User Guide

1. Add MMA8451 /MAG3110 /MPL3115 driver

In this package , there are driver for all Freescale sensors:

Accelerometer : MMA8451/ MMA8452/ MMA8453/MMA8652/ MMA8652

Magnetic Sensor :   MAG3110

Accelerometer + Magnetic Sensor : FXOS8700

Pressure Sensor : MPL3115

1.1 copy the sensors skernel driver source code in kernel direction

 Copy files **'mma845x/mma845x.' 'fxos8700/fxos8700.h' ' fxos8700/fxos8700.c'**

 'mma865x/mma865x.c'   'mag3110/mag3110.c' 'mpl3115/mpl3115' in driver direction into folder **'kernel_dir/drivers/hwmon'**.

1.2 modify kernel configure setting

  Modify file 'Kconfig' on folder 'kernel_dir/drivers/hwmon', add below content:

 config SENSORS_MAG3110

        tristate "Freescale MAG3110 e-compass sensor"

        depends on I2C && SYSFS

        help

         If you say yes here you get support for the Freescale MAG3110

         e-compass sensor.This driver can also be built as a module.

         If so, the module will be called mag3110.

```
config SENSORS_MMA845X

        tristate "MMA8451/MMA8452/MMA8453 device driver"

        depends on I2C && SYSFS

        default n

        help

          If you say yes here you get support for the Freescale MMA8451/

          MMA8452/MMA8453 sensors.

config SENSORS_MMA865X

        tristate "MMA8652/MMA8653 device driver"

        depends on I2C

        default n

        help

          If you say yes here you get support for the Freescale MMA8652/

          MMA8653 sensors.

config SENSORS_MMA7660

        tristate "MMA7660 device driver"

        depends on I2C

        default n

        help

          If you say yes here you get support for the Freescale MMA7660

          sensor.
```

```
config SENSORS_MMA_POSITION

        int "MMA845x or MMA7660  Accelerate Sensor Position Setting"

        depends on SENSORS_MMA845X || SENSORS_MMA865X || SENSORS_MMA7660

        default "0"

        help

         this provide the sensor position setting , value is between 0~7

config SENSORS_MAG_POSITION

        int "MAG3110 Magnetic Sensor Position Setting"

        depends on SENSORS_MAG3110

        default "0"

        help

         this provide the sensor position setting , value is between 0~7

config SENSORS_FXOS8700

        tristate "FXOS8700 Accelerometer & Magnetometer sensor device driver"

        depends on I2C

        default n

        help

    If you say yes here you get support for the Freescale FXOS8700

        Accelerometer & Magnetometer combo sensor.

config SENSORS_FXOS8700_POSITION

        int "FXOS8700 Sensor Position Setting"

        default "0"

        help

         this provide the sensor position setting , value is between 0~7
```

config SENSORS_MPL3115

     tristate "MPL3115 pressure device driver"

     depends on I2C

     default n

Modify file 'Makefile' on folder 'kernel_imx/drivers/hwmon', add below line

     obj-$(CONFIG_SENSORS_MAG3110)   += mag3110.o

     obj-$(CONFIG_SENSORS_MMA845X)   += mma845x.o

     obj-$(CONFIG_SENSORS_MMA7660)   += mma7660.o

     obj-$(CONFIG_SENSORS_MMA865X)   += mma865x.o

     obj-$(CONFIG_SENSORS_FXOS8700)   += fxos8700.o

     obj-$(CONFIG_ SENSORS_MPL3115)   += mpl3115.o

1.3 add sensors i2c borad information

Modify file 'mx53_smd.c'(according to which target board is being used) on folder 'kernel_dir/arch/arm/mach-mx5', add the sensors **i2c_board_info** , modify below contents:

MMA845X:
```
{
.type = "mma845x",
.addr = 0x1C,    // MMA8451 i2c slave address
}
```
MAG3110:
```
{
.type = "mag3110",
.addr = 0x0e,   //MAG3110 i2c slave address
},
```
MMA865X:
```
{
.type = "mma865x",
.addr = 0x1D,
},
```
FXOS8700:
```
{
.type = "fxos8700",
```

```
        .addr = 0x1e,
        },
MPL3115:
        {
        .type = "mpl3115",
        .addr = 0x60,
        },
```
If the sensor connected to i2c bus, add the i2c_board_info in the right i2c bus devices list..

1.4 change kernel menuconfig

use **'make menuconfig'** command to configure compile the sensor driver .the selections of sensors is as below show:

Input Poll Device :
Devices Drivers --> Input device support → Polled input device skeleton

MMA845X Device Selection:

Devices Drivers --> Hardware Monitoring support --> MMA8451/MMA8452/MMA8453 device driver

MMA845X Device Position Setting:

Devices Drivers --> Hardware Monitoring support --> MMA845x Accelerate Sensor Position Setting

MMA865X Device Selection:

Devices Drivers --> Hardware Monitoring support --> MMA8652/MMA8653 device driver

MMA865X Device Position Setting:

Devices Drivers --> Hardware Monitoring support --> MMA845x Accelerate Sensor Position Setting

MAG3110 Device Selection:
Devices Drivers --> Hardware Monitoring support --> MAG3110 device driver

MAG3110 Device Position Setting:

Devices Drivers --> Hardware Monitoring support --> MAG3110 Magnetic Sensor Position Setting

MPL3115 Device Selection:
Devices Drivers --> Hardware Monitoring support --> MPL3115 pressure device driver

FXOS8700 Device Selection:

   Devices Drivers --> Hardware Monitoring support --> FXOS8700 Accelerometer & Magnetometer sensor device driver
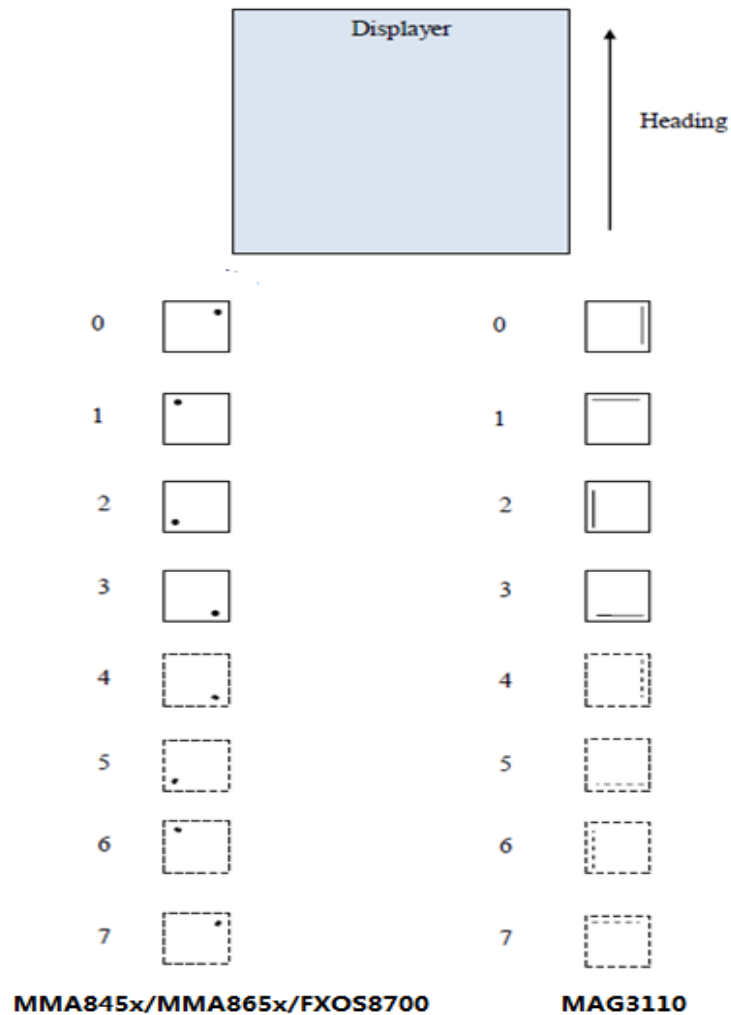
FXOS8700 Device Position Setting:

   Devices Drivers --> Hardware Monitoring support --> FXOS8700 Sensor Position Setting

NOTE: the selection of " **Input Poll Device**" must be selected always. There are some position setting for Accelerometer and Magnetic Sensor, You can read *1.5 Sensor Position Setting* to set CONFIG_SENSORS_MAG_POSITION and CONFIG_ SENSORS_MMA_POSITION value .

1.5 Sensor Position Setting

   Following picture shows the layout relationship between displayer and sensors. Displayer is on the top layer. The sensor drew with solid line is on the top layer, dot line is on the bottom layer.

Displayer

Heading

0		0	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	

MMA845x/MMA865x/FXOS8700   **MAG3110**

2. Add libsensors as android sensor hal

2.1 add libsensor hal source code

 Use **libsensors**   in this package to overwrite the **'hardware/yourplatform/libsensors'** folder

2.2 change Android compile environment

Modify file **'ueventd.freescale.rc'** on folder **'system/core/rootdir/etc'**, add below line to bottom of the file:

```
/dev/uinput          0666  system    input
# sysfs properties
/sys/devices/virtual/input /input*  name      0660  root  input
/sys/devices/virtual/input/input*   max       0660  root  input
/sys/devices/virtual/input/input*   min       0660  root  input
/sys/devices/virtual/input/input*   poll      0666  root  input
/sys/devices/virtual/input/input*   enable    0666  root  input
```

3.Add magd Service to Android

3.1 add magd source

Copy **magd** direction to **Android_dir/hardware/mx5x/**

3.2 Add magd service

Add the following code in *init.rc* to run magd service

```
service magdservice /system/bin/magd
      user root
      group root
      onshot
```

4. Compile the kernel and Android system. Done.

Download the image on your development board. Use Eyes.apk to test sensors.