i.MX 8 Universal Update Utility and Pins Tool

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SECURE CONNECTIONS FOR A SMARTER WORLD

Agenda

- UUU Tool
- Pins Tool

UUU

- New tool to flash storage media on i.MX products
- UUU replaces the MFG Tool
- Less work to create flashing scripts
- Less host and target dependencies
- More host OS supported

Downloading UUU

- Source code:
  - https://github.com/codeauroraforum/mfgtools

- Prebuilt Binaries
  - https://github.com/codeauroraforum/mfgtools/releases

System Requirements

- Windows 10 64-bit.
  - Windows 7 needs additional updates for WICD to work.
- Linux
  - Above Ubuntu 16.04
- MacOS
  - Not tested yet

Known Issues

- Windows: Open device failure
  - libusb bug, need to retry
- Linux: Open device open failure
  - Use **sudo** or add user permissions for device

Supported Platforms

- Currently Supported
  - All MX6 and MX7D, ULP
  - MX8 QXP B0

Technology Detail

- Standard C++ library, zlib, libusb
- U-boot and kernel use WCID to auto install winusb driver in windows platform.
  - About WCID: https://github.com/pbatard/libwdi/wiki/WCID-Devices
- Using libusb as low level usb transfer mechanism
- UI part and core library are separate. Customers can create a UI or design a GUI easily
- FB/FBK use android fastboot protocol

OS Support for UUU Compared with MFG Tools

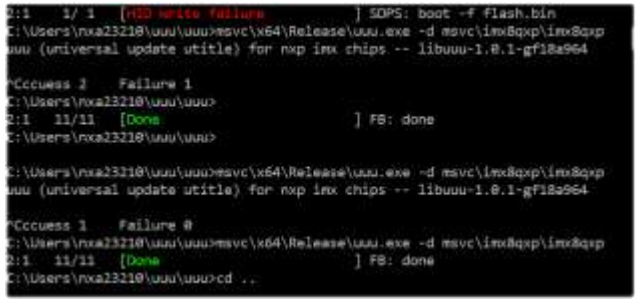
UUU

(Not test yet)

Mfgtools

UUU Compared With MFG Tools

UUU



Command Line Only.

Multi Device Supports
- Not limited by uuu.
- Only limited by number of ports

Simple pure text script

Mfgtools

GUI

Supports max of 4 devices

XML File

Quick User Guide

- Run uboot only
  - uuu flash.bin(imx8qxp) \ u-boot.imx(imx6\imx7\ulp)
- Burn Images into emmc
  - uuu android.zip (android release package, After QXP GA)
  - uuu <yocto release package> (After QXP GA)
- For other storage you need to write uuu script. See below pages
  - https://github.com/codeauroraforum/mfgtools/wiki

How uuu Helps Development

UUU

1. [sudo] uuu –d flash.bin

1. modify u-boot code
2. Build u-boot & make flash
3. Press reset button

SD Card

1. Change uboot code
2. Build uboot & make flash
3. Remove card from board
4. dd flash.bin to sd card
5. Plug sd card
6. Reboot board

How to Support Multiple Boards

- If boards are all the same
  - uuu –d flash.bin. (uuu will monitor all ports for all known type boards)
- If boards are different
  - uuu -d –m 1:2 –m 2:3 flash.bin (monitor port 1:2 and 1:3 only and download flash.bin for known boards)
  - uuu –d –m 5:6 –m 5:7 u-boot.imx (monitor port 5:6 and 5:7 only and download u-boot.imx for known boards)

How to Change u-boot Environment

- uuu basic command format
  - <protocol name>: <cmd>: parameter.
- uuu using android fastboot protocol to communicate with u-boot.
  - Default u-boot will auto run fastboot cmd if booting from USB serial download.
  - FB: ucmd: <any uboot command>
- For example:
  - FB: ucmd: setenv server ip 10.45.76.124

How to Run a Script with uuu

- uuu uuu.lst
- Script is text file.
  - First line must be uuu_version 1.0.1
    - 1.0.1 show required uuu version or later
  - Add any commands after first required line
  - Done command is required at end of script. Which tells uuu to exit if normal mode or increase success number in daemon mode.
- uuu –s enter shell mode.
  - You can input commands and run them at a shell prompt
  - uuu.inputlog will record all input commands
  - You can copy it another file.
  - Next time you use uuu <your new file> to run all commands.

How to Download Kernel and DTB Files

- FB: ucmd setenv fastboot_buffer ${loadaddr}
- FB: download –f Image
- FB: ucmd setenv fastboot_buffer ${fdt_addr}
- FB: download –f imx8qxp_mek.dtb
- FB: acmd booti ${loadaddr} - ${fdt_addr}

How to Flash an Android Image to eMMC

- SDPS: boot -f flash.bin
- FB: flash gpt partition-table.img
- FB: flash boot_a boot-imx8qxp.img
- FB: flash system_a system.img
- FB: flash vendor_a vendor.img
- FB: flash vbmeta_a vbmeta-imx8qxp.img
- FB: ucmd setenv fastboot_buffer ${loadaddr}
- FB: download -f u-boot-imx8qxp.imx
- FB: ucmd setexpr fastboot_blk ${fastboot_bytes}
- FB: ucmd setexpr fastboot_blk ${fastboot_blk} + 0x1FF
- FB: ucmd setexpr fastboot_blk ${fastboot_blk} / 0x200
- FB: ucmd mmc partconf 0 1 1 1
- FB: ucmd echo ${fastboot_buffer}
- FB: ucmd echo ${fastboot_blk}
- FB: ucmd mmc write ${fastboot_buffer} 0x40 ${fastboot_blk}
- FB: ucmd mmc partconf 0 1 1 0
- FB: Done

How to Flash an Android Image With uuu Autoscripts

- Customer just run below command
- uuu imx8qxp_mek_android.zip
  - uuu will search auto.uuu in root directory of imx8qxp_mek_android.zip and run it.

- Save above scripts as auto.uuu
- Put auto.uuu with system.img, vendor.img …. Together
- Zip as imx8qxp_mek_android.zip

How to Flash a Yocto Image to eMMC

- SDPS: boot -f flash.bin
- FB: ucmd setenv fastboot_dev mmc
- FB: ucmd setenv mmcdev ${emmc_dev}
- FB: flash -raw2sparse all fsl-image-imx8qxpmek.rootfs.sdcard
- FB: flash bootloader flash.bin
- FB: ucmd mmc partconf 0 1 1 0
- FB: Done

How to Flash a Yocto Image to eMMC

- uuu fsl-image-validation-imx-imx8qxpmek-20180516162233.rootfs.sdcard
- uuu <release package>
- Note: This have not deployed in current release. Maybe change method in finial GA.
- Need put a uuu.auto in fat parttion
  - Basic uuu.auto look like
    - SDPS: boot -f flash.bin
    - FB: ucmd setenv fastboot_dev mmc
    - FB: ucmd setenv mmcdev ${emmc_dev}
    - FB: ucmd mmc dev ${emmc_dev}
    - FB: flash -raw2sparse raw ..
    - FB: flash bootloader flash.bin
    - FB: ucmd mmc partconf 0 1 1 0
    - FB: Done

Replicating the MFG Tools Default Script

uuu_version 1.0.1

SDPS: boot -f flash_mfg.bin

FBK: ucp mksdcard.sh t:/tmp

FBK: ucmd chmod 777 /tmp/mksdcard.sh

FBK: ucmd /tmp/mksdcard.sh /dev/mmcblk0

FBK: ucmd dd if=/dev/zero of=/dev/mmcblk0 bs=1k seek=4096 count=1

FBK: ucmd sync

FBK: ucmd echo 0 > /sys/block/mmcblk0boot0/force_ro

FBK: ucp flash.bin t:/tmp

FBK: ucmd dd if=/tmp/flash.bin of=/dev/mmc0boot0 bs=1K seek=32

FBK: ucmd echo 1 > /sys/block/mmcblk0boot0/force_ro

FBK: ucmd while [! -e /dev/mmcblk0p1]; do sleep 1; done

FBK: ucmd mkfs.vfat /dev/mmcblk0p1

FBK: ucmd mkdir -p /mnt/mmcblk0p1

FBK: ucmd mount -t vfat /dev/mmcblk0p1 /mnt/mmcblk0p1

FBK: ucp Image t:/mnt/mmcblk0p1

FBK: ucp fsl-imx8qxp-mek.dtb t:/mnt/mmcblk0p1

FBK: ucmd umount /mnt/mmcblk0p1

FBK: ucmd mkfs.ext3 -F -E nodiscard /dev/mmcblk0p2

FBK: ucmd mkdir -p /mnt/ext3

FBK: ucmd mount /dev/mmcblk0p2 /mnt/ext3

FBK: acmd tar -jxv -C /mnt/ext3

FBK: ucp rootfs.tar.bz2 t:-

FBK: Sync

FBK: ucmd umount /mnt/ext3

FBK: DONE

Android Support Plan

- Flash directly using android’s uboot
- eMMC as default script
- Add more script in zip file or flat directory
- Zero depend on yocto release files

Yocto Suppot Plan

- Copy a uuu.auto (eMMC) to fat partition
- Copy flash.bin to fat partition as unified name bootload.bin
- Copy default dtb file to fat partition as unified name default.dtb
- Image already in fat
- Copy a additional kernel.uuu to fat.
- Copy a initramfs.cpio.gz(about 9M) to fat

- No need mfgtools directory at all.
- No file naming dependence again.
- Customer directly use xxx.sdcard to burn into eMMC

Yocto Support Plan 2

- NAND Support
  - There are seldom NAND flash in our release boards.
  - We provide a addition example script.
  - Customer can use example script to burn work.
  - Uboot still not support kobs yet.
  - Need full kernel to do that

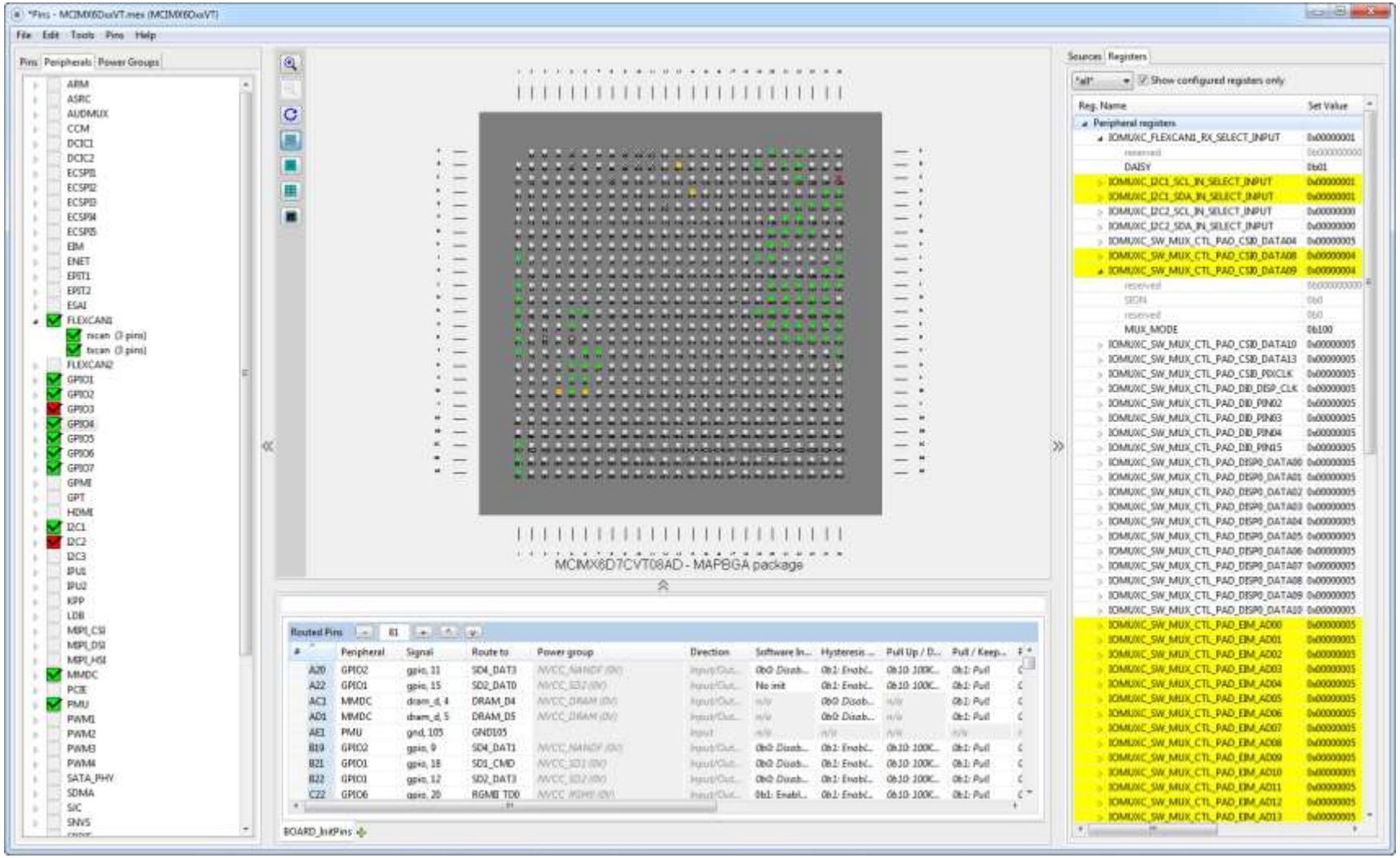
- QSPI
  - Uboot support burn qspi.
  - Boot Parameter data have not support yet.
  - We can use a binary image to do that.
  - Addition script can be added fat partition.

Pins Tool

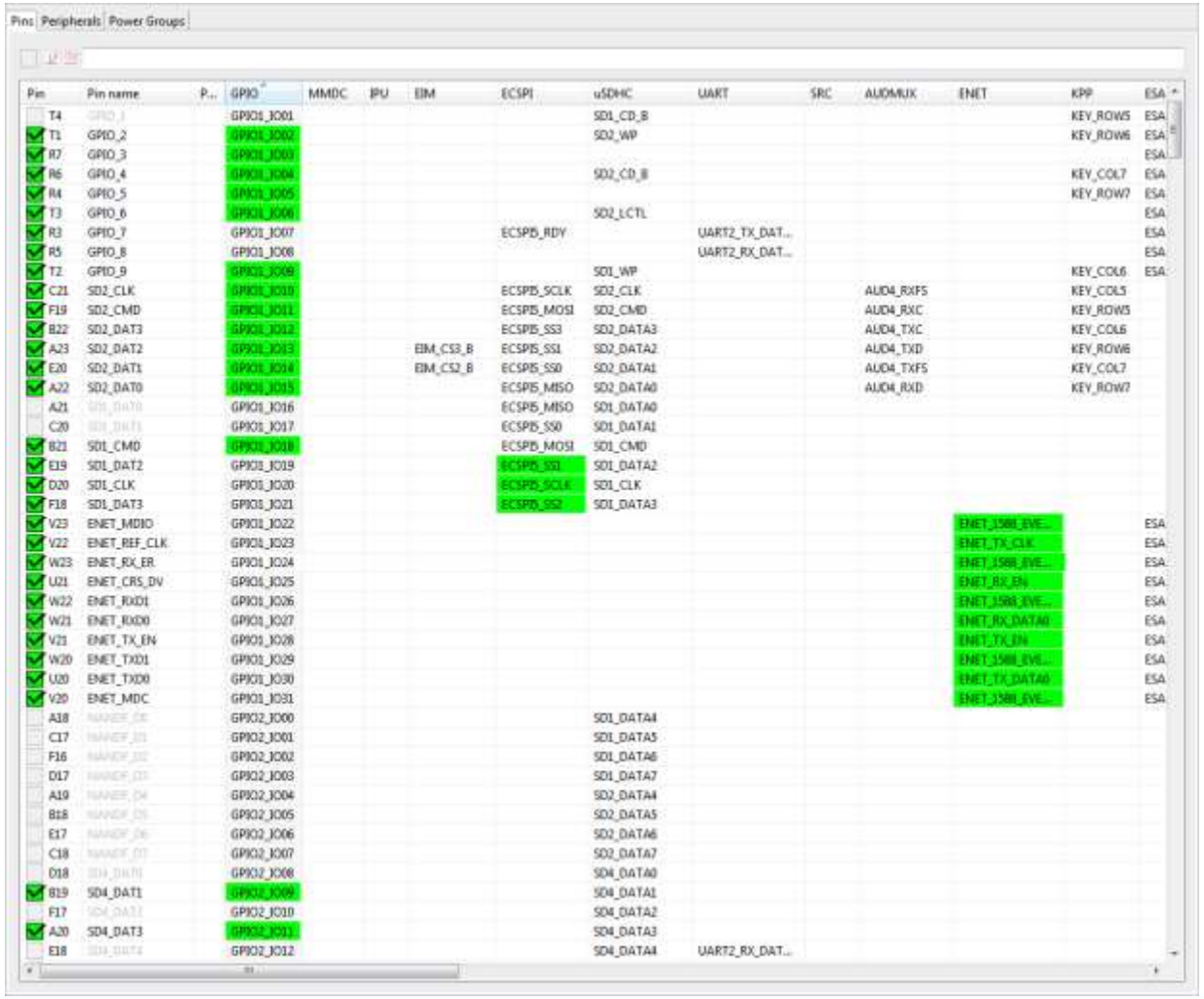
Pins Tool

- Pin Settings Tool to configure muxing and electrical properties of pins
- C code generation which can be used in C/C++ project
- Generates Device Tree Snippet Include (.dtsi) files
- Desktop application, supporting Windows, Mac, and Linux

Pins Tool

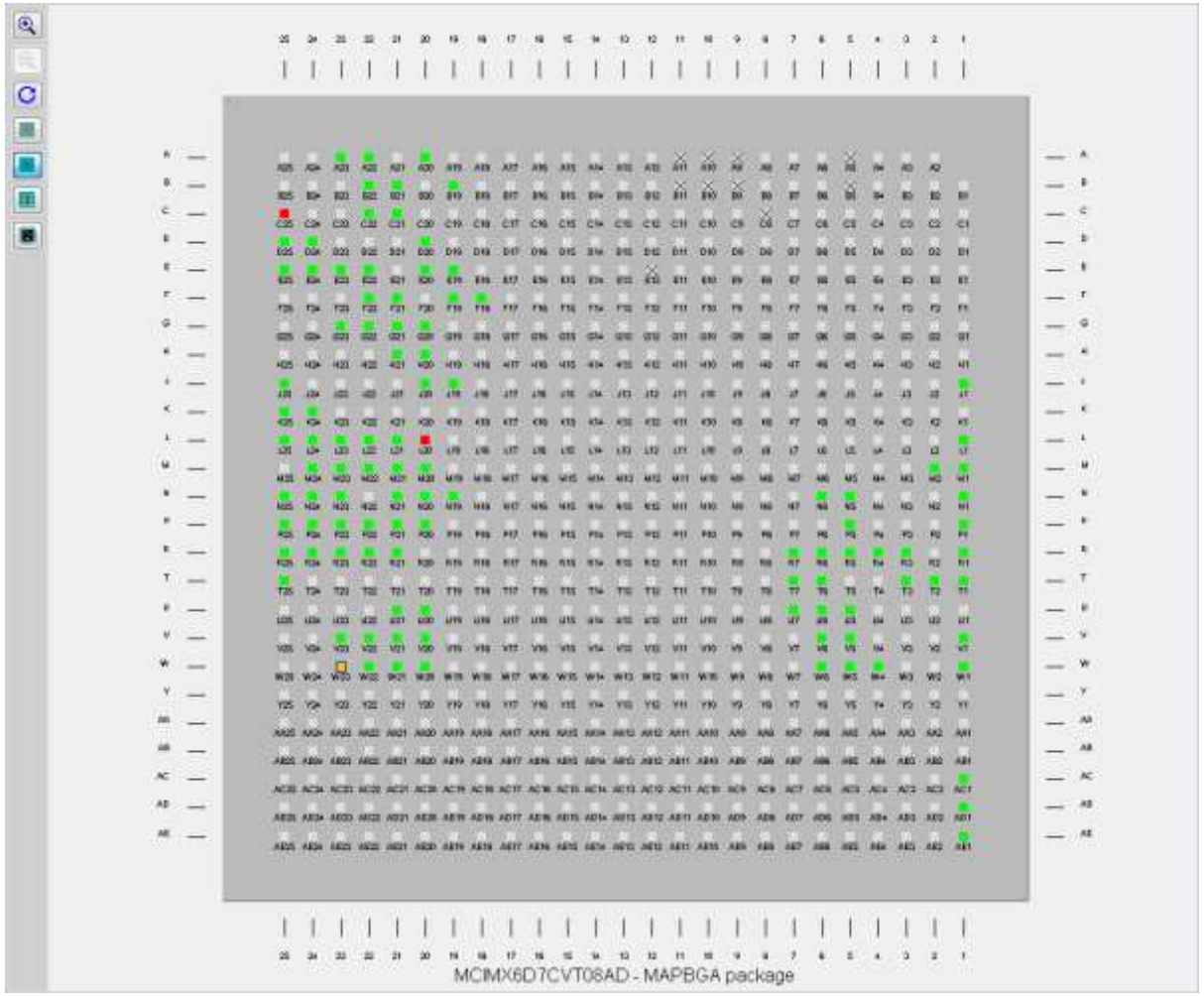

File Edit Tools Pins Help
Pins Peripherals Power Groups
Sources Registers
MCIMX6D7CVT08AD - MAPBGA package
Routed Pins
Peripheral
Signal
Route to
Power group
Direction
Reg. Name
Set Value

Pins Tool



Pin	Pin name	P...	GPIO	MMDC	IPU	EIM	ECSPI	uSDHC	UART	SRC	AUDMUX	ENET	KPP	ESA
T4	GPIO_1		GPIO1_IO01					SD1_CD_B					KEY_ROW5	ESA
T1	GPIO_2		GPIO1_IO02					SD2_WP					KEY_ROW6	ESA
R7	GPIO_3		GPIO1_IO03											ESA
R6	GPIO_4		GPIO1_IO04					SD2_CD_B					KEY_COL7	ESA
R4	GPIO_5		GPIO1_IO05										KEY_ROW7	ESA
T3	GPIO_6		GPIO1_IO06					SD2_LCTL						ESA
R3	GPIO_7		GPIO1_IO07				ECSPI5_RDY		UART2_TX_DAT...					ESA
R5	GPIO_8		GPIO1_IO08						UART2_RX_DAT...					ESA
T2	GPIO_9		GPIO1_IO09					SD1_WP					KEY_COL6	ESA
C21	SD2_CLK		GPIO1_IO10				ECSPI5_SCLK	SD2_CLK			AUD4_RXFS		KEY_COL5	
F19	SD2_CMD		GPIO1_IO11				ECSPI5_MOSI	SD2_CMD			AUD4_RXC		KEY_ROW5	
B22	SD2_DAT3		GPIO1_IO12				ECSPI5_SS3	SD2_DATA3			AUD4_TXC		KEY_COL6	
A23	SD2_DAT2		GPIO1_IO13			EIM_CS3_B	ECSPI5_SS1	SD2_DATA2			AUD4_TXD		KEY_ROW6	
E20	SD2_DAT1		GPIO1_IO14			EIM_CS2_B	ECSPI5_SS0	SD2_DATA1			AUD4_TXFS		KEY_COL7	
A22	SD2_DAT0		GPIO1_IO15				ECSPI5_MISO	SD2_DATA0			AUD4_RXD		KEY_ROW7	
A21	SD1_DAT0		GPIO1_IO16				ECSPI5_MISO	SD1_DATA0						
C20	SD1_DAT1		GPIO1_IO17				ECSPI5_SS0	SD1_DATA1						
B21	SD1_CMD		GPIO1_IO18				ECSPI5_MOSI	SD1_CMD						
E19	SD1_DAT2		GPIO1_IO19				ECSPI5_SS1	SD1_DATA2						
D20	SD1_CLK		GPIO1_IO20				ECSPI5_SCLK	SD1_CLK						
F18	SD1_DAT3		GPIO1_IO21				ECSPI5_SS2	SD1_DATA3						
V23	ENET_MDIO		GPIO1_IO22									ENET_1588_EVE...		ESA
V22	ENET_REF_CLK		GPIO1_IO23									ENET_TX_CLK		ESA
W23	ENET_RX_ER		GPIO1_IO24									ENET_1588_EVE...		ESA
U21	ENET_CRS_DV		GPIO1_IO25									ENET_RX_EN		ESA
W22	ENET_RXD1		GPIO1_IO26									ENET_1588_EVE...		ESA
W21	ENET_RXD0		GPIO1_IO27									ENET_RX_DATA0		ESA
V21	ENET_TX_EN		GPIO1_IO28									ENET_TX_EN		ESA
W20	ENET_TXD1		GPIO1_IO29									ENET_1588_EVE...		ESA
U20	ENET_TXD0		GPIO1_IO30									ENET_TX_DATA0		ESA
V20	ENET_MDC		GPIO1_IO31									ENET_1588_EVE...		ESA
A18	NAND_DE		GPIO2_IO00					SD1_DATA4						
C17	NAND_D1		GPIO2_IO01					SD1_DATA5						
F16	NAND_D2		GPIO2_IO02					SD1_DATA6						
D17	NAND_D3		GPIO2_IO03					SD1_DATA7						
A19	NAND_D4		GPIO2_IO04					SD2_DATA4						
B18	NAND_D5		GPIO2_IO05					SD2_DATA5						
E17	NAND_D6		GPIO2_IO06					SD2_DATA6						
C18	NAND_D7		GPIO2_IO07					SD2_DATA7						
D18	SD4_DAT0		GPIO2_IO08					SD4_DATA0						
B19	SD4_DAT1		GPIO2_IO09					SD4_DATA1						
F17	SD4_DAT2		GPIO2_IO10					SD4_DATA2						
A20	SD4_DAT3		GPIO2_IO11					SD4_DATA3						
E18	SD4_DAT4		GPIO2_IO12					SD4_DATA4	UART2_RX_DAT...					

Pins Tool



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