

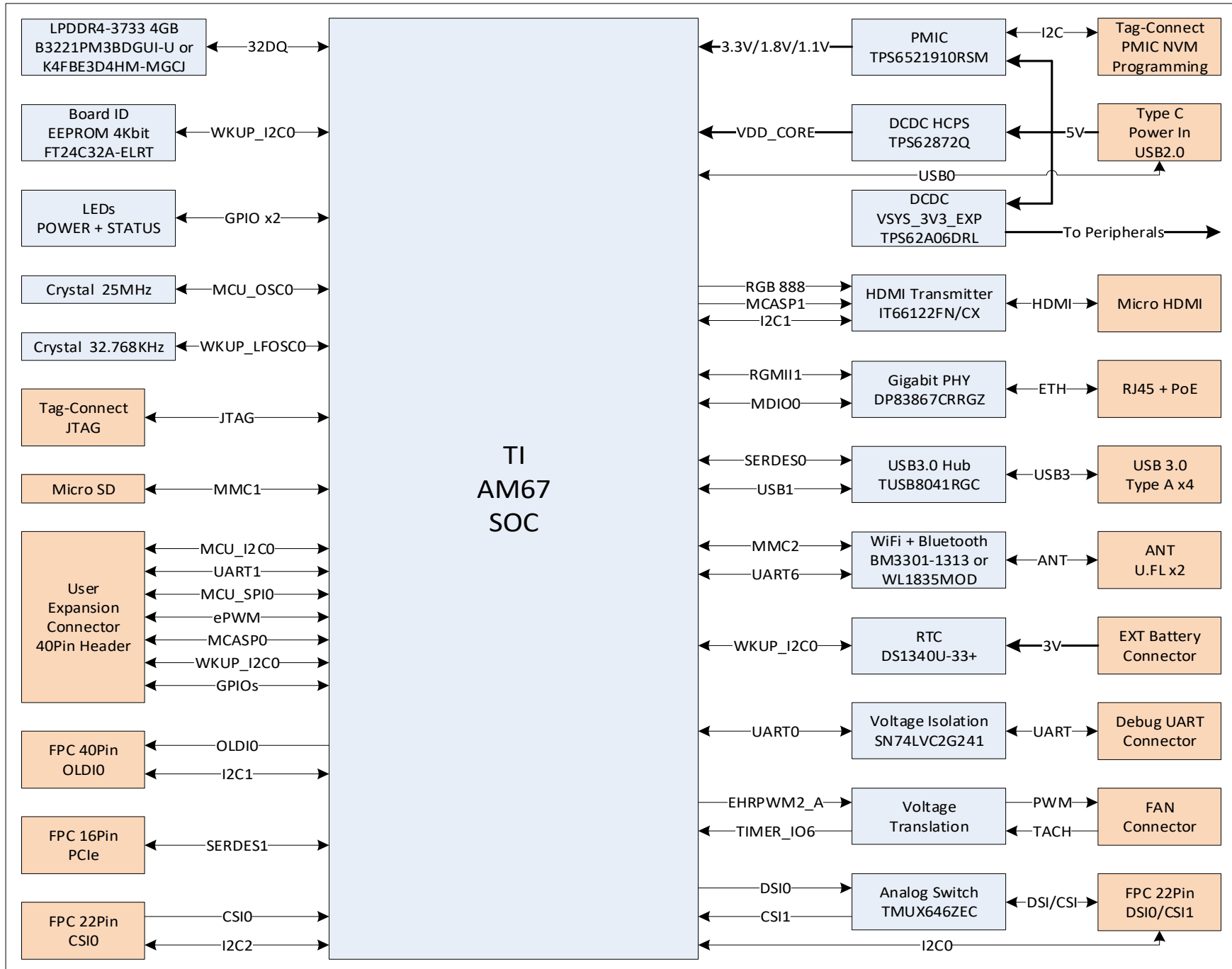
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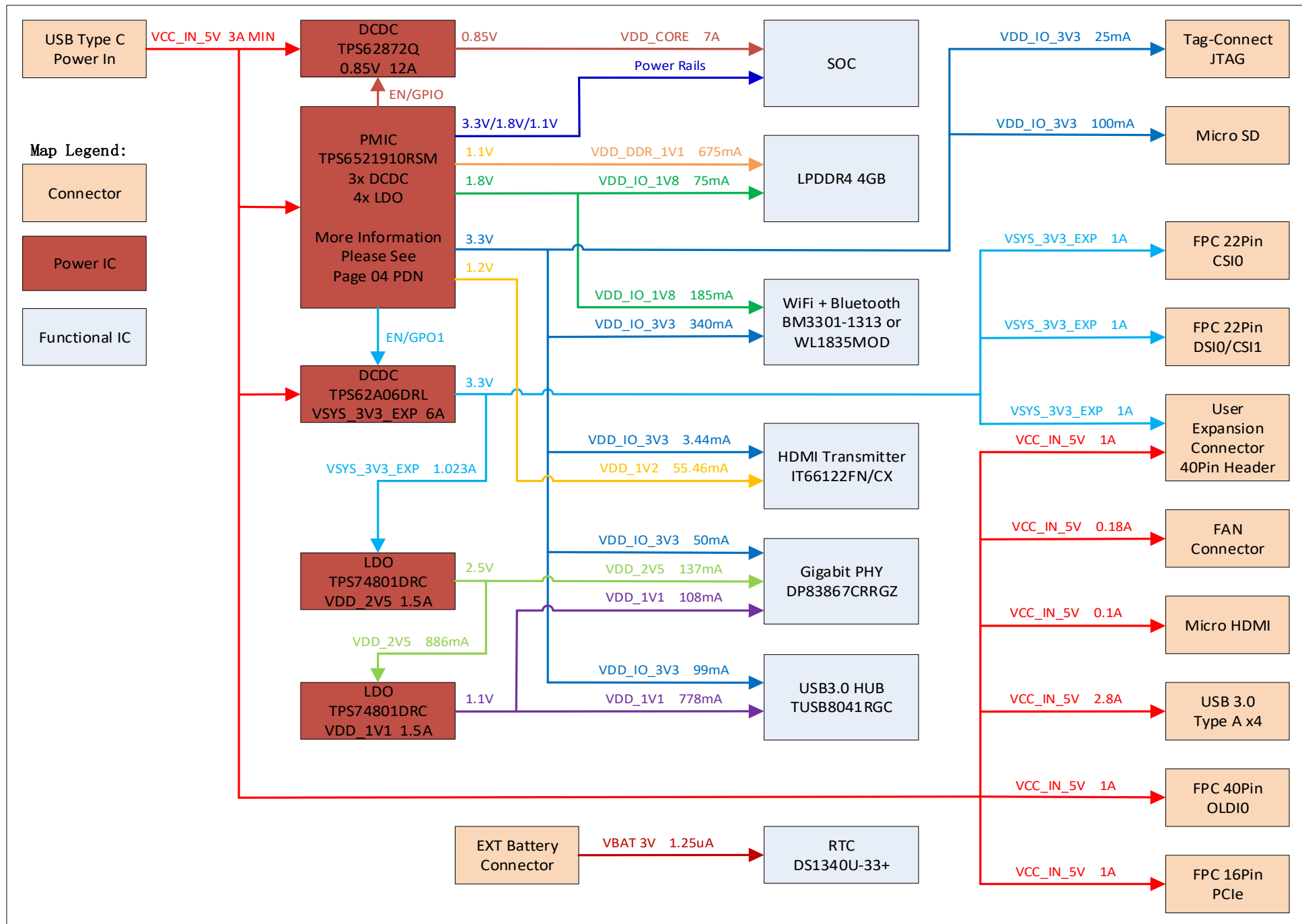
REVISION HISTORY

VER #	DATE	REVISION	DESCRIPTION OF CHANGES	AUTHOR
Rev A	26 Apr 2024	BeagleY-AI_SCH_Rev A_240426	Initial Release	Junqing.Xin

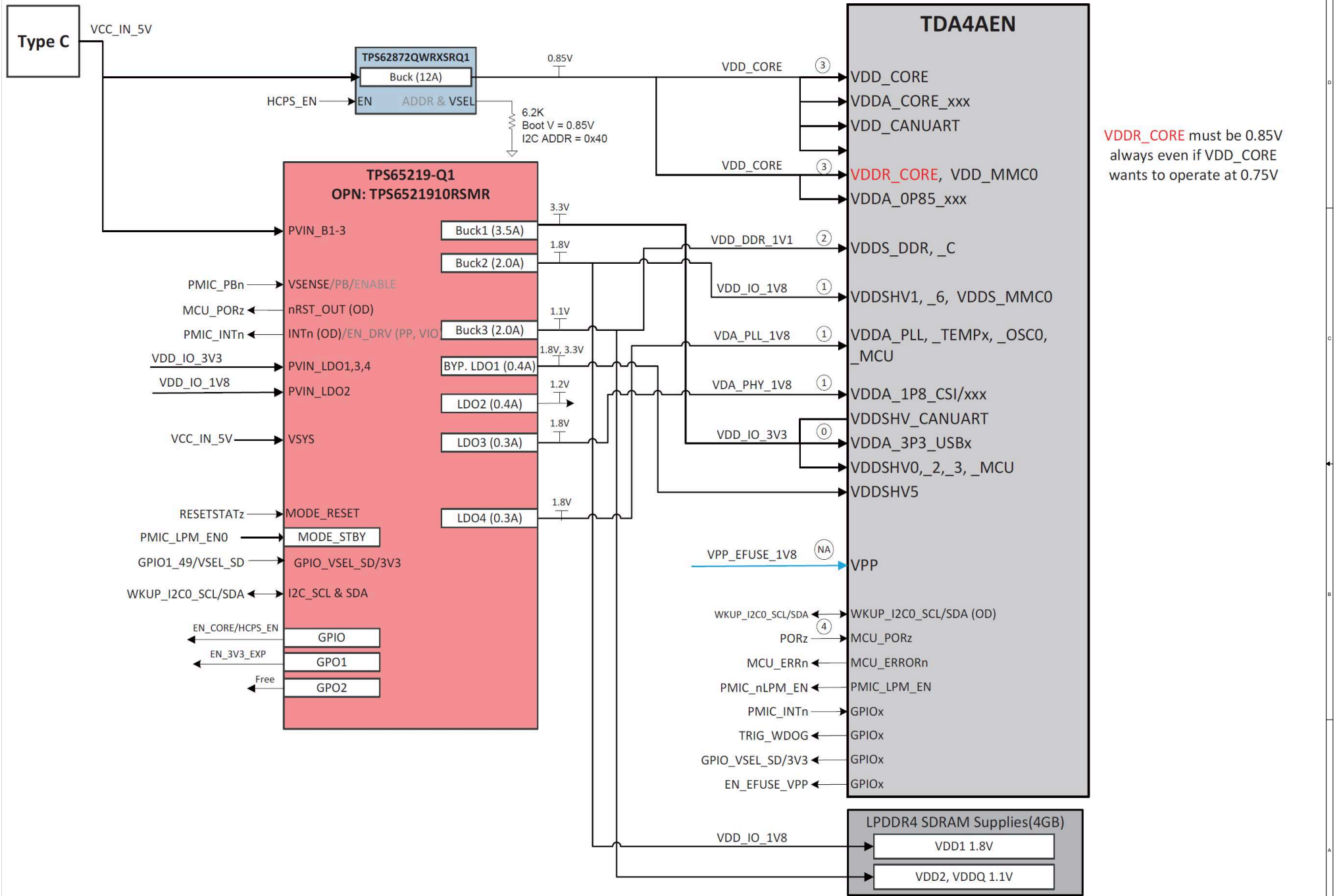
BLOCK DIAGRAM



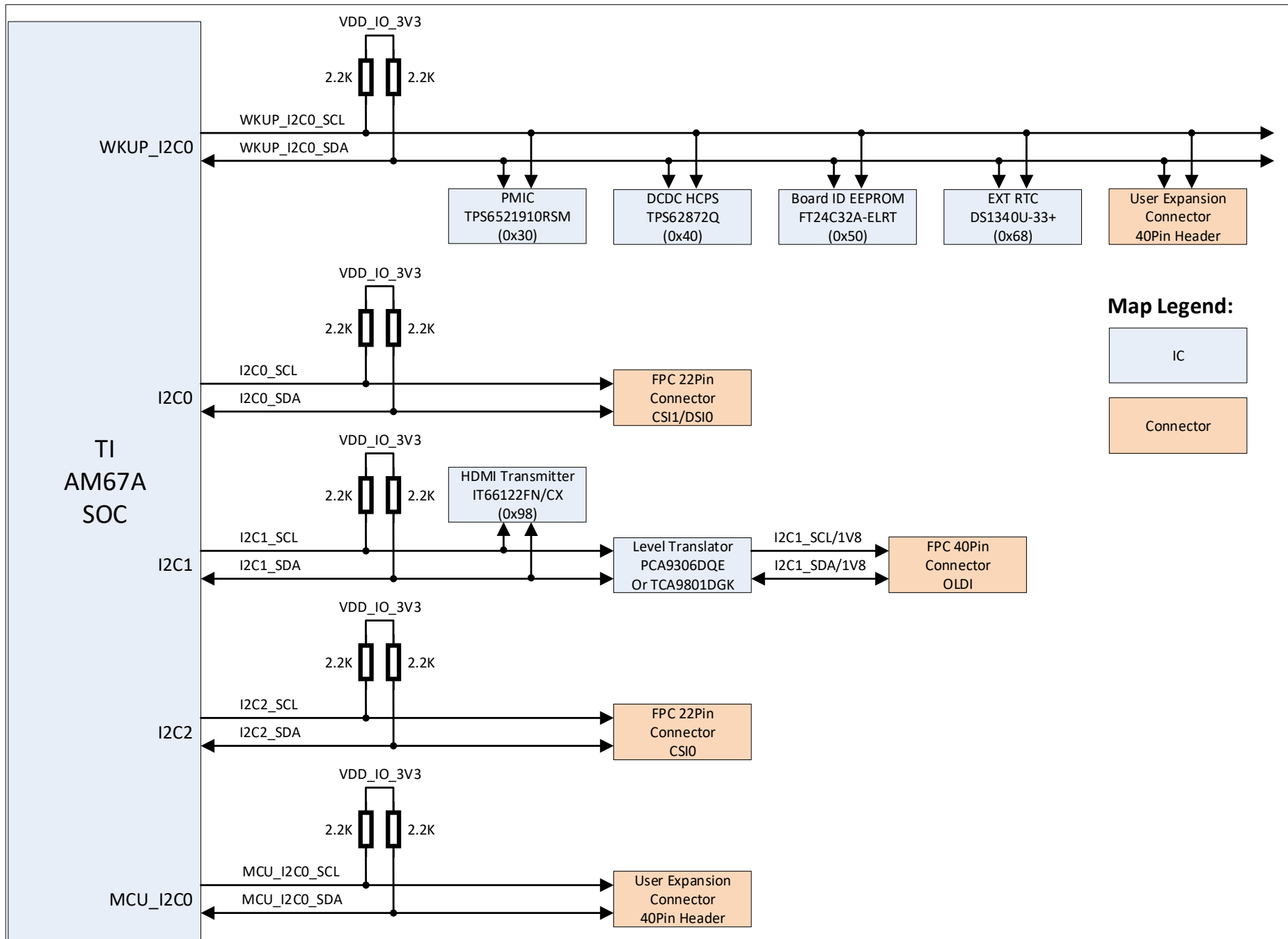
POWER FLOW DIAGRAM



PDN



IIC TREE





[14] K28/GPIO_11/PWR_LED1/TVS

The circuit diagram shows a signal path from K28/GPIO_11 through a series of resistors (R3, R0201) and a parallel combination of resistors (R2, R0201) connected to ground. The signal then passes through a TVS diode (Q1, CJ1012) which is connected to ground. The TVS diode is labeled with parameters: SOT-23, 20V, 500mA.

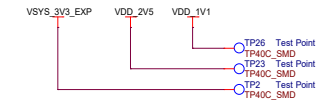
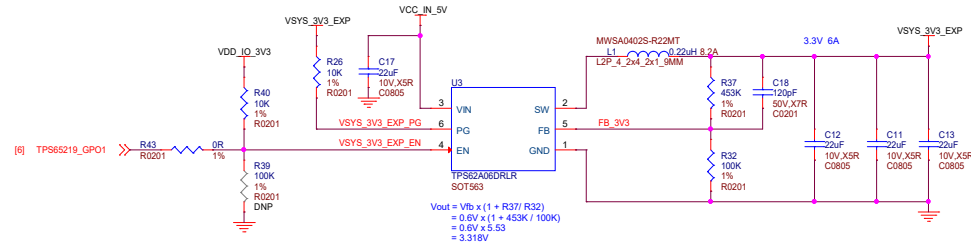
[14] K23/GPIO_12/ACT_LED1/TVS

The circuit diagram shows a signal path from K23/GPIO_12 through a series of resistors (R4, R0201) and a parallel combination of resistors (R1, R0201) connected to ground. The signal then passes through a TVS diode (Q1, CJ1012) which is connected to ground. The TVS diode is labeled with parameters: SOT-23, 20V, 500mA.

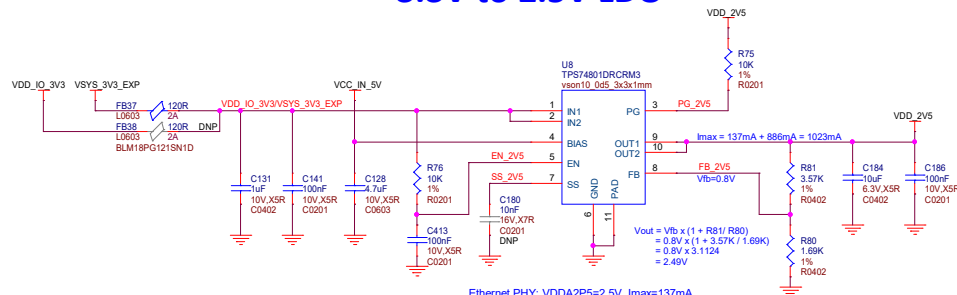


Note:
 "Via" and "Line to Shape" keepout areas need to be applied to positive & negative remote sense traces/nets (i.e. "VDD_xxx_HPS_VOSNS/_GOSNS") both at the buck & along diff trace routing path between buck"xOSNS" pins to ensure no unwanted power or Gnd connections are made before reaching the desired remote sense location where only 1x power & Gnd connection should be made.

VSYS_3V3_EXP For LDO & CSI & DSI & RPi 40Pin (Total: 4A)

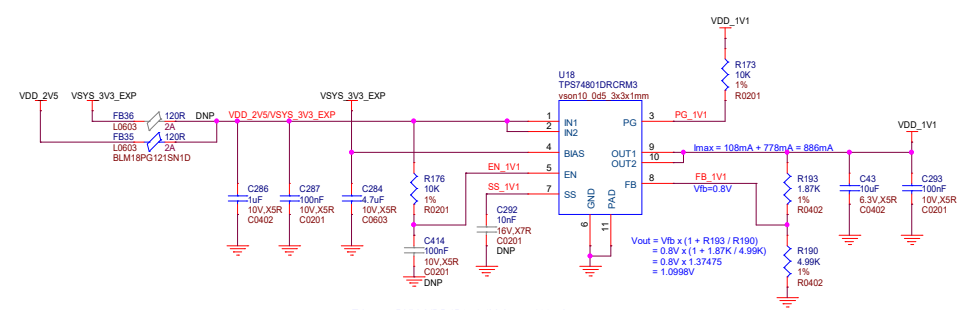


ETHERNET POWER 3.3V to 2.5V LDO



Ethernet PHY: VDDA2P5=2.5V, I_{max}=137mA
 LDO U18 Power In=2.5V, I_{max}=886mA
 Total: I_{max}= 137mA + 886mA = 1023mA
 Power Consumption: (3.3V-2.5V) * 1.023A = 0.8184W
 Thermal Junction-to-ambient: 0.8184W * 44.2°C/W=36.17°C

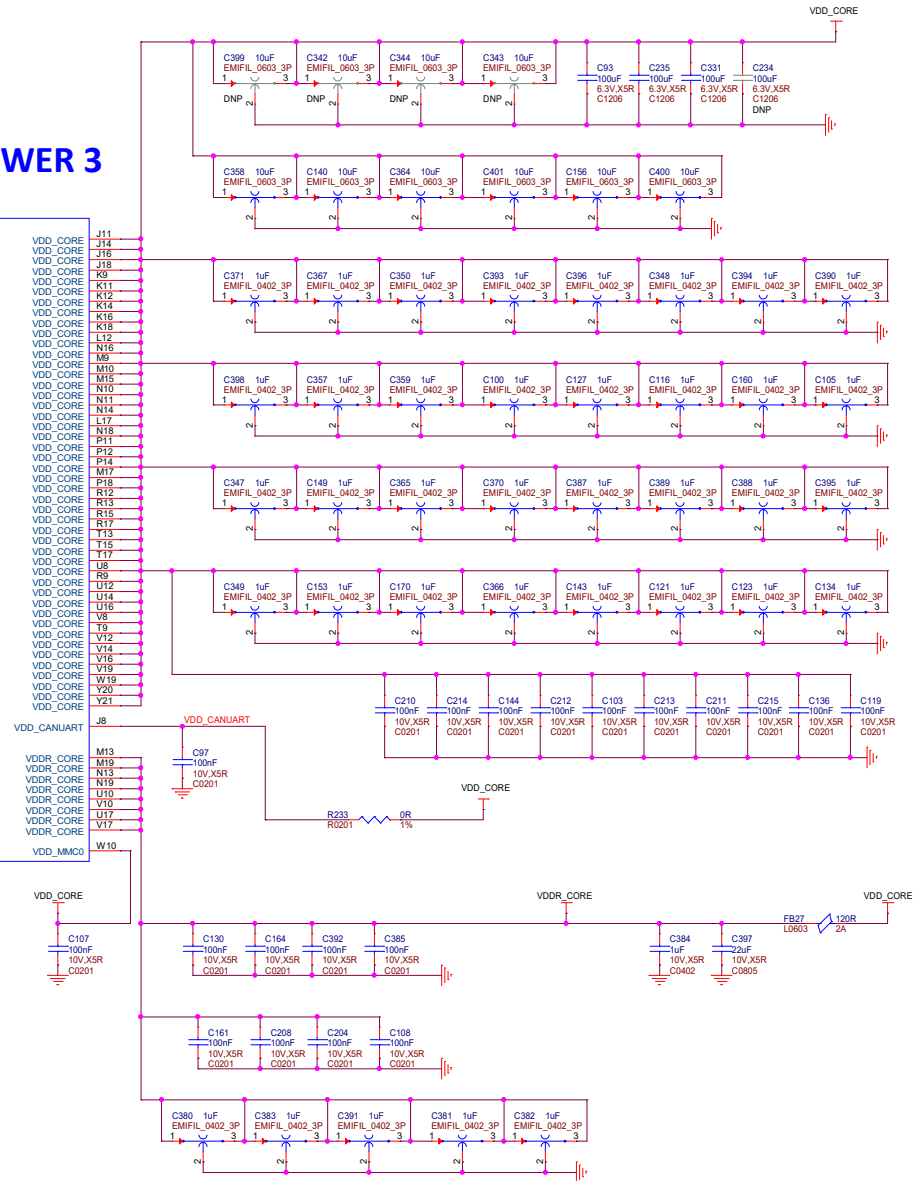
USB3.0 HUB & ETHERNET POWER 3.3V/2.5V to 1.1V LDO



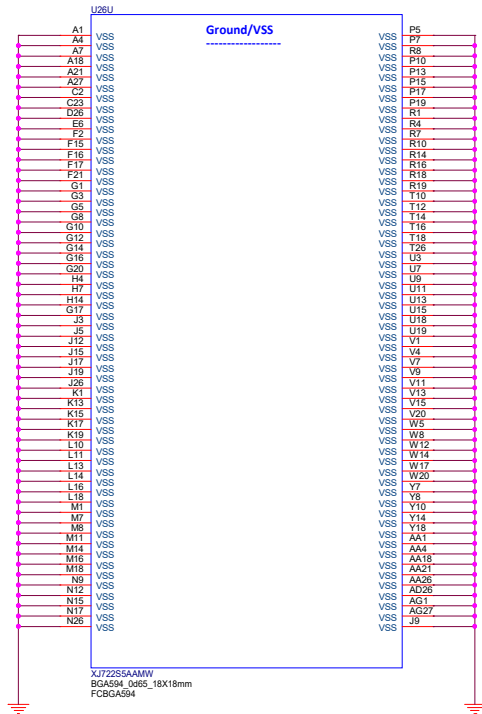
Ethernet PHY: VDD1P0=1.1V, I_{max}=108mA
 USB3.0 HUB: VDD=1.1V, I_{max}=778mA
 Total: I_{max} = 108mA + 554mA = 886mA
 Option 1: VIN_2V5/3V3 = 3.3V
 Power Consumption: (3.3V-1.1V) * 0.886A = 1.9492W
 Thermal Junction-to-ambient: 1.9492W * 44.2°C/W=86.15°C
 Option 2: VIN_2V5/3V3 = 2.5V
 Power Consumption: (2.5V-1.1V) * 0.886A = 1.2404W
 Thermal Junction-to-ambient: 1.2404W * 44.2°C/W=54.83°C

Some Dcaps may be shown as "Do Not Populate" (DNP) components if Power Integrity (PI) simulation results for a particular power rail on this PCB design combined with Dcap scheme (value, pkg type, ESL, Loop-Inductance, etc.) results in an impedance response below or equal to the desired target impedance (Z_t).

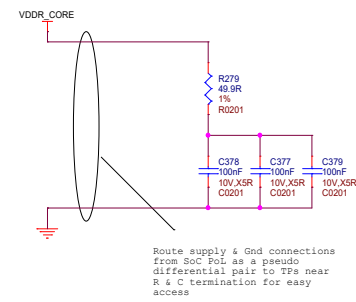
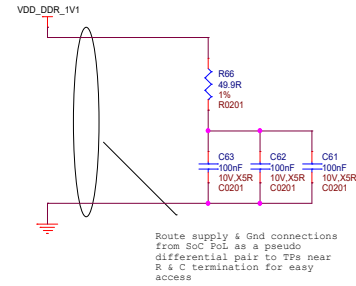
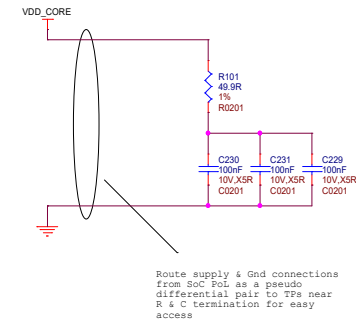
XJ72S5AAMW
BGA594_0d65_18X18mm
FCBGA594



SOC GROUND

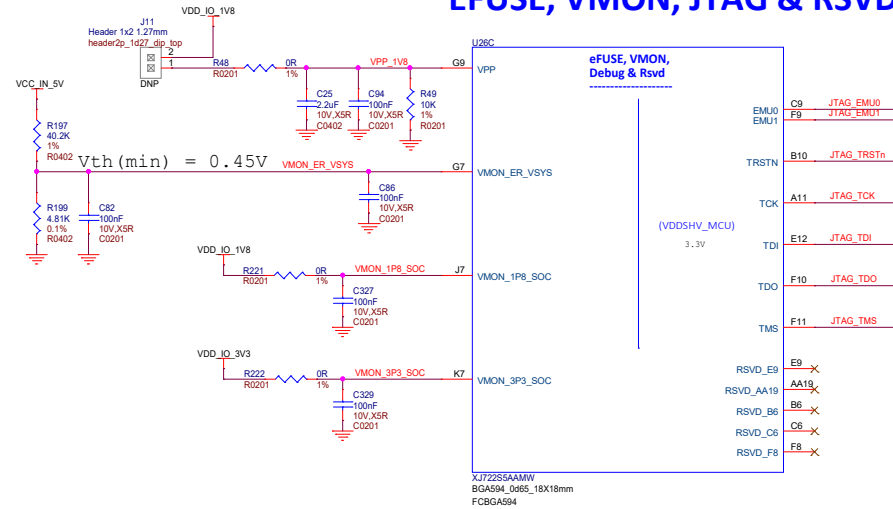


SoC Supply Noise Kelvin Sensing

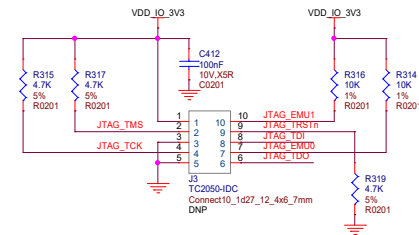


monitoring VCC_IN 5V, to protect SoC from 1st stage power fault.

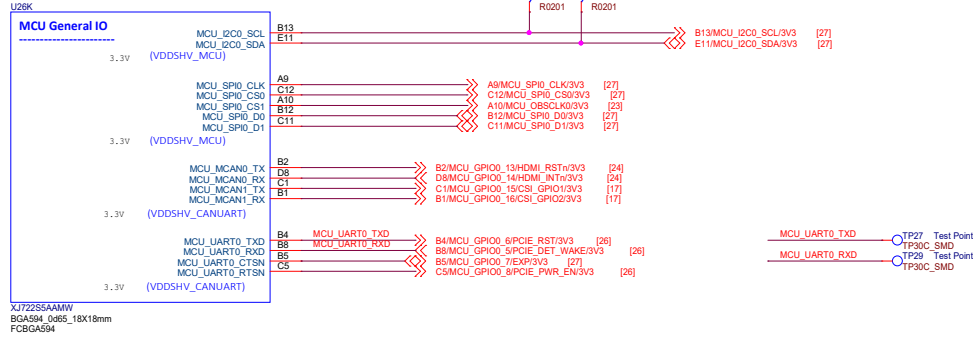
EFUSE, VMON, JTAG & RSVD



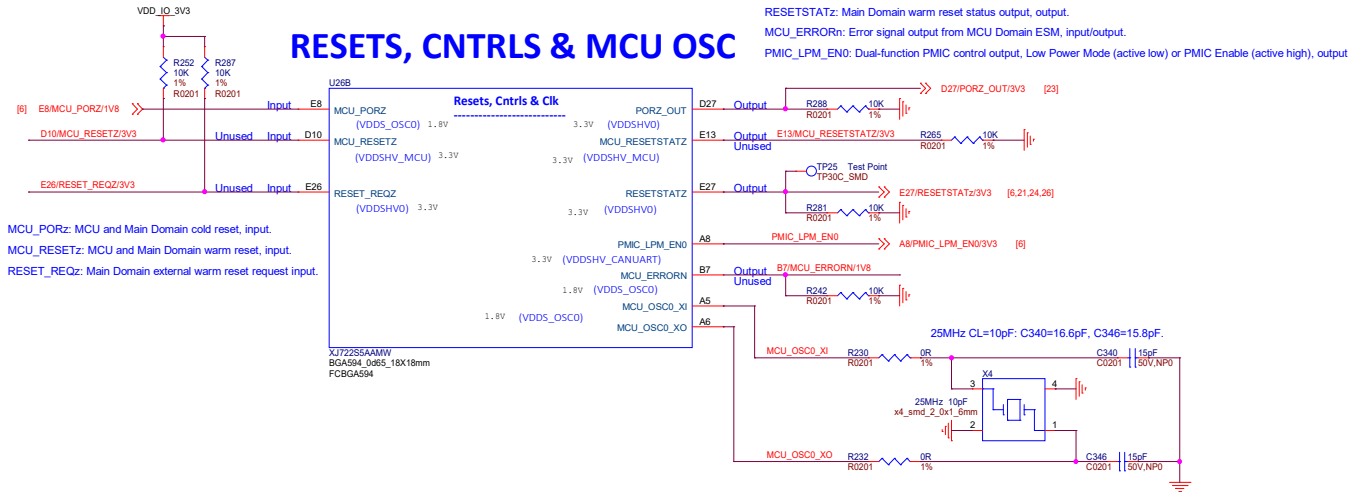
Tag-Connect



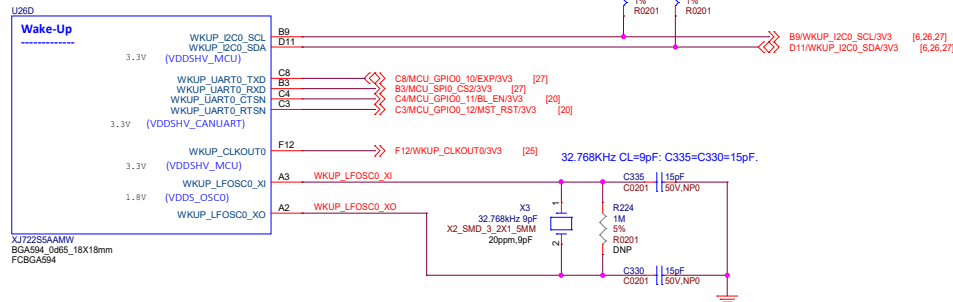
MCU GENERAL IO



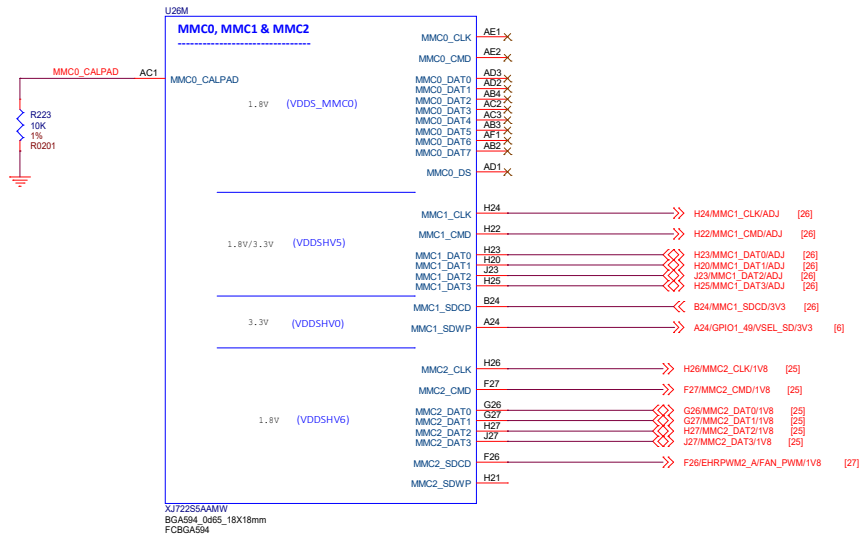
RESETS, CNTRLS & MCU OSC



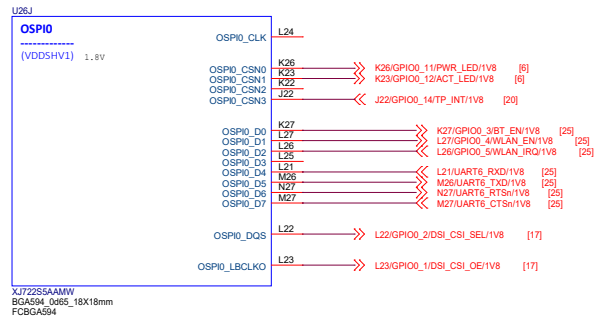
WKUP RESETS, CNTRLS & OSC



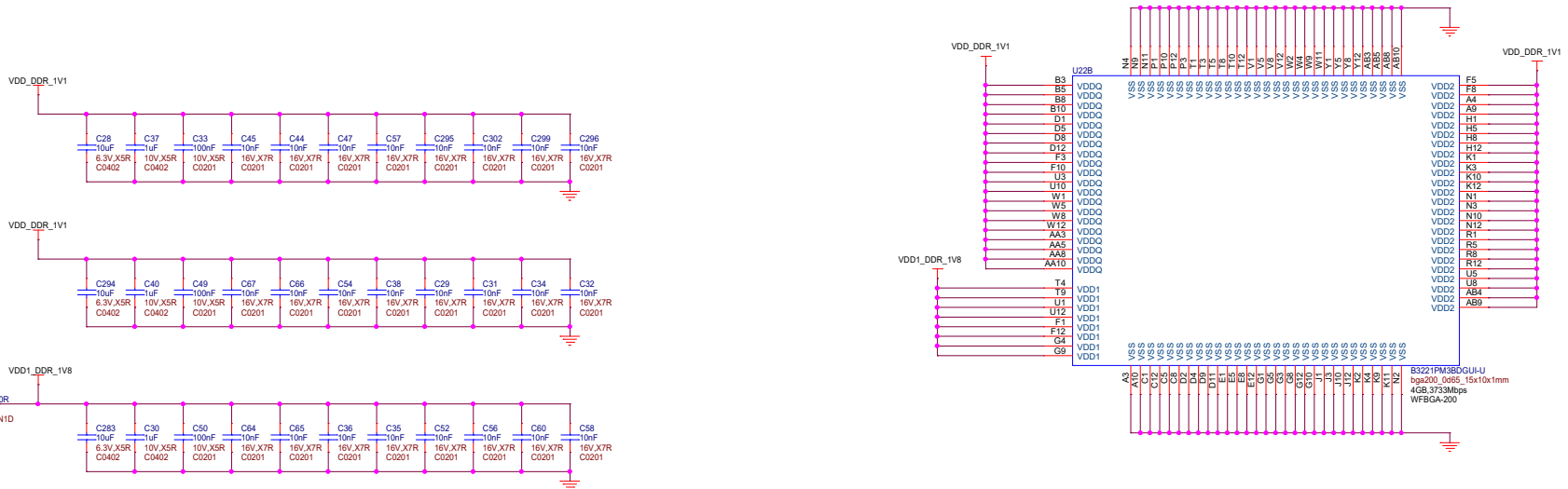
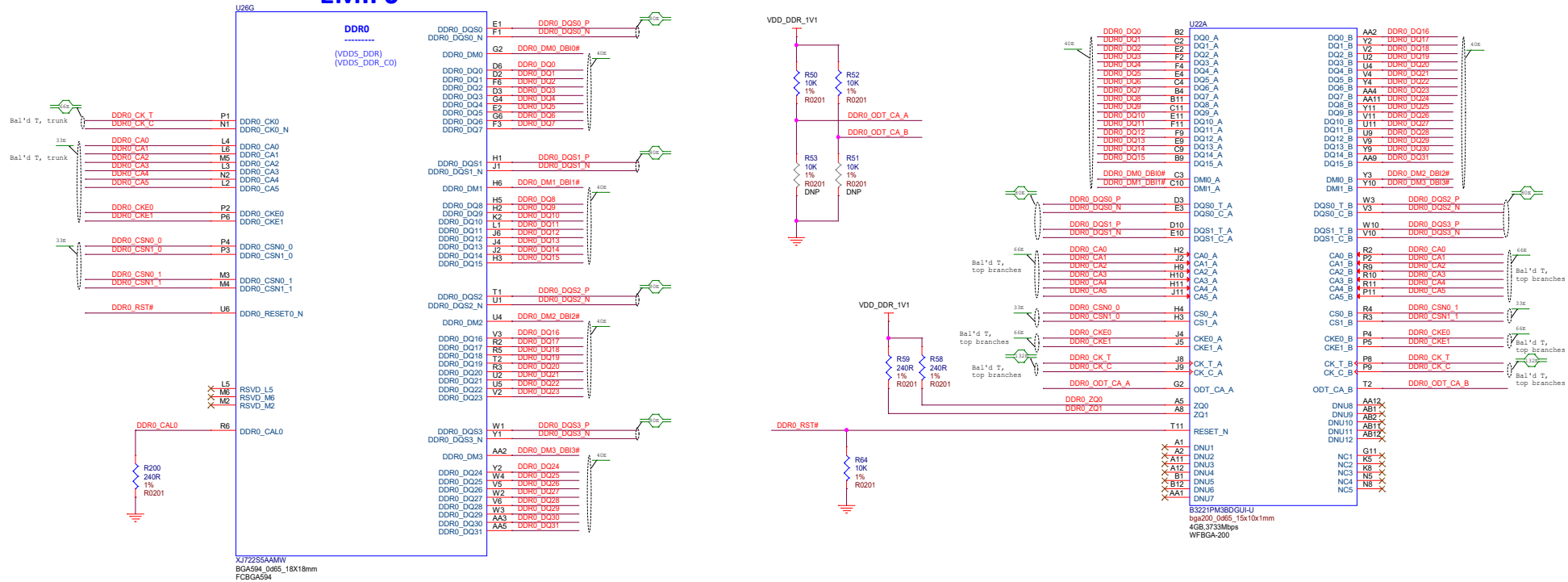
MMC 0, 1, 2



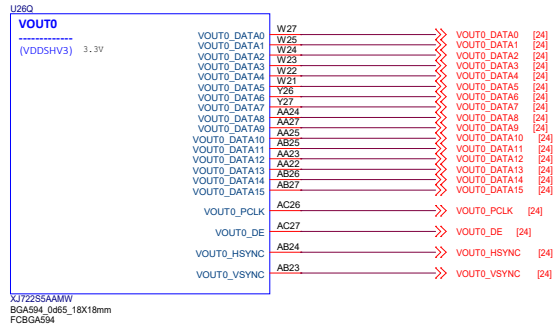
OSPI



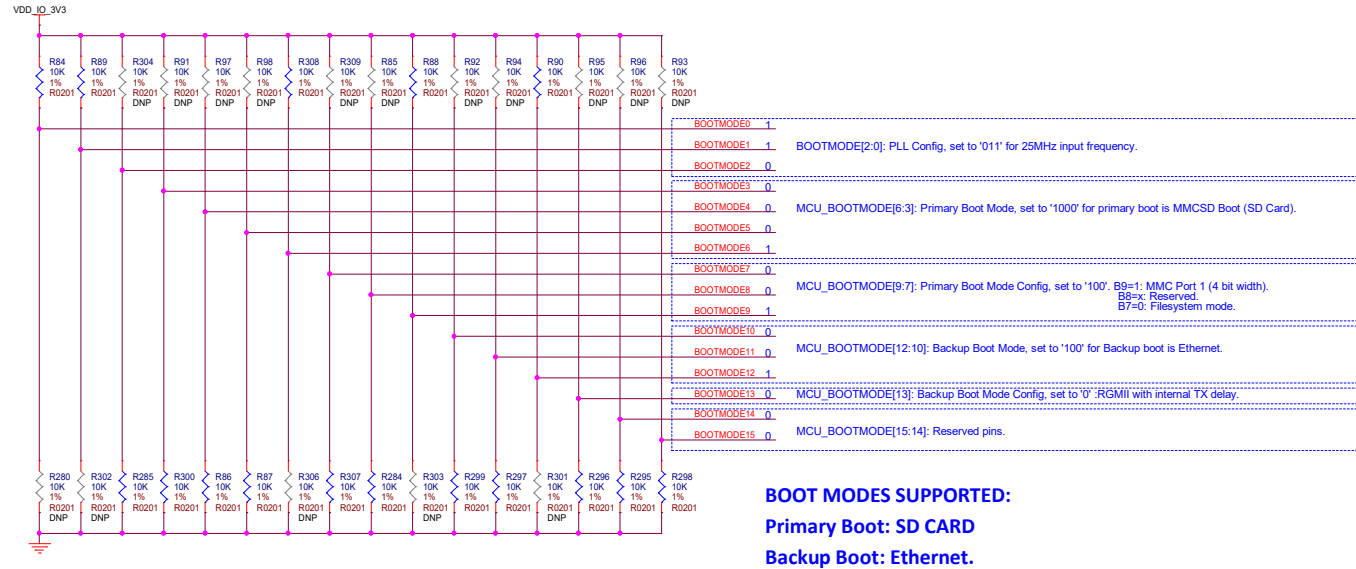
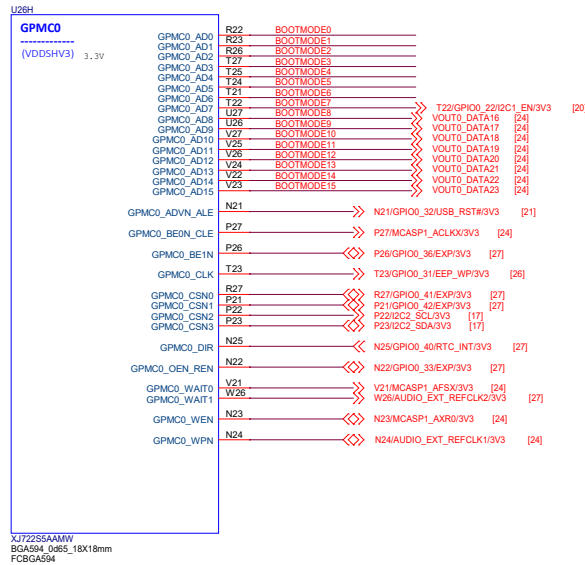
LPDDR4 MEMORY I/F



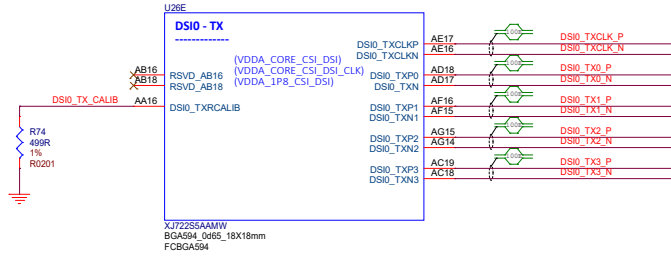
VOUT



GPMC

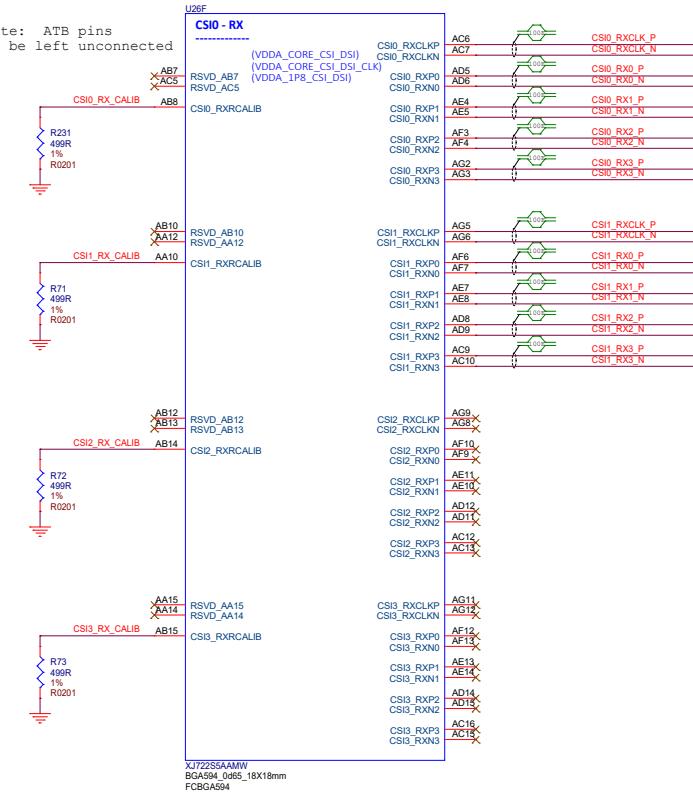


DSI

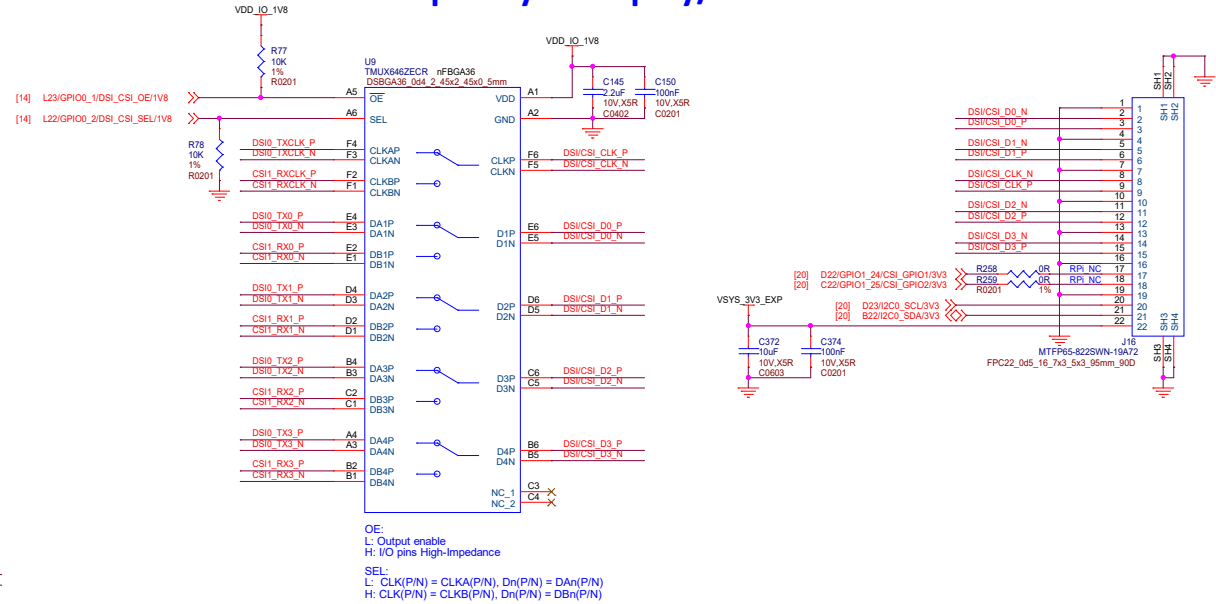


CSI 0, 1, 2, 3

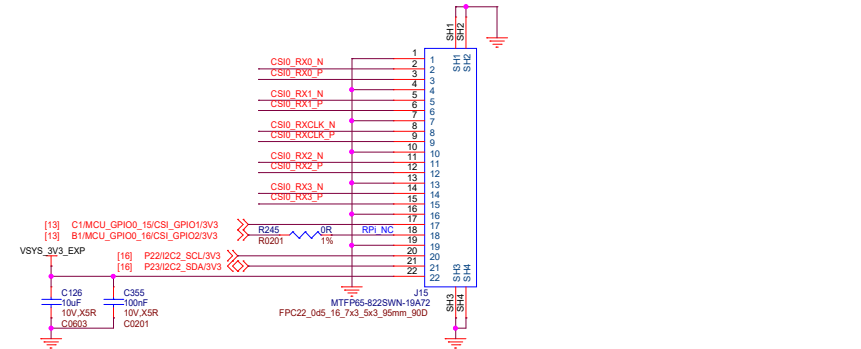
Note: ATB pins
to be left unconnected



Raspberry Pi Display/Camera Connector x4 Lane

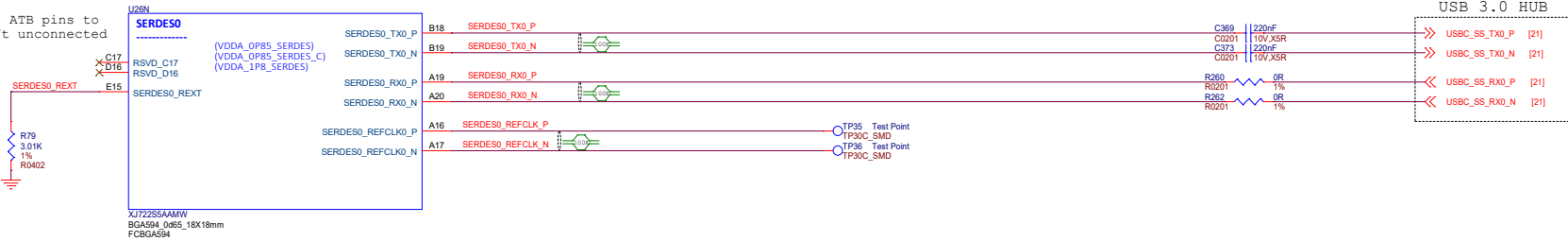


Raspberry Pi Camera Connector x4 Lane



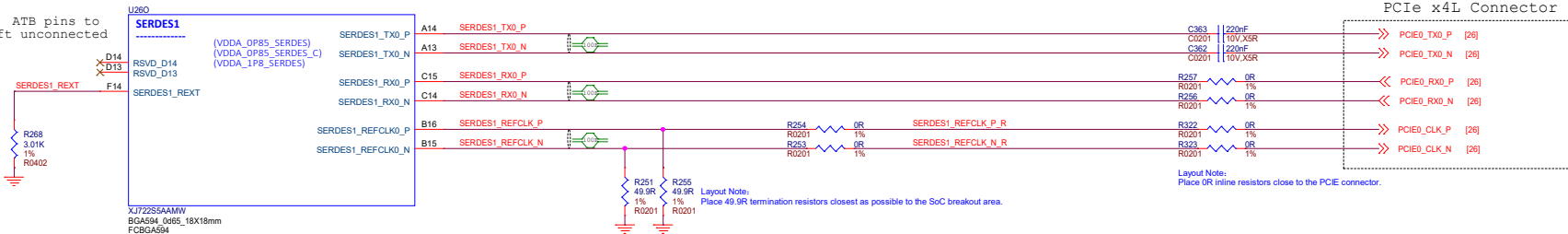
SERDES0

Note: ATB pins to be left unconnected

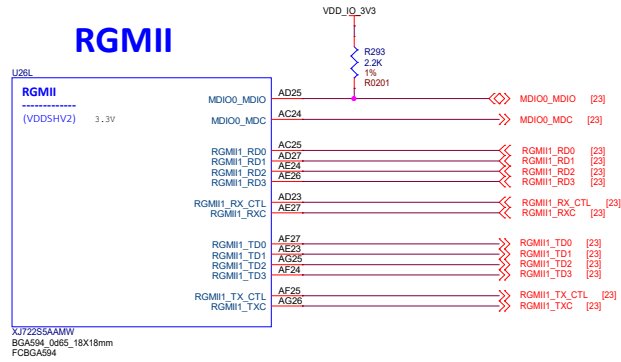


SERDES1

Note: ATB pins to be left unconnected

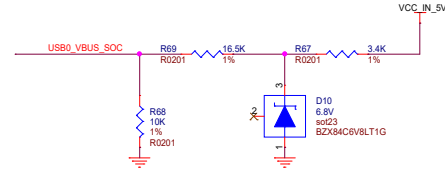


RGMII

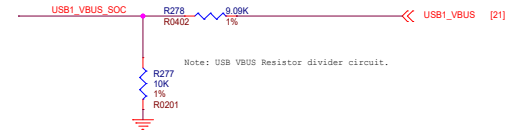


USB VBUS Resistor divider circuit

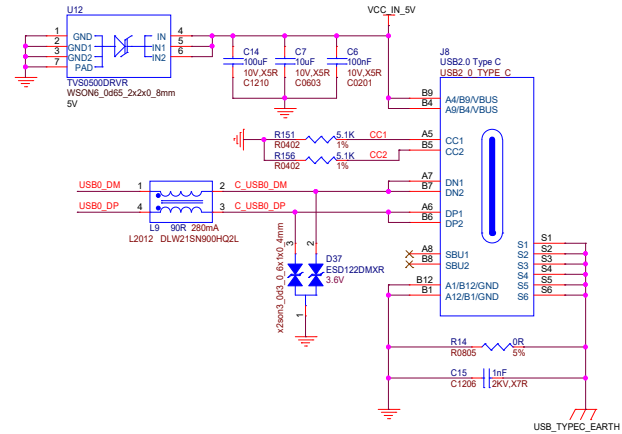
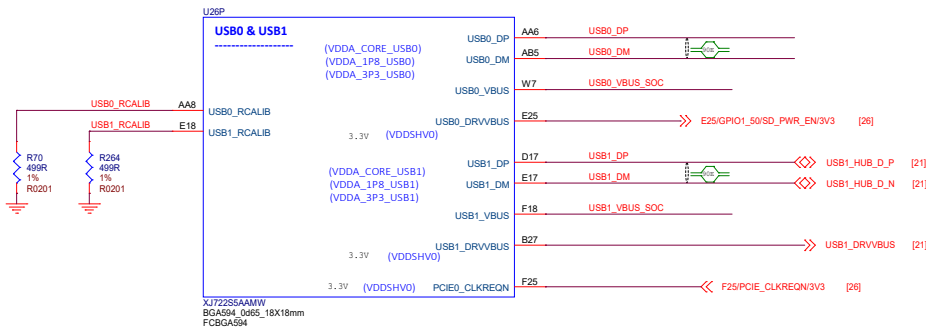
Note: Recommended VBUS circuit for USB connector. Supports 5V VBUS



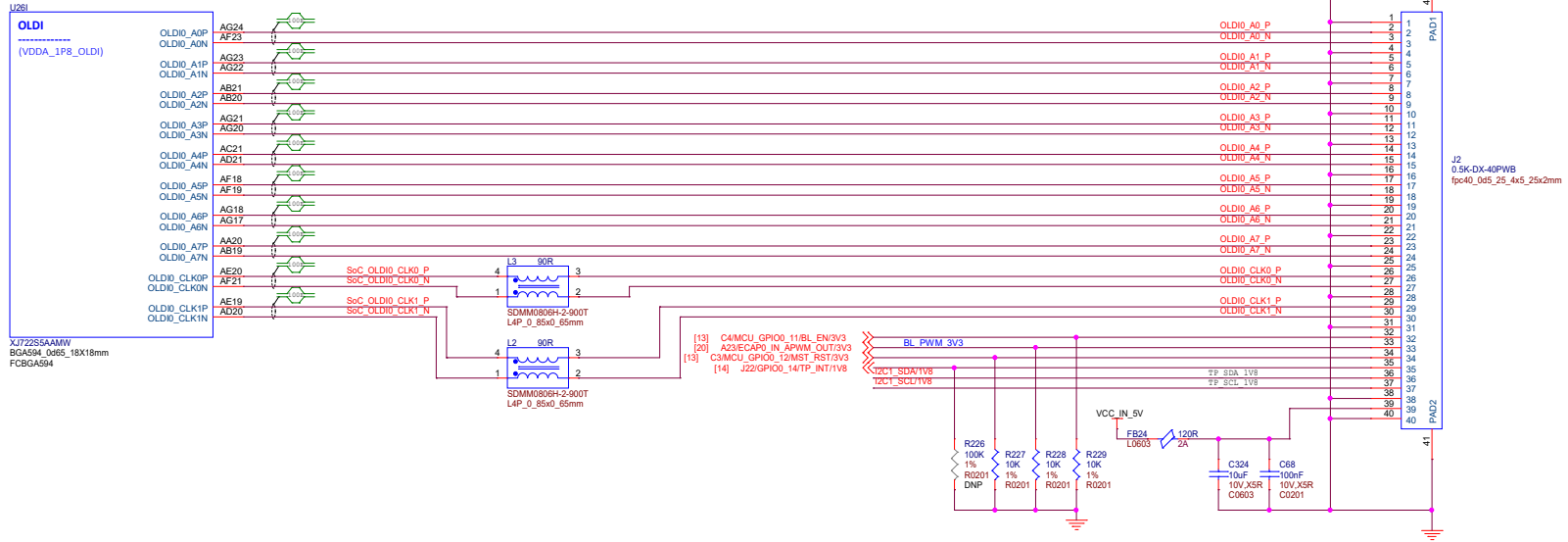
Note: Recommended VBUS circuit for embedded Hub



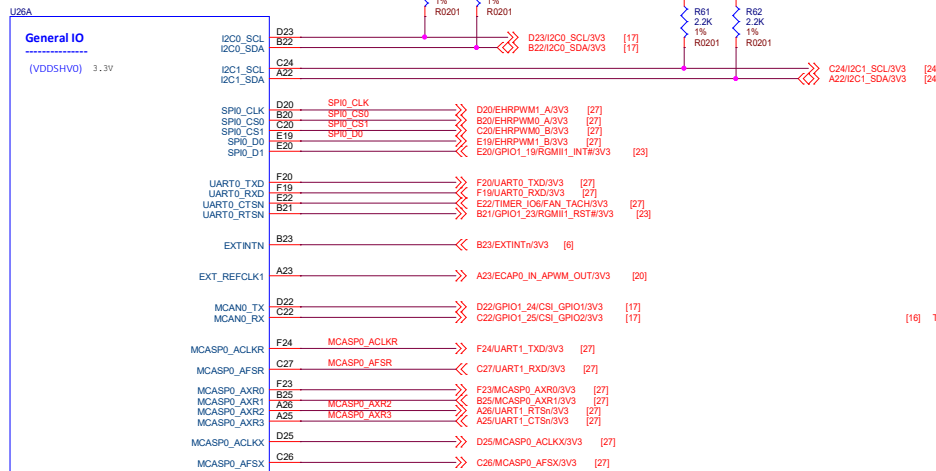
USB0 & USB1



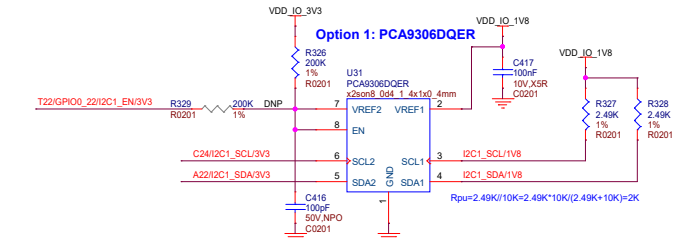
OLDI



GENERAL IO



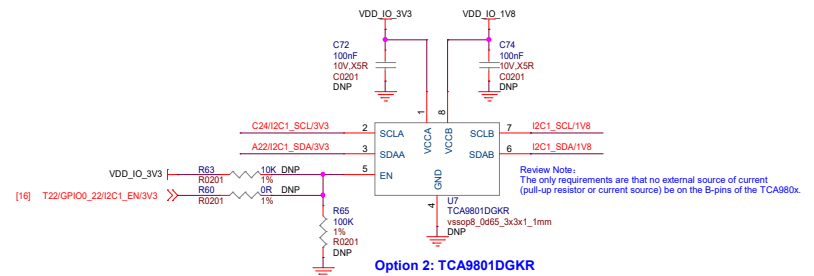
XJ7225AAMW
BGAS94_0d65_18x18mm
FCBGAS94



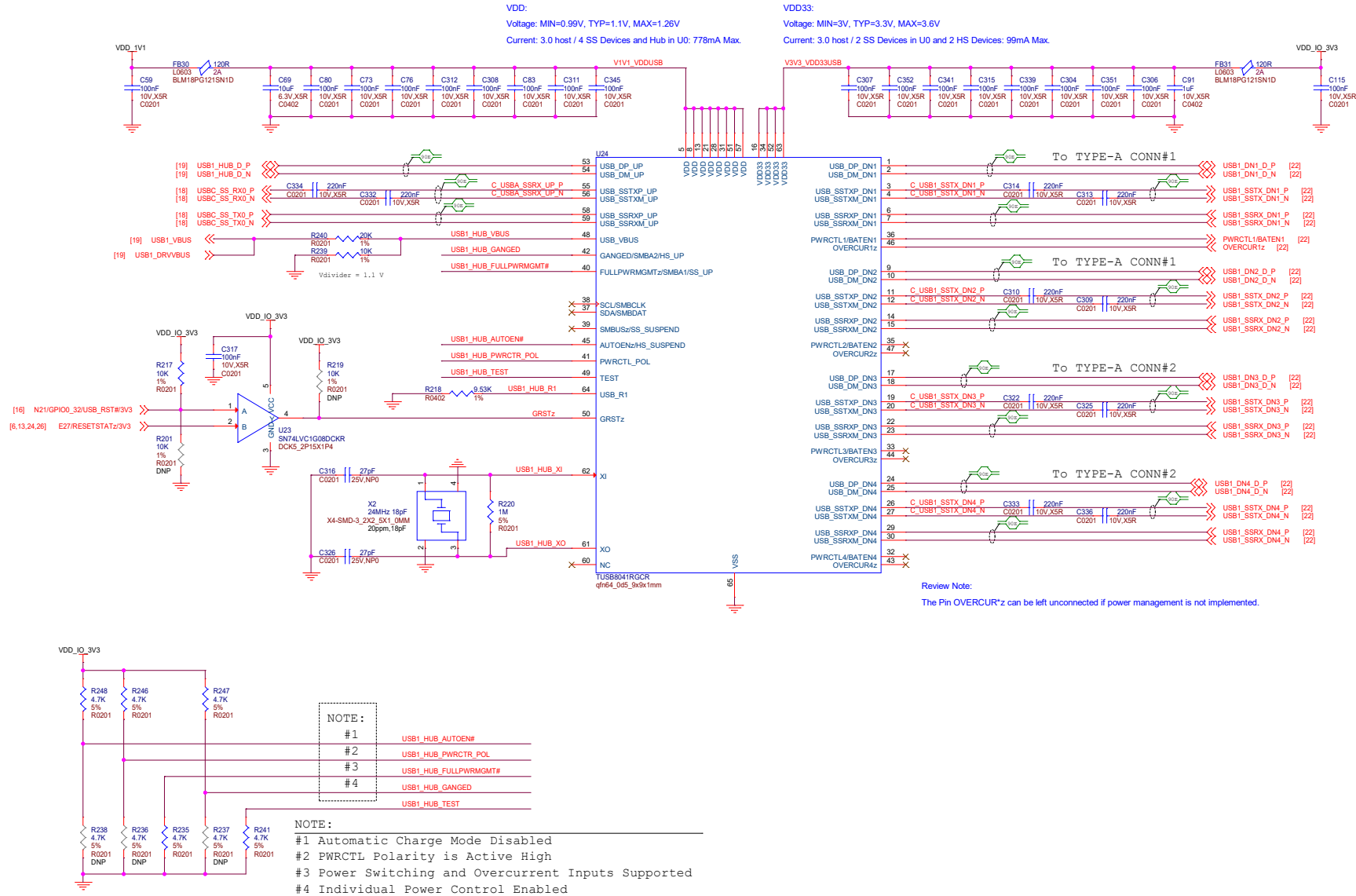
IIC voltage-level translator:

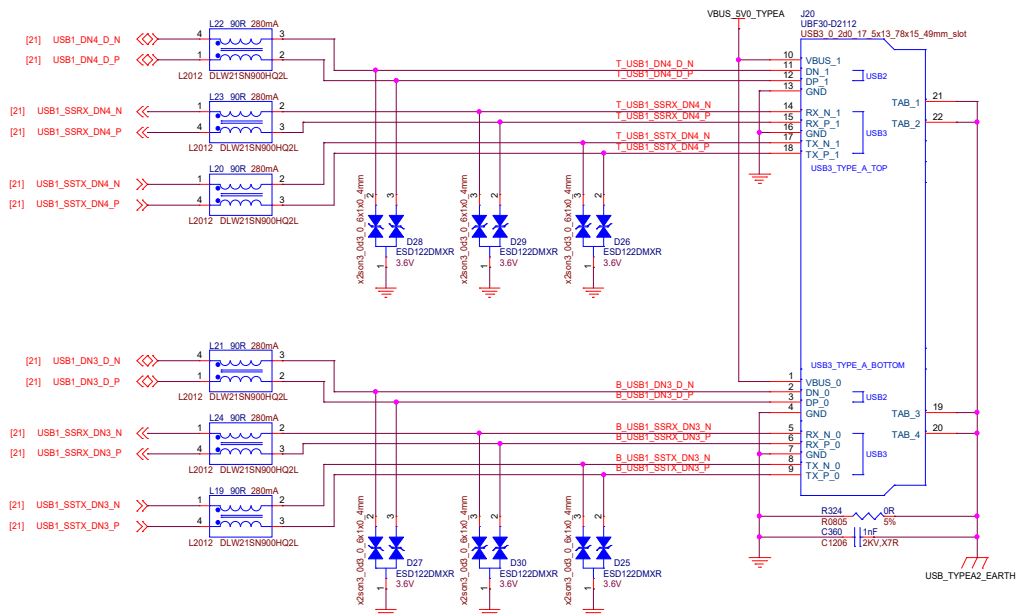
Option 1: TL PCA9306DQER, if there are pull-up resistors on the OLDI LCD, must install U31.
As there are 10K pull-up on the OLDI LCD, so install U31 default.

Option 2: TL TCA9801DGKR, if there are no pull-up resistors or current source on the OLDI LCD, can install U7.



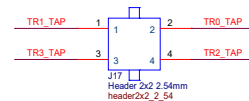
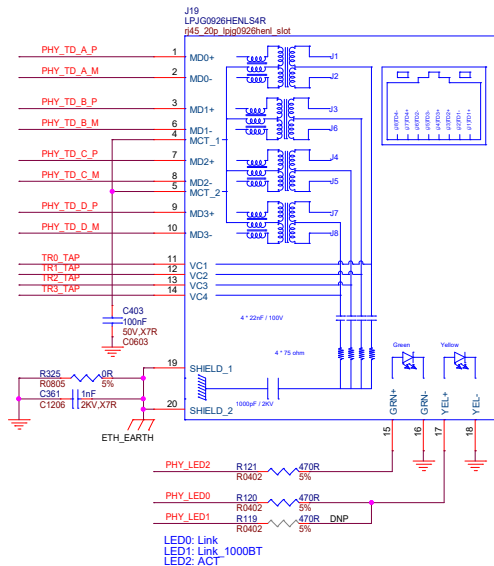
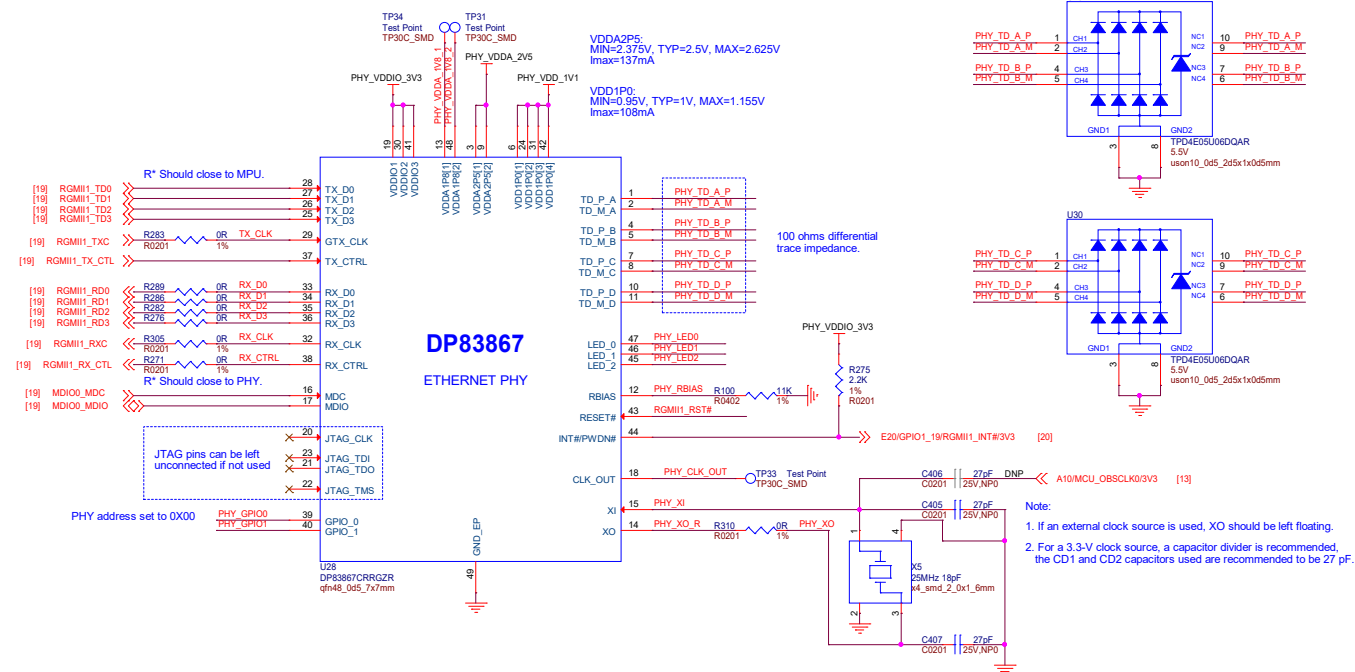
USB 3.0 HUB



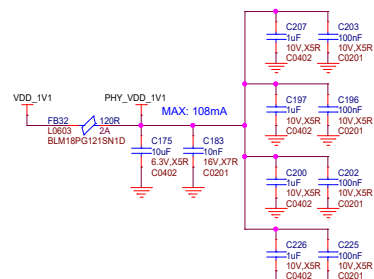
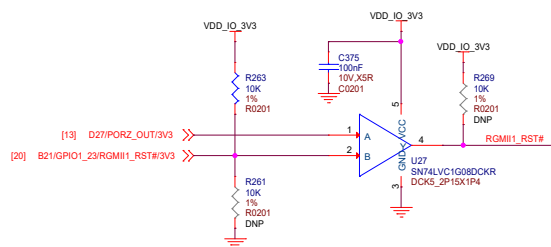
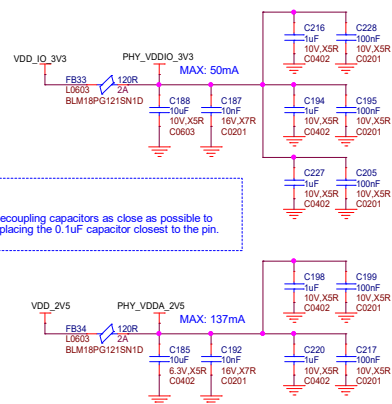
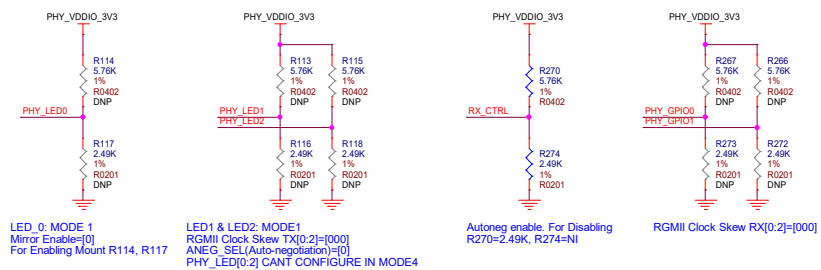


The schematic diagram illustrates the TPS2515 current limiter circuit. The IC (U11) is configured with its IN1 pin connected to the 5V supply (VCC_IN_5V) and its IN2 pin connected to the 5V output (VBUS_5V0_TYPEA). The feedback network consists of resistors R110 (100k) and R0201, which set the current limit to 2800mA. The current sense resistor R099 (10k) is connected between the output and the IN2 pin. The output is connected to the 5V supply through a network of capacitors (C221, C232, C404, C411, C402) and resistors (R0201). The current limit is set to 2800mA.

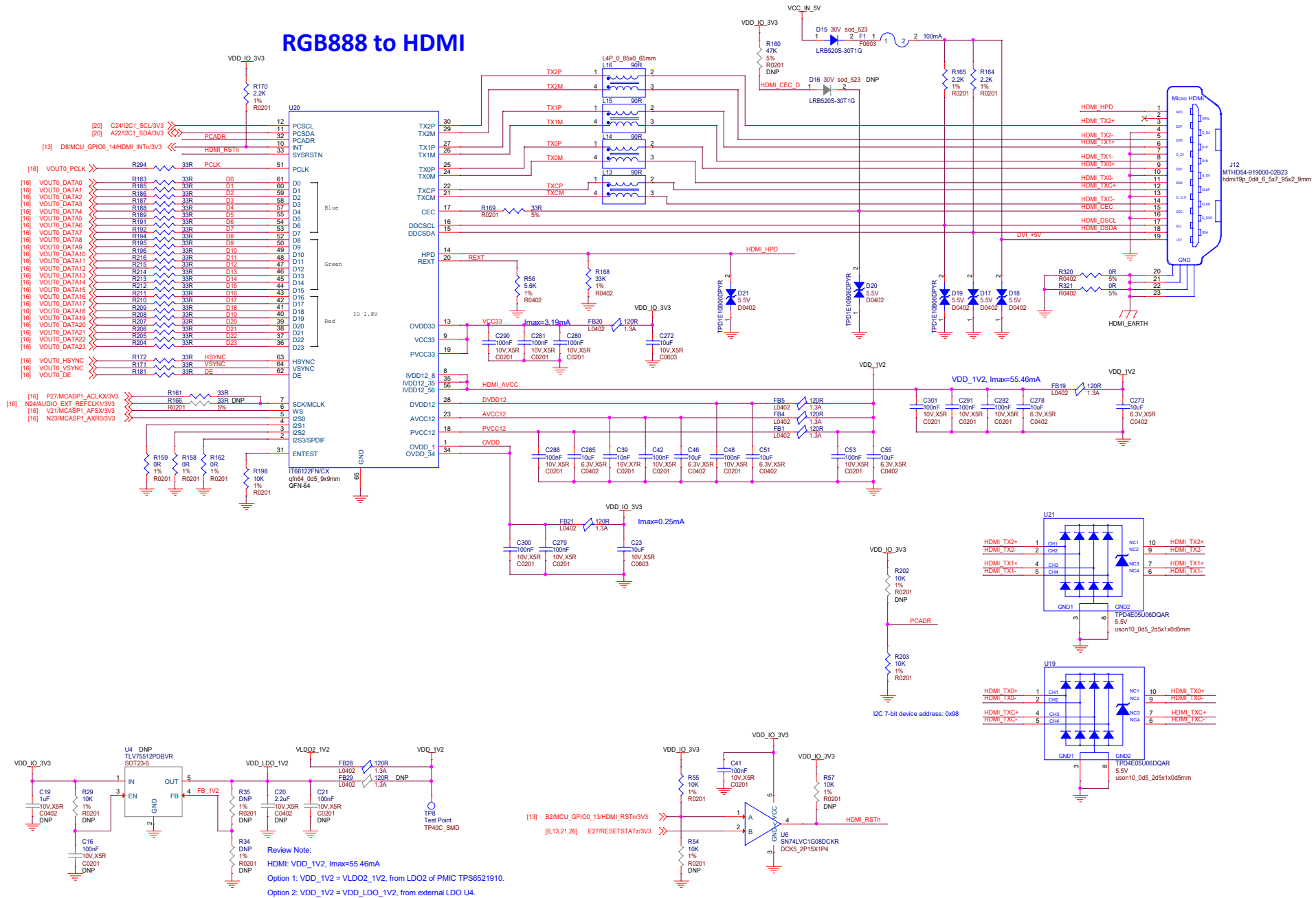
GB ETHERNET



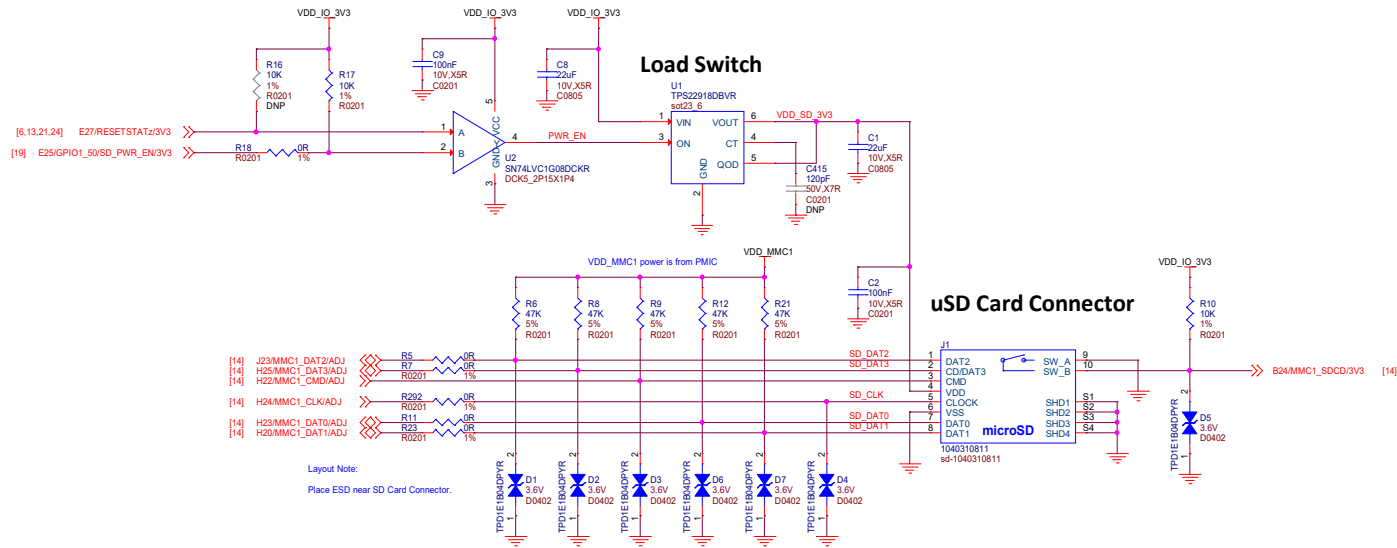
PoE HEADER



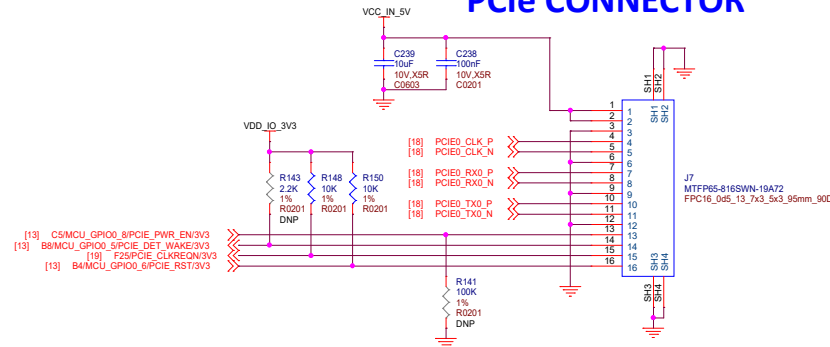
RGB888 to HDMI



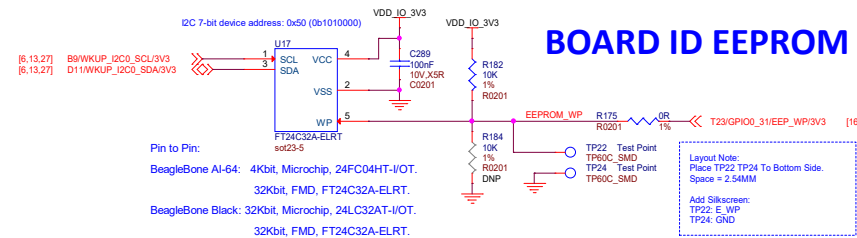
Micro SD CARD INTERFACE



PCIe CONNECTOR



BOARD ID EEPROM 4Kbit



[illegible]

[16] N25/GPIO0_40/RTC_INT3/V33 << R45 10k 1% OR R2021 1% FT/OUT 8 VCC 9 FT/OUT X1 1 2 RTC_X1 10 11 SMD 3.2x1.5MM 12 13 Vbackup 14 15 Vbackup 16 17 Vbackup 18 19 Vbackup 20 21 Vbackup 22 23 Vbackup 24 25 Vbackup 26 27 Vbackup 28 29 Vbackup 30 31 Vbackup 32 33 Vbackup 34 35 Vbackup 36 37 Vbackup 38 39 Vbackup 40 41 Vbackup 42 43 Vbackup 44 45 Vbackup 46 47 Vbackup 48 49 Vbackup 50 51 Vbackup 52 53 Vbackup 54 55 Vbackup 56 57 Vbackup 58 59 Vbackup 60 61 Vbackup 62 63 Vbackup 64 65 Vbackup 66 67 Vbackup 68 69 Vbackup 70 71 Vbackup 72 73 Vbackup 74 75 Vbackup 76 77 Vbackup 78 79 Vbackup 80 81 Vbackup 82 83 Vbackup 84 85 Vbackup 86 87 Vbackup 88 89 Vbackup 90 91 Vbackup 92 93 Vbackup 94 95 Vbackup 96 97 Vbackup 98 99 Vbackup 100 101 Vbackup 102 103 Vbackup 104 105 Vbackup 106 107 Vbackup 108 109 Vbackup 110 111 Vbackup 112 113 Vbackup 114 115 Vbackup 116 117 Vbackup 118 119 Vbackup 120 121 Vbackup 122 123 Vbackup 124 125 Vbackup 126 127 Vbackup 128 129 Vbackup 130 131 Vbackup 132 133 Vbackup 134 135 Vbackup 136 137 Vbackup 138 139 Vbackup 140 141 Vbackup 142 143 Vbackup 144 145 Vbackup 146 147 Vbackup 148 149 Vbackup 150 151 Vbackup 152 153 Vbackup 154 155 Vbackup 156 157 Vbackup 158 159 Vbackup 160 161 Vbackup 162 163 Vbackup 164 165 Vbackup 166 167 Vbackup 168 169 Vbackup 170 171 Vbackup 172 173 Vbackup 174 175 Vbackup 176 177 Vbackup 178 179 Vbackup 180 181 Vbackup 182 183 Vbackup 184 185 Vbackup 186 187 Vbackup 188 189 Vbackup 190 191 Vbackup 192 193 Vbackup 194 195 Vbackup 196 197 Vbackup 198 199 Vbackup 200 201 Vbackup 202 203 Vbackup 204 205 Vbackup 206 207 Vbackup 208 209 Vbackup 210 211 Vbackup 212 213 Vbackup 214 215 Vbackup 216 217 Vbackup 218 219 Vbackup 220 221 Vbackup 222 223 Vbackup 224 225 Vbackup 226 227 Vbackup 228 229 Vbackup 230 231 Vbackup 232 233 Vbackup 234 235 Vbackup 236 237 Vbackup 238 239 Vbackup 240 241 Vbackup 242 243 Vbackup 244 245 Vbackup 246 247 Vbackup 248 249 Vbackup 250 251 Vbackup 252 253 Vbackup 254 255 Vbackup 256 257 Vbackup 258 259 Vbackup 260 261 Vbackup 262 263 Vbackup 264 265 Vbackup 266 267 Vbackup 268 269 Vbackup 270 271 Vbackup 272 273 Vbackup 274 275 Vbackup 276 277 Vbackup 278 279 Vbackup 280 281 Vbackup 282 283 Vbackup 284 285 Vbackup 286 287 Vbackup 288 289 Vbackup 290 291 Vbackup 292 293 Vbackup 294 295 Vbackup 296 297 Vbackup 298 299 Vbackup 300 301 Vbackup 302 303 Vbackup 304 305 Vbackup 306 307 Vbackup 308 309 Vbackup 310 311 Vbackup 312 313 Vbackup 314 315 Vbackup 316 317 Vbackup 318 319 Vbackup 320 321 Vbackup 322 323 Vbackup 324 325 Vbackup 326 327 Vbackup 328 329 Vbackup 330 331 Vbackup 332 333 Vbackup 334 335 Vbackup 336 337 Vbackup 338 339 Vbackup 340 341 Vbackup 342 343 Vbackup 344 345 Vbackup 346 347 Vbackup 348 349 Vbackup 350 351 Vbackup 352 353 Vbackup 354 355 Vbackup 356 357 Vbackup 358 359 Vbackup 360 361 Vbackup 362 363 Vbackup 364 365 Vbackup 366 367 Vbackup 368 369 Vbackup 370 371 Vbackup 372 373 Vbackup 374 375 Vbackup 376 377 Vbackup 378 379 Vbackup 380 381 Vbackup 382 383 Vbackup 384 385 Vbackup 386 387 Vbackup 388 389 Vbackup 390 391 Vbackup 392 393 Vbackup 394 395 Vbackup 396 397 Vbackup 398 399 Vbackup 400 401 Vbackup 402 403 Vbackup 404 405 Vbackup 406 407 Vbackup 408 409 Vbackup 410 411 Vbackup 412 413 Vbackup 414 415 Vbackup 416 417 Vbackup 418 419 Vbackup 420 421 Vbackup 422 423 Vbackup 424 425 Vbackup 426 427 Vbackup 428 429 Vbackup 430 431 Vbackup 432 433 Vbackup 434 435 Vbackup 436 437 Vbackup 438 439 Vbackup 440 441 Vbackup 442 443 Vbackup 444 445 Vbackup 446 447 Vbackup 448 449 Vbackup 450 451 Vbackup 452 453 Vbackup 454 455 Vbackup 456 457 Vbackup 458 459 Vbackup 460 461 Vbackup 462 463 Vbackup 464 465 Vbackup 466 467 Vbackup 468 469 Vbackup 470 471 Vbackup 472 473 Vbackup 474 475 Vbackup 476 477 Vbackup 478 479 Vbackup 480 481 Vbackup 482 483 Vbackup 484 485 Vbackup 486 487 Vbackup 488 489 Vbackup 490 491 Vbackup 492 493 Vbackup 494 495 Vbackup 496 497 Vbackup 498 499 Vbackup 500 501 Vbackup 502 503 Vbackup 504 505 Vbackup 506 507 Vbackup 508 509 Vbackup 510 511 Vbackup 512 513 Vbackup 514 515 Vbackup 516 517 Vbackup 518 519 Vbackup 520 521 Vbackup 522 523 Vbackup 524 525 Vbackup 526 527 Vbackup 528 529 Vbackup 530 531 Vbackup 532 533 Vbackup 534 535 Vbackup 536 537 Vbackup 538 539 Vbackup 540 541 Vbackup 542 543 Vbackup 544 545 Vbackup 546 547 Vbackup 548 549 Vbackup 550 551 Vbackup 552 553 Vbackup 554 555 Vbackup 556 557 Vbackup 558 559 Vbackup 560 561 Vbackup 562 563 Vbackup 564 565 Vbackup 566 567 Vbackup 568 569 Vbackup 570 571 Vbackup 572 573 Vbackup 574 575 Vbackup 576 577 Vbackup 578 579 Vbackup 580 581 Vbackup 582 583 Vbackup 584 585 Vbackup 586 587 Vbackup 588 589 Vbackup 590 591 Vbackup 592 593 Vbackup 594 595 Vbackup 596 597 Vbackup 598 599 Vbackup 600 601 Vbackup 602 603 Vbackup 604 605 Vbackup 606 607 Vbackup 608 609 Vbackup 610 611 Vbackup 612 613 Vbackup 614 615 Vbackup 616 617 Vbackup 618 619 Vbackup 620 621 Vbackup 622 623 Vbackup 624 625 Vbackup 626 627 Vbackup 628 629 Vbackup 630 631 Vbackup 632 633 Vbackup 634 635 Vbackup 636 637 Vbackup 638 639 Vbackup 640 641 Vbackup 642 643 Vbackup 644 645 Vbackup 646 647 Vbackup 648 649 Vbackup 650 651 Vbackup 652 653 Vbackup 654 655 Vbackup 656 657 Vbackup 658 659 Vbackup 660 661 Vbackup 662 663 Vbackup 664 665 Vbackup 666 667 Vbackup 668 669 Vbackup 670 671 Vbackup 672 673 Vbackup 674 675 Vbackup 676 677 Vbackup 678 679 Vbackup 680 681 Vbackup 682 683 Vbackup 684 685 Vbackup 686 687 Vbackup 688 689 Vbackup 690 691 Vbackup 692 693 Vbackup 694 695 Vbackup 696 697 Vbackup 698 699 Vbackup 700 701 Vbackup 702 703 Vbackup 704 705 Vbackup 706 707 Vbackup 708 709 Vbackup 710 711 Vbackup 712 713 Vbackup 714 715 Vbackup 716 717 Vbackup 718 719 Vbackup 720 721 Vbackup 722 723 Vbackup 724 725 Vbackup 726 727 Vbackup 728 729 Vbackup 730 731 Vbackup 732 733 Vbackup 734 735 Vbackup 736 737 Vbackup 738 739 Vbackup 740 741 Vbackup 742 743 Vbackup 744 745 Vbackup 746 747 Vbackup 748 749 Vbackup 750 751 Vbackup 752 753 Vbackup 754 755 Vbackup 756 757 Vbackup 758 759 Vbackup 760 761 Vbackup 762 763 Vbackup 764 765 Vbackup 766 767 Vbackup 768 769 Vbackup 770 771 Vbackup 772 773 Vbackup 774 775 Vbackup 776 777 Vbackup 778 779 Vbackup 780 781 Vbackup 782 783 Vbackup 784 785 Vbackup 786 787 Vbackup 788 789 Vbackup 790 791 Vbackup 792 793 Vbackup 794 795 Vbackup 796 797 Vbackup 798 799 Vbackup 800 801 Vbackup 802

[illegible]

UART0 is MPU Debug UART.