AN1213



VORAGO VA108x0 Schematic Symbol and PCB footprint

September 19, 2018 Version 2.0

VA10800/VA10820

Abstract

The VA108x0 comes in two packages, 128 plastic QFP and 128 ceramic QFP. This application note briefly describes how to use the associated va108xx.lbr file to create schematic symbols and PCB footprints in several PCB design tools such as Altium, OrCAD or PADS.

Table of Contents

| 1 | С | Overview of library contents | .1 |
|---|-----|---|-----|
| 2 | Ε | agle Footprint and Symbol | . 1 |
| 3 | A | Altium Footprints and Symbols | .3 |
| | 3.1 | VA108XX CER128 symbol | .3 |
| | 3.2 | 2 VA108XX CER128 PORTS symbol | .5 |
| | 3.3 | VA108XX CER128 SIDE symbol | .7 |
| | 3.4 | Footprint and 3D model | .9 |
| 4 | С | Conversion instructions | .9 |
| | 4.1 | Cadence OrCAD specific | .9 |
| | 4.2 | PADS specific (Mentor Graphics) | 10 |
| 5 | A | Alternate Function Assignment spreadsheet | 10 |
| 6 | С | Conclusions | 10 |
| 7 | C | Other Resources | 11 |
| | - | | |

1 Overview of library contents

Each PCB design tool vendor creates device, package and symbol libraries in their own formats. Each vendor has their own way of importing symbols from other vendors. EAGLE from Autodesk and Altium is one of the most popular PCB design tools. VORAGO provides the VA108x0 symbol and footprint in an EAGLE library. Customers can use the import function of the tool they subscribe to quickly create both the schematic part symbol and the PCB pad layout.

2 Eagle Footprint and Symbol



The library (va108xx.lbr) consists of devices, symbols and footprints as shown in Figure 1. Four devices are offered; each package, ceramic and plastic, have two symbol options. See Figure 2. The "_split" option shows the device with pins grouped functionally. For example, power and grounds are shown in a separate block while the port pins are listed sequentially. The non-split option lists the pins in order of the mechanical package. Different designers prefer to use one or the other of these formats.

The plastic QFP has two layout options. One is for the part and the second is for a socket. See Figure 3.

| | gore r ecreen capiere er me | | | | | | | | | | | |
|------|---|--|-------------------------|--|--|--|--|--|--|--|--|--|
| | 1 Library - C:\SVN_Pueblo\Boards\eagle\lbr\va108xx.lbr - EAGLE 8.2.1 fr | ee | – 🗆 X | | | | | | | | | |
| File | Edit Draw View Library Options Window Help | | | | | | | | | | | |
| l C | ÷⊟ ≞ I 📖 →⊷ 🐘 Ð⊷ I 🔤 💁 I @. @. Q. | C. C | 5 | | | | | | | | | |
| i E | | | | | | | | | | | | |
| | 0.1 inch (1.0 3.3) | | ~ | | | | | | | | | |
| 114 | Device | Package | Symbol | | | | | | | | | |
| | VA108XX_CERAMIC | CERAMIC_LQFP128 | VA108XX_CERAMIC | | | | | | | | | |
| | VA108XX_CERAMIC_SPLIT | IC51-1284-1788 | VA108XX_CERAMIC_SPLIT_A | | | | | | | | | |
| | VA108XX_QFP128 | PLASTIC_SQFP128_14X14 | VA108XX_CERAMIC_SPLIT_B | | | | | | | | | |
| 1 | VA108XX_QFP128_SPLIT | SQFP128_14X14 | VA108XX_CERAMIC_SPLIT_C | | | | | | | | | |
| | | | VA108XX_QEP128 | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | VATOOXX_QFFI20_SFEIT_D | | | | | | | | | |
| | Add Device | Add Package | Add Symbol | | | | | | | | | |
| | nd sevicem | nourischugen | , ad cymborn | | | | | | | | | |
| | | | | | | | | | | | | |

Figure 1- Screen capture of the EAGLE library Table of Contents

Figure 2 - "_split" symbol option showing pins grouped by functionality.



Figure 3 - Plastic 128 QFP with socket layout



3 Altium Footprints and Symbols

The Altium component library is divided into two files: 1) va108xx.PcbLib, which contains the PCB footprint and 3D modeling, and 2) va108xx.SchLib which contains the schematic layout and pin associations. The easiest way to quickly view the footprint or component schematic is: File -> Open -> "filename".

Three graphical schematics are provided based on your application preference. Each of the three models has both a Normal and Alternate1 graphical display mode. It is possible to view between display modes without impacting the connections.

3.1 VA108XX_CER128 symbol

This symbol option contains two parts, a large symbol for all signal pins and a second part grouping the power pins, with divider lines showing where sides change.

The Alt1 view combines all the power pins into one grouped pin for VDD33, VDD15, and VSS for a simpler view. One schematic connection establishes nets on all physical of that type.



Figure 4 - VA108XX_CER128 (Normal mode)







3.2 VA108XX_CER128_PORTS symbol

This symbol separates the chip into 8 parts: PortA, PortB, JTAG, I2CA, I2CB, boot ROM interface, system pins, and power as discrete pins grouped by side.

The "Alt1" representation expands the graphical symbol to show what functions are available for each port pin. Changing between the Normal/Alt1 view will not affect connections on the schematic.



Figure 6 - VA108XX_CER128_Port schematic symbol – (Normal Mode)

| UIA | | UIB | | |
|---|--|---------|--------------|--|
| | 92 13 | | | 3 |
| PORTA[0] | 94 22 | VSS | VDD33 | 16 |
| PORTA[1] | 104 25 | VSS | VDD33 | 27 |
| PORTA[2] = | 105 30 | VSS | VDD33 | 28 |
| PORTA[3] | 106 31 | VSS | VDD33 | 32 |
| PORTA[4] | 100 31 | VSS | VDD33 | 40 |
| PORTA[5] =x | 10/ 30 | VSS | VDD33 | 49 |
| PORTA[6] | 100 30 | VSS | VDD33 | 01 |
| PORTAT71 | 4/ | VSS | VDD33 | 6/ |
| PORTAIS1 | 110 57 | VSS | VDD33 | 11 |
| PORTA(91 - | 112 59 | VSS | UDD33 | 88 |
| PORTALIOI | 114 71 | VSS | VDD33 | 96 |
| PORTAILLI | 115 74 | VSS | UDD33 | 113 |
| PORTALIZI | 116 83 | VSS | VDD33 | 124 |
| POPTALISI | [17 86 | USS | | and the second sec |
| POPTACIAL - | <u>I</u> 18 93 | TUCC | VDD15 | 19 |
| DORTALISI - | 120 100 | TICC | UDDIS | 34 |
| PORTALIS | 122 102 | VOO | VDD15 | 55 |
| PORTA[16] <r< td=""><td>123 111</td><td>VSS</td><td>VDDIS</td><td>69</td></r<> | 123 111 | VSS | VDDIS | 69 |
| PORTA[1/] =x | 125 121 | VSS | VDDIS | 80 |
| PORTA[18] | 15 128 | VSS | VDDIS | 98 |
| PORTA[19] | 7 | VSS | VDD15 | |
| PORTA[20] =x | 51 | VA1083 | V CERIS | POPT |
| PORTA[21] | 34 | VALUES | er_enters | - I OICI |
| PORTA[22] | 16 | | | |
| PORTA[23] | 20 | TT | C | |
| PORTA[24] | 10 | | | |
| PORTA[25] | 1 | | TDO D | |
| PORTA[26] | +1 | | TCK - | |
| PORTA[27] | 12 | | TMS | 3 |
| PORTA[28] | <u>+</u> 3 | Т | RST N | 30 |
| PORTA[29] | ++ | | TDI | :) |
| PORTA[30] | <u>+</u>) | 17. | 1003232 | EPINE DOPT |
| PORTA[31] | <u>+0</u> | V2 | AIDSYY_C | ER128_PORT |
| VA108XX_CER128_PC | RT | | | |
| TITH TOTAL | | UID | 1.1534 S4012 | 87 |
| | | I | 2CA_SDA | =10 |
| The statement of | 19 | I | 2CA_SCL | -HET |
| PORTB[0] | 50 | VA10 | NEVY CER | LIN DORT |
| PORTB[1] == | 50 | VAI | JOAN_CEI | CI20_FORI |
| PORTB[2] | <u>1</u> | | | |
| PORTB[3] | 22 | THE | | |
| PORTB[4] == | 25 | UIE | | 01 |
| PORTB[5] | 2+ | 12 | CB SDA | |
| PORTB[6] | 0 | 12 | CB_SCL | <15 |
| PORTB[7] - | 0 | 27.4.24 | NOVY OF | DIN DODT |
| PORTB(S) | 50 | VAI | JAXX_CEP | CI28_PORT |
| PORTBI91 | 00 | | | |
| PORTBIIO1 | 2/ | | | |
| PORTBUIL | 99 | UIF | _ | |
| PORTBUIL | 101 | ROM | CS N | 73 |
| PORTBUIS | <u>I</u> 03 | RO | MISCH | 70 |
| POPTBILIAI | <u>I</u> 26 | POM | TRONT | 75 |
| POPTBUSI | [27 | ROM | L MISO | 78 |
| PORTBUIL | <u>[</u> | ROM | L'unso | |
| PORTBUT | 33 | VA108 | SXX_CERI | 28_PORT |
| PORTRUS | 35 | | | |
| PORTBUIL | 37 UI | G | | |
| PORTRIZOL | 62 | D | STPOR | 11 |
| PORTRIZI | 53 F | FRURN | ENN | 29 |
| PORTBIZZI | 54 | EXTER | SET N | 81 |
| PORTBIZZI | 65 | BAIRD | CIK | 12 |
| TOKID[20] M | | | CLA C | |
| - Zalada - Calendar - | and the second s | | | |



Figure 7 – VA108XX_CER128_Ports Symbol (Alternate 1 mode)

| 1A | | THE D | | | TUD | | |
|--|--|--|--|--|--|--|--|
| FSEL1 | FSEL2 | FSEL3 | FSEL0 | 02 | 12 UIB | | 1 2 |
| TIM0 | RSVD | RSVD | PORTA[0] | -36 <u>4</u> | 15 VS | S VDD33 | 16 |
| TIMI | RSVD | RSVD | PORTA[1] | -16-1 | 22 VS | S VDD33 | 10 |
| TIM2 | UBRX | RSVD | PORTA[2] | ======================================= | 20 VS | S VDD33 | 2/ |
| TIM3 | UBTX | RSVD | PORTA[3] | 3105 | 30 VS | S VDD33 | 28 |
| TIM4 | UBCTS | RSVD | PORTA[4] | <h200< td=""><td>31 VS</td><td>S VDD33</td><td>32</td></h200<> | 31 VS | S VDD33 | 32 |
| TIM5 | UBRTS | RSVD | PORTA[5] | ======================================= | 30 VS | S VDD33 | 49 |
| 'IM6 | UACTS | RSVD | PORTA[6] | 108 | 38 VS | S VDD33 | 61 |
| IM7 | UARTS | RSVD | PORTA[7] | 109 | 4/ VS | S I VDD33 | 6/ |
| IMS | UARX | RSVD | PORTAIS | 110 | 5/ VS | S VDD33 | 11 |
| 'IM9 | UATX | RSVD | PORTA[9] | 51612 | 59 VS | S I VDD33 | 88 |
| CIM10 | SSB7 | RSVD | PORTAGIO | 114 | 71 VS | S VDD33 | 96 |
| IMII | SSB6 | RSVD | PORTAILLI | 115 | 74 VS | S I VDD33 | 113 |
| TIM12 | SSB5 | UBCTS | PORTA[12] | 116 | 83 VS | S VDD33 | 124 |
| TIM13 | SSB4 | UBRTS | PORTAIL | 117 | 86 VS | S I | a secondaria |
| TIM14 | SSB3 | UACTS | PORTA[14] | 118 | 93 VS | S VDD15 | 19 |
| TIMIS | SSB2 | UARTS | PORTAILS | 5120 | 100 VS | S VDD15 | - 34 |
| SBTYE | SSBI | UARX | PORTA[16] | 122 | 102 VS | S VDD15 | 55 |
| SATYE | SSB0 | UATX | PORTA[17] | 123 | 111 VS | S [VDD15 | 69 |
| SSC3 | BMISO | UBRY | PORTAILSI | 125 | 121 VS | S VDD15 | 80 |
| SSC2 | BMOSI | UBTX | PORTAIL91 | SH35 | 128 VS | S I VDDIS | 98 |
| SSCI | SBSCK | SSC4 | PORTAI201 | -17 =H= | ** | | |
| SSA7 | SSB7 | SSC3 | PORTAI211 | 21 | VAI | 08XX_CER1 | 28_PORT |
| SSA6 | SSB6 | SSC2 | PORTAI | 124 | | | |
| SSAS | SSB5 | SSCI | PORTAI231 | 26 | | | |
| SSA4 | TIM16 | UACTS | PORTA[24] | 39 | | UIC | |
| COAS | TIM17 | UARTS | PORTAI251 | 40 | | TDO | 4 |
| 3343 | TTACIO | URRY | PORTAIN | 41 | | TCK | 5 |
| SSA3 | TIMES | | | | | | |
| SSA3 SSA2 SSA1 | TIM18 | UBTY | PORTAI271 | 42 | | TMS | -16 |
| SSA3 SSA2 SSA1 SSA0 | TIM18 TIM19 TIM20 | UBTX | PORTA[27] | <12 <143 | | TMS TRST N | |
| SSA3 SSA2 SSA1 SSA0 AMISO | TIM18 TIM19 TIM20 TIM21 | UBTX UACTS | PORTA[27] PORTA[28] PORTA[29] | ~42 <43 <444 | | TMS TRST_N TDI | |
| SSA3 SSA2 SSA1 SSA0 AMISO AMOSI | TIM18 TIM19 TIM20 TIM21 TIM22 | UBTX UACTS UARTS | PORTA[27] PORTA[28] PORTA[29] PORTA[30] | | | TMS TRST_N TDI | |
| SSA3 SSA2 SSA1 SSA0 AMISO AMOSI SASCK | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 | UBIX UACTS UARTS UARX UARX UATX | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] | | | TMS TRST_N TDI VA108XX_ | 36 8 39 39 CER128_PORT |
| SSA3 SSA2 SSA1 SSA0 AMISO AMOSI SASCK A108XX | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 | UBTX UACTS UARTS UARX UATX PORT | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] | | | TMS TRST_N TDI VA108XX_ | G 3 3 3 2 2 CER128_PORT |
| SSA3 SSA2 SSA1 SSA0 AMISO AMOSI SASCK A108XX_ | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 | UBTX UACTS UARTS UARX UARX UATX PORT | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] | | U | TMS TRST_N TDI VA108XX_ | CER128_PORT |
| SSA3 SSA2 SSA1 SSA0 AMISO AMOSI SASCK A108XX_ JIH | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 | UBTX UACTS UARTS UARX UARX UATX PORT | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] | | U | TMS TRST_N TDI VA108XX_ | CER128_PORT |
| SSA3 SSA2 SSA1 SSA0 AMISO AMOSI SASCK A108XX_ JIH ESEL1 | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 | UBTX UACTS UARTS UARX UARX UATX PORT | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] | | U: | TMS TRST_N TDI VA108XX_ | CER128_PORT |
| SSA3 SSA2 SSA1 SSA0 AMISO AMOSI SASCK A108XX_ JIH FSEL1 SSB2 | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 CER128_ FSEL2 SSA1 | UBTX UACTS UARTS UARX UARX UATX PORT FSEL3 TIM0 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] FSEL0 PORTB[0] | | | TMS TRST_N TDI VA108XX_ ID 2CA_SDA 12CA_SCL | CER128_PORT |
| SSA3 SSA2 SSA1 SSA0 AMISO AMOSI SASCK A108XX_ UH FSEL1 SSB2 SSB1 | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 CER128_ FSEL2 SSA1 SSA2 | UBTX UACTS UARTS UARX UARX UATX PORT FSEL3 TIM0 TIM1 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] FSEL0 PORTB[0] PORTB[1] | | | TMS TRST_N TDI VA108XX_ ID 2CA_SDA I2CA_SCL A108XX_CE | CER128_PORT |
| SSA3 SSA2 SSA1 SSA1 SSA0 AMISO AMOSI SASCK A108XX_ JIH FSEL1 SSB2 SSB1 SSB0 | FSEL2 SSA1 SSA2 SSA3 | UBTX UACTS UARTS UARX UATX PORT FSEL3 TIM0 TIM1 TIM1 | PORTA[27] PORTA[27] PORTA[28] PORTA[30] PORTA[31] FSEL0 PORTB[1] PORTB[1] PORTB[1] | | | TMS TRST_N TDI VA108XX_ ID 2CA_SDA 12CA_SCL A108XX_CE | CER128_PORT |
| SSA3 SSA2 SSA1 SSA1 SSA0 AMISO AMOSI SSACK A108XX_ JIH FSEL1 SSB2 SSB1 SSB0 BMISO BMISO | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 FSEL2 SSA1 SSA2 SSA3 SSA4 | UBTX UACTS UARTS UARTS UARX UATX PORT FSEL3 TIM0 TIM1 TIM2 | PORTA[27] PORTA[27] PORTA[28] PORTA[30] PORTA[31] FSEL0 PORTA[31] PORTB[0] PORTB[1] PORTB[1] PORTB[2] | | | TMS TRST_N TDI VAI08XX_ ID 2CA_SDA I2CA_SCL AI08XX_CE | 29 29 29 29 29 20 20 20 20 20 20 20 20 20 20 20 20 20 |
| SSA3 SSA2 SSA1 SSA1 SSA0 AMISO AMISO AMOSI SASCK A108XX_ JIH FSEL1 SSB2 SSB1 SSB0 BMISO BMISO | FSEL2 SSA1 SSA2 SSA3 SSA4 SSA5 | UBTX UACTS UACTS UARX UATX PORT FSEL3 TIM0 TIM1 TIM1 TIM2 TIM3 TIM4 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTA[31] PORTB[0] PORTB[0] PORTB[1] PORTB[2] PORTB[2] PORTB[4] | | | TMS TRST_N TDI VA108XX_ 1D 2CA_SDA 12CA_SCL A108XX_CE | CER128_PORT |
| SSA2 SSA2 SSA1 SSA1 SSA0 AMISO AMISO AMISO AMISO AMISO AMISO SSB2 SSB1 SSB2 SSB1 SSB0 BMISO BMISO BMISO | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA5 SSA4 | FSEL3 TIM0 TIM1 TIM2 TIM3 TIM4 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] FSEL0 PORTB[3] PORTB[1] PORTB[2] PORTB[2] PORTB[3] PORTB[4] | | U I V. | TMS TRST_N TDI VA108XX_ ID 2CA_SDA I2CA_SCL A108XX_CE | CER128_PORT |
| SSA2 SSA2 SSA1 SSA0 AMISO AMOSI SASCK A108XX_ JIH FSEL1 SSB2 SSB0 BMISO BMISO BMOSI BSCK UBPY | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA5 SSA5 SSA6 | UBTX UACTS UARTS UARX UATX PORT FSEL3 TIM0 TIM1 TIM1 TIM2 TIM3 TIM4 TIM5 TIM6 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTA[31] PORTB[0] PORTB[0] PORTB[1] PORTB[2] PORTB[2] PORTB[4] PORTB[4] PORTB[4] PORTB[4] | | | TMS TRST_N TDI VAI08XXX 1D 2CA_SDA 12CA_SCL AI08XX_CE 1E 12CB_SDA 10CB_SCL | 5 5 3 3 3 3 3 3 3 3 3 3 3 3 3 |
| SSA2 SSA2 SSA2 SSA2 SSA2 SSA2 SSA2 SSA2 | TIM18 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA5 SSA5 SSA5 SSA6 | UBTX UACTS UARTS UARX UARX UATX PORT FSEL3 TIM0 TIM1 TIM2 TIM3 TIM4 TIM5 TIM4 TIM5 SSC2 | PORTA[27] PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTA[31] PORTB[1] PORTB[2] PORTB[2] PORTB[3] PORTB[5] PORTB[5] PORTB[5] PORTB[5] | | | TMS TRST_N TDI VA108XX_ ID 2CA_SDA I2CA_SCL A108XX_CE IE I2CB_SDA I2CB_SDA I2CB_SCL | 25 25 25 25 25 25 25 25 25 25 |
| SSA2 SSA2 SSA2 SSA1 SSA0 AMISO AMISO AMISO AMISO AMISO SSS1 SSB0 BMISO BMISO BMOSI BSCK UBRX UBRX | IIMI8 TIM19 TIM20 TIM21 TIM22 TIM22 CCER128_ CCER128_ SSA1 SSA2 SSA3 SSA4 SSA3 SSA4 SSA5 SSA6 SSA6 SSA0 ADTCO | FSEL3 TIM0 TIM1 TIM2 TIM3 TIM4 TIM5 TIM6 SSC3 | PORTA[27] PORTA[27] PORTA[29] PORTA[30] PORTA[31] PORTB[31] PORTB[31] PORTB[31] PORTB[31] PORTB[31] PORTB[32] PORTB[32] PORTB[32] PORTB[32] PORTB[32] | | | TMS TRST N TRST N TDI VA108XX_ ID 2CA_SDA ICCA_SCL IE IE 2CE_SDA ICCE_SCL A108XX_CE | |
| SSA2 SSA2 SSA2 SSA2 SSA2 SSA2 SSA2 SSA2 | IIM19 TIM20 TIM20 TIM21 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA5 SSA5 SSA6 SSA0 AMISO | FSEL3 TIM0 TIM1 TIM2 TIM3 TIM4 TIM5 TIM6 SSC3 SSC2 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTB[31] PORTB[1] PORTB[1] PORTB[2] PORTB[3] PORTB[3] PORTB[5] PORTB[5] PORTB[7] PORTB[7] | | U I V. U V. | TRS 1 TRSTN TRSTN UVA108XX_ ID 2CA_SDA ICA_SCL A108XX_CE IE ICE_SCL A108XX_CE | 5 3 3 2 2 2 2 2 2 2 2 2 2 2 2 2 |
| SSA2 SSA2 SSA2 SSA2 SSA2 SSA2 SSA2 AMOSI SASCK AMOSI SSB2 SSB1 SSB2 SSB1 BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMASI SSB2 SSB1 SSB2 SSB2 SSB2 SSB2 SSB2 SSB2 | ILMI9 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA5 SSA5 SSA6 SSA0 AMISO AMISO | FSEL3 TIM0 TIM1 TIM2 TIM3 TIM4 TIM5 TIM5 TIM5 SSC3 SSC2 SSC1 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTB[31] PORTB[31] PORTB[4] PORTB[4] PORTB[4] PORTB[5] PORTB[5] PORTB[6] PORTB[6] PORTB[6] PORTB[6] PORTB[7] PORTB[6] PORTB[7] | | U I V, U V, | TMS TRSTN TRSTN TDI VA108XX_ ID 3CA_SDA 12CA_SCL A108XX_CE 1E 12CB_SDA 12CB_SCL A108XX_CE | 5 8 3 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 |
| SSA2 SSA2 SSA2 SSA2 SSA2 SSA2 AMISO AMOSI SASCK AI08XX JIH FSEL1 SSB2 SSB0 BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO SSB6 SSCK UBRX UBRX UBRX SSB6 SSC | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA5 SSA5 SSA6 SSA6 SSA6 SSA6 SSA6 SSA6 | FSEL3 TIM0 TIM1 TIM2 TIM3 TIM4 TIM5 TIM6 SSC3 SSC1 TIM10 TIM2 | PORTA[27] PORTA[27] PORTA[29] PORTA[30] PORTA[30] PORTA[31] PORTB[0] PORTB[0] PORTB[1] PORTB[2] PORTB[2] PORTB[4] PORTB[5] PORTB[5] PORTB[6] PORTB[7] PORTB[| | ט 1 1 7 7 7 7 7 7 | TMS TRSTN TDT VA108XX DD 2CA_SDA DCA_SCL A108XX_CE IE 2CB_SDA DCB_SCL A108XX_CE | ST ST ST ST ST ST ST ST ST ST |
| SSA2 SSA2 SSA2 SSA1 SSA0 AMISO AMOSI SASCK AI08XX JIH FSEL1 SSB0 BMOSI BSCK UBTX UBTX UBTX UATX SSB6 SSB5 SSB5 | TIM19 TIM19 TIM20 TIM21 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA5 SSA6 SSA0 AMISO AMISO AMISO SSB1 SSB1 | FSEL3 TIM0 FSEL3 TIM0 TIM1 TIM1 TIM2 TIM3 TIM4 TIM5 TIM6 SSC3 SSC2 SSC1 TIM10 TIM11 TIM11 | PORTA[27] PORTA[28] PORTA[30] PORTA[30] PORTA[31] PORTB[3] PORTB[1] PORTB[1] PORTB[5] PORTB[6] PORTB[6] PORTB[6] PORTB[6] PORTB[7] PORTB[10] PORTB[10] PORTB[10] | | U I V. U V. U U U U U | TASS TRSTN TDI VA108XX_ ID 2CA_SDA ICCA_SCL A108XX_CE IE 2CB_SDA ICCB_SCL A108XX_CE | 25 25 25 25 25 25 25 25 25 25 |
| SSA2 SSA2 SSA1 SSA2 SSA1 AMISO AMOSI SASCK A108XX_ DIH FSEL1 SSB2 SSB1 SSB1 SSB1 BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO SSB5 SSB4 SSB4 SSB4 SSB4 | TIM19 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 SSA1 SSA2 SSA1 SSA2 SSA3 SSA4 SSA5 SSA5 SSA6 SSA6 SSA0 AMIS0 AMIS0 AMIS0 SSB1 SSB0 | FSEL3 TIM0 TIM1 TIM2 TIM3 TIM4 TIM5 TIM4 SSC3 SSC2 SSC1 TIM10 TIM11 TIM11 TIM11 TIM11 TIM12 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTA[31] PORTB[0] PORTB[1] PORTB[1] PORTB[3] PORTB[4] PORTB[5] PORTB[6] PORTB[7] PORTB[9] PORTB[9] PORTB[1] PORTB[1] PORTB[1] | | ט 1 ע ע ע 1 ע ע ע ע ע | TMS TRSTN TRSTN TD1 VA108XX_ ID 2CA_SDA I2CA_SCL A108XX_CE IE IE I2CB_SDA I2CB_SDA I2CB_SDA I2CB_SCL | 5 5 3 3 3 3 3 3 3 3 3 3 3 3 3 |
| SSA2 SSA2 SSA2 SSA1 SSA0 AMISO AMOSI SASCK A108XX JIH FSEL1 SSB2 SSB1 SSB2 BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO SSB4 UBRX UBRX UBRX SSB5 SSB5 SSB5 SSB3 | TIM19 TIM20 TIM20 TIM21 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA5 SSA5 SSA6 SSA0 AMISO AMISO BMISO | FSEL3 TIM0 FSEL3 TIM0 TIM1 TIM3 TIM4 TIM5 TIM4 TIM5 TIM4 TIM5 SSC1 SSC2 SSC2 SSC2 TIM10 TIM11 TIM12 TIM10 TIM11 | PORTA[27] PORTA[28] PORTA[28] PORTA[30] PORTA[31] PORTB[31] PORTB[0] PORTB[0] PORTB[1] PORTB[2] PORTB[2] PORTB[5] PORTB[5] PORTB[7] PORTB[7] PORTB[10] PORTB[10] PORTB[11] PORTB[12] | | | TASS TRSTN TDI VA108XX_ ID 2CA_SDA ICCA_SCL A108XX_CE IE 2CB_SDA ICCB_SCL A108XX_CE F OM_CS_N KOM_SCK | 2 2 2 2 2 2 2 2 2 2 2 2 2 2 |
| SSA2 SSA2 SSA2 SSA3 AMISO AMOSI SASCK A108XX_ JUH FSEL1 SSB2 SSB1 SSB0 BMISO BMISO BMISO BMISO BMISO BMISO BMISO SSB5 SSB4 SSB4 SSB4 SSB3 SSB2 | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA5 SSA6 SSA0 AMISO AMISO AMISO AMISO BMISO BMISO | FSEL3 UARTS UARTS UARTS UARTS UARTS UARTS UARTS FSEL3 TIM0 TIM1 TIM1 TIM1 TIM1 TIM12 TIM11 TIM12 TIM11 TIM14 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTA[31] PORTB[31] PORTB[1] PORTB[1] PORTB[3] PORTB[4] PORTB[14] PORTB[14] | | | TMS TRSTN TDI VA108XX_ ID 2CA_SDA I2CA_SCL A108XX_CE IE I2CB_SDA I2CB_SCL A108XX_CE F OM_CS_M SCK OM_SCK | 56 39 39 39 39 39 39 39 39 39 39 39 39 39 31 38 32 38 34 38 35 38 36 38 37 38 38 39 39 39 30 38 37 38 37 38 37 38 38 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 |
| SSA3 SSA2 SSA1 SSA0 AMISO AMOSI SASCK A108XX2 JIH FSEL1 SSB2 SSB1 BSCK UBTX UBTX UBTX UBTX SSB6 SSB3 SSB3 SSB3 SSB3 SSB3 | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM22 TIM23 CER128 SSA2 SSA3 SSA4 SSA3 SSA4 SSA5 SSA5 SSA6 SSA0 AMISO AMISO AMISO BSB0 SSB1 SSB0 BMOSI BSCK | FSEL3 TIM0 TIM1 TIM2 TIM3 TIM4 TIM5 SSC2 SSC1 TIM10 TIM1 TIM4 TIM5 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTB[31] PORTB[31] PORTB[4] PORTB[4] PORTB[4] PORTB[5] PORTB[7] PORTB[7] PORTB[10] PORTB[10] PORTB[11] PORTB[12] PORTB[12] PORTB[13] PORTB[15] | | U I V V U I R R R R R | TMS TRSTN TRSTN TD1 VA108XX D2CA_SDA 12CA_SCL A108XX_CE 12CB_SCL A108XX_CE CCB_SDA 12CB_SCL A108XX_CE COM_CS_N COM_CS_N COM_CS_N COM_OSCK DM_MISO | 5 8 9 9 9 9 9 9 9 9 9 9 9 9 9 |
| SSA2 SSA2 SSA1 SSA2 SSA0 AMISO AMOSI SASCK A108XX JIH FSEL1 SSB0 BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO SSB1 SSB2 SSB1 SSB2 SSB1 SSB2 SSB1 SSB2 SSB1 SSB2 SSB1 SSB2 SSB1 SSB2 SSB1 | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM22 TIM23 CER128 SSA1 SSA2 SSA2 SSA3 SSA4 SSA5 SSA5 SSA5 SSA6 SSA0 AMIS0 AMIS0 SSB1 SSB1 SSB1 SSB1 SSB1 SSB1 SSB2 SSB2 | FSEL3 UARTS UARTS UARTS UARTS UARTS UARTS UARTS FSEL3 TIM0 TIM1 TIM1 TIM1 TIM2 TIM3 TIM4 TIM12 TIM11 TIM12 TIM11 TIM12 TIM13 TIM14 TIM14 TIM16 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTA[31] PORTB[3] PORTB[1] PORTB[2] PORTB[2] PORTB[5] PORTB[5] PORTB[6] PORTB[10] PORTB[11] PORTB[14] PORTB[14] PORTB[14] PORTB[15] | | U I V V U I I R R R R R R R R R V I I | TMS TRSTN TDI VA108XX_ ID 2CA_SDA ICCA_SCL A108XX_CE IE 2CB_SDA ICCB_SCL A108XX_CE 7 0M_CS_N 0M_SCK 0M_MOSI 0M_MISO 108XY_CE | 25 25 25 25 25 25 25 25 25 25 |
| SSA2 SSA2 SSA2 SSA3 AMISO AMOSI SASCK A108XX_ JUH FSEL1 SSB2 SSB1 SSB2 BMISO BMISO BMISO BMISO SSB4 SSB4 SSB4 SSB4 SSB4 SSB4 SSB4 SS | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM22 TIM23 CER128 SSA1 SSA1 SSA2 SSA1 SSA3 SSA4 SSA3 SSA4 SSA5 SSA5 SSA5 SSA6 SSA0 AMISO BMOSI SSB0 BMISO BMOSI BSCK UBCTS UBCTS | FSEL3 TIM0 FSEL3 TIM0 TIM1 TIM1 TIM2 TIM3 TIM4 TIM5 TIM6 SSC3 SSC1 TIM10 TIM11 TIM12 TIM13 TIM14 TIM15 TIM10 TIM115 TIM115 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTA[31] PORTB[3] PORTB[1] PORTB[1] PORTB[4] PORTB[4] PORTB[4] PORTB[4] PORTB[4] PORTB[1] PORTB[13] PORTB[14] PORTB[14] PORTB[15] PORTB[14] PORTB[14] PORTB[15] PORTB[16] PORTB[17] | | U I V, U I R R R R R R R VA | TMS TRSTN TRSTN TDI VA108XX_ D 2CA_SDA 12CA_SCL A108XX_CE E 2CB_SDA 12CB_SDA 12CB_SDA 12CB_SCL A108XX_CE F OM_CS_N COM_SCK COM_SCK | 56 39 39 39 29 34 31 34 32 34 34 34 35 36 36 36 37 36 37 37 37 70 75 78 378 90RT |
| SSA3 SSA2 SSA1 SSA0 AMISO AMOSI SASCK A108XX JIH FSEL1 SSB0 BMISO BMISO BMISO BMISO BMISO BSCK UBTX UARX UATX SSB6 SSB3 SSB3 SSB3 SSB3 SSB3 SSB3 SSB3 | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM22 TIM23 CER128 SSA2 SSA3 SSA4 SSA5 SSA5 SSA5 SSA5 SSA5 SSA6 SSA0 AMISO AMISO AMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO SSB1 SSB0 SSB1 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB0 SSB1 SSB1 | UMATS | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[30] PORTA[31] PORTB[3] PORTB[0] PORTB[1] PORTB[1] PORTB[5] PORTB[7] PORTB[10] PORTB[11] PORTB[12] PORTB[13] PORTB[15] PORTB[15] PORTB[15] PORTB[15] PORTB[15] PORTB[15] PORTB[15] PORTB[15] | 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2 | U I V U I I R R R R R R V A | TMS TRSTN TDI VA108XX_ ID 2CA_SDA ICCA_SCL A108XX_CEF COM_CS_N ROM_SCK DM_MOSI DM_MISO DI08XX_CEF | 5 5 5 5 7 5 7 5 7 7 7 7 7 7 7 7 7 7 7 7 7 |
| SSA3 SSA2 SSA1 SSA1 SSA2 AMISO AMOSI SASCK A108XX JUH FSEL1 SSB0 BMISO BMISO BMISO BMISO BMISO SSB4 SSB3 SSB3 SSB2 SSB1 SSB0 BMISO BMISO BMISO | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA4 SSA5 SSA5 SSA5 SSA5 SSA5 SSA6 SSA0 AMISO AMISO AMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO | UJERN UJERN UJERN UJERN UJERN UJERN UJERN UJERN FSEL3 TIM0 TIM0 TIM0 TIM1 TIM2 SSC2 SSC2 SSC2 TIM10 TIM14 TIM13 TIM14 TIM15 TIM14 TIM15 TIM14 TIM15 TIM14 TIM15 TIM14 TIM15 TIM14 TIM15 TI | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[30] PORTA[31] PORTB[31] PORTB[31] PORTB[4] PORTB[4] PORTB[4] PORTB[14] PORTB[14] PORTB[15] PORTB[15] PORTB[16] PORTB[17] PORTB[17] PORTB[18] PORTB[18] PORTB[18] PORTB[18] | | U I V, U I I R R R R VA UIG | TMS TRSTN TDI VA108XX_ ID 2CA_SDA 12CA_SCL A108XX_CE IE 2CB_SDA 12CB_SCL A108XX_CE 5 0M_CS_N 0M_SCK 0M_MISO 108XX_CE5 | 56 39 39 39 39 39 30 31 31 73 78 778 7128_PORT 11 |
| SSA3 SSA2 SSA1 SSA1 SSA2 AMISO AMOSI SASCK A108XX JIH FSEL1 SSB2 SSB1 SSB0 BMISO BMOSI SSB4 SSB4 SSB5 SSB3 SSB3 SSB3 SSB3 SSB3 SSB1 SSB0 BMISO BMISO BMISO BMISO BMISO | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA3 SSA4 SSA5 SSA5 SSA6 SSA6 SSA0 AMISO AMISO AMISO BMISSI BSCK UBRXS UBRXS UBRXS | UBERN UACTS UARTS UARTS UARTS UARTS UARX UATX FSEL3 TIM0 TIM0 TIM1 TIM3 TIM4 TIM3 SSC2 SSC1 TIM10 TIM11 TIM13 TIM11 TIM13 TIM11 TIM15 TIM11 TIM15 TIM11 TIM15 TIM11 TIM15 TIM11 TIM15 TIM11 TIM15 TIM11 TIM15 TIM11 TIM15 TIM11 TIM15 TIM11 TIM15 TIM11 TIM15 TIM1 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[31] PORTA[31] PORTB[31] PORTB[1] PORTB[1] PORTB[1] PORTB[4] PORTB[5] PORTB[6] PORTB[10] PORTB[11] PORTB[12] PORTB[12] PORTB[15] PORTB[15] PORTB[15] PORTB[15] PORTB[15] PORTB[17] PORTB[17] PORTB[18] PORTB[17] PO | | U I V. U I R R R V V V V U I G | TMS TRSTN TRSTN TD1 VA108XX_ D2CA_SDA 12CA_SCL A108XX_CE C2CB_SDA 12CB_SDA | 6 3 |
| SSA3 SSA2 SSA1 SSA1 SSA0 AMISO AMOSI SASCK SSB2 SSB1 SSB0 BMISO BMISO BMISO BMISO BMISO BMISO BSCK UBTX UATX SSB5 SSB3 SSB3 SSB3 SSB3 SSB1 SSB0 BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO | ILMI18 TIM19 TIM20 TIM21 TIM22 TIM22 TIM23 CER128 SSA1 SSA2 SSA2 SSA3 SSA4 SSA5 SSA5 SSA5 SSA5 SSA6 SSA0 AMIS0 AMIS0 BMI | UJERN UJERN UJERN UJERN UJERN FSEL3 FSEL3 TIM0 TIM1 TIM2 TIM3 TIM4 TIM1 TIM1 TIM111 TIM111 TIM11 | PORTA[27] PORTA[28] PORTA[29] PORTA[30] PORTA[30] PORTA[31] PORTB[3] PORTB[1] PORTB[1] PORTB[1] PORTB[6] PORTB[6] PORTB[1] PORTB[1] PORTB[1] PORTB[1] PORTB[1] PORTB[14] PORTB[14] PORTB[15] PORTB[15] PORTB[15] PORTB[16] PORTB[16] PORTB[16] PORTB[16] PORTB[17] PORTB[16] PORTB[17] PORTB[1 | | U I V U I V U I I R R R V V U I I EF_BU | TAIS TRSTN TDI VA108XX_ ID 2CA_SDA ICCA_SCL A108XX_CEE IE 2CB_SDA ICCB_SCL A108XX_CEE COM_CS_N ROM_SCK OM_MOSI IOM_SCK OM_MOSI IOM_SCK COM_SCK | 25 25 25 25 25 25 25 25 25 25 |
| SSA2 SSA2 SSA2 SSA3 AMISO AMOSI SASCK AI0SXX JUH FSEL1 SSB2 SSB1 SSB0 BMISO BMISO BMISO BMISO BMISO BSCK SSB3 SSB2 SSB3 SSB2 SSB3 SSB2 SSB1 SSB0 BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO SSB4 SSB3 SSB4 SSB3 SSB4 SSB4 SSB4 SSB4 | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA3 SSA4 SSA5 SSA5 SSA6 SSA6 SSA6 SSA0 AMISO BMISO BMISO BMISO BMISO BMISO BMOSI SSD2 SSD1 SSCK UBRX UBRX UARTS SSC1 | UBERN UACTS VARTS UARTS UARTS UARTS UARX UATX FSEL3 TIM0 TIM1 TIM1 TIM2 TIM3 TIM4 TIM5 TIM6 SSC3 SSC1 TIM10 TIM17 TIM111 TIM1111 TIM111 TIM11 | PORTA[27] PORTA[27] PORTA[28] PORTA[30] PORTA[30] PORTA[31] PORTB[31] PORTB[1] PORTB[1] PORTB[1] PORTB[4] PORTB[4] PORTB[4] PORTB[4] PORTB[4] PORTB[1] PORTB[1] PORTB[1] PORTB[1] PORTB[1] PORTB[13] PORTB[14] PORTB[15] PORTB[15] PORTB[15] PORTB[15] PORTB[16] PORTB[16] PORTB[17] PORTB[16] PORTB[17] PORTB[16] PORTB[17] | | U I V, U I V, U I R R R R R VA U I G E F BU E XI | TMS TRSTN TDI VA108XX_ ID 2CA_SDA I2CA_SCL A108XX_CE IE 2CE_SDA I2CE_SCL A108XX_CE 5 0M_CS_N KOM_SCK OM_MOSI 0M_MISO 0108XX_CEF DSTPOR RN_EN_N | 56 39 39 39 39 39 31 31 32 31 31 31 31 31 31 |
| SSA3 SSA2 SSA1 SSA1 SSA2 AMISO AMOSI SASCK SSB2 SSB1 SSB0 BMOSI SSB0 BMOSI SSB5 SSB4 SSB3 SSB3 SSB1 SSB0 BMOSI SSB0 BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO SSB4 SSB4 SSB4 SSB4 SSB5 SSB4 SSB4 SSB5 SSB4 SSB5 SSB4 SSB5 SSB4 SSB5 SSB4 SSB5 SSB4 SSB5 SSB4 SSB5 SSB4 SSB5 SSB5 | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM22 TIM23 CER128 SSA2 SSA3 SSA4 SSA5 SSA5 SSA5 SSA5 SSA5 SSA5 SSA6 SSA0 AMISO AMOSI SSB0 BMOSI BSCK UBCTS UBRXS UBRXS UBRXS UBRXS UARTS SSC2 | UJATX UJATX UJATX UJATX UJATX UJATX UJATX UJATX TIM0 TIM1 TIM1 TIM1 TIM1 TIM1 TIM1 TIM1 TIM1 | PORTA[27] PORTA[27] PORTA[28] PORTA[30] PORTA[30] PORTA[31] PORTB[31] PORTB[31] PORTB[17] PORTB[4] PORTB[4] PORTB[4] PORTB[4] PORTB[4] PORTB[4] PORTB[4] PORTB[7] PORTB[17] PORTB[10] PORTB[10] PORTB[11] PORTB[14] PORTB[15] PORTB[15] PORTB[17] PORTB[17] PORTB[17] PORTB[18] PORTB[18] PORTB[18] PORTB[18] PORTB[18] PORTB[19] PORTB[19] PORTB[19] PORTB[10] PORT | | U I V. V. U I R R R R R R VA VA UIG EF_BU EXT | TMS TRSTN TDI VA108XX_ D 2CA_SDA DCA_SCL A108XX_CEP IE 2CB_SDA 102KX_CEP 7 0M_CS_N XOM_SCK 0M_MOSI 0M_MISO 108XX_CEP DSTPOR RN_EN_N RESET_N CLK | 36 40 40 40 40 40 41 41 41 41 41 41 41 41 41 41 41 42 41 42 |
| SSA2 SSA2 SSA2 SSA1 SSA2 AMISO AMOSI SASCK SSS2 SSB1 SSB0 BMISO BMISO BMISO BMISO BMISO BMISO BMISO BMISO BSCK UBTX UATX SSB5 SSB1 SSB0 BMISO BSCK UBTX UATX SSB5 SSB1 SSB0 BMISO BMISO BMISO BMISO BMISO BMISO BMISO SSB1 SSB0 SSB1 SSB0 BMISO BMISO SSB2 SSB1 SSB0 SSB1 SSB0 BMISO SSB0 SSB0 SSB0 SSB0 SSB0 SSB0 SSB0 SS | ILMI8 TIM19 TIM20 TIM21 TIM22 TIM22 TIM23 CER128 SSA1 SSA2 SSA3 SSA4 SSA5 SSA5 SSA5 SSA6 SSA6 SSA6 SSA0 AMISO AMISO AMISO BMISO BMISO BMISO BMISSO BMISSO BMISSO BMISSI UBRTS UBRTS UBRTS UBRTS UBRTS SSC1 SSC1 SSC1 SSC2 SC1 SSC2 SC2 SC2 SC2 SC2 SC2 SC2 SC2 SC2 SC | UJERN UJERN UJERN UJERN UJERN UJERN UJERN UJERN FSELJ TIMO TIMO TIMO TIMO TIMO TIMO TIMO TIMO | PORTA[27] PORTA[27] PORTA[28] PORTA[30] PORTA[30] PORTA[31] PORTB[31] PORTB[31] PORTB[1] PORTB[1] PORTB[1] PORTB[1] PORTB[1] PORTB[14] PORTB[14] PORTB[14] PORTB[14] PORTB[15] PORTB[14] PORTB[15] PORTB[16] PORTB[17] PORTB[18] PORTB[17] PORTB[18] PORTB[17] PORTB[18] PORTB[18] PORTB[19] PORTB[19] PORTB[19] PORTB[19] PORTB[19] PORTB[21] PORTB[21] PORTB[21] PORTB[21] PORTB[21] | · 문화 | U I V U U I V V U U I I R R R V V U I I E F_BU E XI U I I V I V V V | TMS TRSTN TDI VA108XX_ ID 2CA_SDA 12CA_SCL A108XX_CE IE 2CB_SDA 12CB_SCL A108XX_CE 5 0M_CS_N 0M_SCK 0M_MOSI 108XX_CEF I0STPOR RN_EN_N RESET_N (CK V_CEPLIS | 56 39 40 41 42 42 42 42 42 42 42 42 42 78 77 78 78 42 78 78 42 78 78 78 42 78 78 78 712 78 12 90 81 90 12 90 12 90 12 90 12 90 12 90 12 90 12 90 12 90 12 90 12 90 91 92 91 91 92 91 92 91 92 91 92 93 </td |

3.3 VA108XX_CER128_SIDE symbol

This symbol is separated into 4 parts, one for each physical side of the va108xx. The "Alt1" representation expands the graphical symbol to show what functions are available for each port pin. Changing between the Normal/Alt1 view will not affect connections on the schematic.



Figure 8 - VA108XX_CER128_SIDE symbol (Normal mode)

Figure 9 VA108XX_CER128_Side symbol (Alternate 1 mode)

| FSEL0 FSEL1 FSEL2 FSEL3 PORTB[16] SSB0 UBCTS TIM16 | VSS 1141 1141 1141 1141 1141 1141 1141 11 | | AND | VSS End Stud | FSEL3 FSEL2 | FSEL1 FSEL0 VDD33 |
|---|--|---|--|------------------------------|-------------|---------------------------------|
| NC VDD33 | FIS OCTINOCULAR CONTROCULAR OCTINOCULAR OCTINOCULAR | ORTA ORTA ORTA ORTA ORTA ORTA VI PORTA | POKI POKI POKI POKI POKI POKI POKI | ORTH VI VI | RSVD RSVD | NC TIMI PORTA[1] |
| TDO TCK TMS | FSELI SSB1 1 SSB2 1 SSC3 1 SSC3 1 ATXE 1 BTXE 1 BTXE 1 TIM15 1 | | TIME TIME TIME TIME TIME TIME STIME STIME STIME STIME | SSB5 I SSB6 I | RSVD RSVD | TIM0 PORTA[0] I2CB_SDA |
| TRST_N TDI NC | SEL2 BSCK MOSI MISO SSB0 S SSB1 S SSB1 S SSB2 | SSB3 SSB4 SSB5 SSB6 SSB6 SSB7 JATX | ARX ARTS ARTS ACTS BRTS BRTS BRTS JBRX MISO SSB0 | SSB1 SSB2 | | VDD33 |
| DSTPOR CLK VSS | SEL3 F TM15 1 TM14 B TM14 B BRX B BRX B BRX B ARX | ACTS BRCB BRCB BRCB BRCB BRCB BRCB BRCB BRC | | 11MI | | VSS NC I2CA_SCL |
| NC PORTA[19] SSC2 BMOSI UBTX | | 35544 4 . | | ГГ | | VSS NC |
| PORTA[20] SSC1 SBSCK SSC4 | VABOSXX_CER128_SIDE | 10.00 | | To a factor | | VDD15 |
| VDD15 NC | SEL3 FIM17 FIM18 FIM18 FIM18 JACT JACT JACT JACT JACT JACT | JACT JARC JARX JATX JATX TIMO | IIMS IIMS IIMS IIMS IIMS IIMS IIMS IIMS | IIM20 | | ROM_MISO VDD33 |
| PORTA[21] SSA7 SSB7 SSC3 VSS | XIS XS XIS | 8888 - 9 | 0499 9 9 8 | KKO- | dei i ei h | NC ROM_MOSI |
| NC PORTA[22] SSA6 SSB6 SSC2 | TIN TIN TIN | | SSA SSA SSA SSA SSA SSA SSA SSA SSA SSA | U M U M SSC | | VSS ROM_CS_N |
| VSS PORTA[23] SSA5 SSB5 SSC1 VDD33 | SELI BMISC BMOS BMOS BSCK SSA4 SSA4 SSA4 SSA1 SSA1 SSA1 SSA1 | SSA0 AMISC AMOS SASCR SSB2 SSB2 SSB1 SSB1 | SSB0 BMISC BMISC BSCK BSCK UBRX UBRX UARX | JBRX JBTX JBTX JARX | | VSS ROM SCK |
| VDD33 EF_BURN_EN_N VSS | 15 15 15 18(18) 18(18) 18(19) 18(19) 18(19) 18(25) 18(25) 18(25) 18(25) | | | B21 B21 | SSC1 AMOSI | VDD15 UATX PORTB[9] VDD33 |
| VSS VDD33 | POR POR POR POR POR POR POR POR | POR POR VDD POR | POR POR POR VDD VSS VSS VSS POR POR | POR POR | TIM23 SSC2 | NC UATX PORTB[23] |



3.4 Footprint and 3D model

PCB footprint along with 2D and 3D images are located in the va108xx.pcblib file. Either update the library search path to include this file or move the file to a location in the existing search path.

Figure 10 - VA108xx_Ceramic_LQFP128 model (click on the 2D button to toggle between 2D and 3D)

| ✓ Footprint | | | | | | | | | |
|-------------------------------|--|--|--|--|--|--|--|--|--|
| Name | | | | | | | | | |
| VA108XX_CERAMIC_LQFP128 | | | | | | | | | |
| 2D VA108XX_CERAMIC_LQFP128 | | | | | | | | | |
| Add 🖍 🚔 | | | | | | | | | |
| | | | | | | | | | |
| ▲ Graphical | | | | | | | | | |
| Mode Normal - | | | | | | | | | |

4 Conversion instructions

4.1 Cadence OrCAD specific

Please see <u>http://www.orcad.com/products/orcad-pcb-designer/overview</u> for latest import capabilities of OrCAD.

4.2 PADS specific (Mentor Graphics)

Pulled from https://www.pads.com

With the latest version of PADS (VX.1) xDX designer has an Eagle schematic importer. It's as easy as file import Eagle, run the translator once to generate the properties to convert and then run the translator again with the correct property mappings.

Eagle files from version 6.5+ are supported

5 Alternate Function Assignment spreadsheet

The VA108x0 has port pins with 3 alternate functions such as UART, SPI or Timer pins. When defining which pins to use, it is useful to have a tool to help coordinate those assignments. A spreadsheet is provided with AN1213.zip file. The spreadsheet has columns for package pin number, side of the page (East, West, North, South), and the alternate functions. A system designer can use this sheet to make assignments based on availability of a function and its relative proximity to other ICs.

This sheet can also be used to add the other ICs on the PCB. It will function as a netlist for the ICs and can be compared against the PCB design tool.

| | | VA108xx Pin Selection Help sheet | | | | | | | | | | | |
|-----------|---------|----------------------------------|-------|--------------------|----------------------|----------------------|----------------------|---------------|-----------------------|------------------|---------------|---------------|-------|
| | | | | | | | | | | | | | |
| | | Notes: | | | | | | | | | | | |
| | | 1 | | Each port pin has | 3 alternate function | s that can be seler | ted via software | The default v | alue for each pin is | Function Sele | ect 0 = Gener | al purpose ir | nout |
| | | 2 | | Recommendation | is to identify which | h timers and serial | ports are needed i | n application | then select port p | ins with that fu | nction. | | |
| | | 3 | | Supplimental infor | mation can be inse | erted for connection | ns to other Ics. Thi | s would ess | entially be the netli | st of the design | in a spreads | heet. | |
| | | | | | | | | | , | Ū | · · | | |
| | | | | | | | | | | | | | |
| | | | | | MOLL#1 | | | | | | | | |
| Pla | etic | Cers | mic | | 100 #1 | | l | ITAG#1 | SPI boot device | | Clock src | | |
| 110 | Side of | Cere | | | | | | UTACIT | OF T DOOL GEVICE | | CIOCK SIC | | |
| 128 pin # | package | 128 pin # | | Pin/Function-0 | Function-1 | Function-2 | Function-3 | 10-pin | IC #1 | IC #2 | IC #3 | IC #4 | IC #5 |
| | | | | | | | | | | | | | |
| 48 | East | 46 | East | PORTA[31] | SPI_SCKA | RTC[23] | UARTA_TX | | | | | | 1 |
| 47 | East | 45 | East | PORTA[30] | SPI_MOSIA | RTC[22] | UARTA_RX | | | | | | |
| 45 | East | 44 | East | PORTA[29] | SPI_MISOA | RTC[21] | UARTA_RTSn | | | | | | |
| 43 | East | 43 | East | PORTA[28] | SPI_SSELAn[0] | RTC[20] | UARTA_CTSn | | | | | | |
| 42 | East | 42 | East | PORTA[27] | SPI_SSELAn[1] | RTC[19] | UARTB_TX | | | | | | |
| 41 | East | 41 | East | PORTA[26] | SPI_SSELAn[2] | RTC[18] | UARTB_RX | | | | | | |
| 40 | East | 40 | East | PORTA[25] | SPI_SSELAn[3] | RTC[17] | UARTB_RTSn | | | | | | |
| 38 | East | 39 | East | PORTA[24] | SPI_SSELAn[4] | RTC[16] | UARTB_CTSn | | | | | | |
| 25 | South | 26 | South | PORTA[23] | SPI_SSELAn[5] | SPI_SSELBn[5] | SPI_SSELCn[1] | | | | | | |
| 23 | South | 24 | South | PORTA[22] | SPI_SSELAn[6] | SPI_SSELBn[6] | SPI_SSELCn[2] | | | | | | |
| 19 | South | 21 | South | PORTA[21] | SPI_SSELAn[7] | SPI_SSELBn[7] | SPI_SSELCn[3] | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 17 | Couth | 17 | Couth | DODTAVOOL | | | | | | | | | |
| 17 | South | 17 | South | PORTA[20] | SPI_SSELCn[1] | SPI_SUKB | SPI_SSELCh[4] | | | | | | |
| 100 | South | 105 | South | PORTA[19] | SPI_SSELCh[2] | | | | | | | | |
| 120 | West | 125 | West | | OPI_SSELCO[3] | | | | | | | | |

6 Conclusions



VORAGO is supplying CAD library files to enable users to quickly start their PCB design. Symbol and footprint models in native EAGLE and Altium tools are provided. Several versions of the symbol are provided to meet preferences of different customers. A separate spreadsheet is provided to assist engineers select which pins to place UART, SPI and Timer functions.

7 Other Resources

VORAGO VA10800 datasheet: http://www.voragotech.com/sites/default/files/files/datasheets/VA10800_DS_0.pdf

VORAGO VA10820 datasheet: http://www.voragotech.com/sites/default/files/files/datasheets/VA10820_DS_0.pdf

VORAGO MCU products: http://www.voragotech.com/VORAGO-products

VORAGO Application notes: <u>http://www.voragotech.com/resources</u>

VORAGO VA108xx REB1board user guide: Part of Board Support Package (BSP) http://www.voragotech.com/products/reb1

Altium Eagle converter instructions - http://www.altium.com/video-eagle-importer

Altium website - http://www.altium.com

Change Log June 8, 2017 - Rev 1.0 Original release

Rev 2.0 September 15, 2018 Added Altium component information Added Function Select spreadsheet in section 5. Updated table of contents and revision #