Report of setup of Variscite VAR-SOM-MX6 Yocto Sumo release

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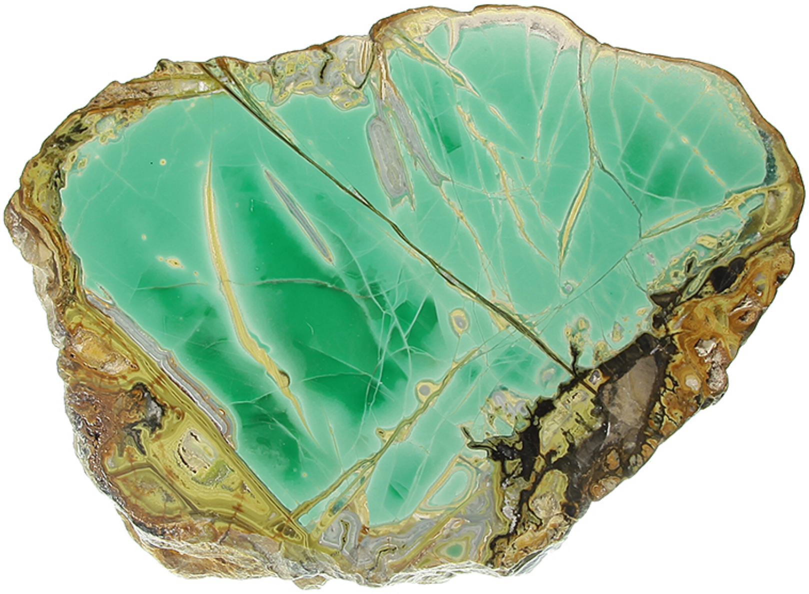

Contents

1 introduction

The VAR-SOM-MX6 Yocto Sumo release from Variscite has a guide to follow for installation, but in previous and current releases have not been trivial to follow. The aim of here is to clarify the methods and to provide the necessary corrections made.

Compilation info in “.tex” file. At the top, between the “%==...” signs.

1.1 setup

The recommended first reading is largely unneded. At time of writing, it is unavailable. In addition, there is no “beginners guide” to the Yocto release for VAR-SOM-MX6 that

Note: When initializing, the variviki does not list the folder “build_x11“. This will generally need to be added. This should be mentioned at relevant points, but in case one slips through, it is worth noting. Another frequent issue, is when running programs from current folder, there is a need to insert ”./” infront of the path.

2 VAR-SOM-MX6 Yocto Sumo 2.5 based on FSL Community BSP 2.5 with 4.9.88_2.0.0-ga Linux release

Information found on variwiki under Yocto Sumo release guide. website

2.1 build x11 GUI demo image

The given commands throw an error with setup-environment. Adding a ”./” as below works. Next is building the demo image using bitbake, excluding QT content.

```
$ cd ~/var-fslc-yocto
$ MACHINE=var-som-mx6 DISTRO=fslc-x11 . ./setup-
    environment build_x11

$ bitbake fsl-image-gui
```

Output in Appendix 5.1.

2.2 console-only demo image

Not built. Should not pose new issue beyond the GUI. GUI image is enough.

2.3 Local conf customization

2.3.1 Change download directory.

It is implied already being in directory “/home/user/var-fslc-yocto/” at execution. Make and set permision for a yocto download file:

Change download path for the configuration file for yocto’s build_x11 setup → the given link does not work. You need to add the directory for the build, making the addition ./build_x11/conf/local.conf.

```
$ sudo mkdir /opt/yocto_downloads
$ sudo chmod 777 /opt/yocto_downloads

$ sed -i ’s/DL_DIR ?= ”${BSPDIR}\/downloads/DL\_DIR =
    ”\/opt\/yocto\_downloads/g’ build\_x11/conf/local.
    conf
```

2.3.2 BuildResults

The resulting files should be located in: “tmp/deploy/images/var-som-mx6” Table layout of files on web page

2.4 create bootable SD card

2.4.1 SD structure. map of SD card structure after partitioning.

schematics on the wiki.

2.4.2 Yocto pre-built

The standard partition is not sensitive to SD size, nor does it include the install scripts. At time of writing, utilized extended version

Replace “sdX” with the right device name. This can be obtained by “dmesg” or “lsusb” or “ls /dev/sd*” command on your host Linux PC, after the SD card reader is inserted. Also notable, the partition containing the root file system is not named “rootfs” making for GUI and QT.

```
$ sudo umount /dev/sdX*

$ cd ~/var-fslc-yocto/build_x11

$ zcat tmp/deploy/images/var-som-mx6/fsl-image-gui-var
    -som-mx6.wic.gz | sudo dd of=/dev/sdX bs=1M && sync
```

2.4.3 Create extended SD card

This is a variscite partition shell script “var-create-yocto-sdcard.sh” which partitions the card and installs necessary files for NAND flash.

An issue that popped up, was the bash “rename” command. running a “sudo apt-get install rename” fixed issue. (Replace /dev/sdX with your actual device, running “dmesg” will give you the relevant mount directory)

```
$ cd ~/var-fslc-yocto
$ sudo MACHINE=var-som-mx6 sources/meta-variscite-fslc
   /scripts/var\_mk\_yocto\_sdcard/var-create-yocto-
   sdcard.sh <options> /dev/sdX

================================================================

options:
-h              Display help message
-s              Only show partition sizes to be written,
    without actually write them
-a              Automatically set the rootfs partition
   size to fill the SD card
-r              Select alternative rootfs for recovery
   images (default: build\_x11/tmp/deploy/images/var-
   som-mx6/fsl-image-gui-var-som-mx6.*)
```

Current run with fully partitioning SD card using option “-a”
output in Appendix ??

2.5 Boot board through SD card

images and directions per board fonud on wiki

2.5.1 Setting boot mode. 6.1.1 har instructions for MX6 custom board.

2.5.2 Automatic device tree selection in U-boot. Default enabled.

2.6 Flash images to NAND

See Section 3.

3 Yocto NAND Flash Burning

3.1 Introduction

VAR-SOM-MX6 boots from on-SOM NAND flash. U-boot, kernel image and device tree blob are also stored in NAND flash. full recipee on wiki

3.2 NAND flash structure

defined MTD partitions on NAND flash:

```
0x000000000000-0x000000200000 : "spl"
0x000000200000-0x000000400000 : "bootloader"
0x000000400000-0x000000c00000 : "kernel"
0x000000c00000-End            : "rootfs"
```

3.3 eMMC structure

Not explored.

3.4 Yocto built binaries for NAND flash

Images generated for NAND flash are located in “tmp/deploy/images/var-som-mx6”. There is a table showing the expected files on the variwiki site

3.5 installing Yocto binaries

If followed extended SD card creation, NAND flash scripts are already included on the SD card.

3.5.1 images location

```
/opt/images/
 Yocto
     SPL-nand
     SPL-sd
     imx6dl-var-som-cap.dtb
     imx6dl-var-som-res.dtb
     imx6dl-var-som-solo-cap.dtb
     imx6dl-var-som-solo-res.dtb
     imx6dl-var-som-solo-vsc.dtb
     imx6dl-var-som-vsc.dtb
     imx6q-var-dart.dtb
     imx6q-var-som-cap.dtb
     imx6q-var-som-res.dtb
     imx6q-var-som-vsc.dtb
     imx6qp-var-som-cap.dtb
     imx6qp-var-som-res.dtb
     imx6qp-var-som-vsc.dtb
     rootfs.tar.gz
     rootfs_128kbpeb.ubi
     rootfs_256kbpeb.ubi
     u-boot.img-nand
```

```
    u-boot.img-sd
    uImage
```

3.5.2 Preparing images for NAND flash

Note: the extended SD card creation makes these steps redundant. The SD card should be mounted on the host computer. Assumed mount directory is "/media/rootfs/". If mounted into another folder, modify accordingly.

setup:

```
$ export YOCTO_IMGS_PATH=~/var-fslc-yocto/build_x11/
    tmp/deploy/images/var-som-mx6
$ export P2_MOUNT_DIR=/media/rootfs/
$ sudo mkdir -p ${P2_MOUNT_DIR}/opt/images/Yocto/
```

Linux:

```
$ sudo cp ${YOCTO_IMGS_PATH}/uImage ${P2_MOUNT_DIR}/
    opt/images/Yocto/
```

Device tree:

```
$ sudo cp ${YOCTO_IMGS_PATH}/uImage-imx*.dtb ${
    P2_MOUNT_DIR}/opt/images/Yocto/
```

NAND images:

```
SPL:
$ sudo cp ${YOCTO_IMGS_PATH}/SPL-nand ${P2_MOUNT_DIR}/
    opt/images/Yocto/

U-Boot:
$ sudo cp ${YOCTO_IMGS_PATH}/u-boot.img-nand ${
    P2_MOUNT_DIR}/opt/images/Yocto/

 File System:
$ sudo cp ${YOCTO_IMGS_PATH}/fsl-image-gui-var-som-mx6
    .ubi ${P2_MOUNT_DIR}/opt/images/Yocto/rootfs.ubi
```

Other images on wiki.

3.6 installing Yocto binaries

When accessing board on linux, minicom needed to disable flow control in order to make any input.

3.6.1 Images locations

directory structure on SD card

```
/opt/images/
 Yocto
     SPL-nand
     SPL-sd
     imx6dl-var-som-cap.dtb
     imx6dl-var-som-res.dtb
     imx6dl-var-som-solo-cap.dtb
     imx6dl-var-som-solo-res.dtb
     imx6dl-var-som-solo-vsc.dtb
     imx6dl-var-som-vsc.dtb
     imx6q-var-dart.dtb
     imx6q-var-som-cap.dtb
     imx6q-var-som-res.dtb
     imx6q-var-som-vsc.dtb
     imx6qp-var-som-cap.dtb
     imx6qp-var-som-res.dtb
     imx6qp-var-som-vsc.dtb
     rootfs.tar.gz
     rootfs\_128kbpeb.ubi
     rootfs\_256kbpeb.ubi
     u-boot.img-nand
     u-boot.img-sd
     uImage
```

Further on would be to flash images and the like onto the board, but this is not a priority at this moment. The main goal now is to get the toolchain up and running.

4 Yocto toolchain installation for out of Yocto builds

4.1 prerequisits

A full Yocto OpenEmbedded environment to generate the toolchain. This means following steps 1 and 3 from the guide to building yocto from source code.

4.2 Build toolchain

run the following code, where the text from the wiki: setup-environment is replaced by ./setup-environment:

```
$ cd ~/var-fslc-yocto
$ MACHINE=var-som-mx6 DISTRO=fslc-x11 . ./setup-
    environment build_x11
```

```
$ bitbake meta-ide-support
$ bitbake meta-toolchain
```

Output can be found in Appendix ?? Then run the Tool chain build, output at 5.2

4.3 Build complete SDK

build development environment with the required libraries in addition to the basic toolchain. runoutput in Appendix ?? Output will be located in tmp/deploy/sdk/.

4.3.1 Install toolchain/SDK

Installation is done with

```
$ tmp/deploy/sdk/fslc-x11-glibc-x86_64-meta-toolchain-
    armv7at2hf-neon-toolchain-2.5.sh
```

Returning:

```
tmp/deploy/sdk/fslc-x11-glibc-x86_64-meta-toolchain-
    armv7at2hf-neon-toolchain-2.5.sh
FSLC X11 SDK installer version 2.5
==================================
Enter target directory for SDK (default: /opt/fslc-x11
    /2.5):
You are about to install the SDK to ”/opt/fslc-x11
    /2.5”. Proceed[Y/n]? y
[sudo] password for norxe:
Extracting SDK.........................done
Setting it up...done
SDK has been successfully set up and is ready to be
    used.
Each time you wish to use the SDK in a new shell
    session, you need to source the environment setup
    script e.g.
 $ . /opt/fslc-x11/2.5/environment-setup-armv7at2hf-
     neon-fslc-linux-gnueabi
```

4.4 Use of toolchain/SDK

```
$ source /opt/fslc-x11/2.5/environment-setup-
    armv7at2hf-neon-fslc-linux-gnueabi
```

5 appendix

Percentage completion of runs demarkated in “#” signs. They do not follow the linebreak convention. They do not follow the linebreak convention. there is not meaningful information in these lines. They are included in order to stay true to results.

5.1 bitbake of fslc image

```
 bitbake fsl-image-gui
WARNING: Host distribution "ubuntu-18.04" has not been
     validated with this version of the build system;
    you may possibly experience unexpected failures. It
     is recommended that you use a tested distribution.
Parsing recipes: 100%
    |######################################################################################
     Time: 0:00:34
Parsing of 2471 .bb files complete (0 cached, 2471
    parsed). 3374 targets, 209 skipped, 3 masked, 0
    errors.
NOTE: Resolving any missing task queue dependencies

Build Configuration:
BB_VERSION             = "1.38.0"
BUILD_SYS              = "x86_64-linux"
NATIVELSBSTRING        = "universal"
TARGET_SYS             = "arm-fslc-linux-gnueabi"
MACHINE                = "var-som-mx6"
DISTRO                 = "fslc-x11"
DISTRO_VERSION         = "2.5"
TUNE_FEATURES          = "arm armv7a vfp thumb neon
    callconvention-hard"
TARGET_FPU             = "hard"
meta
meta-poky              = "HEAD:5887
    f81bb585d0a697b91daf7f7dd6ccb1d444e2"
meta-oe
meta-multimedia        = "HEAD:
    b0950aeff5b630256bb5e25ca15f4d59c115e7c1"
meta-freescale         = "HEAD:50
    fbef4593f79949ab6c67b2582d8b5c8b24838a"
meta-freescale-3rdparty = "HEAD:42
    c913b8fd266f72950a9ce305d316c0ecb64343"
meta-freescale-distro = "HEAD:
    f7e2216e93aff14ac32728a13637a48df436b7f4"
```

```
meta-browser          = "HEAD:
    d807b901b0b68b478093964bd60a77b9376b3f12"
meta-gnome
meta-networking
meta-python           = "HEAD:
    b0950aeff5b630256bb5e25ca15f4d59c115e7c1"
meta-qt5              = "HEAD:4
    b96f70a083eacfc4ff4a45d4efbb2d131f88c82"
meta-swupdate         = "HEAD:
    dae0d3e906e764e02a8b6357e7698bfde278fa6e"
meta-variscite-fslc   = "HEAD:
    d1aab80e20b92d3fbef64b8368e050d0aec6587a"

Initialising tasks: 100%
    |##############################################################################################################################################################################
     Time: 0:00:04
NOTE: Executing SetScene Tasks
NOTE: Executing RunQueue Tasks
NOTE: Tasks Summary: Attempted 8113 tasks of which
    8067 didn't need to be rerun and all succeeded.
NOTE: Writing buildhistory

Summary: There was 1 WARNING message shown.
```

5.2 bitbake of toolchain

outputh from build of IDE support:

```
bitbake meta-ide-support
WARNING: Host distribution "ubuntu-18.04" has not been
     validated with this version of the build system;
    you may possibly experience unexpected failures. It
     is recommended that you use a tested distribution.
Parsing recipes: 100%
    |##############################################################################################################################################################################
     Time: 0:00:34
Parsing of 2471 .bb files complete (0 cached, 2471
    parsed). 3374 targets, 209 skipped, 3 masked, 0
    errors.
NOTE: Resolving any missing task queue dependencies

Build Configuration:
BB_VERSION            = "1.38.0"
BUILD_SYS             = "x86_64-linux"
NATIVELSBSTRING       = "universal"
TARGET_SYS            = "arm-fslc-linux-gnueabi"
```

```
MACHINE                  = "var-som-mx6"
DISTRO                   = "fslc-x11"
DISTRO_VERSION           = "2.5"
TUNE_FEATURES            = "arm armv7a vfp thumb neon
    callconvention-hard"
TARGET_FPU               = "hard"
meta
meta-poky                = "HEAD:5887
    f81bb585d0a697b91daf7f7dd6ccb1d444e2"
meta-oe
meta-multimedia          = "HEAD:
    b0950aeff5b630256bb5e25ca15f4d59c115e7c1"
meta-freescale           = "HEAD:50
    fbef4593f79949ab6c67b2582d8b5c8b24838a"
meta-freescale-3rdparty = "HEAD:42
    c913b8fd266f72950a9ce305d316c0ecb64343"
meta-freescale-distro = "HEAD:
    f7e2216e93aff14ac32728a13637a48df436b7f4"
meta-browser             = "HEAD:
    d807b901b0b68b478093964bd60a77b9376b3f12"
meta-gnome
meta-networking
meta-python              = "HEAD:
    b0950aeff5b630256bb5e25ca15f4d59c115e7c1"
meta-qt5                 = "HEAD:4
    b96f70a083eacfc4ff4a45d4efbb2d131f88c82"
meta-swupdate            = "HEAD:
    dae0d3e906e764e02a8b6357e7698bfde278fa6e"
meta-variscite-fslc   = "HEAD:
    d1aab80e20b92d3fbef64b8368e050d0aec6587a"

 Initialising tasks: 100%
    |################################################################################################################################################################
     Time: 0:00:00
NOTE: Executing SetScene Tasks
NOTE: Executing RunQueue Tasks
NOTE: Tasks Summary: Attempted 1298 tasks of which
    1246 didn't need to be rerun and all succeeded.
NOTE: Writing buildhistory

Summary: There was 1 WARNING message shown.
```

output from toolchain build:

```
bitbake meta-toolchain
WARNING: Host distribution "ubuntu-18.04" has not been
```

```
     validated with this version of the build system;
    you may possibly experience unexpected failures. It
     is recommended that you use a tested distribution.
Loading cache: 100%
    |##########################################################################################
     Time: 0:00:00
Loaded 3373 entries from dependency cache.
Parsing recipes: 100%
    |##########################################################################################
     Time: 0:00:01
Parsing of 2471 .bb files complete (2470 cached, 1
    parsed). 3374 targets, 209 skipped, 3 masked, 0
    errors.
NOTE: Resolving any missing task queue dependencies

Build Configuration:
BB_VERSION           = "1.38.0"
BUILD_SYS            = "x86_64-linux"
NATIVELSBSTRING      = "universal"
TARGET_SYS           = "arm-fslc-linux-gnueabi"
MACHINE              = "var-som-mx6"
DISTRO               = "fslc-x11"
DISTRO_VERSION       = "2.5"
TUNE_FEATURES        = "arm armv7a vfp thumb neon
    callconvention-hard"
TARGET_FPU           = "hard"
meta
meta-poky            = "HEAD:5887
    f81bb585d0a697b91daf7f7dd6ccb1d444e2"
meta-oe
meta-multimedia      = "HEAD:
    b0950aeff5b630256bb5e25ca15f4d59c115e7c1"
meta-freescale       = "HEAD:50
    fbef4593f79949ab6c67b2582d8b5c8b24838a"
meta-freescale-3rdparty = "HEAD:42
    c913b8fd266f72950a9ce305d316c0ecb64343"
meta-freescale-distro = "HEAD:
    f7e2216e93aff14ac32728a13637a48df436b7f4"
meta-browser         = "HEAD:
    d807b901b0b68b478093964bd60a77b9376b3f12"
meta-gnome
meta-networking
meta-python          = "HEAD:
    b0950aeff5b630256bb5e25ca15f4d59c115e7c1"
meta-qt5             = "HEAD:4
    b96f70a083eacfc4ff4a45d4efbb2d131f88c82"
```

```
meta-swupdate          = "HEAD:
    dae0d3e906e764e02a8b6357e7698bfde278fa6e"
meta-variscite-fslc   = "HEAD:
    d1aab80e20b92d3fbef64b8368e050d0aec6587a"

 Initialising tasks: 100%
    |################################################################################################################################
     Time: 0:00:01
NOTE: Executing SetScene Tasks
NOTE: Executing RunQueue Tasks
WARNING: nativesdk-bzip2-1.0.6-r5 do_fetch: Checksum
    mismatch for local file /opt/yocto_downloads/bzip2
    -1.0.6.tar.gz
Cleaning and trying again.
WARNING: nativesdk-bzip2-1.0.6-r5 do_fetch: Renaming /
    opt/yocto_downloads/bzip2-1.0.6.tar.gz to /opt/
    yocto_downloads/bzip2-1.0.6.tar.gz_bad-
    checksum_f4b5249c17053f5c4c85d870feef4f48
WARNING: nativesdk-bzip2-1.0.6-r5 do_fetch: Checksum
    failure encountered with download of http://www.
    bzip.org/1.0.6/bzip2-1.0.6.tar.gz - will attempt
    other sources if available
WARNING: nativesdk-shadow-4.2.1-r0 do_fetch: Failed to
     fetch URL http://pkg-shadow.alioth.debian.org/
    releases/shadow-4.2.1.tar.xz, attempting MIRRORS if
     available
WARNING: meta-toolchain-1.0-r7 do_populate_sdk: The
    postinstall intercept hook 'update_gio_module_cache
    -nativesdk' failed, details in /home/norxe/var-fslc
    -yocto/build_x11/tmp/work/armv7at2hf-neon-fslc-
    linux-gnueabi/meta-toolchain/1.0-r7/temp/log.
    do_populate_sdk
NOTE: Tasks Summary: Attempted 3156 tasks of which
    1586 didn't need to be rerun and all succeeded.
NOTE: Writing buildhistory

Summary: There were 6 WARNING messages shown.
```

5.2.1 bild SDK

```
bitbake -c populate_sdk fsl-image-gui
WARNING: Host distribution "ubuntu-18.04" has not been
     validated with this version of the build system;
    you may possibly experience unexpected failures. It
     is recommended that you use a tested distribution.
```

```
Loading cache: 100%
    |####################################################################################
     Time: 0:00:00
Loaded 3373 entries from dependency cache.
Parsing recipes: 100%
    |####################################################################################
     Time: 0:00:01
Parsing of 2471 .bb files complete (2470 cached, 1
    parsed). 3374 targets, 209 skipped, 3 masked, 0
    errors.
NOTE: Resolving any missing task queue dependencies

Build Configuration:
BB_VERSION           = "1.38.0"
BUILD_SYS            = "x86_64-linux"
NATIVELSBSTRING      = "universal"
TARGET_SYS           = "arm-fslc-linux-gnueabi"
MACHINE              = "var-som-mx6"
DISTRO               = "fslc-x11"
DISTRO_VERSION       = "2.5"
TUNE_FEATURES        = "arm armv7a vfp thumb neon
    callconvention-hard"
TARGET_FPU           = "hard"
meta
meta-poky            = "HEAD:5887
    f81bb585d0a697b91daf7f7dd6ccb1d444e2"
meta-oe
meta-multimedia      = "HEAD:
    b0950aeff5b630256bb5e25ca15f4d59c115e7c1"
meta-freescale       = "HEAD:50
    fbef4593f79949ab6c67b2582d8b5c8b24838a"
meta-freescale-3rdparty = "HEAD:42
    c913b8fd266f72950a9ce305d316c0ecb64343"
meta-freescale-distro = "HEAD:
    f7e2216e93aff14ac32728a13637a48df436b7f4"
meta-browser         = "HEAD:
    d807b901b0b68b478093964bd60a77b9376b3f12"
meta-gnome
meta-networking
meta-python          = "HEAD:
    b0950aeff5b630256bb5e25ca15f4d59c115e7c1"
meta-qt5             = "HEAD:4
    b96f70a083eacfc4ff4a45d4efbb2d131f88c82"
meta-swupdate        = "HEAD:
    dae0d3e906e764e02a8b6357e7698bfde278fa6e"
```

```
meta-variscite-fslc  = "HEAD:
    d1aab80e20b92d3fbef64b8368e050d0aec6587a"

Initialising tasks: 100%
    |#################################################################################################
     Time: 0:00:03
NOTE: Executing SetScene Tasks
NOTE: Executing RunQueue Tasks
WARNING: fsl-image-gui-1.0-r0 do_populate_sdk: The
    postinstall intercept hook 'update_gio_module_cache
    -nativesdk' failed, details in /home/norxe/var-fslc
    -yocto/build_x11/tmp/work/var_som_mx6-fslc-linux-
    gnueabi/fsl-image-gui/1.0-r0/temp/log.
    do_populate_sdk
NOTE: Tasks Summary: Attempted 7315 tasks of which
    7314 didn't need to be rerun and all succeeded.
NOTE: Writing buildhistory

Summary: There were 2 WARNING messages shown.
```