Resources

- TIDL Build and Run Instructions : Click Here
- Installation Manual : Click Here

Setup Tutorial in Ubuntu

To install SDK

- Click The link : Here
- And download "ti-processor-sdk-rtos-j721e-evm-09_00_01_01-prebuilt.tar.gz" File
- To open Terminal : Ctrl + Alt + T

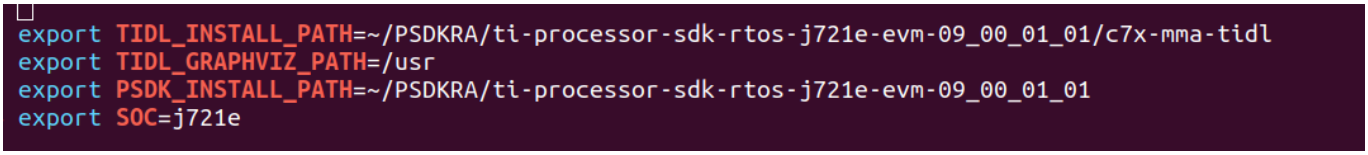
To export the path

1. Open Terminal
2. open bashrc script with nano or vim

```
vi  ~/.bashrc
```

1. Enter the following text

```
export TIDL_INSTALL_PATH=~/PSDKRA/ti-processor-sdk-rtos-j721e-evm-
09_00_01_01/c7x-mma-tidl
export TIDL_GRAPHVIZ_PATH=/usr
export PSDK_INSTALL_PATH=~/PSDKRA/ti-processor-sdk-rtos-j721e-evm-
09_00_01_01
export SOC=j721e
```



To install dependencies

- All the dependencies should be installed inside ti-processor-sdk-rtos-j721e-evm-09_00_01_01 directory

1. Graphviz tool

```
cd ${PSDK_INSTALL_PATH}
sudo apt install graphviz-dev
```

   - We need to build this inside the TIDL_INSTALL_PATH directory

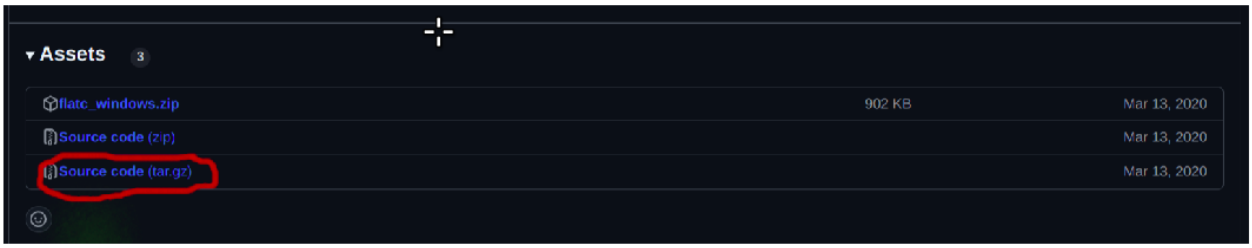
```
cd ${TIDL_INSTALL_PATH}
TARGET_PLATFORM=PC make gv
```

2. Google Protobuf

```
cd ${PSDK_INSTALL_PATH} # If you are in this directory then leave it
wget
https://github.com/protocolbuffers/protobuf/releases/download/v3.11.3/
protobuf-cpp-3.11.3.tar.gz
tar -xvzf protobuf-cpp-3.11.3.tar.gz
```

3. Google Flatbuffer

   - Download tar file form this link




```
cd ${PSDK_INSTALL_PATH}
tar -xvzf flatbuffers-1.12.0.tar.gz
```

4. Open CV

   - Download tar file form this link


```
cd ${PSDK_INSTALL_PATH}
tar -xvzf opencv-4.1.0.tar.gz
```

Building the dependencies

1. OpenCV

```
cd ${PSDK_INSTALL_PATH}
cd opencv-4.1.0/cmake
cmake -DBUILD_opencv_highgui:BOOL="1" -DBUILD_opencv_videoio:BOOL="0"
-DWITH_IPP:BOOL="0" -DWITH_WEBP:BOOL="1" -DWITH_OPENEXR:BOOL="1" -
DWITH_IPP_A:BOOL="0" -DBUILD_WITH_DYNAMIC_IPP:BOOL="0" -
DBUILD_opencv_cudacodec:BOOL="0" -DBUILD_PNG:BOOL="1" -
DBUILD_opencv_cudaobjdetect:BOOL="0" -DBUILD_ZLIB:BOOL="1" -
DBUILD_TESTS:BOOL="0" -DWITH_CUDA:BOOL="0" -
DBUILD_opencv_cudafeatures2d:BOOL="0" -
DBUILD_opencv_cudaoptflow:BOOL="0" -DBUILD_opencv_cudawarping:BOOL="0"
-DINSTALL_TESTS:BOOL="0" -DBUILD_TIFF:BOOL="1" -DBUILD_JPEG:BOOL="1" -
DBUILD_opencv_cudaarithm:BOOL="0" -DBUILD_PERF_TESTS:BOOL="0" -
DBUILD_opencv_cudalegacy:BOOL="0" -DBUILD_opencv_cudaimgproc:BOOL="0"
-DBUILD_opencv_cudastereo:BOOL="0" -DBUILD_opencv_cudafilters:BOOL="0"
-DBUILD_opencv_cudabgsegm:BOOL="0" -DBUILD_SHARED_LIBS:BOOL="0" -
DWITH_ITT=OFF ../
# Run the make file
make
```

2. Protobuf

```
cd ${PSDK_INSTALL_PATH}
cd protobuf-3.11.3/
./configure CXXFLAGS=-fPIC --enable-shared=no LDFLAGS="-static"
make
```

3. Flatbuffer

```
cd ${PSDK_INSTALL_PATH}
cd flatbuffers-1.12.0/
cmake -G "Unix Makefiles" -DCMAKE_BUILD_TYPE=Release -
DCMAKE_CXX_FLAGS="-Wno-class-memaccess"
make
```

4. Tensorflow

```
cd ${PSDK_INSTALL_PATH}
git clone --depth 1 --single-branch -b tidl-j7
https://github.com/TexasInstruments/tensorflow.git
```

5. Onnxruntime

```
cd ${PSDK_INSTALL_PATH}
git clone --depth 1 --single-branch -b tidl-j7
https://github.com/TexasInstruments/onnxruntime.git
```

6. TVM

```
cd ${PSDK_INSTALL_PATH}
git clone --single-branch -b tidl-j7
https://github.com/TexasInstruments/tvm
cd tvm
git submodule init
git submodule update --init --recursive
```

Build the TIDL PC Tools

- Before that just refer this file

```
/home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-
09_00_01_01/c7x-mma-tidl/makerules/config.mk
```

```
129 PSDK_TOOLS_PATH     ?= $(HOME)/ti
130 # Set the default gcc based on the version of Ubuntu
131 OS_VERSION := $(shell cat /etc/os-release | grep VERSION_ID= | sed -e "s|VERSION_ID=\"||" | sed -e "s|\"||")
132 ifeq ($(OS_VERSION),18.04)
133         TIDL_GCC_VERSION?=5
134 else
135         TIDL_GCC_VERSION?=11
136 endif
137
138 BIOS_PATH           ?="$(PSDK_INSTALL_PATH)/bios_6_83_02_07"
139 XDCTOOLS_PATH       ?="$(PSDK_INSTALL_PATH)/xdctools_3_61_04_40_core"
140 IVISION_PATH        ?="$(PSDK_INSTALL_PATH)/ivision"
141 DSP_TOOLS           ?="$(PSDK_TOOLS_PATH)/ti-cgt-c7000_$(CGT_C7X_VERSION)"
142 MMALIB_PATH         ?="$(PSDK_INSTALL_PATH)/mmalib_$(MMALIB_VERSION)"
143 PDK_INSTALL_PATH    ?="$(PSDK_INSTALL_PATH)/pdk_jacinto_09_00_01_04/packages"
144 CONCERTO_ROOT       ?=$(PSDK_BUILDER_PATH)/concerto
145 MCU_PLUS_SDK_PATH   ?=$(PSDK_INSTALL_PATH)/mcu_plus_sdk
146 TIOVX_PATH          ?=$(PSDK_INSTALL_PATH)/tiovx
147 VISION_APPS_PATH    ?=$(PSDK_INSTALL_PATH)/vision_apps
148 GCC_LINUX_ARM_ROOT  ?=$(PSDK_TOOLS_PATH)/arm-gnu-toolchain-11.3.rel1-x86_64-aarch64-none-linux-gnu
149 LINUX_FS_PATH       ?=$(PSDK_INSTALL_PATH)/targetfs
150 TVM_HOME            ?=$(PSDK_INSTALL_PATH)/tvm
151 TF_REPO_PATH        ?=$(PSDK_INSTALL_PATH)/tensorflow
152 ONNX_REPO_PATH      ?=$(PSDK_INSTALL_PATH)/targetfs/usr/include/onnxruntime
153
154 # Below are only needed for PC emulation Test bench build
155 TIDL_OPENCV_PATH    ?="$(PSDK_INSTALL_PATH)/opencv-4.1.0"
156 TIDL_PROTOBUF_PATH  ?= $(PSDK_INSTALL_PATH)/protobuf-3.11.3
157 TIDL_FLATBUF_PATH   ?="$(PSDK_INSTALL_PATH)/flatbuffers-1.12.0"
158 TIDL_GRAPHVIZ_PATH  ?="/usr"
159
```

- In this i change the directory path for the tensorflow and see the PSDK_TOOLS_PATH , it will be helpful in upcoming process

```
cd ${PSDK_INSTALL_PATH}
cd sdk_builder/
make tidl_pc_tools -j # I have a 8GB RAM so i can't completely run this
```

```
process so i just used j2 in the place of j
make
```

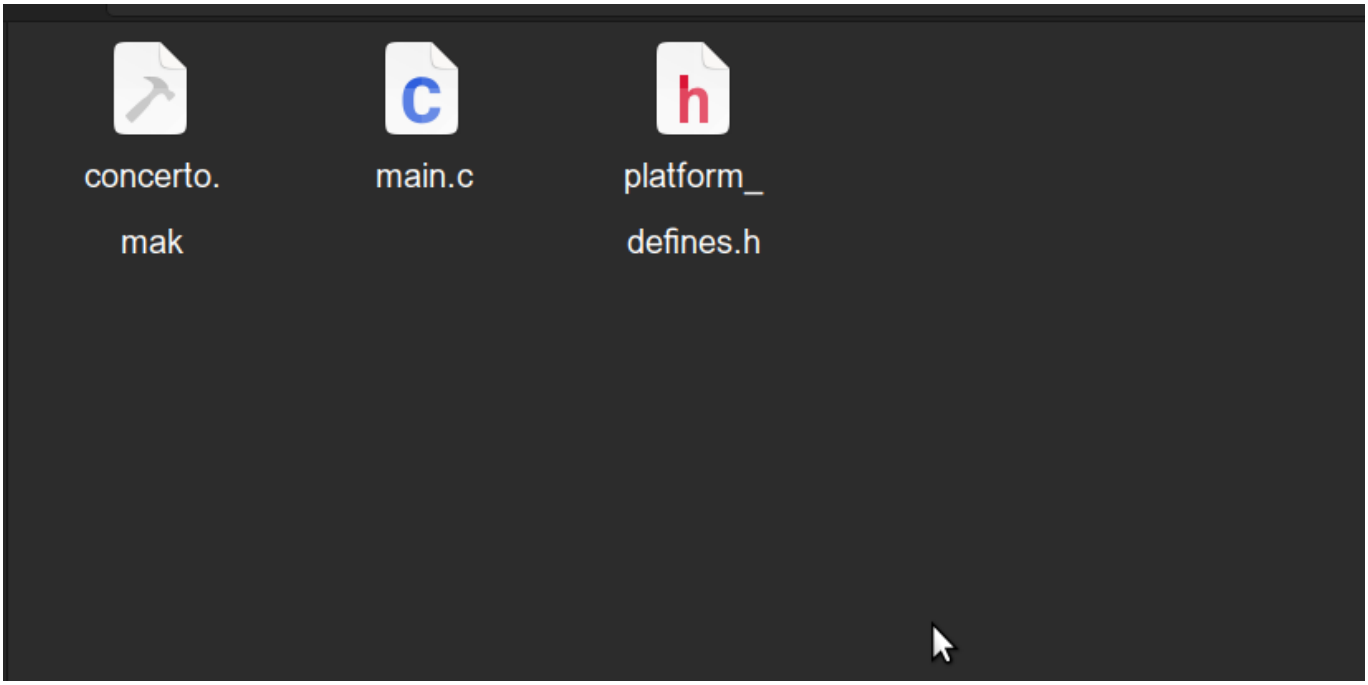
Build command to run TIDL-RT

```
cd ${TIDL_INSTALL_PATH}
make TARGET_PLATFORM=PC
make
```

Running Custom Test App

- Go to the directory

```
cd ti-processor-sdk-rtos-j721e-evm-09_00_01_01/c7x-mma-
tidl/ti_dl/test/src/pc_linux/
```

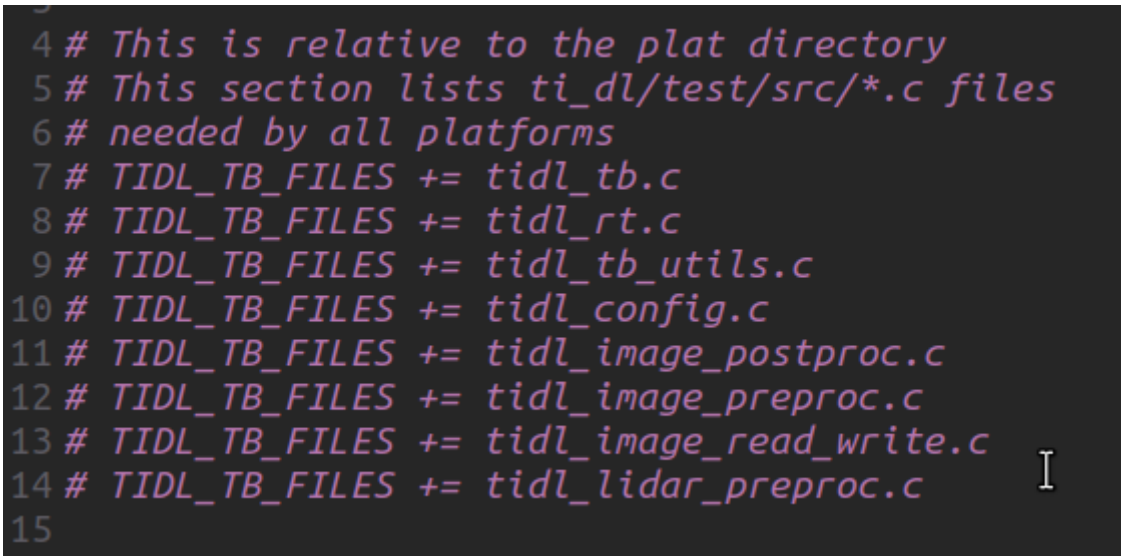


- In this , delete platform_defines.h file and modify the main.c program with the hello_world.c

```
#include<stdio.h>
int main(){
    printf("Hello World");
    return 0;
}
```

- In ti-processor-sdk-rtos-j721e-evm-09_00_01_01/c7x-mma-tidl/ti_dl/test/src/concerto_common.mak comment out the following code

```
TIDL_TB_FILES += tidl_tb.c
TIDL_TB_FILES += tidl_rt.c
TIDL_TB_FILES += tidl_tb_utils.c
TIDL_TB_FILES += tidl_config.c
TIDL_TB_FILES += tidl_image_postproc.c
TIDL_TB_FILES += tidl_image_preproc.c
TIDL_TB_FILES += tidl_image_read_write.c
TIDL_TB_FILES += tidl_lidar_preproc.c
```



- Go to the ti-processor-sdk-rtos-j721e-evm-09_00_01_01/c7x-mma-tidl/ti_dl/test/ directory and run the following command

```
make TARGET_BUILD=debug TARGET_PLATFORM=PC
```

- To run the output code

```
cd ti-processor-sdk-rtos-j721e-evm-09_00_01_01/c7x-mma-
tidl/ti_dl/test/out/PC/x86_64/LINUX/debug/
./PC_dsp_test_dl_algo.out
```

Error I got

1. c7x.h is not loaded

```
                 from src/tidl_batchReshape.c:71:
/home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/mmalib_09_00_03_03/ti/mmalib/src/cnn_c7xmma/MMALIB_CNN_convolve_col_smallNo_ixX_ixX_oxX/../../common
/MMALIB_types.h:35:10: fatal error: c7x.h: No such file or directory
   35 | #include <c7x.h> // for streaming engine, streaming address gen.
      |          ^~~~~~~
compilation terminated.
make[2]: *** [/home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/c7x-mma-tidl/makerules/rules.mk:501: /home/arshathahamed10/PSDKRA/ti-processor-sdk-rto
s-j721e-evm-09_00_01_01/c7x-mma-tidl/out/PC/dsp/algo/release/ti_dl/algo/src/priv/./tidl_stalgo_workload.obj] Error 1
make[2]: Leaving directory '/home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/c7x-mma-tidl/ti_dl/algo/src/priv'
make[1]: *** [makefile:192: tidl_priv] Error 2
make[2]: *** [/home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/c7x-mma-tidl/makerules/rules.mk:501: /home/arshathahamed10/PSDKRA/ti-processor-sdk-rto
s-j721e-evm-09_00_01_01/c7x-mma-tidl/out/PC/dsp/algo/release/ti_dl/algo/./src/tidl_batchReshape.obj] Error 1
compiling ../tfImport/proto_cc/tensorflow/core/framework/op_def.pb.cc
In file included from /home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/mmalib_09_00_03_03/ti/mmalib/src/cnn_c7xmma/MMALIB_CNN_convolve_col_smallNo_ix
X_ixX_oxX/MMALIB_CNN_convolve_col_smallNo_ixX_ixX_oxX.h:25,
                 from /home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/mmalib_09_00_03_03/ti/mmalib/src/cnn_c7xmma/mmalib_cnn.h:26,
                 from ./inc/tidl_alg_int.h:88,
                 from src/tidl_argmax.c:73:
/home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/mmalib_09_00_03_03/ti/mmalib/src/cnn_c7xmma/MMALIB_CNN_convolve_col_smallNo_ixX_ixX_oxX/../../common
/MMALIB_types.h:35:10: fatal error: c7x.h: No such file or directory
   35 | #include <c7x.h> // for streaming engine, streaming address gen.
      |          ^~~~~~~
compilation terminated.
compiling ../tfImport/proto_cc/tensorflow/core/framework/resource_handle.pb.cc
make[2]: *** [/home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/c7x-mma-tidl/makerules/rules.mk:501: /home/arshathahamed10/PSDKRA/ti-processor-sdk-rto
s-j721e-evm-09_00_01_01/c7x-mma-tidl/out/PC/dsp/algo/release/ti_dl/algo/./src/tidl_argmax.obj] Error 1
compiling ../tfImport/proto_cc/tensorflow/core/framework/step_stats.pb.cc
In file included from /home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/mmalib_09_00_03_03/ti/mmalib/src/cnn_c7xmma/MMALIB_CNN_convolve_col_smallNo_ix
X_ixX_oxX/MMALIB_CNN_convolve_col_smallNo_ixX_ixX_oxX.h:25,
                 from /home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/mmalib_09_00_03_03/ti/mmalib/src/cnn_c7xmma/mmalib_cnn.h:26,
                 from ./inc/tidl_alg_int.h:88,
                 from src/tidl_batchNorm.c:73:
/home/arshathahamed10/PSDKRA/ti-processor-sdk-rtos-j721e-evm-09_00_01_01/mmalib_09_00_03_03/ti/mmalib/src/cnn_c7xmma/MMALIB_CNN_convolve_col_smallNo_ixX_ixX_oxX/../../common
/MMALIB_types.h:35:10: fatal error: c7x.h: No such file or directory
   35 | #include <c7x.h> // for streaming engine, streaming address gen.
```

- For this i download the c7x dsp compiler by manual from this link
- create a **ti** directory in the home and store the file and run the command

```
./ti_cgt_c7000_4.1.0.LTS_linux-x64_installer.bin
```

- See the path is stored in config.mk

```
108 PSDK_TOOLS_PATH      ?= "C:/ti"
109 BIOS_PATH            ?="$(PSDK_T
```