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TODO: FPGA clocks and PLLs.

FREE F0-32 F0-48 P0-64 F4-100 F4-144 Nucle **FMC FMC DCMI** LCD **Arduino PWM ELL-i external function** ELL-i name JTAG Ard ELL DIP MEM DDR XO2 XO2 XO2 256 I/O XO2 XO2 XO2 XO2 4000 I/O XO2 PIN PIN PIN 32 32 32 144 144 PIN functi conn. 144 **BANK** PIN **BANK** pin on PA 0 PA 0 PA 0 PA 0 Arduino A 0 11 A0 FMC_NIORD PF 6 PA 1 **PC Card** Arduino A 1 / 051: COMP2_INM 9 A1 PA 4 PA 4 PA 4 PA 4 Arduino A 2 / DAC1_OUT 7 A2 PA 4 PA 5 PA 5 PB 0 Arduino A 3 / DAC2 OUT 5 A3 PA 5 PB 9 Arduino A 4 / SDA 1 125 PT20D SDA/PCLKC0 PB 9 PC 0 DCMI_D 7) LCD_B7 3 A4 1 27 PT8D **SDA/PCLK** PB 6 PC 1 SDRAM DCMI D 5)--PB 6 PB 6 FMC SDNE1 Arduino A 5 / SCL 1 A5 28 PT8C SCL/PCLK 1 126 PT20C **SCL/PCLKT0** PA10 PA10 PA10 PA 3 DCMI_D 1) TIM1_CH3 Arduino D 0 / USART1 RX 24 D0 1 59 PB23A PA10 PA10 PA 9 PA 9 PA 9 PA 2 DCMI_D 0) TIM1 CH2 Arduino D 1 / USART1 TX 26 D1 1 60 PB23B PA 9 PA 9 (TIM3_ETR)/TIM: Arduino D 2 1 127 PT18B **PCLKC0_1** 28 D2 PA 7 PD 2 PD 2 PD 2 PA10 DCMI_D11) PA 7 PA11 PA11 PA11 PA11 PA11 PB 3 LCD_R4 TIM1_CH4 Arduino D 3 (PWM) / CAN1_RX / USART1_CTS / DONE 30 D3 1 52 PB15A PA12 PA12 PA12 PA12 PB 5 LCD_R5 (TIM1_ETR) Arduino D 4 / CAN1_TX / USART1_RTS / INITN 32 D4 1 54 PB15B PA12 1 55 PB20A PCLKT2_1 PB 1 PB 1 PB 1 LCD_R6)++ TIM3_CH4 31 D5 PB 1 PB 1 Arduino D 5 (PWM) PA 3 PA 3 29 D6 PA 3 PA 3 PA 3 PB10 LCD_B5 TIM9_CH2/TIM Arduino D 6 (PWM) / 051: COMP2_INP 1 56 PB20B PCLKC2_1 27 D7 PB 8 PB 8 PB 8 PB 8 PA8 1 109 PT28D **DONE** Arduino D 7 23 PT9D **DONE** NAND DCMI D12) 1 110 PT28C **INITN** PB 2 PB 7 PB 7 PG 6 FMC_INT2 LCD_R7) Arduino D 8 (For LQFP32, PB2 also used for SN) 25 D8 PA 9 PB 0 PB 0 PB 0 LCD_R3 TIM3_CH3 Arduino D 9 (**PWM**) 23 D9 1 20 PR5B PCLKC1_0 PB 0 PB 0 PC 7 1 133 PT14A PA15 PA15 PA15 PA15 PB 6 DCMI_ HSYNC LCD_VSYNC TIM2_CH1 21 D10 1 137 PT13C **TDO** PA15 Arduino D10 SPI1_SS (PWM) / JTDI<-JTDO 1 PT6C **TDO** 19 D11 PB 5 PB 5 PB 5 PA 7 FMC_SDCKE1 SDRAN DCMI_D10)--TIM3_CH2 Arduino D11 / SPI1_MOSI (PWM) / CAN2_RX 1 17 PB9B **SI** 1 71 PB30B **SI** PB 5 TIM13_CH1/TIN Arduino D12 / SPI1_MISO 10 PB2D **SO** PA 6 PA 6 PA 6 PA 6 DCMI_PIXCLK LCD_G2 17 D12 1 45 PB9B **SO** PB 3 PB 3 PB 3 PB 3 PB 3 TIM2_CH2 Arduino D13 / SPI1_SCK/ JTDO from STM32F4 15 D13 9 PB2C CCLK 1 44 PB9A **CCLK** ELL-i E 0 LVDS 1T PF 4 PF 7 FMC_NREG PC Card 33 E0 11 PB4A 1 141 PT10A PF 5 PF 8 FMC_NIOWR 35 E1 PC Card ELL-i E 1 LVDS 1C 12 PB4B 1 140 PT10B PF 6 PF 9 FMC_CD **PC Card** ELL-i E 2 LVDS 2T 37 E2 13 PB4C 1 139 PT11A PF 7 **FMC INTR** LCD_DE) ELL-i E 3 LVDS 2C 39 E3 14 PB4D 1 138 PT11B PC Car DCMI D11)--PC₀ XX ELL-i E 4 LVDS 3T 41 E4 1 122 PT21A XX 43 E5 PC₁ ELL-i E 5 LVDS 3C 1 121 PT21B PC₂ XX ELL-i E 6 LVDS 4T 45 E6 1 112 PT27A PC3 XX ELL-i E 7 LVDS 4C 47 E7 1 111 PT27B PC 4 PG 7 FMC_INT3 NAND DCMI_D13) LCD_CLK) 49 E8 ELL-i E 8 LVDS 5T 1 114 PT25A PC 5 ELL-i E 9 LVDS 5C 51 E9 1 113 PT25B LCD HSYNC PC 6 PC 6 PC 6 DCMI_D 0) ELL-i E10 LVDS 6T 53 E10 1 143 PT9A PC 7 PC 7 PC 7 DCMI_D 1) LCD G6 ELL-i E11 LVDS 6C 55 E11 1 142 PT9B PB11 PB11 PB11 LCD_G5 4 PL5C ELL-i E12 **I2C2 SDA** 57 E12 1 115 PT24B PB₁₀ 5 PL5D PB10 PB10 LCD_G4 ELL-i E13 I2C2 SCL 59 E13 1 117 PT24A PB12 PB12 ELL-i E14 SPI2 SS / CAN2_RX 60 E14 1 65 PB27A PB12 PB 9 PB15 PB15 PB15 PB15 ELL-i E15 **SPI2 MOSI** 58 E15 1 69 PB29B PB14 PB14 PB14 PB14 ELL-i E16 **SPI2 MISO** 56 E16 1 68 PB29A PB13 PB13 PB10 PB13 ELL-i E17 SPI2 SCK / CAN2_TX 54 E17 1 67 PB27B DCMI_D 4 PC11 PC11 PC11 ELL-i E18 **USART3 RX** (F4-only) 52 E18 1 58 PB21B PC10 PC10 PC10 DCMI_D 8 LCD_R2 ELL-i E19 USART3 TX (F4-only) 50 E19 1 57 PB21A PA₁ PA 1 PA 1 ETH_INT ETH ENC28J60 intrerrupt PA 7 PA 7 LCD_R6)--ETH_RMII_CRS_DV ETH_CRS PC 1 PC 1 **ETH RMII MDC** ETH MDC PA 2 PA 2 ETH_RMII_MDIO ETH_MDIO PA 1 PA 1 ETH RMII REF CLK ETH_CLK PC 4 PC 4 ETH_RMII_RXD0 ETH_RXD0 **ETH RMII RXD1** PC 5 PC 5 ETH RXD1 PB12 PG13 ETH_RMII_TXD0 ETH_TXD0 PB13 PG14 PB11 PG11 FMC_NCE4_2 Chip se DCMI_D 3)--LCD_B3)--ETH_RMII_TXEN ETH_TXEN PC12 PC12 PC12 DCMI_D 9 Internal CSSPIN / DMCI D9 **CSSPIN** 8 PB2A CSSPIN 1 40 PB4A **CSSPIN** PA 8 PA 8 PA8 PA 8 LCD_R6)--TIM1_CH1 Internal MCO MCO 1 21 PR5A **PCLKT1_0** 1 128 PT18A **PCLKT0 1** PA 8 PC 8 DCMI_D 2) Internal **PROGRAMN PROGRAMN** 1 25 PT9B **PROGRAM** 1 119 PT23D PROGRAMN PC 8 PC 8 PB 2 PB 2 LCD_B6 PB 2 PB 2 PB 2 DCMI_D 6) Internal SN / DMCI_D6 / LCD_B6 (Arduino D8 for LQFP32) FPGA_SN 1 16 PB9A **SN** 1 70 PB30A **SN** PA14 PA14 PA14 PA14 PA14 JTAG JTCK / SWCLK **JTCK** 1 30 PT7A **TCK** 1 131 PT15C **TCK** PC 9 JTDI 1 32 PT6D **TDI** PC 9 PC 9 JTAG JTDI to MachXO2 1 136 PT13D **TDI JTMS** PA13 PA13 PA13 PA13 **JTAG JTMS / SWDIO** 1 29 PT7B **TMS** 1 130 PT15D **TMS** PA13 PB 4 PB 4 PB 4 **JTRST** PB 4 PB 4 JTAG NJTRST/JTAGENB 1 26 PT9A **JTAGENB** 1 120 PT23C **JTAGENB** PD14 PD14 FMC D 0 MEM_D0 1 1 PL3A MEM ADDR / DATA 0 FMC_D 1 MEM ADDR / DATA 1 MEM_D1 2 PL3B PD15 PD15 PD 0 PD 0 MEM_D2 FMC_D 2 MEM ADDR / DATA 2 3 PL4A PD 1 PD 1 FMC D3 MEM ADDR / DATA 3 MEM D3 1 4 PL4B MEM_D4 PE 7 PE 7 FMC_D 4 MEM ADDR / DATA 4 5 PL6A PE 8 PE 8 MEM_D5 6 PL6B FMC_D 5 MEM ADDR / DATA 5 PE 9 PE 9 FMC D6 MEM ADDR / DATA 6 MEM_D6 1 9 PL7A PE10 PE10 FMC_D 7 MEM ADDR / DATA 7 MEM_D7 1 10 PL7B PE11 PE11 FMC_D 8 LCD_G3 MEM_D8 1 11 PL8A MEM ADDR / DATA 8 PE12 PE12 LCD_B4 FMC_D 9 MEM ADDR / DATA 9 MEM_D9 1 12 PL8B PE13 PE13 FMC_D10 LCD_DE) MEM ADDR / DATA10 MEM_D10 1 20 PL10D PCLKC4_0 PE14 PE14 FMC_D11 LCD_CLK) MEM_D11 1 19 PL10C **PCLKT4_0** MEM ADDR / DATA11 PE15 PE15 FMC_D12 LCD_R7)++ MEM_D12 1 15 PL10A MEM ADDR / DATA12 PD 8 PD 8 MEM_D13 FMC_D13 MEM ADDR / DATA13 1 17 PL10B PD 9 PD 9 FMC_D14 MEM ADDR / DATA14 MEM_D14 1 13 PL9A PD10 PD10 LCD_B3) MEM_D15 1 14 PL9B FMC_D15 MEM ADDR / DATA15 PF 0 FMC_A 0 MEM ADDR 0 MEM_A0 PF 1 MEM_A1 FMC_A 1 MEM ADDR 1 PF 2 FMC_A 2 MEM ADDR 2 MEM_A2 PF 3 MEM_A3 FMC_A 3 MEM ADDR 3 PF 4 MEM_A4 FMC_A 4 MEM ADDR 4 PF 5 FMC_A 5 MEM ADDR 5 MEM_A5 PF12 FMC_A 6 MEM ADDR 6 MEM_A6 PF13 MEM_A7 FMC_A 7 MEM ADDR 7 PF14 FMC_A 8 MEM_A8 MEM ADDR 8 PF15 MEM_A9 FMC_A 9 MEM ADDR 9 PG 0 FMC_A10 MEM ADDR10 MEM_A10 PG 1 FMC_A11 MEM ADDR11 MEM_A11 PG 2 FMC_A12 MEM_A12 MEM ADDR12 PG 3 MEM_A13 FMC_A13 MEM ADDR13 PG 4 FMC_A14 MEM ADDR14 MEM_A14 PG 5 FMC_A15 MEM ADDR15 MEM_A15 PD11 PD11 1 21 PL13A FMC_A16 MEM ADDR16 MEM_A16 PD12 PD12 1 22 PL13B FMC_A17 MEM ADDR17 MEM_A17 PD13 PD13 FMC_A18 MEM ADDR18 MEM_A18 1 23 PL14A PE 3 PE 3 FMC_A19 MEM_A19 MEM ADDR19 1 24 PL14B PE 4 PE 4 FMC_A20 DCMI_D 4 LCD_B0 MEM ADDR20 MEM_A20 1 41 PB4B PE 5 PE 5 FMC_A21 DCMI_D 6) LCD_G0 MEM ADDR21 MEM_A21 1 42 PB7A PE 6 PE 6 FMC_A22 DCMI_D 7) LCD_G1 MEM ADDR22 MEM_A22 1 61 PB24A PE 2 PE 2 FMC_A23 MEM ADDR23 MEM_A23 1 62 PB24B PD 7 PD 7 1 50 PB13B FMC_NE1/NCE2 Chip select MEM CHIP SELECT 1 MEM_CS1 PG 9 MEM_CS2 FMC_NE2/NCE3 Chip select MEM CHIP SELECT 2 PG10 FMC_NE3/NCE4 Chip se DCMI_D 2) LCD_B2)--MEM_CS3 MEM CHIP SELECT 3 PG12 LCD_B1 MEM CHIP SELECT 4 MEM_CS4 1 63 PB24D FMC_NE4 Chip select PC 0 PC 0 MEM CTRL SDRAM FMC_SDNWE SDRAM MEM_SDWNE PC 2 PC 2 FMC_SDNE0 SDRAM (opt) MEM CTRL SDRAM MEM_SDNE0 MEM CTRL SDRAM PC 3 PC 3 FMC_SDCKE0 SDRAM (opt) MEM_SDCKE0 FMC_SDNRAS | SDRAM DCMI_D12) PF11 MEM_SDNRAS MEM CTRL SDRAM FMC_SDCLK SDRAM PG8 MEM CTRL SDRAM MEM_SDCLK FMC SDNCAS SDRAM DCMI D13) PG15 MEM CTRL SDRAM MEM_SDNCAS PB 7 FMC NL/NADV NOR/PEDCMI VSYNC MEM CTRL SRAM MEM_NADV 1 43 PB7B PD 3 PD 3 FMC_CLK NOR/P(DCMI_D 5)++ MEM_CLK 1 49 PB13A **PCLKT2_0** LCD_G7 MEM CTRL SRAM FMC_NOE NOR/PSRAM/SDRAM MEM_NOE PD 4 PD 4 MEM CTRL SRAM/SDRAM 1 47 PB10A PD 5 PD 5 MEM CTRL SRAM/SDRAM FMC_NWE NOR/PSRAM/SDRAM MEM_NWE 1 48 PB10B PD 6 PD 6 FMC_NWAIT NOR/P(DCMI_D10)++ LCD_B2)++ MEM CTRL SRAM/SDRAM MEM_NWAIT 1 132 PT14B SRAM/I DCMI_D 2) MEM CTRL SRAM/SDRAM MEM_NBL0 PE 0 PE 0 FMC_NBL0 1 38 PB3A PE 1 PE 1 FMC_NBL1 SRAM/I DCMI_D 3) MEM CTRL SRAM/SDRAM MEM_NBL1 1 39 PB3B DDR_A0 XX MEM DDR2 ADDR 1 73 PR19B MEM DDR2 ADDR DDR_A1 1 74 PR19A XX MEM DDR2 ADDR DDR_A2 XX 1 75 PR18B XX MEM DDR2 ADDR DDR_A3 1 76 PR18A XX MEM DDR2 ADDR DDR_A4 1 77 PR16B XX DDR_A5 MEM DDR2 ADDR 1 1 78 PR16A XX MEM DDR2 ADDR DDR_A6 1 81 PR15B XX DDR_A7 MEM DDR2 ADDR 1 82 PR15A XX DDR_A8 MEM DDR2 ADDR 1 83 PR14B XX MEM DDR2 ADDR DDR_A9 1 84 PR14A XX MEM DDR2 ADDR DDR_A10 1 85 PR13B XX MEM DDR2 ADDR DDR_A11 1 86 PR13A XX DDR_A12 1 87 PR10D MEM DDR2 ADDR XX MEM DDR2 ADDR DDR_A13 1 89 PR10C XX MEM DDR2 ADDR DDR_A14 1 95 PR8B DQ0 XX MEM DDR2 ADDR DDR_A15 1 96 PR8A DQ0 XX 1 25 PL16A MEM DDR2 CTRL XX 1 26 PL16B MEM DDR2 CTRL XX MEM DDR2 CTRL 1 27 PL17A PCLKT3_0 XX MEM DDR2 CTRL 1 28 PL17B PCLKTC 0 XX MEM DDR2 CTRL 1 31 PL18D XX MEM DDR2 CTRL 1 1 32 PL19A XX MEM DDR2 CTRL 1 33 PL19B XX MEM DDR2 CTRL 1 34 PL20A XX MEM DDR2 CTRL 1 35 PL20B XX MEM DDR2 CTRL 1 103 PR4C XX MEM DDR2 CTRL CLK DDR_CLKN 1 91 PR10B PCLKC1_0 1 XX MEM DDR2 CTRL CLK DDR_CLK 1 92 PR10A **PCLKT1_0** XX DDR_DQS0 1 93 PR9B DQS0 MEM DDR2 DATA XX MEM DDR2 DATA DDR_DQS0N 1 94 PR9A DQS0N XX MEM DDR2 DATA DDR_DQ1 1 97 PR6B DQ0 XX MEM DDR2 DATA DDR_DQ0 1 1 98 PR6A DQ0 XX DDR_DQ3 MEM DDR2 DATA 1 99 PR5B DQ0 XX MEM DDR2 DATA DDR_DQ2 1 100 PR5A DQ0 XX MEM DDR2 DATA DDR_DQ5 1 104 PR3B DQ0 XX MEM DDR2 DATA DDR_DQ4 1 105 PR3A DQ0 XX MEM DDR2 DATA DDR_DQ7 1 106 PR2B DQ0

MEM DDR2 DATA

DDR_DQ6

1 107 PR2A DQ0

USED

6 20 20 16 59

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