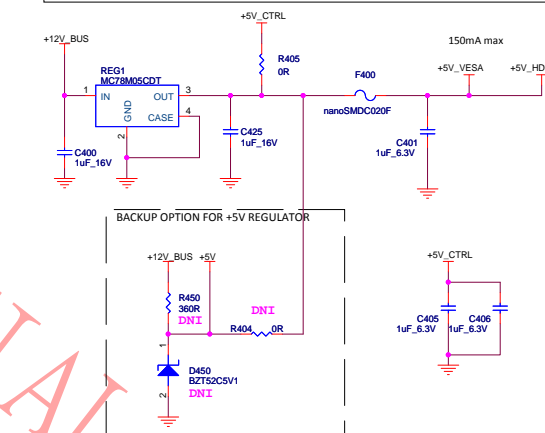
**LDO #1: Vin = 2.1V to 3.6V MAX Vout = +1.8V +/- 2% Iout = 2.3A (TBV) RMS MAX**

**PCB: 50 to 70mm sq. copper area for cooling**


$$V_{OUT} = V_{ref} \times (1 + R_5/R_4)$$

**Regulators for +5V, +5V\_VESA and +5V\_HDMI**  
**Iout max = 150mA (DVI+HDMI)**

**Other cheaper solution at 5MHz switching for 1.8V**

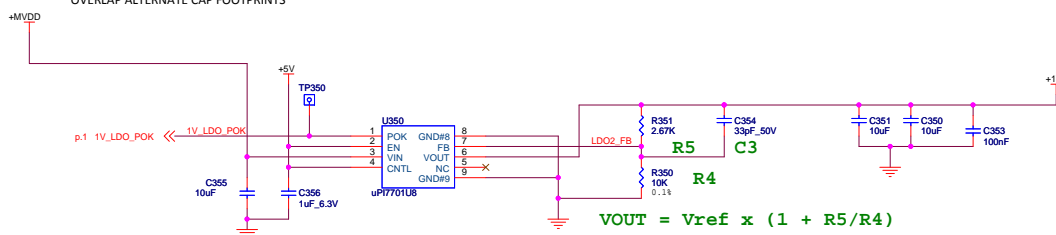


optional 5V power for VDDC regulator;

**LDO #2: Vin = +1.35V to 1.8VMAX    Vout = +1V +/- 2%    Iout = 1.7A (TBV) RMS MAX**

**PCB: 50 to 70mm sq. copper area for cooling**

OVERLAP ALTERNATE CAP FOOTPRINTS


$$V_{OUT} = V_{ref} \times (1 + R_5/R_4)$$

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Sheet 19 of 23

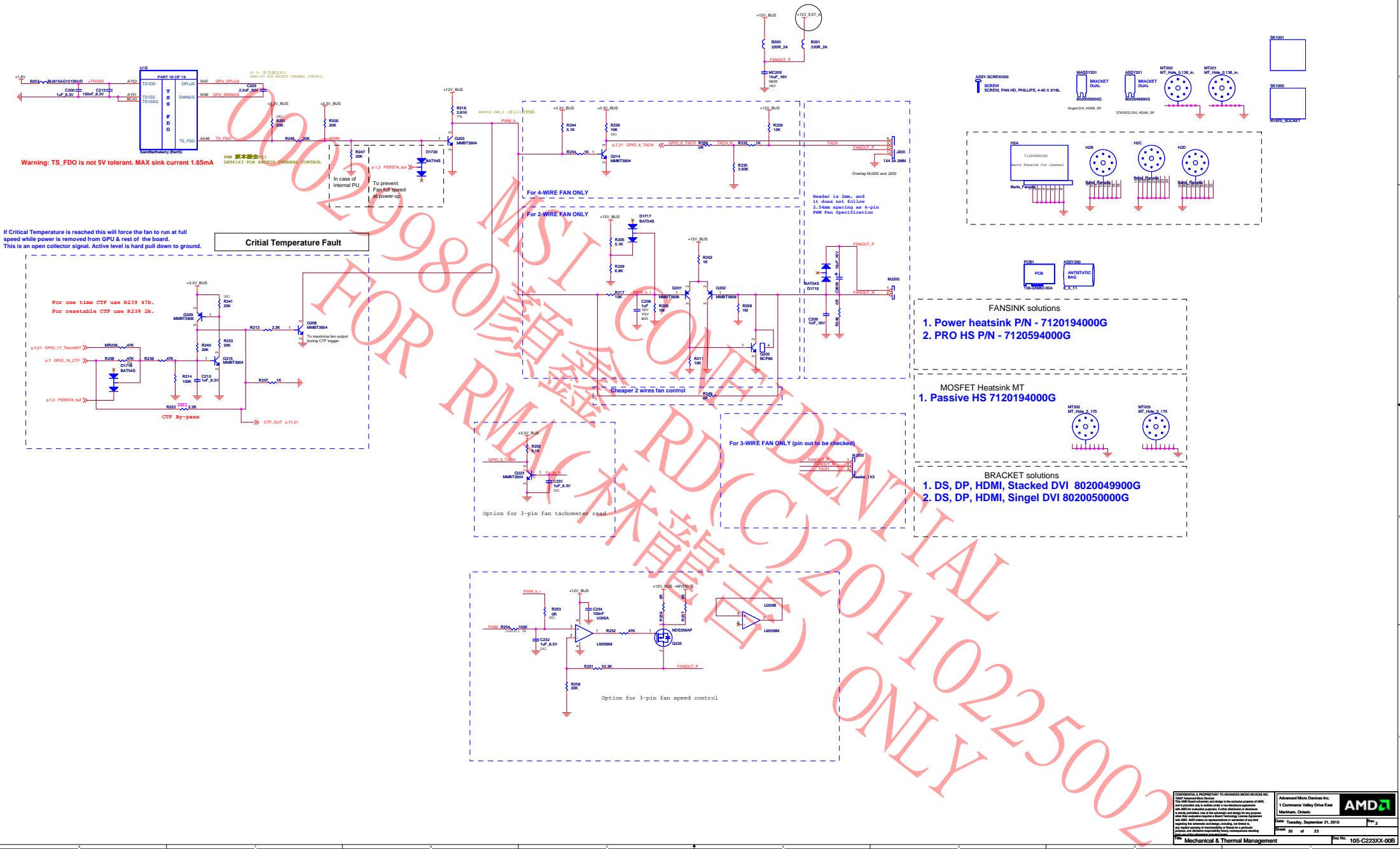
Rev

Title	Small Rail Regulators
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Doc No. 105-C223XX-00B



## (20) BARTS Mechanical and Thermal Management



(21) BARTS Debug Circuits







RH BARTS GDDR5 DP-HDMI-DVII-DVII

Schematic No.  
105-C223XX-00B

Date:  
Tuesday, September 21, 2010

## REVISION HISTORY

**NOTE:** This schematic represents the PCB, it does not represent any specific SKU.  
For Stuffing options (component values, DNI , ? please consult the product specific BOM.  
Please contact AMD representative to obtain latest BOM closest to the application desired.

Rev 2

Sch Rev	PCB Rev	Date	REVISION DESCRIPTION
0	00A	21/06/2010	Initial release. Based on C221 layout
1	00B		<p>Page17: add C221            Page14: update Q601,Q602,Q603,Q604 symbol            Page18: add R241, R201.            Page18: add optional 3-pin fan tach circuitry;add optional 3-pin fan speed control circuitry</p>

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