

# **Intel® Unified 3D Library for Intel® Atom™ E3900 SoC Family/Intel® Celeron® Processor N3350/Intel® Pentium® Processor N4200 for Yocto Project\***

## **Release Notes**

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*August 2017*

*MR3.1 Release*



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## Revision History

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| Date          | Revision | Description   |
|---------------|----------|---------------|
| February 2017 | 001      | MR2 release   |
| May 2017      | 002      | MR3 realease  |
| August 2017   | 003      | MR3.1 release |

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## 1.0 Introduction

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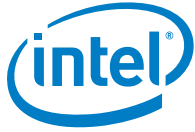
This document describes the typical hardware system requirements, features, testing, and use of the driver for Intel® Unified 3D Library.

The Intel® Unified 3D Library driver is available for 64-bit systems for the Intel® Atom™ E3900 SoC Family, Intel® Celeron® Processor N3350, and Intel® Pentium® Processor N4200 for Yocto Project\*.

### 1.1 Terminology

**Table 1. Terminology**

| Term | Description                     |
|------|---------------------------------|
| BSP  | Board Support Package           |
| DRI  | Direct Rendering Infrastructure |
| IOTG | Internet of Things Group        |
| OS   | Operating System                |
| RPM  | RPM Package Manager             |
| SoC  | System-on-a-Chip                |



## 2.0 *Driver Information*

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The Intel® Unified 3D Library driver is available for 64-bit systems and is part of the release package. The details of the Linux\* drivers are as follows:

**Intel® Unified 3D Library Driver: intel-linux-ufo-yocto\_<version>-64bit.tar.gz**

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## 3.0 System Requirements

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The Intel® Unified 3D Library driver supports the following platforms:

- Intel® Atom™ E3900 SoC Family
- Intel® Celeron® Processor N3350
- Intel® Pentium® Processor N4200

### 3.1 Prerequisites and Constraints

The Intel® Unified 3D Library driver is part of Intel proprietary software.

To integrate the driver, you must obtain the board support package (BSP) and add the meta-intel-proprietary recipe along with the RPM binary.

1. Download the BSP for Yocto Project\* from GitHub to your host machine

- HTTPS directly from <https://github.com/01org/iotg-yocto-bsp-public/tree/e3900/master> by selecting the appropriate tag version, for example, E3900-MR2, from the top left menu or

- SSH using the following command:

```
git clone https://github.com/01org/iotg-yocto-bsp-public.git -b e3900/master
```

This git tree is maintained as single product branch. To get code base from the previous release, for example the PV release, check out to the specific tag.

- For PV release: git checkout E3900-PV
- For Maintenance Release Version 1: git checkout E3900-MR1
- For Maintenance Release Version 2: git checkout E3900-MR2
- For Maintenance Release Version 3: git checkout E3900-MR3
- For Maintenance Release Version 3.1: git checkout E3900-MR3.1 (use this tag for this release)

```
$cd /home/user/development
```

**Note:** The directory path mentioned here is an example for demonstration purposes. You can use any convenient directory location for the build.

2. Extract the Intel® Unified 3D Library DRI proprietary meta layer.

```
$ tar xvf meta-intel-proprietary-<component>.tar.bz2
```



3. Download the Intel® Unified 3D Library RPM compressed tar ball and put the content in one location. The Intel® Unified 3D Library DRI RPM binary is provided with this package.

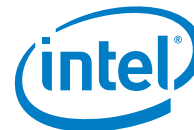
Example Download path: /home/user/rpm-binaries

```
$cd /home/user/rpm-binaries
```

Refer to Section 4.0 for instructions on integrating and building with Intel® Unified 3D Library.

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## 4.0 Using Intel® Unified 3D Library

This section describes how to integrate, build, and verify the Intel® Unified 3D Library driver.

### 4.1 Integrating the Intel® Unified 3D Library Driver in the Yocto\* Build

The Intel® Unified 3D Library driver is available with the release package provided.

As mentioned in the previous section, the proprietary meta layer and the Intel® Unified 3D Library DRI RPM packages must be extracted to a particular location.

1. Go to the directory location where the Yocto BSP meta layer is cloned in the host (Ubuntu\*) machine.

```
bsp-apolllolake-i
```

Refer to the Yocto BSP Gold release for more details on Yocto BSP cloning and building.

2. Run the `setup.sh` script to initiate the build.

```
$/setup.sh
```

3. When prompted for the image type, choose option 4 to build a custom image.

**Figure 1. Choosing the Custom Build**

```
Select an option:
1. core-image-sato-sdk
2. core-image-sato
3. linux-kernel
4. custom
Default build target is core-image-sato-sdk. If no input is received within 20 secs, default target will be built.
4
```

When the `setup.sh` script has completed, a new folder named `yocto_build` appears under `/home/user/development/`.

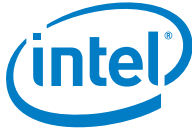
4. Change the directory to `yocto_build/build/conf`.

```
$cd /home/user/development/yocto_build/build/conf
```

5. Edit `bblayers.conf` to include the meta-intel-proprietary layer. This layer was previously downloaded.

```
$ vim bblayers.conf
```

6. Add the path `meta-intel-proprietary/meta-intel-ufo` as shown in [Figure 2](#). Save and exit.



**Note:** The path is an example for demonstration purposes. Your path might differ based on the location of the meta layers.

**Figure 2. Adding the meta-intel-ufo Path in bblayers.conf**

```
# LAYER_CONF_VERSION is increased each time build/conf/bblayers.conf
# changes incompatibly
LCONF_VERSION = "6"

BBPATH = "${TOPDIR}"
BBFILES ?= ""

BBLAYERS ?= " \
/home/user/development/yocto_build/meta \
/home/user/development/yocto_build/meta-yocto \
/home/user/development/yocto_build/meta-yocto-bsp \
/home/user/development/yocto_build/meta-intel \
/home/user/development/yocto_build/meta-intel/meta-tlk \
/home/user/development/yocto_build/meta-intel-middleware \
/home/user/development/yocto_build/meta-openembedded/meta-fileystems \
/home/user/development/yocto_build/meta-openembedded/meta-networking \
/home/user/development/yocto_build/meta-openembedded/meta-oe \
/home/user/development/yocto_build/meta-openembedded/meta-python \
/home/user/development/yocto_build/meta-openembedded/meta-multimedia \
/home/user/development/yocto_build/meta-qt5 \
/home/user/development/yocto_build/meta-measured \
/home/user/development/yocto_build/meta-intel-iot-middleware \
/home/user/development/yocto_build/meta-soletta \
/home/user/development/yocto_build/meta-intel-leafhill \
/home/user/development/meta-intel-proprietary/meta-intel-ufo \
"

BBLAYERS_NON_REMOVABLE ?= " \
/home/user/development/yocto_build/meta \
/home/user/development/yocto_build/meta-yocto \
```

7. Edit `local.conf` located in the same directory to include the path where the downloaded RPM binaries are located.

```
$vim local.conf
```

Add the following line at the top of the `local.conf` file.

```
export RPM_PATH=""<full_path_to_the_downloaded_rpm>""
```



Example: If the RPM binaries are in `/home/user/rpm-binary/`, insert the following command in `local.conf`:

```
export RPM_PATH=/home/user/rpm-binary''
```

8. Further edit `local.conf` to let the compiler know to install the RPM binaries during the build.

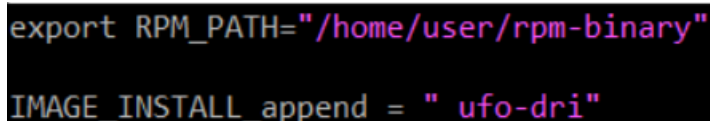
Add the following line:

```
IMAGE_INSTALL_append = `` ufo-dri''
```

[Figure 3](#) shows the RPM path and `ufo-dri` appended in `local.conf`.

**Note:** There is a <space> in front of `ufo-dri` as shown in [Figure 3](#).

**Figure 3. Adding the RPM Binary and Appending `ufo-dri` in `local.conf`**



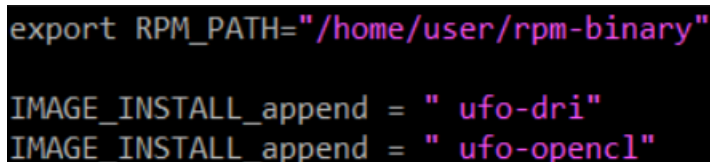
```
export RPM_PATH="/home/user/rpm-binary"
IMAGE_INSTALL_append = " ufo-dri"
```

9. OpenCL and `ufo-nano` are also provided with the UFO RPM release package. Follow these steps to install OpenCL and `ufo-nano` as part of the binary package:

- a. Copy the `ufo-openCL` and `ufo-nano` RPMs provided with the UFO binaries into the `RPM-binary` directory in the build system.
- b. Append the following line in `local.conf` to add `ufo-opencl`

```
IMAGE_INSTALL_append = " ufo-opencl"
```

**Figure 4. Appending `ufo-opencl` in `local.conf`**



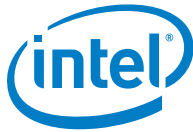
```
export RPM_PATH="/home/user/rpm-binary"
IMAGE_INSTALL_append = " ufo-dri"
IMAGE_INSTALL_append = " ufo-opencl"
```

10. If `ufo-nano` is needed, append the following line in `local.conf` to add `ufo-nano`

```
IMAGE_INSTALL_append = " ufo-nano"
```

11. Go up one level to `yocto_build`.

```
$ cd ../../
```



12. Prepare the environment to run the bitbake command.

```
$ source oe-init-build-env
$ cd build
```

13. Start the image compilation.

```
$ bitbake core-image-sato-sdk
```

**Note:** It is recommended to start with a new image build. However, if the previous build is being used, execute the following commands before image compilation.

```
$ bitbake linux-firmware -c cleanall
$ bitbake libva -c cleanall && bb virtual/libva -c cleanall
$ bitbake libva -c cleansstate && bb virtual/libva -c
cleansstate
$ bitbake core-image-sato-sdk
```

**Note:** Refer to *Intel® Atom™ E3900 SoC Family Yocto BSP Media-SDK Getting Started Guide* provided with the IOTG Yocto BKC document for the procedure to integrate UFO DRI with closed Source Media Stack.

#### 4.1.1 Verifying the Installation of the Intel® Unified 3D Library Driver

To verify that the Intel® Unified 3D Library driver is installed and being used:

1. If ufo-nano is not installed, execute the following command in the terminal.

```
$ glxinfo | grep -i OpenGL
```

The output should contain the following library description.

```
'OpenGL renderer string: Intel(R) Unified 3D Library'
```

2. If ufo-nano is installed, execute the following command in the terminal.

```
$ es2_info
```

The output should contain the following library description.

```
'GL_VERSION: OpenGL ES 3.1 - Build <version>-nano-production'
```

```
'GL_RENDERER: Intel(R) Unified 3D Library '
```

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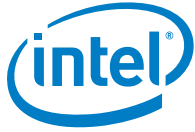


## **5.0      *Enabled Features***

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This section is not applicable to the current release.

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## **6.0      *Disabled Features***

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This section is not applicable to the current release.

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## 7.0 Fixed Issues

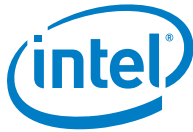
---

This section describes the fixed issues that affect the Intel® Unified 3D Library driver.

### 7.1 Fixed Issues

Refer to the graphics section in *Intel® Atom™ E3900 SoC Family/Intel® Celeron® Processor N3350/Intel® Pentium® Processor N4200 Board Support Package for Yocto Project\** Release Notes for details.

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## 8.0 Known Issues and Limitations

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This section describes the known issues and limitations that affect the Intel® Unified 3D Library driver.

### 8.1 Known Issues

Refer to the graphics section in *Intel® Atom™ E3900 SoC Family/Intel® Celeron® Processor N3350/Intel® Pentium® Processor N4200 Board Support Package for Yocto Project\** Release Notes for details.

### 8.2 Limitations

None

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