



**HMI**

TH-SERIES OF HUMAN MACHINE INTERFACES



# **Th-series**

Th-series Human Machine Interfaces

and its Baseboard

User's Guide

Rev 0.92

# 1 Contents

2	Care and maintenance .....	6
2.1	General .....	6
2.2	Regulatory information .....	6
3	Introduction .....	8
4	Get started .....	9
4.1	Mounting the HMI in a wall .....	9
4.1.1	Mounting the HMI in a hollow wall with clamps from the back. ....	9
4.1.2	Mounting the HMI in a hollow wall from the front. ....	14
4.1.3	Mount as an open frame option .....	19
4.2	Mount the HMI on a VESA mount (Flat Display Mounting Interface).....	21
4.3	Connecting the cables and power on the HMI .....	22
4.4	Inserting a micro SD card for update, storage or installing software .....	23
4.4.1	Updating the system software of the HMI with a SD card and the dipswitch.....	24
5	Explanation of the HMI .....	26
6	Explanation of the Thb-3517 Baseboard.....	29
6.1	Explanation of the touch panel PCB.....	32
6.2	Explanation of the optional button PCB.....	33
6.3	Explanation of the optional antenna .....	34
6.4	Resetting the HMI .....	35
7	Mechanical Dimensions .....	36
7.1	Thb-3517 dimensions.....	36
7.2	Back Cover Dimensions .....	37
7.3	Th-0735W Dimensions .....	38
7.4	Th-1035W Dimensions .....	39
7.5	Th-0635 Dimensions.....	40
7.6	Th-0835 Dimensions.....	41
7.7	Th-1035 Dimensions.....	42
7.8	Th-1235 Dimensions.....	43
7.9	Th-1535 Dimensions.....	44
8	Downloads and drivers .....	45

9	Software - Android.....	46
9.1	Installing an Android éclair image in a Linux environment .....	46
9.1.1	Step1 - Making a SD-card with the image on your computer.....	46
9.1.2	Step 2 – Using the SD-card to install an image in the NAND Flash of your Board .....	48
9.2	Installing an Android éclair image in a Windows environment.....	50
9.2.1	Step1 - Making a SD-card with the image on your computer.....	50
9.2.2	Step 2 – Using the SD-card to install an image in the NAND Flash of your board .....	56
9.3	Booting from the SD-card.....	57
10	Software – Angstrom (Linux).....	58
10.1	Installing an Angstrom (Linux) image in a Linux environment .....	58
10.1.1	Step1 - Making a SD-card with the image on your computer.....	58
10.1.2	Step 2 – Using the SD-card to install an image in the NAND Flash of your board .....	60
10.2	Installing an Angstrom (Linux) image in a Windows environment.....	62
10.2.1	Step1 - Making a SD-card with the image on your computer.....	62
10.2.2	Step 2 – Using the SD-card to install an image in the NAND Flash of your board .....	68
10.3	Booting from the SD-card.....	69
11	Software – Windows CE .....	70
11.1	Warning.....	70
11.2	Connecting a null-modem cable .....	70
11.3	Update to Windows Embedded CE6.0 R3 .....	73
11.4	Get the BSP .....	73
11.4.1	Download the BSP from the web-Site .....	73
11.4.2	Install BSP to “Platform Builder for CE 6.0” .....	73
11.5	Create a SD card.....	76
11.6	How to put the WinCE image in the NAND Flash .....	87
11.6.1	Write the Bootloader and OS image to the NAND Flash. ....	87
11.6.2	Boot from NAND flash. ....	99
12	Appendix - Pin outs.....	107
12.1	Module connector.....	107
12.2	SPI1.....	111

---

12.3	GPIO Switch (SW3) .....	112
12.3.1	Auto Update Procedure .....	113
12.4	UART 1/UART 3 .....	114
12.5	LVDS connector .....	116
12.6	GPIO Switch (SW4) .....	119
12.7	CANBUS .....	120
12.8	GPIO connector .....	121
12.9	RS-232, RS-232/422/RS-485 .....	122
12.10	Touch panel PCB connector .....	124
12.11	Speaker connector .....	125
12.12	Microphone connector .....	125
12.13	Battery connector .....	125
12.14	RS-232 cable.....	126
13	Schematics.....	127
13.1	Schematics of Thb-3517 .....	127
13.2	Schematics of Touch Panel PCB .....	136
13.3	Schematics of Keypad PCB.....	138

## 2 Care and maintenance

### 2.1 General

Your device is a product of superior design and craftsmanship and should be treated with care. The following suggestions will help you.

- Keep the device dry. Precipitation, humidity, and all types of liquids or moisture can contain minerals that will corrode electronic circuits. If your device does get wet, allow it to dry completely.
- Do not use or store the device in dusty, dirty areas. Its moving parts and electronic components can be damaged.
- Do not store the device in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store the device in cold areas. When the device returns to its normal temperature, moisture can form inside the device and damage electronic circuit boards.
- Do not attempt to open the device.
- Do not drop, knock, or shake the device. Rough handling can break internal circuit boards and fine mechanics.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the device.
- Do not paint the device. Paint can clog the moving parts and prevent proper operation.
- Unauthorized modifications or attachments could damage the device and may violate regulations governing radio devices.

These suggestions apply equally to your device, battery, charger, or any enhancement. If any device is not working properly, take it to the nearest authorized service facility for service.

### 2.2 Regulatory information

#### Disposal of Waste Equipment by Users in Private Household in the European Union



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.



We hereby declare that the product is in compliance with the essential requirements and other relevant provisions of European Directive 1999/5/EC (radio equipment and telecommunications terminal equipment Directive).

**Federal Communications Commission (FCC) Unintentional emitter per FCC Part 15**

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment to an outlet on a different circuit from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.



**WARNING!** To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

### 3 Introduction

The Th-series Human Machine Interface (HMI) is a small computer with a touch screen. The HMI is based on the System on Module TAM-3517

(For more details on the TAM-3517, the software or the PCB, please download the TAM3517 user guide from the TechNexion website)

Anybody can buy a HMI, TAM-3517 and a Baseboard from our website.

The Th-series of HMI's come in different versions, the user's guide is meant as a general guide for all these versions. Pictures and details of the device can differ from the actual purchased product. All specifications are subject to change without notice.

One can always check our website ( [www.technexion.com](http://www.technexion.com) ) for more details, to download this user guide or to see other information.



## 4 Get started

### 4.1 Mounting the HMI in a wall

This guide describes four mounting options of how to mount the HMI in a wall.

1. Mounting in a hollow wall with clamps from the back
2. In a hollow wall mounted from the front
3. Mount as an open frame option
4. Mount on a VESA (Flat Display Mounting Interface) mount.

HMI	Cut out dimension in mm (w x h)
Th-0735w	192 x 132
Th-1035w	247 x 149.5
Th-0635	169 x 125.5
Th-0835	222 x 149
Th-1035	257 x 194
Th-1235	289 x 219
Th-1535	335 x 264

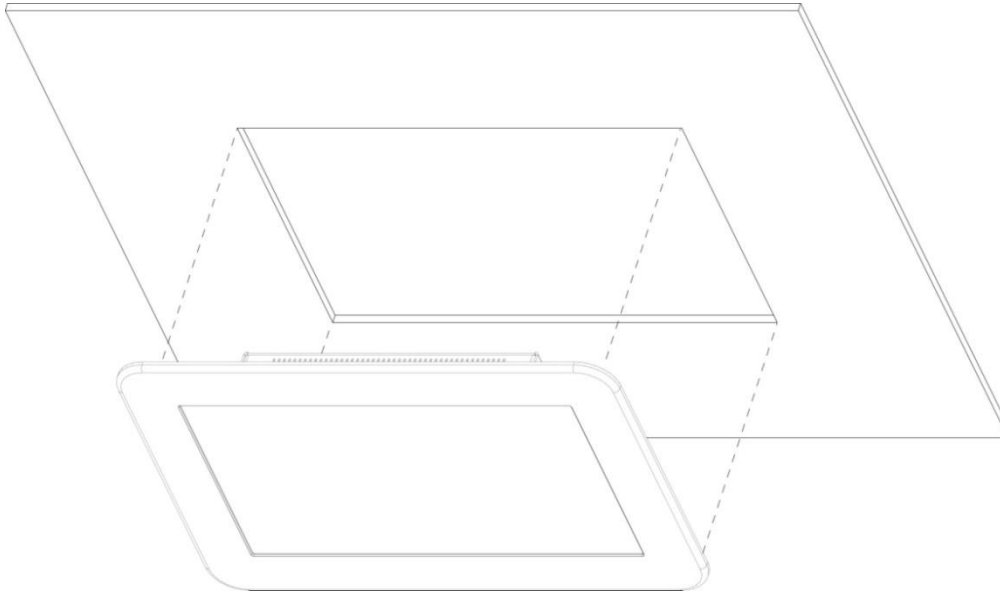
NOTE: These dimensions are the **minimum** dimensions; it is advised to make the cut-out 1 or 2 mm bigger, for easier mounting, and to make it easy to insert the clamps.

#### 4.1.1 Mounting the HMI in a hollow wall with clamps from the back.

This paragraph describes how to mount the HMI with Clamps into a wall.



Clamp for mounting the HMI



Step 1: First you will need to cut a hole in a hollow wall, following the dimensions given in the table above (at the start of this chapter).

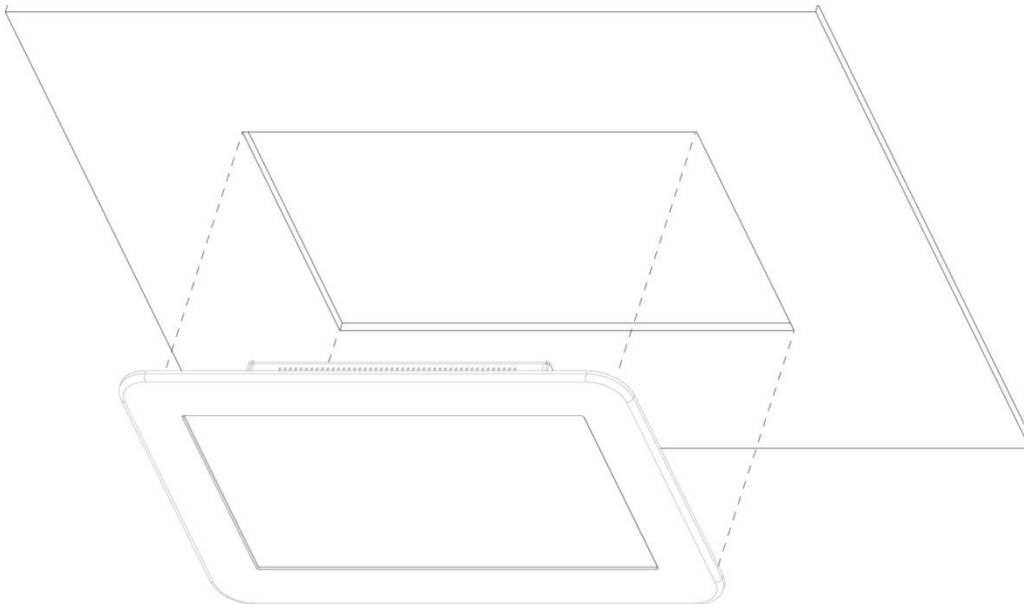


Step2: For Clamp mounting we need to open the holes on the back ([see number 11](#)). First use a screw driver to move the metal piece to the outside (Do not let the metal piece drop inside the HMI).

NOTE: For 7" and 6.5" these metal pieces are placed on the backcover



Step 3: One can also use a plier afterward to take out the metal piece



Step 2: Place the HMI in the hole.



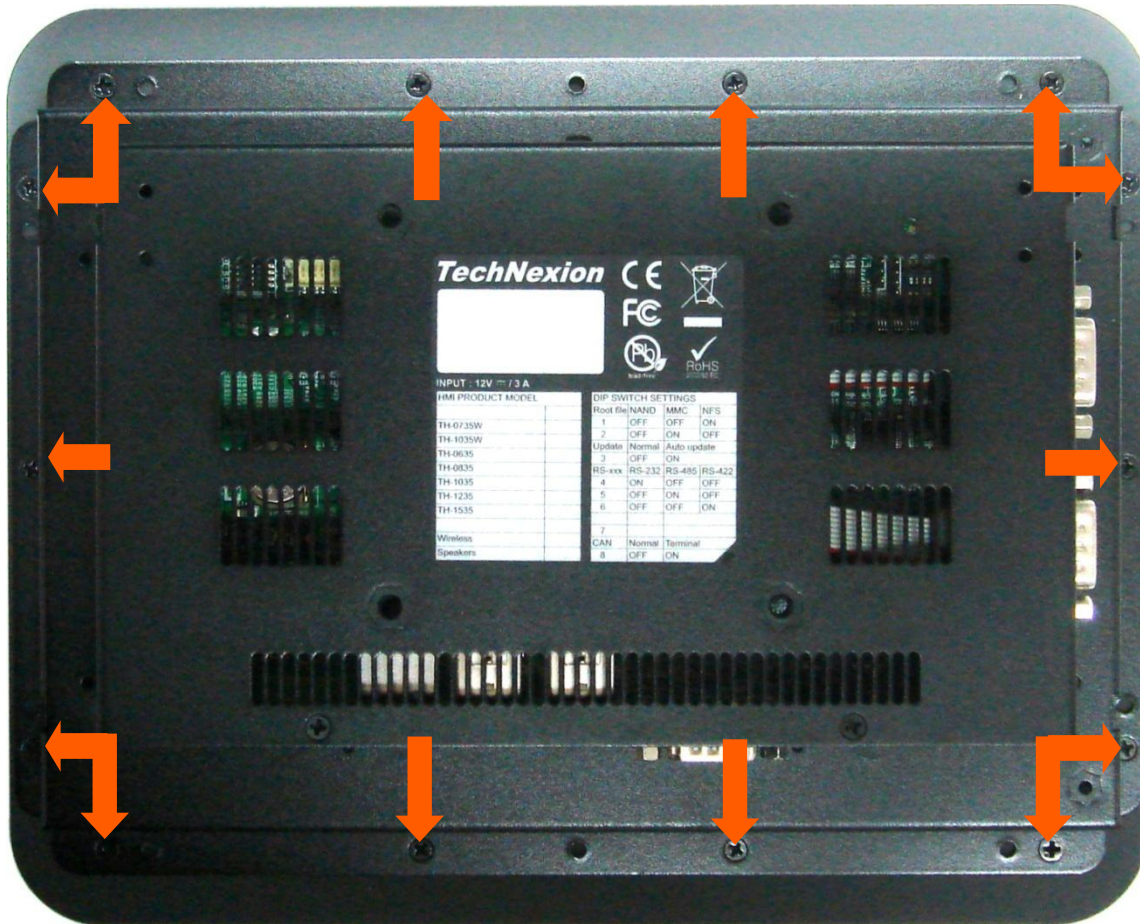
Step 3: Insert the clamps in the holes on the side of the HMI–



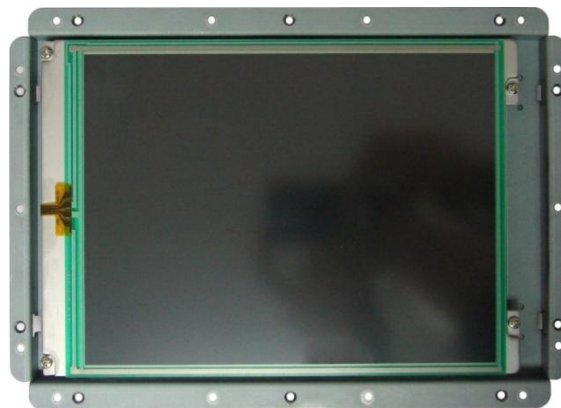
Step 4: Fix the clamp-screws. Avoid applying too much force on the screws.

#### 4.1.2 Mounting the HMI in a hollow wall from the front.

This mounting option uses an optional, patent pending, front bezel with magnets. Please mention the need of this option, when you order your HMI.



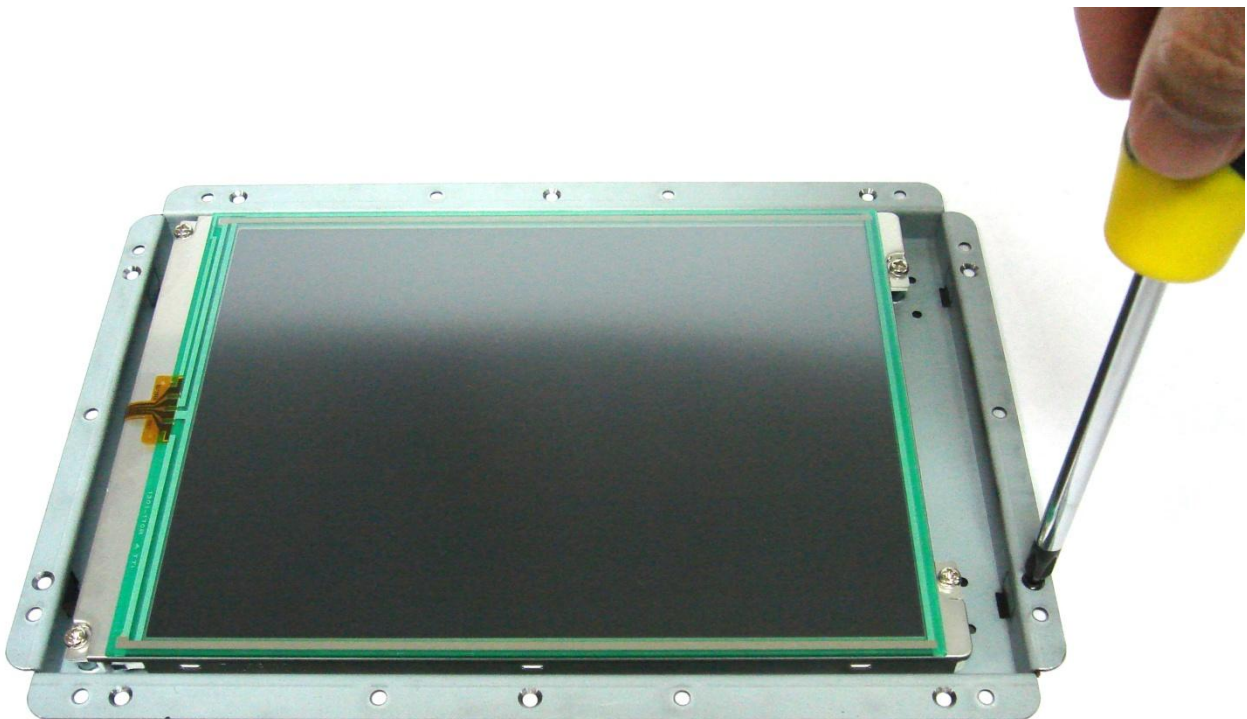
First remove the screws that hold the front bezel. Remove the front bezel (It will feel a little sticky because of magnets that hold the front bezel in place).



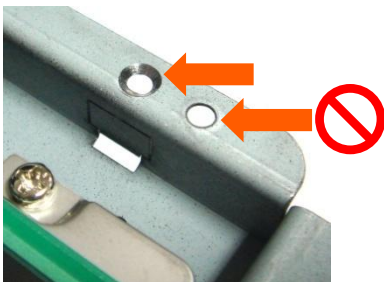
View of HMI without the front bezel

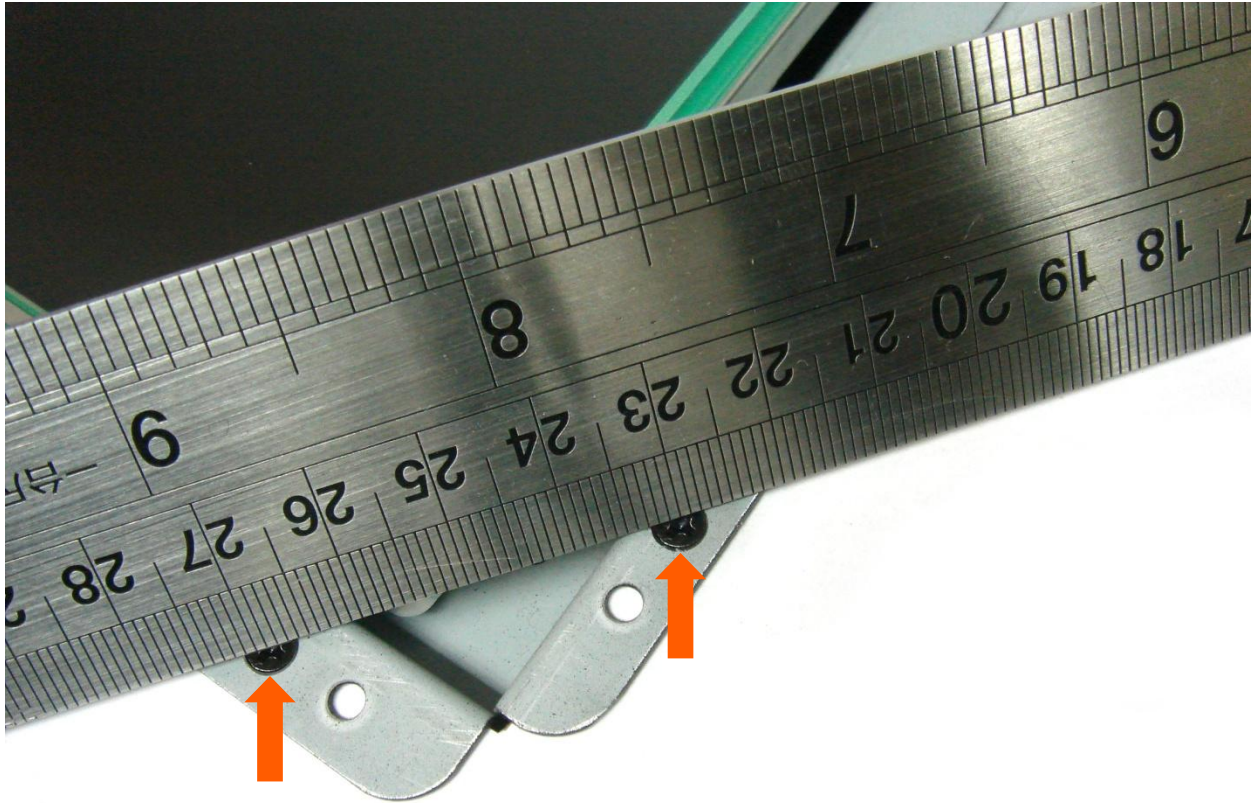


For mounting the HMI you will need screws that look like this (countersunk)



Place the HMI in the right orientation in the cutout (for size of the cut out please checks the table at the beginning of this chapter) and fix the screws from the front in the **chamfered** holes (do not use the other holes).





Make sure that after mounting the screws are flush with the surface (do not stick out), one can check the flatness with a ruler.

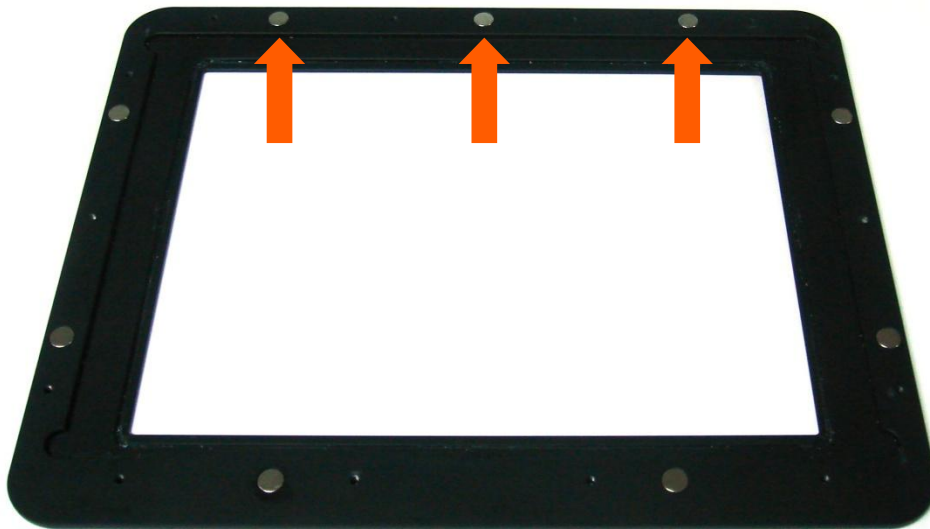


Mount the small headless screws with a T6 TORX screwdriver in the front bezel

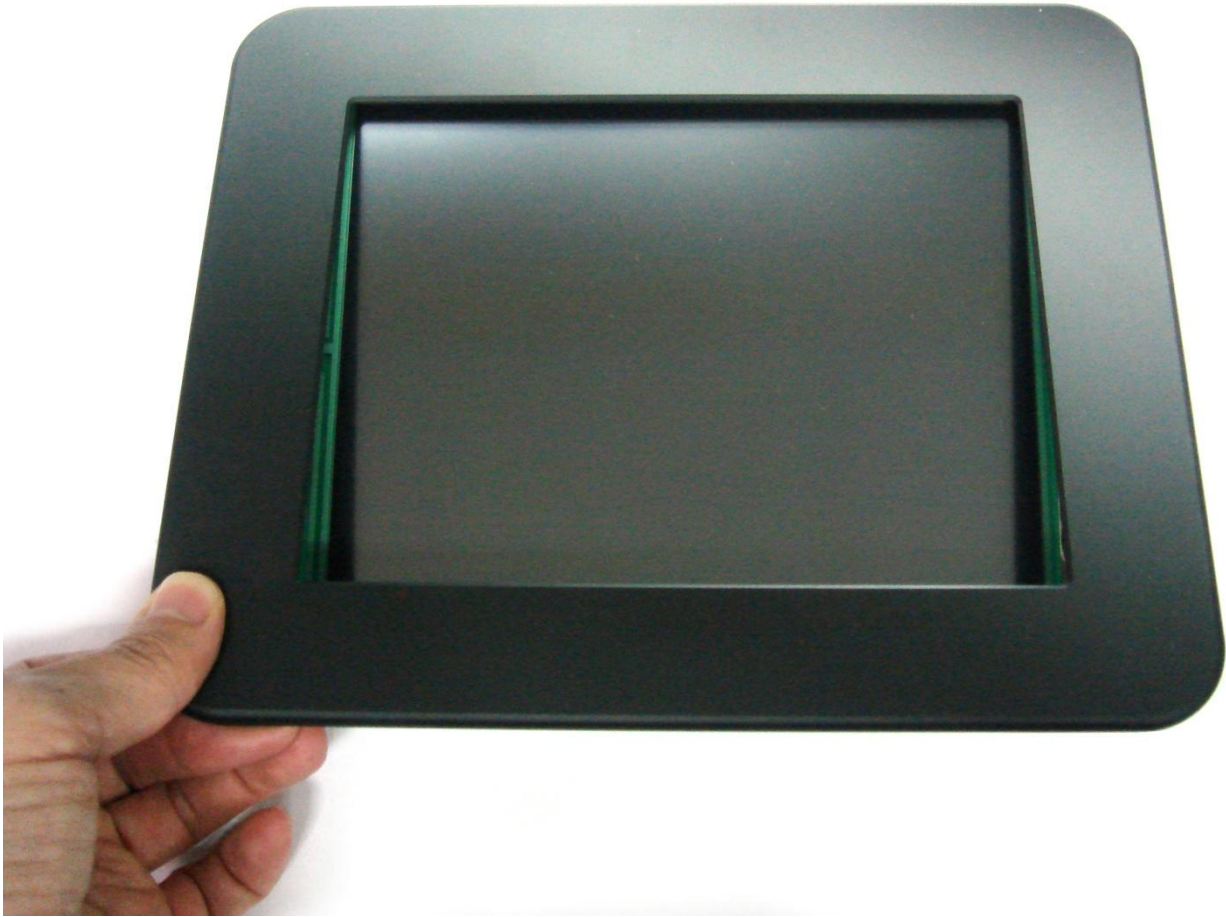




Mount at least 3 headless screws in different corners of the front bezel. They are meant to prevent the front bezel from moving to the sides. They also help to position the front bezel when it is snapped on the HMI.

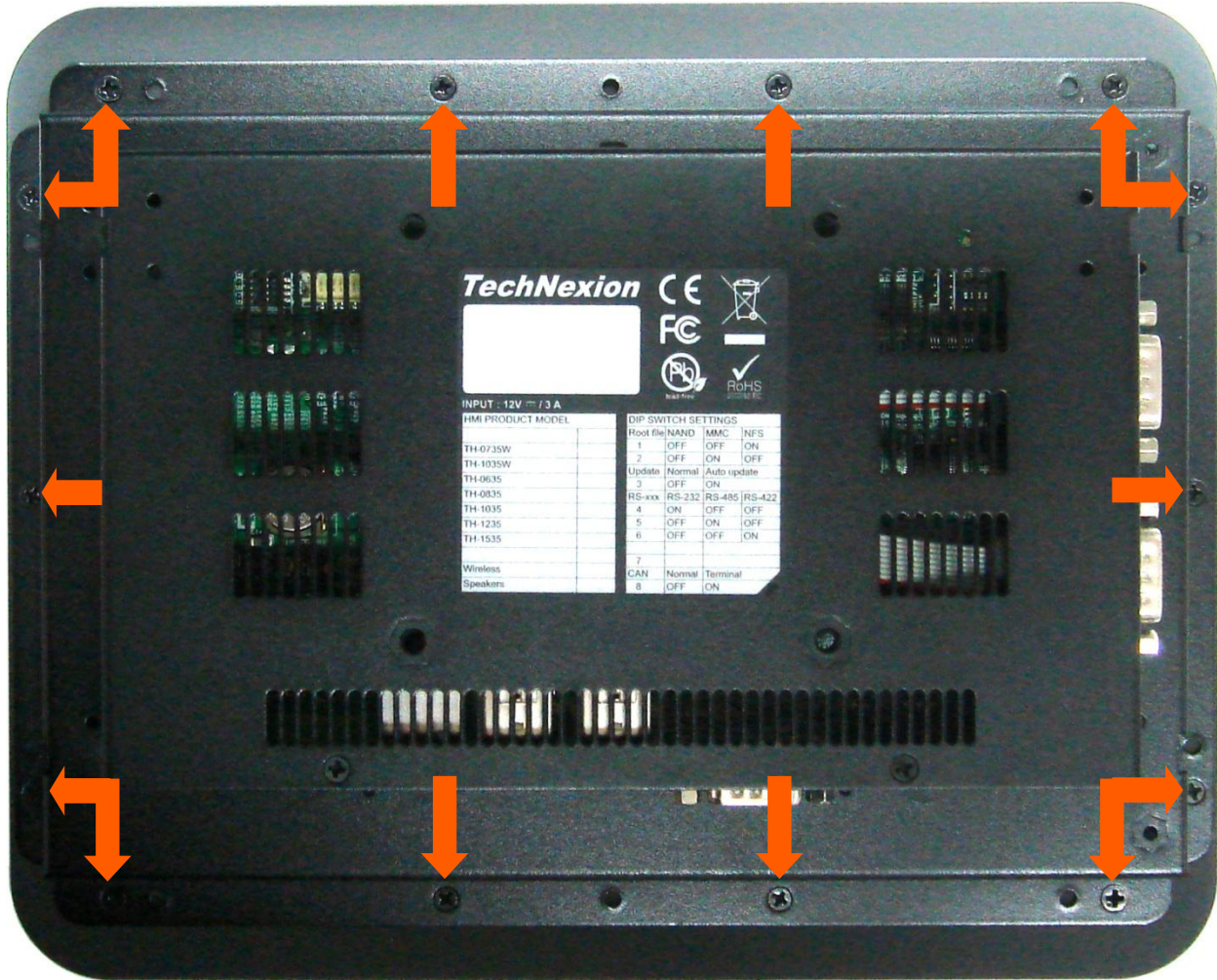


The top of the front bezel is where the most magnets are, or where the magnets are most spread out.



Snap the front bezel carefully in place (do not scratch the touchscreen).

### 4.1.3 Mount as an open frame option



First remove the screws that hold the front bezel. Remove the front bezel (It will feel a little sticky because of magnets that hold the front bezel in place).



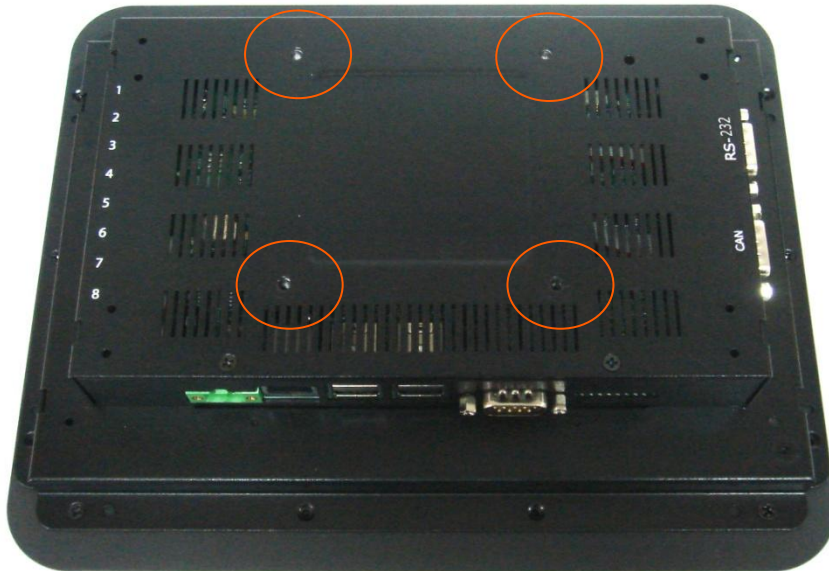
View of HMI without the front bezel



Fix the HMI behind the surface of your choice.

## 4.2 Mount the HMI on a VESA mount (Flat Display Mounting Interface)

Connecting HMI to a VESA mount (Flat Panel Mounting Interface) can be done with the four holes at the back of the HMI. The M4 holes are placed in a square of 75 mm by 75 mm.



VESA mount: Use the four holes in the circles.



Example of a HMI with an optional VESA mounted stand

### 4.3 Connecting the cables and power on the HMI



After mounting the display, all cables can be plugged in (make sure there is no power on the power cable yet).



Only after plugging in the cables, switch on the power to the HMI.



The HMI are delivered with a converter that can be put on the plug of the regular power adapter to change it into a Phoenix CombiCon MSTB 2.5 connector.

#### 4.4 Inserting a micro SD card for update, storage or installing software



Insert the micro SD card in the orientation as shown above



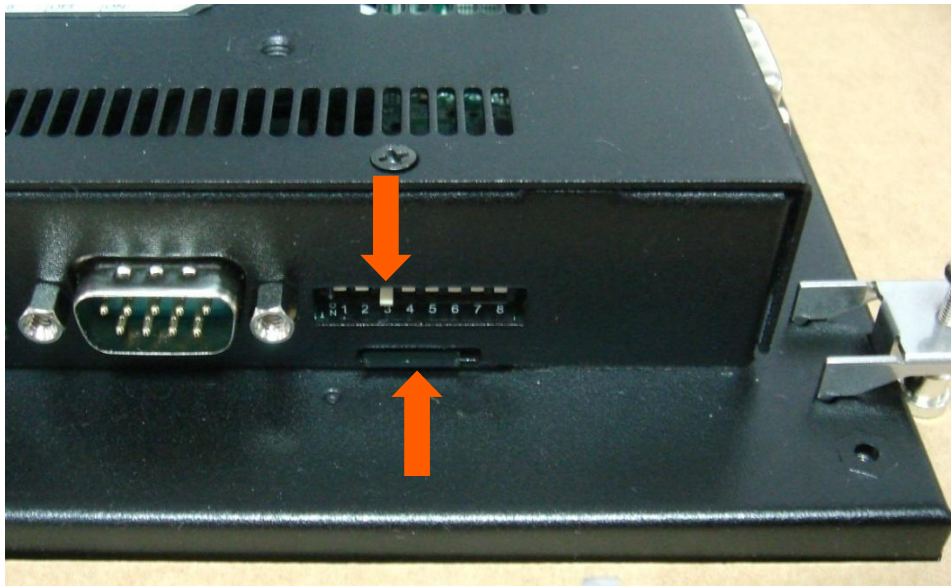
Card inside the unit and ready to use for storage and installing software

#### 4.4.1 Updating the system software of the HMI with a SD card and the dipswitch



For updating the system on should first insert the SD-card then put switch number 3 on the dipswitch to ON (to check setting see the label on the back of the HMI) then switch the power to the unit off and then on again (restart).





HMI with the dipswitch (number 3) in the update position (ON). After the update is finished TAKE OUT THE SD-CARD and put the Dipswitch (number 3) back to OFF. Restart the HMI

### 5 Explanation of the HMI



- 1 Product Label with regulatory information, the product model and dipswitch settings
- 2 Power connector 12 V DC (Phoenix Combicon MSTB 2.5)
- 3 RJ45 Ethernet connector (LAN)
- 4 2x USB Host
- 5 2x USB Host
- 6 [RS-232 / 422 / 485](#) (switchable with dipswitch 8) (COM2)
- 7 MicroSD card slot
- 8 [Dipswitch SW4](#)
- 9 [CAN Bus](#)
- 10 [RS-232 \(COM1\)](#)
- 11 Mounting hole for wall mount Clamps
- 12 M4 Screw hole (4x) for FDMI (VESA) mounting
- 13 Hole to access reset button
- 14 Button 1: Home
- 15 Button 2 : Enter / Select
- 16 Button 3 : Back
- 17 Button 4 : Menu
- 18 Button 5 : Brightness up
- 19 Button 6 : Brightness down
- 20 Button 7 : Volume up
- 21 Button 8 : Volume down
- 22 LCD with touch screen

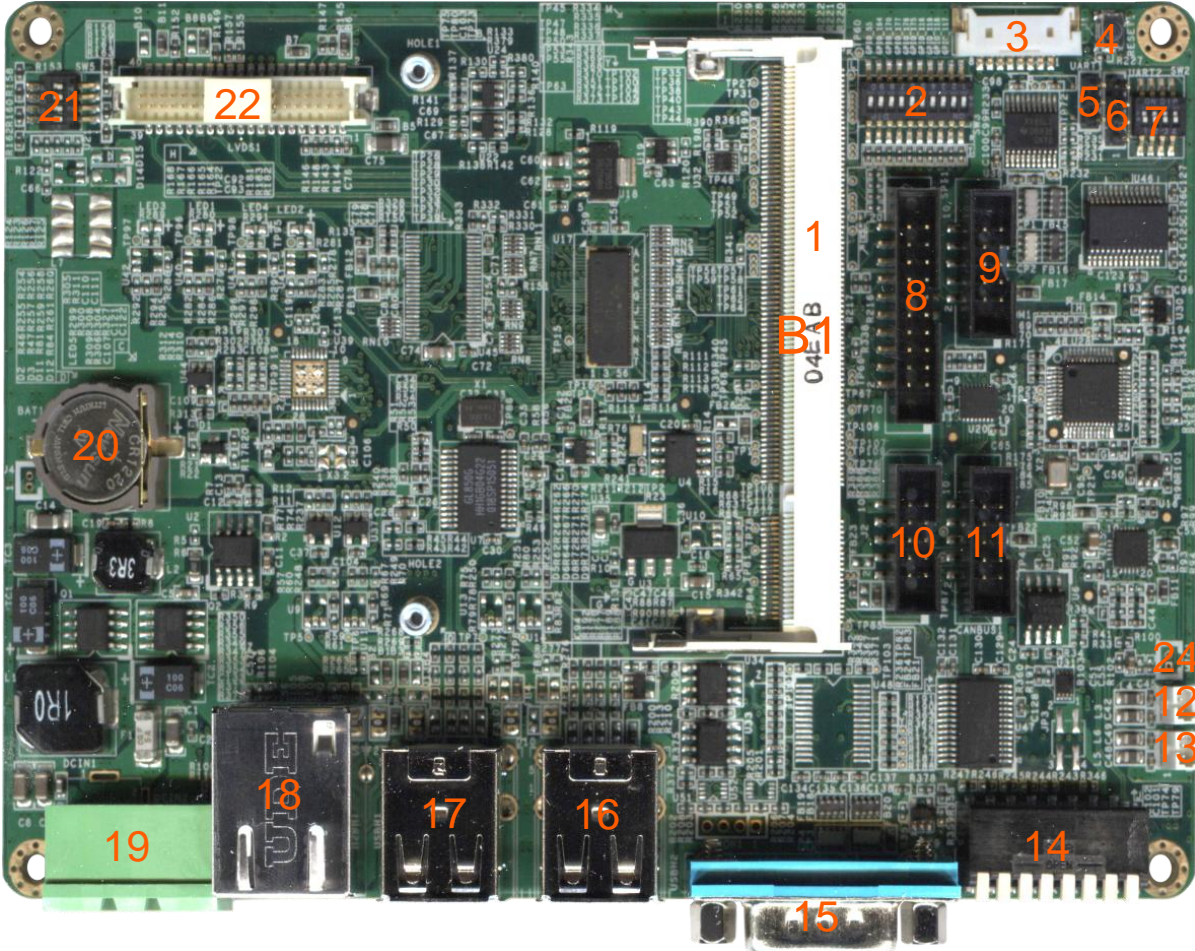
23 Aluminum front bezel

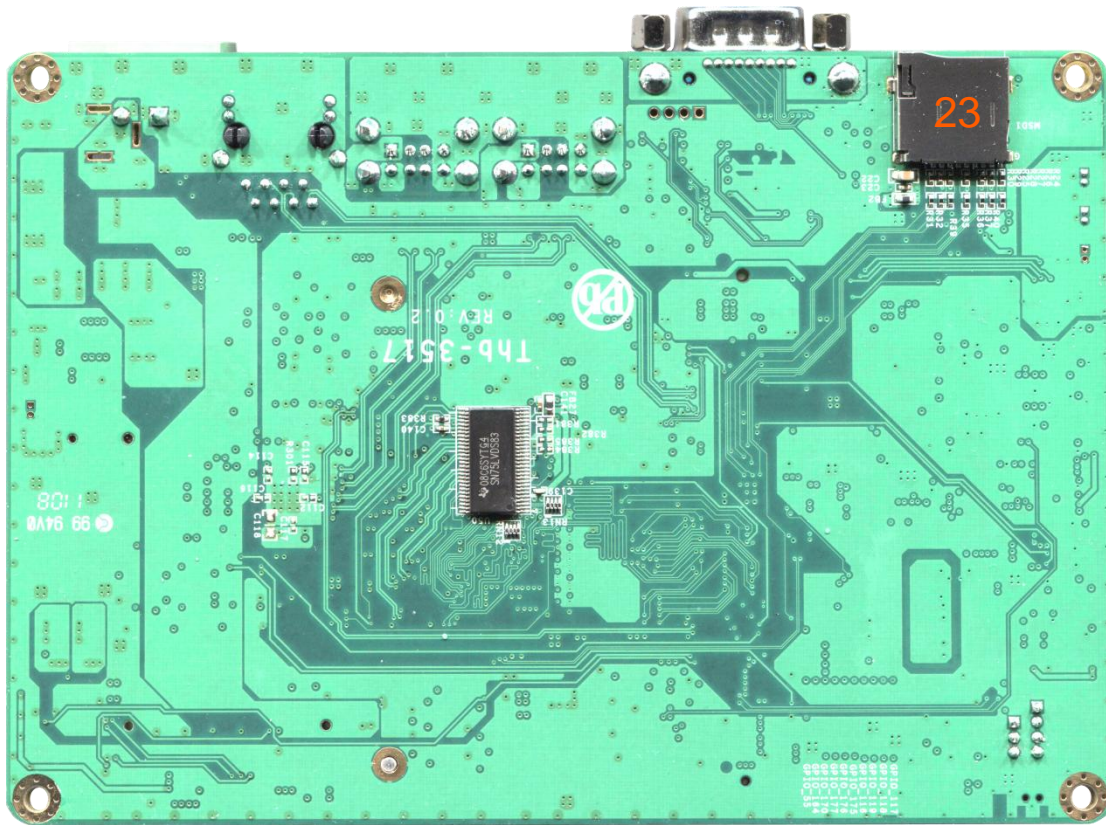
24 Back

25 Backcover



### 6 Explanation of the Thb-3517 Baseboard





**B1** [Connector to the TAM-3517 CPU module](#)

**1** [Connector to the TAM-3517 CPU module](#)

**2** [Dipswitch SW3](#)

**3** [touch panel PCB connector](#)

**4** Reset button

**5** [UART1 / UART 3](#)

**6** [UART2](#)

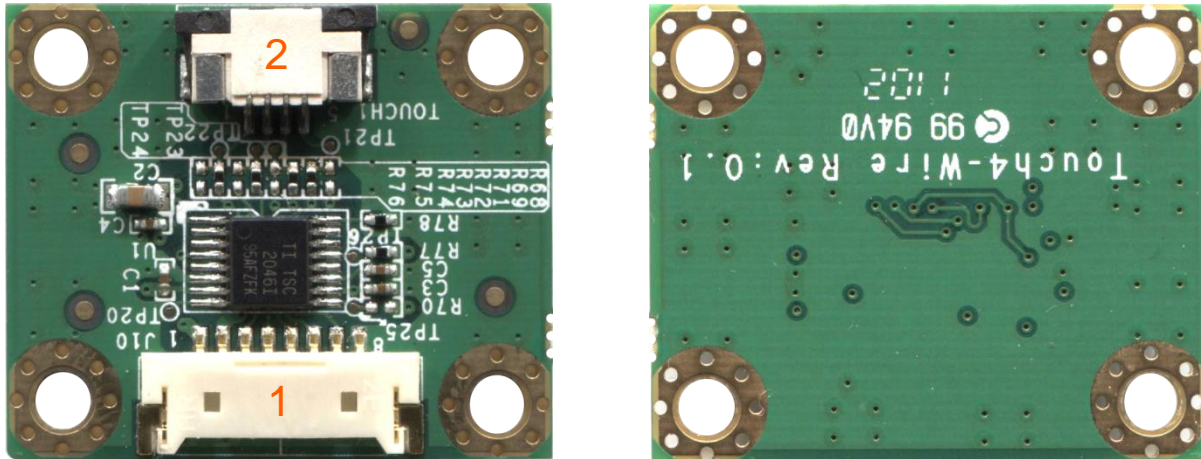
**7** [Switch between UART1 and UART3](#)

**8** [SPI](#)

**9** [RS-232](#)

- 10 [GPIO connector](#) (can be connected to a button-PCB)
- 11 [CAN Bus](#)
- 12 [speaker Left](#)
- 13 [Speaker Right](#)
- 14 [Dipswitch SW4](#)
- 15 [RS-232 / 422 / 485](#) (also marked as RS-xxx)
- 16 USB Host (2x)
- 17 USB Host (2x)
- 18 LAN
- 19 12 VDC Power connector with screws (Phoenix Combicon MSTB 2.5)
- 20 RTC Battery (CR-1220)
- 21 [Switch LVDS settings](#)
- 22 [LVDS connector](#)
- 23 Micro SD card slot
- 24 [Microphone](#) (optional)

## 6.1 Explanation of the touch panel PCB

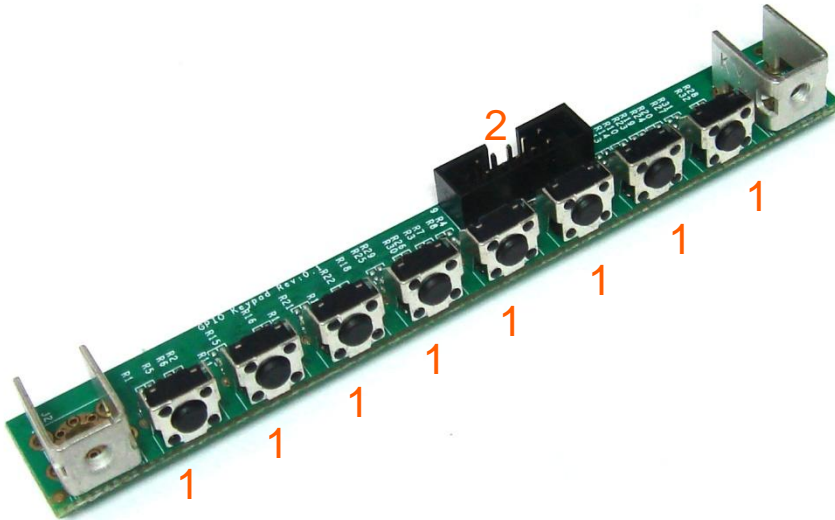


- 1 Connector to Thb-3517
- 2 Connector to touch panel of connected LCD

The Thb-3517 can be connected to many different touch panels with this PCB. The wire connection between Thb-3517 and this PCB allows flexible placement of the touch panel PCB wherever it is needed. One can also use other touch panel PCBs, for example, for 5 wire touch panels with the Thb-3517.



## 6.2 Explanation of the optional button PCB



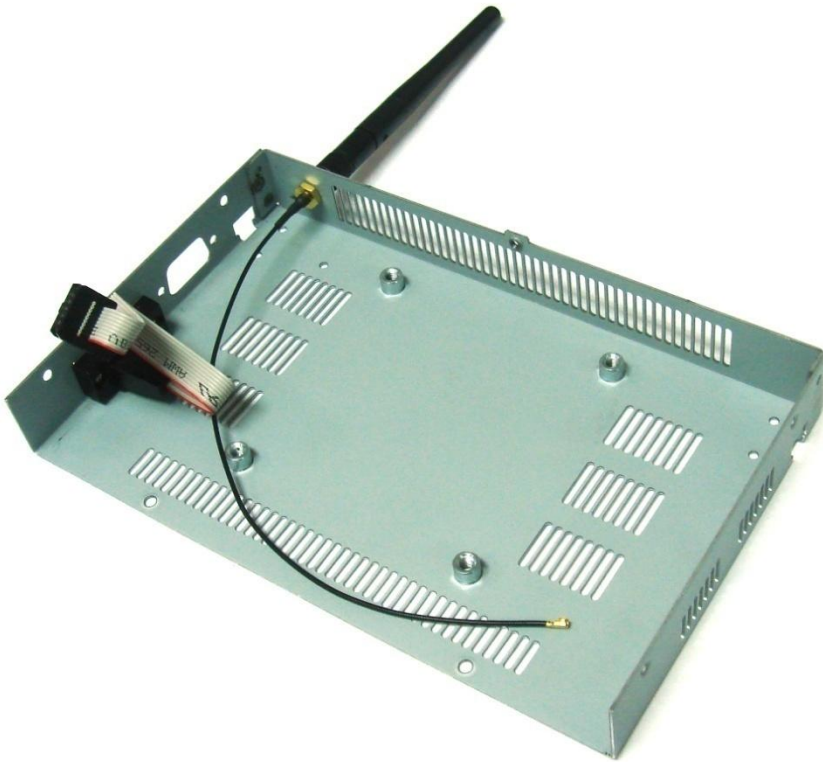
- 1 Buttons
- 2 Connector to Thb-3517

The Thb-3517 can have an optional button PCB connected to the GPIO connector, programmed with several functions.

In the HMI it has the following functions (numbers according back cover):

- 1 Home
- 2 Enter / Select
- 3 Back
- 4 Menu
- 5 Brightness up
- 6 Brightness down
- 7 Volume up
- 8 Volume down

### 6.3 Explanation of the optional antenna



The HMI can be fitted with an optional antenna in the back cover. However this is only useful if the SOM on the PCB has WIFI.

## 6.4 Resetting the HMI



Resetting the HMI (shown here, done with the plastic filling of a pen) (see the first page of this chapter: the reset button is number 4)

## 7 Mechanical Dimensions

### 7.1 Thb-3517 dimensions

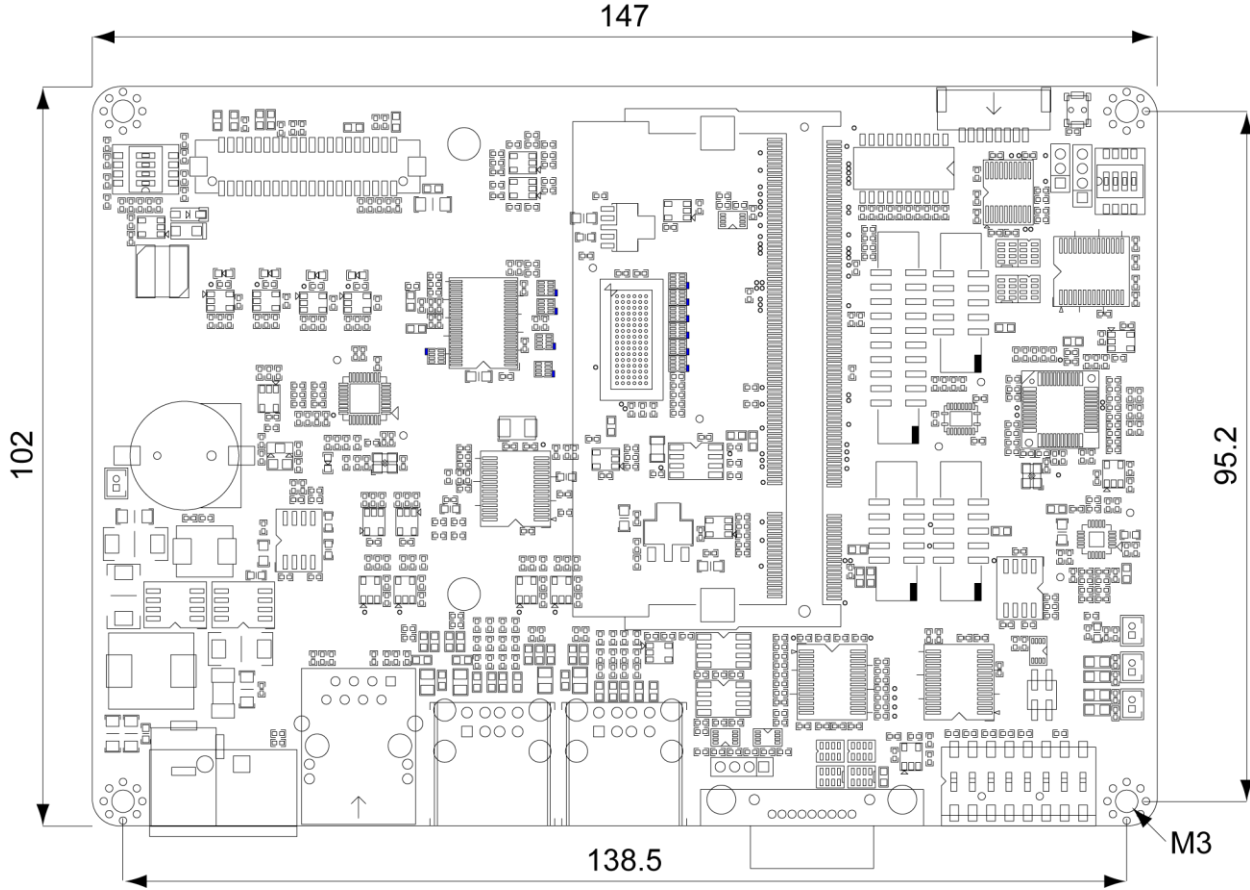


Figure 14

Dimensions in mm

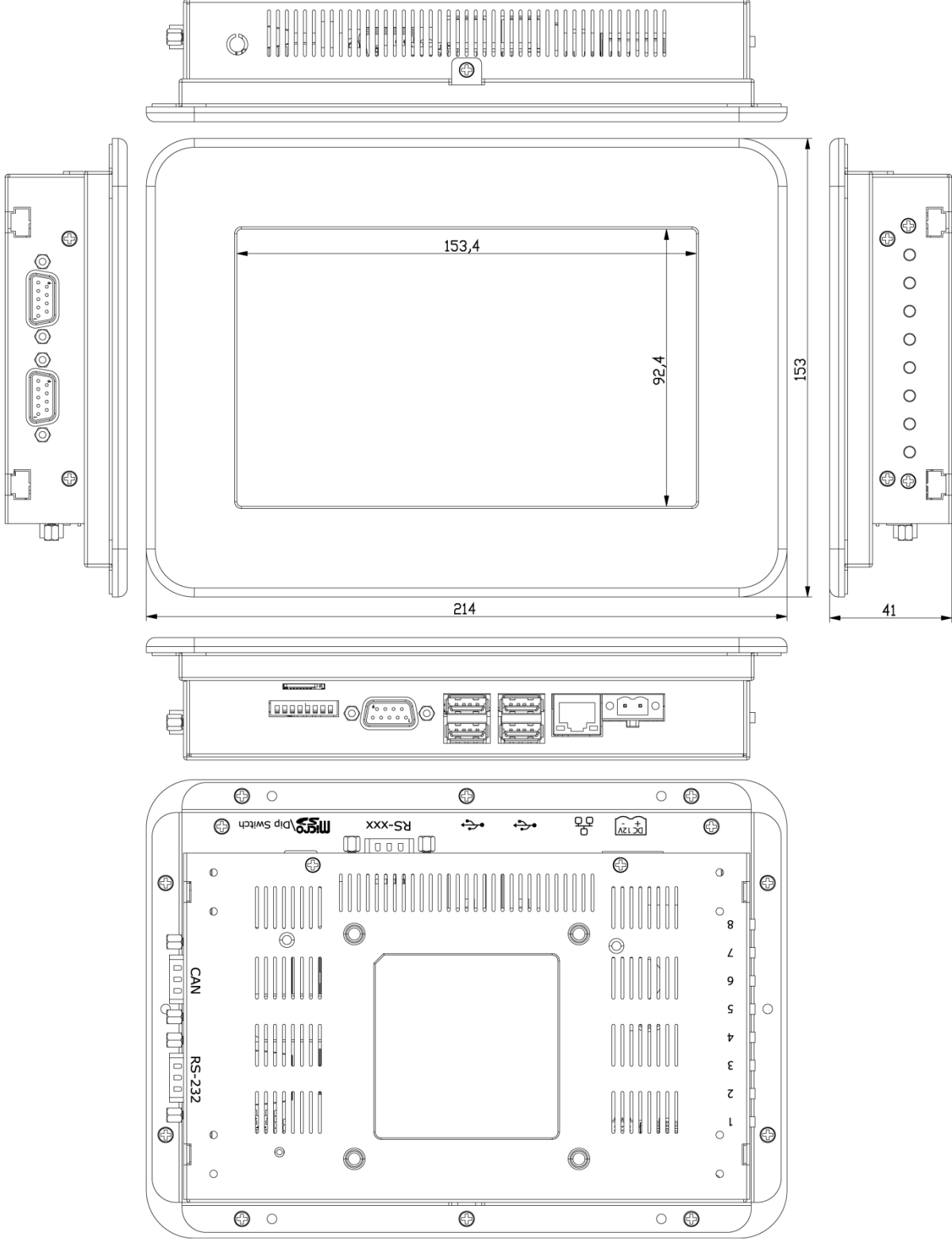
### 7.2 Back Cover Dimensions

The back cover (indicated in orange circle) is standard on most HMIs (7", 8.4", 10.4", 12.1") and has the same dimension.

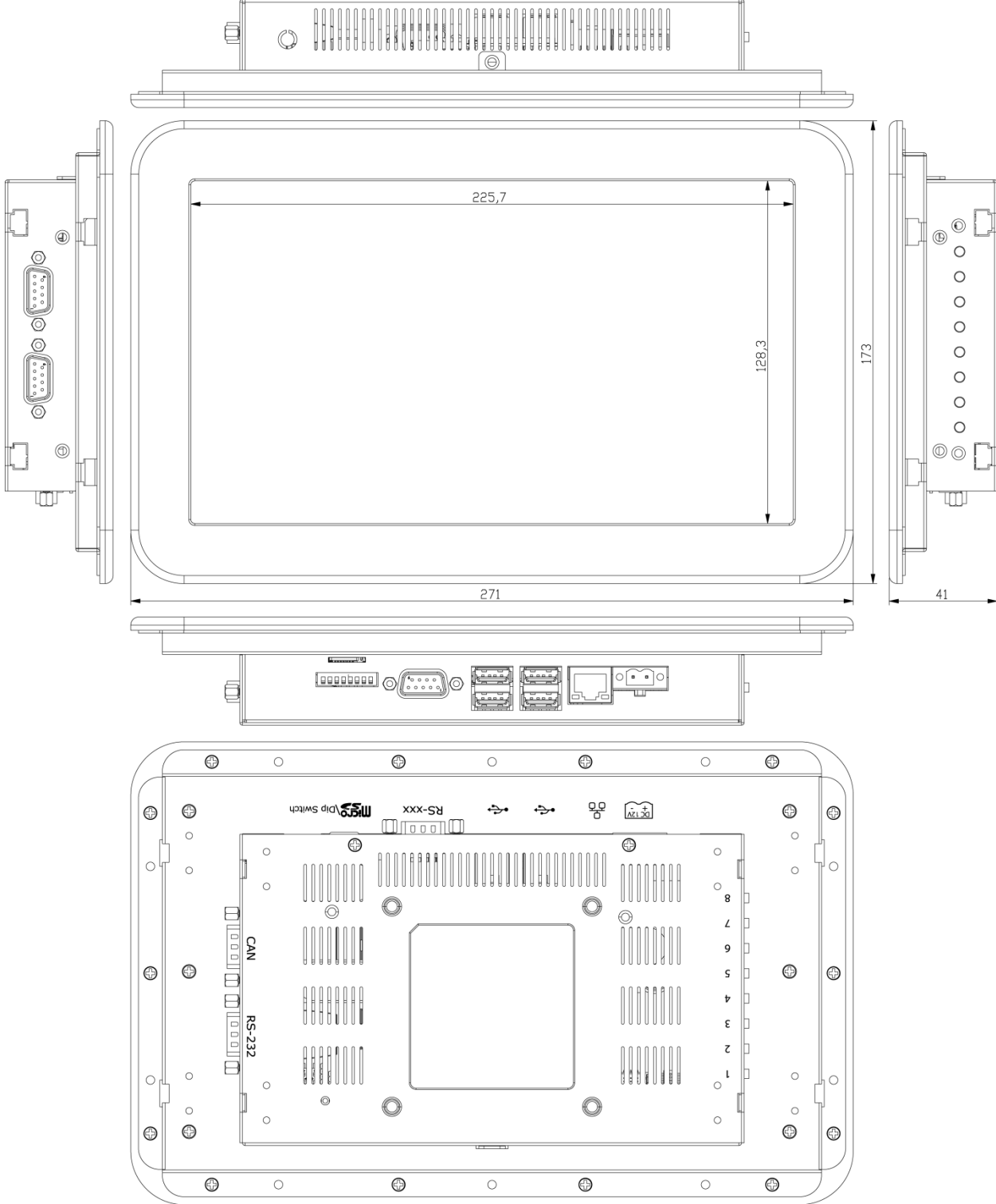


The dimension is 189 mm wide by 116.5 high and 26.5 mm deep. Please keep in mind that space is needed for the cables in the connectors.

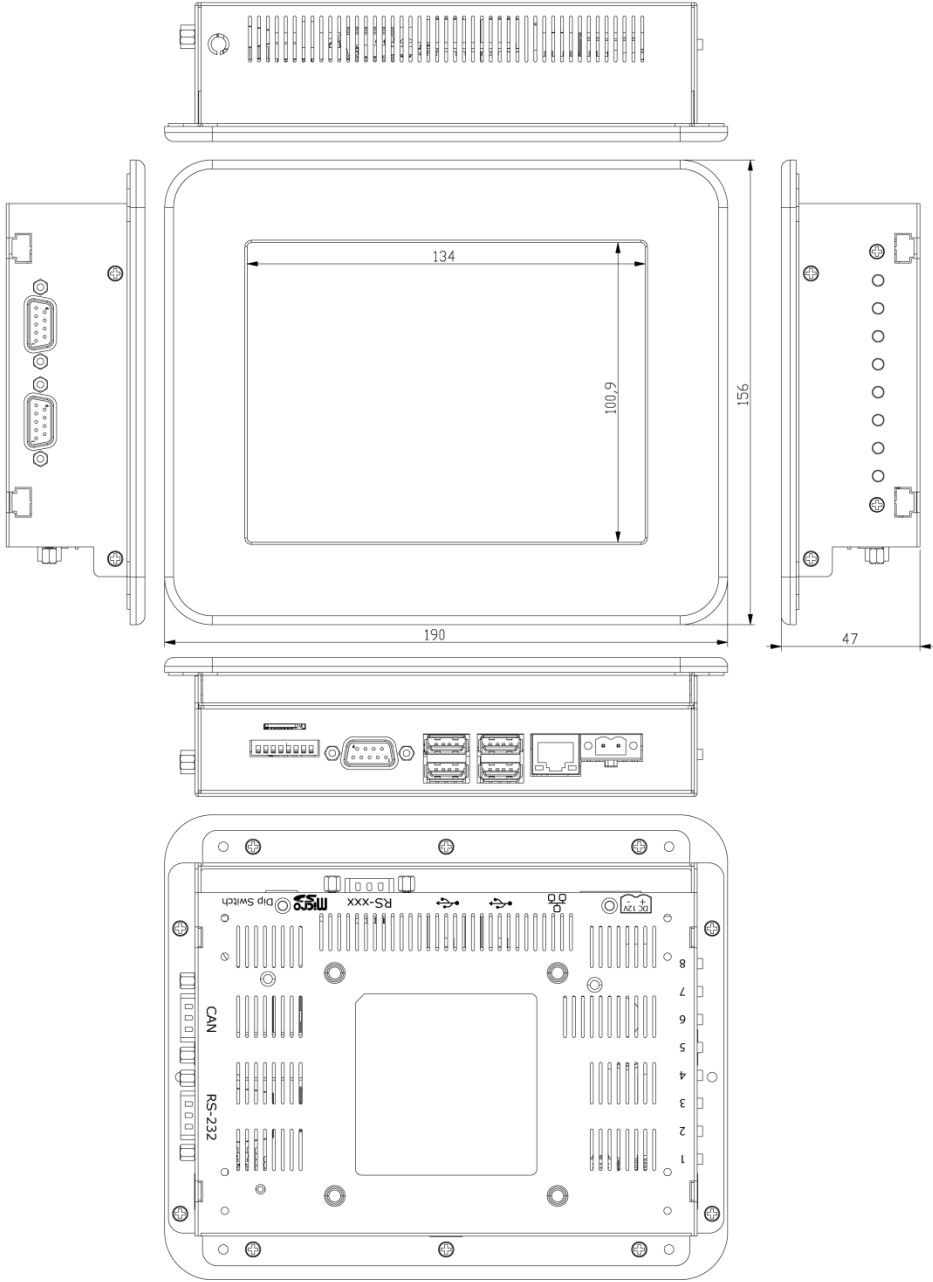
### 7.3 Th-0735W Dimensions



### 7.4 Th-1035W Dimensions



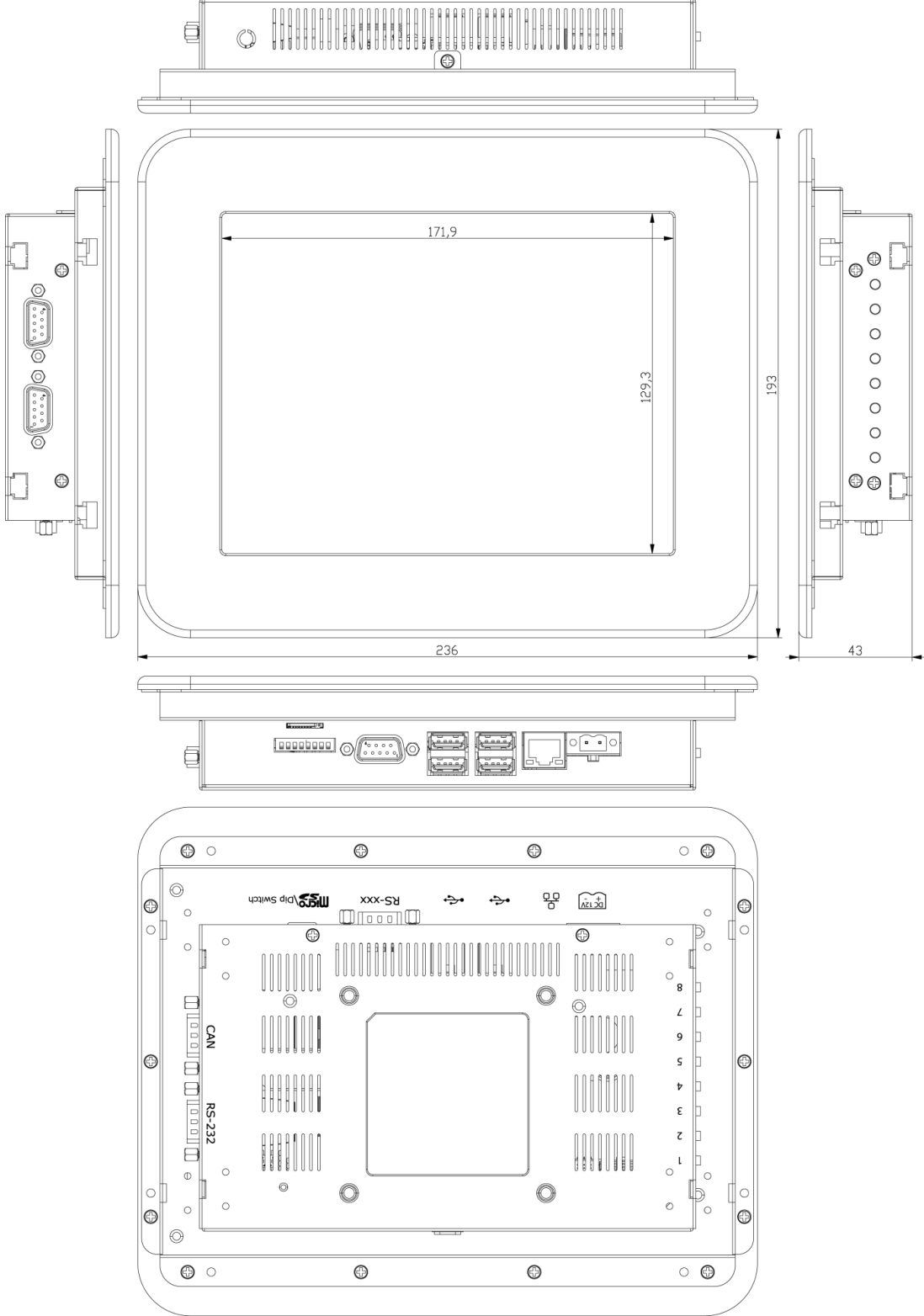
### 7.5 Th-0635 Dimensions



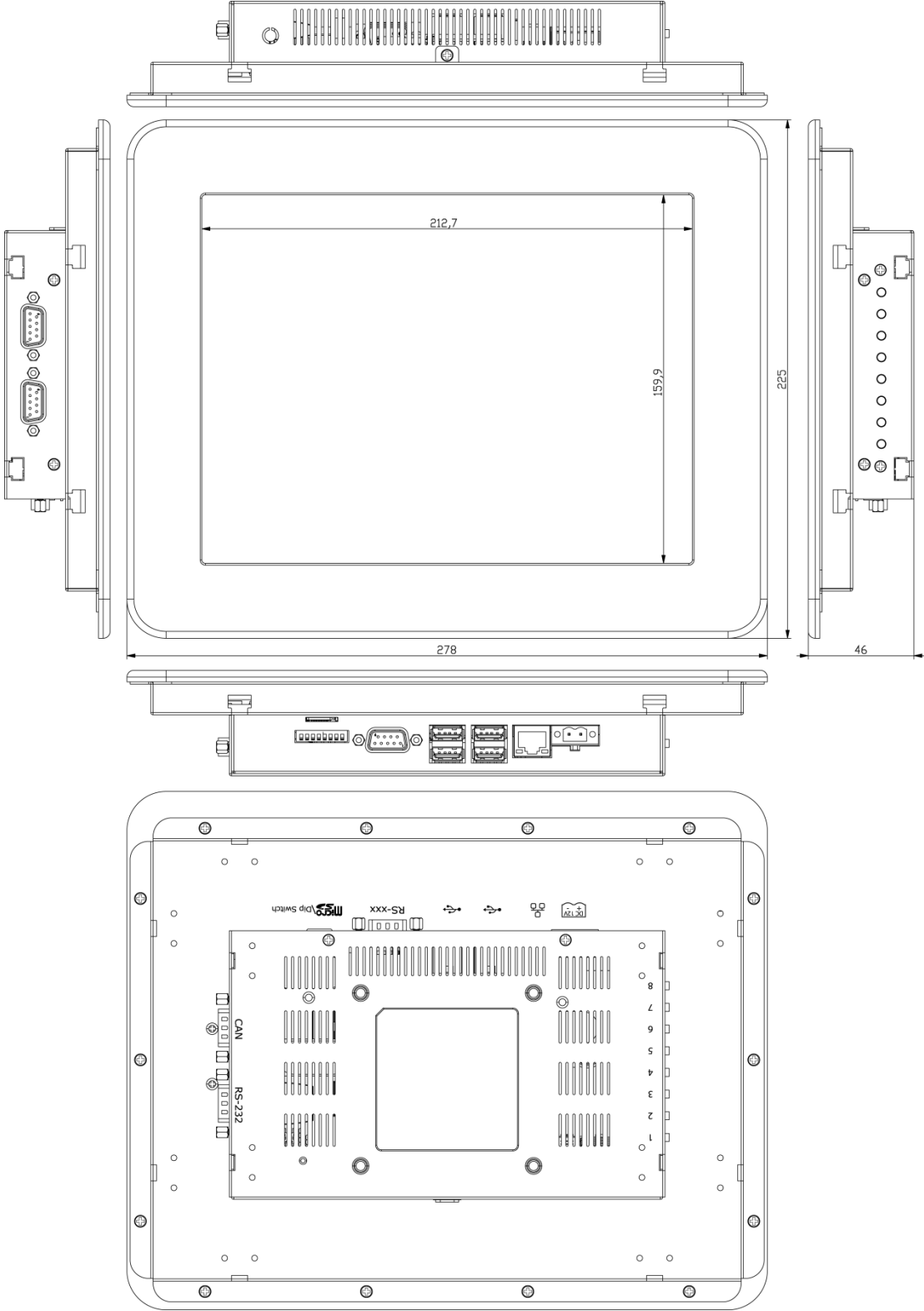
Note: The 6.5" HMI has a different construction than the other models.



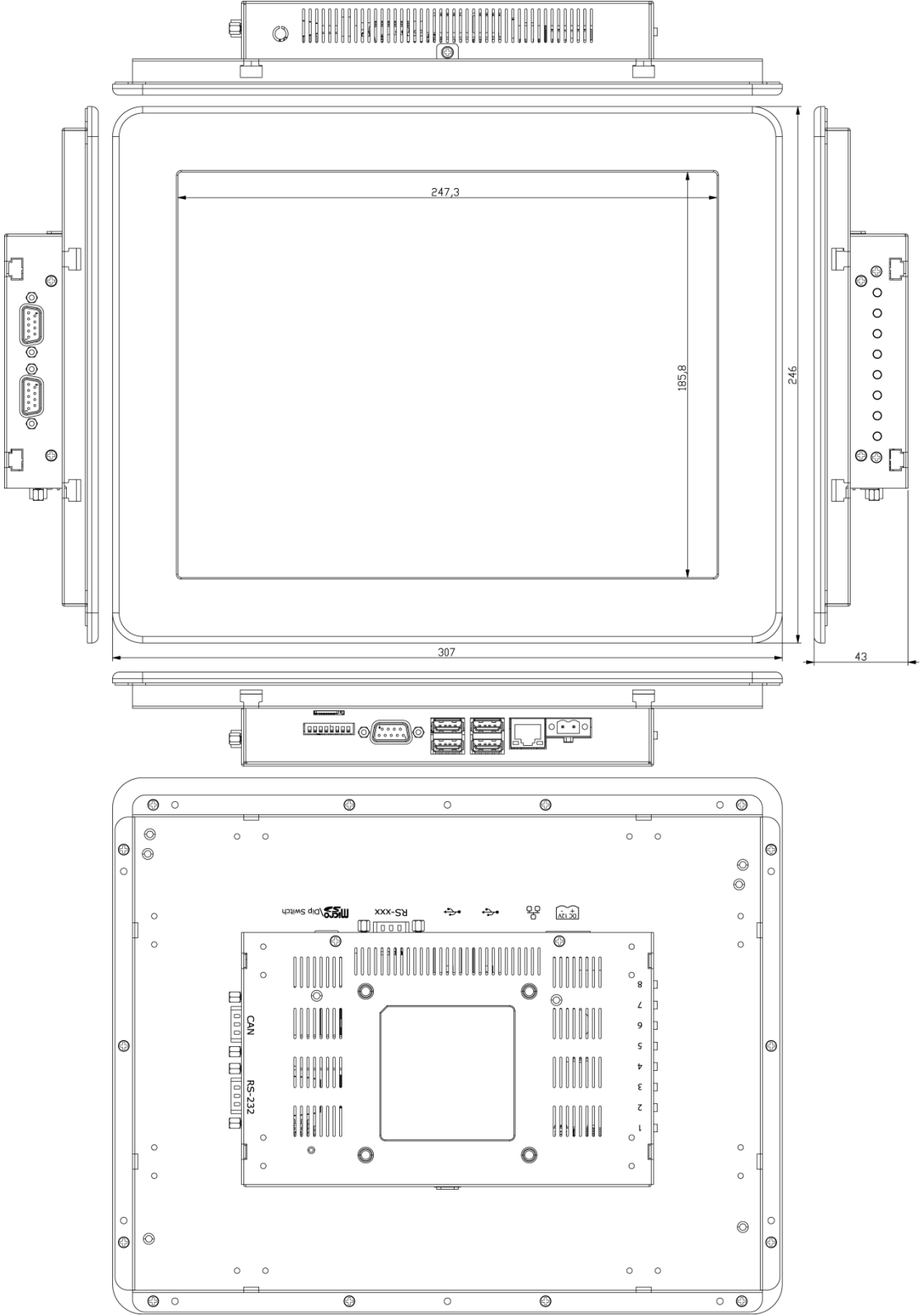
### 7.6 Th-0835 Dimensions



### 7.7 Th-1035 Dimensions



### 7.8 Th-1235 Dimensions





## 8 Downloads and drivers

Drivers and other download can be found at the TechNexion community webpage ([www.technexion.com/service-and-support/downloads](http://www.technexion.com/service-and-support/downloads))

**TechNexion** Putting Huge Things in Tiny Spaces

Home » Service and Support » Downloads

Share | Facebook | Twitter | LinkedIn | RSS

### TechNexion - Download Center

Folder: public

Sub-Folders:

- TI CPU Modules**  
Contains all files for:  
TAO-3530 + Inferno / Thunder / Tsunami  
TAM-3517 + Twister  
TDM-3730 + Blizzard
- HMI**  
Th Series : Th-0635, Th-0735W, Th-0835, Th-1035, Th-1035W, Th-1235, Th-1535
- Embedded Boards**  
Contains all drivers and documentation for:  
3.5" formfactor : TIM-3525  
DIN-A5 formfactor : TIM-5450, TIM-5510, TIM-5525, TIM-5780
- Fanless Systems**  
Contains all drivers and documentation for:  
Orca-2450, Orca-2510, Orca-2780
- Multimedia Touch Panel PC**  
Contains all drivers and documentation for:  
Tm-1500, Tm-1700

**Support**

- Downloads
- Warranty
- RMA Procedures

**Products**

**ARM CPU Modules**

- TI OMAP3530
- TAO-3530
- Inferno
- Thunder
- Tsunami
- TI Sitara AM3517
- TAM-3517
- Twister
- TI DM3730
- TDM-3730
- Blizzard
- TCM-500A

**HMI**

- Th-0435P Coming Soon
- Th-0535P Coming Soon
- Th-0735W
- Th-1035W
- Th-0635
- Th-0835
- Th-1035
- Th-1235
- Th-1535

**Touch Panel PC**

**AMD**

- Tm-1500
- Tm-1700

**Embedded Mainboards**

- TIM-3525
- TIM-5450
- TIM-5510
- TIM-5780

**Fanless Systems**

- Orca-2450
- Orca-2510
- Orca-2780

**Development Kits**

- Infernapack
- Thunderpack

Figure 16: Download center at TechNexion.com

## 9 Software - Android

### 9.1 Installing an Android éclair image in a Linux environment

This Chapter will explain how to install the Android OS on your board.

If you wish to install your HMI with Angstrom; then follow the instruction in the next [chapter](#).

#### 9.1.1 Step1 - Making a SD-card with the image on your computer

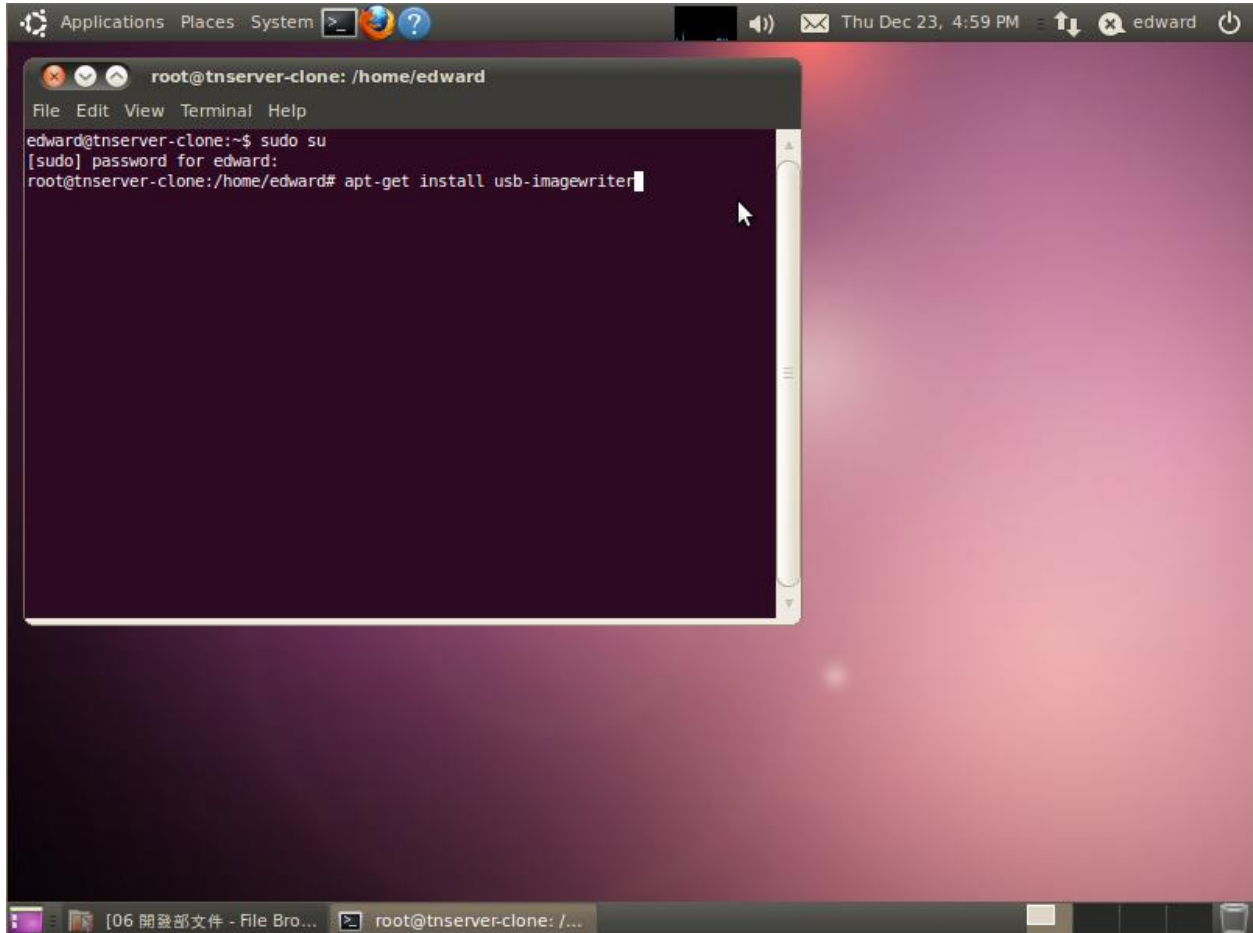


Figure 17: Download the image (tam3517-sd-android.img.bz2), decompress and install the image writer on your computer

(This Image writer can also be found at: <http://packages.ubuntu.com/lucid/usb-imagewriter> )

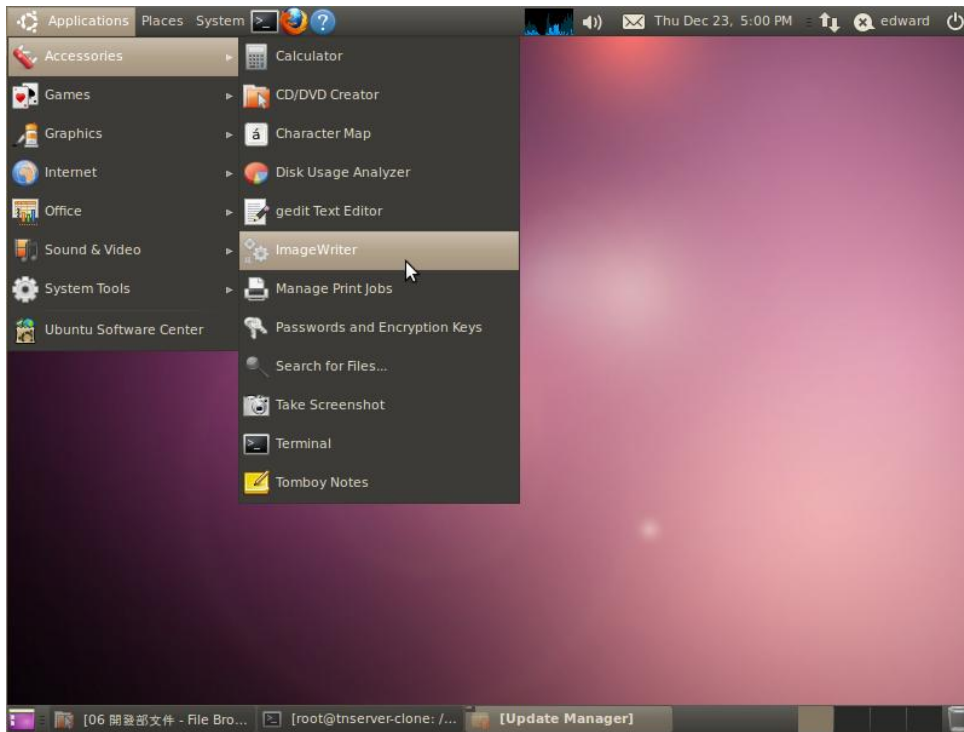


Figure 18: Start image writer



Figure 19: (plug the SD-card with an adapter into your computer). Select image and destination (SD-card), click write to device

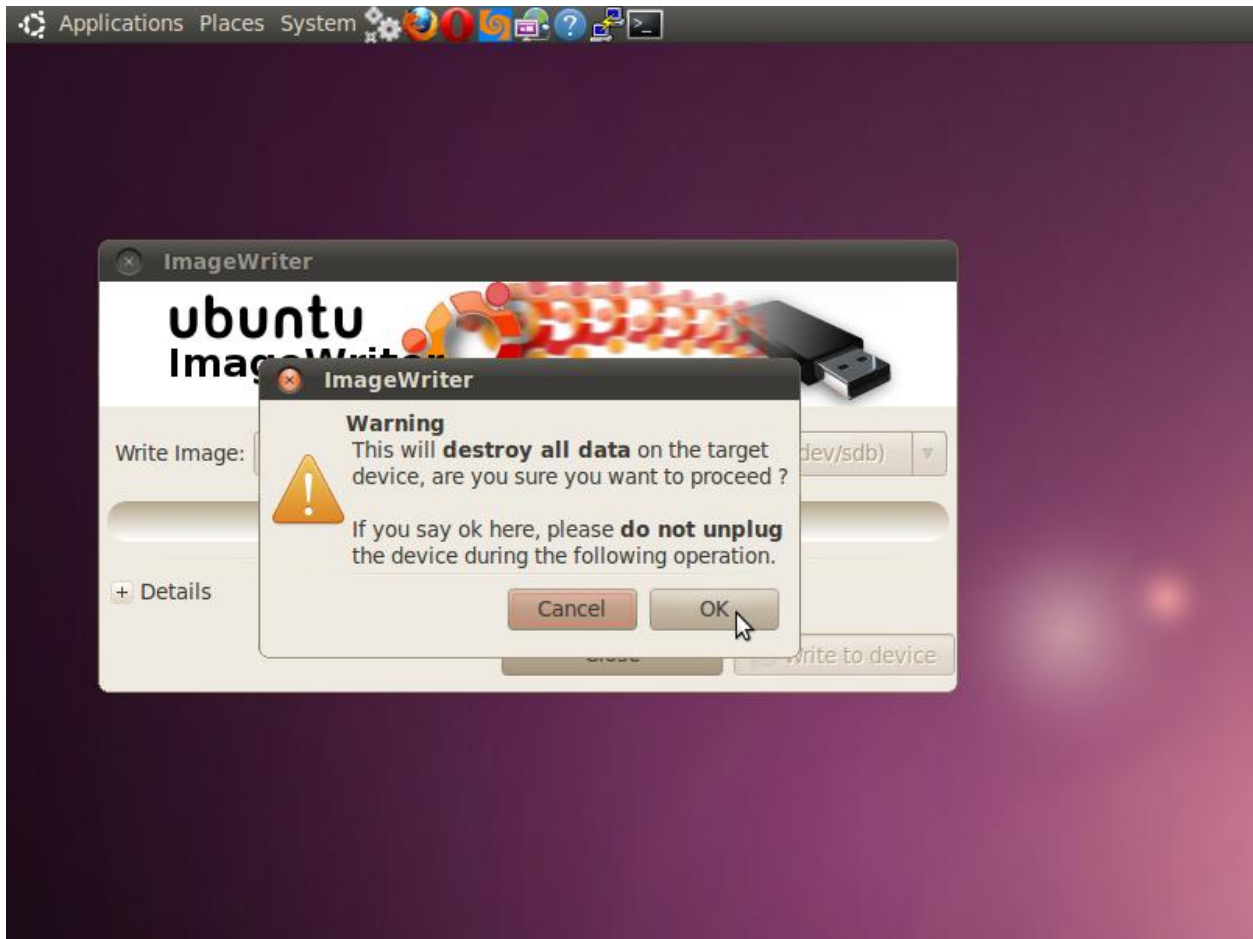


Figure 20: Confirm OK

### 9.1.2 Step 2 - Using the SD-card to install an image in the NAND Flash of your Board



**Warning!** This procedure will erase all the data that is present in the NAND Flash.



**Warning!** Be patient: The following procedure will take **5 minutes** to complete.



Set the dipswitch on your HMI (SW4) as follows:

<b>3</b>	<b>Operation:</b>
ON	Auto update

Put the SD-card in your HMI and plug in the power cable. LED2 on the TAM-3517 module will turn on and start to flash and after **5 minutes** will switch off, which means the software is installed.

**Take out the SD card, set the dipswitch 3 back to OFF** and then **reboot** again. It will now show Android.

## 9.2 Installing an Android éclair image in a Windows environment

This Chapter will explain how to install the Android OS on your board.

If you wish to install your HMI with Angstrom; then follow the instruction in the next [chapter](#).

### 9.2.1 Step1 - Making a SD-card with the image on your computer

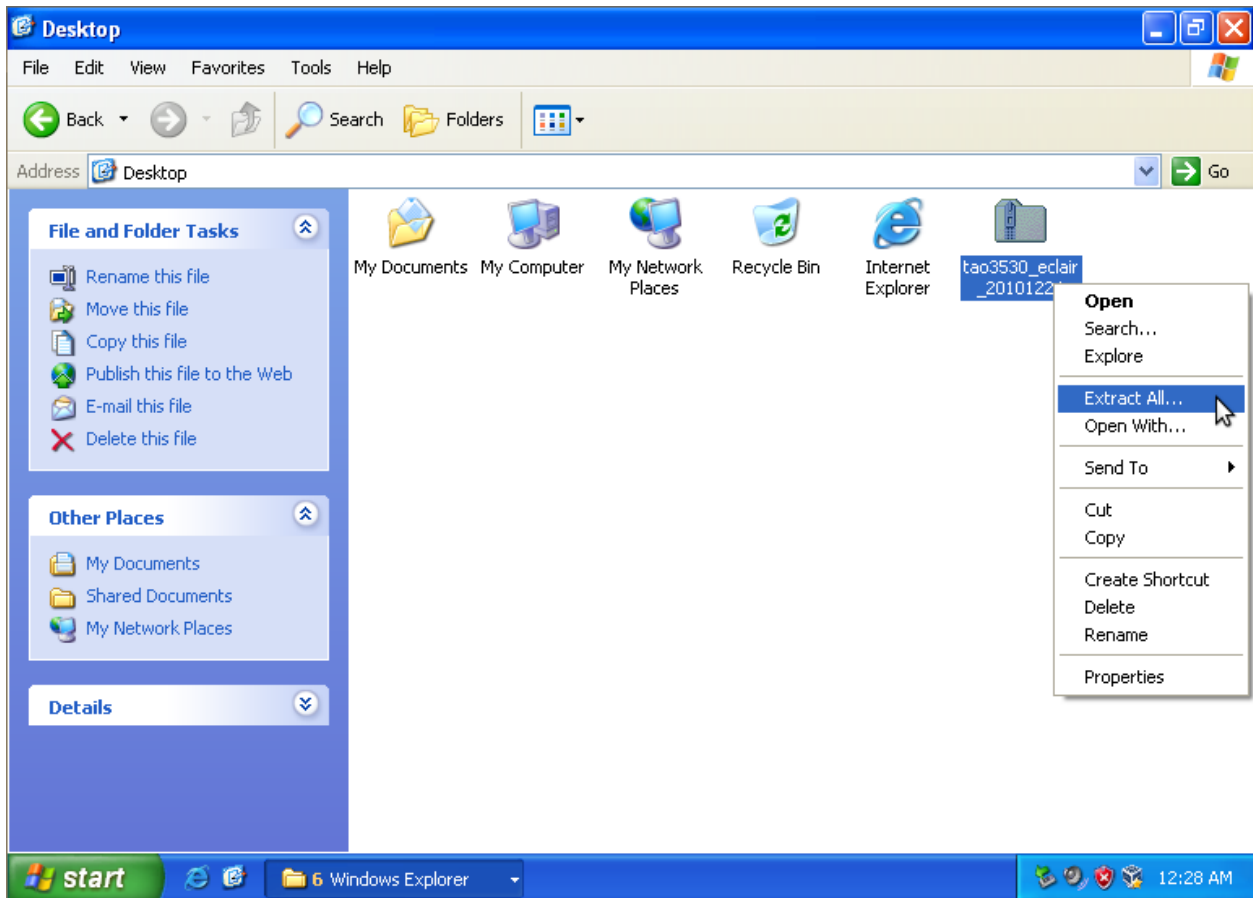
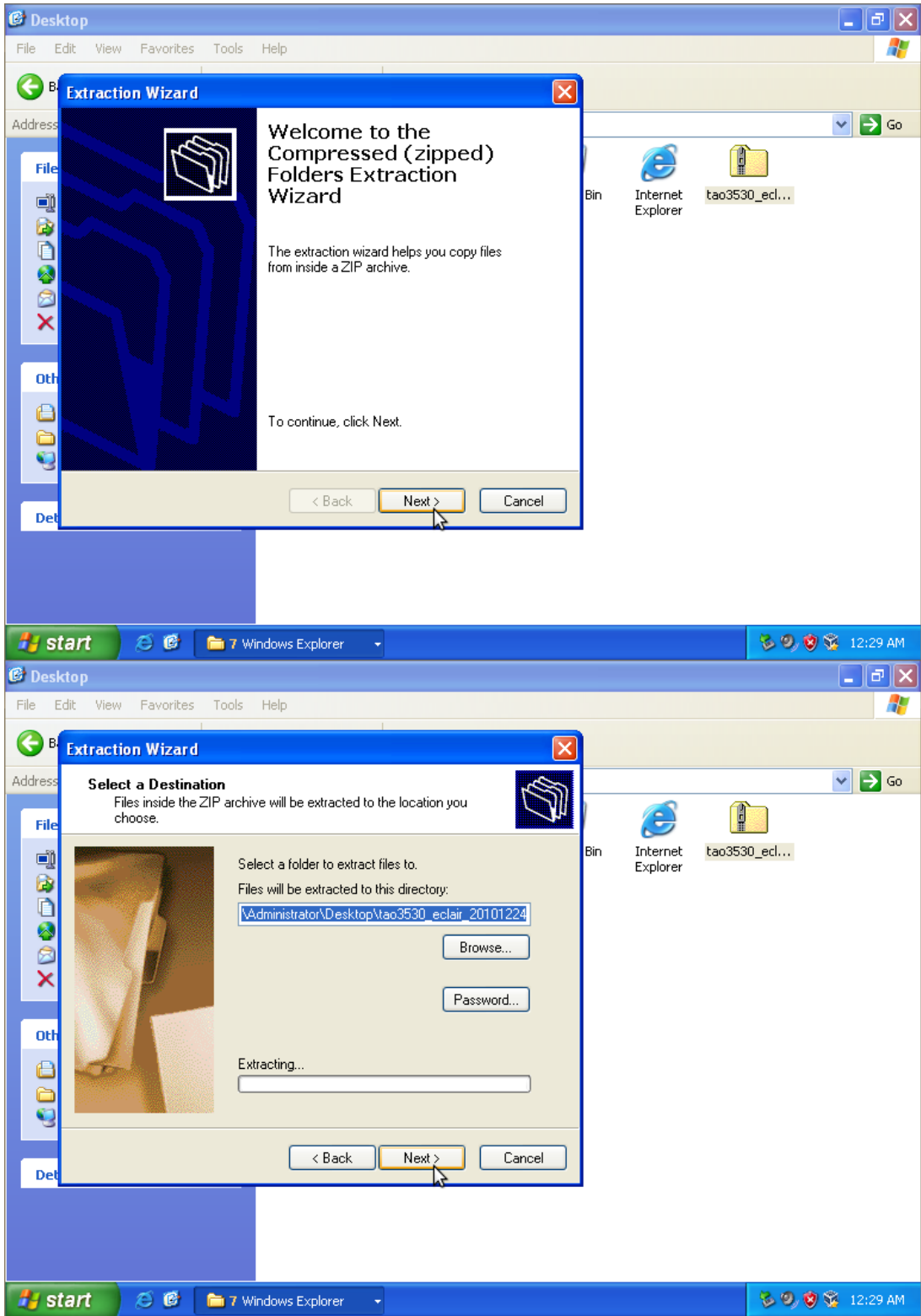


Figure 21: Download the image (tam3517-sd-android.img.bz2) and extract it on your computer



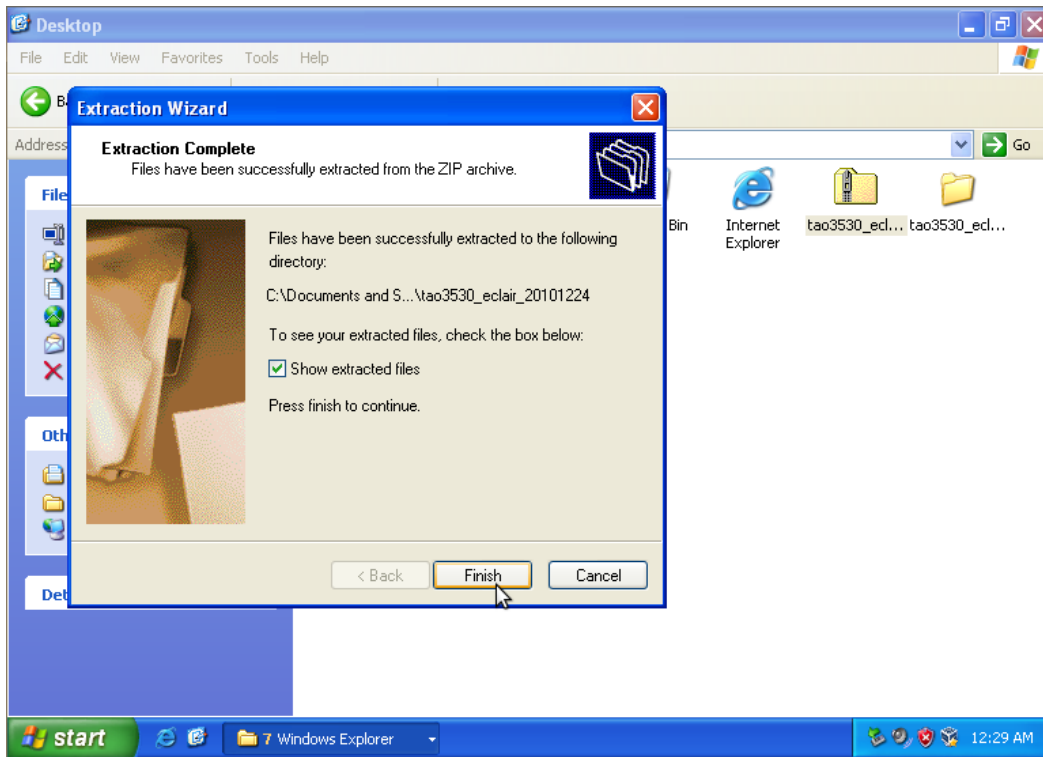


Figure 22-24: After extraction, click finish

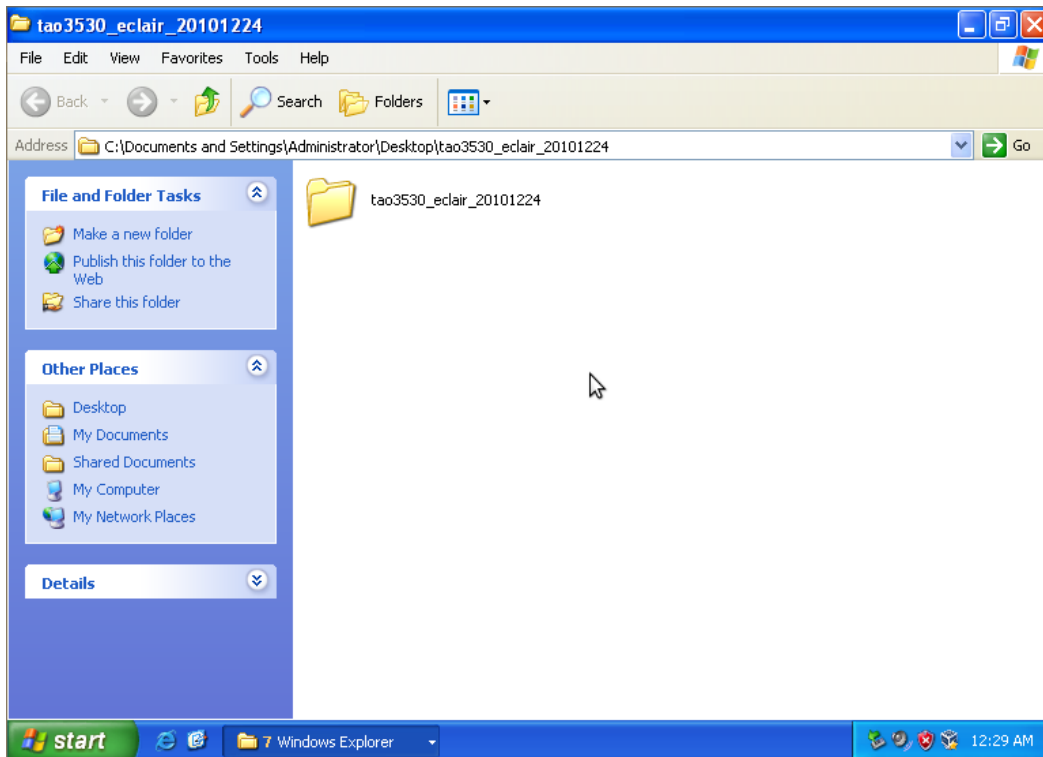


Figure 25: Browse to the folder on your computer

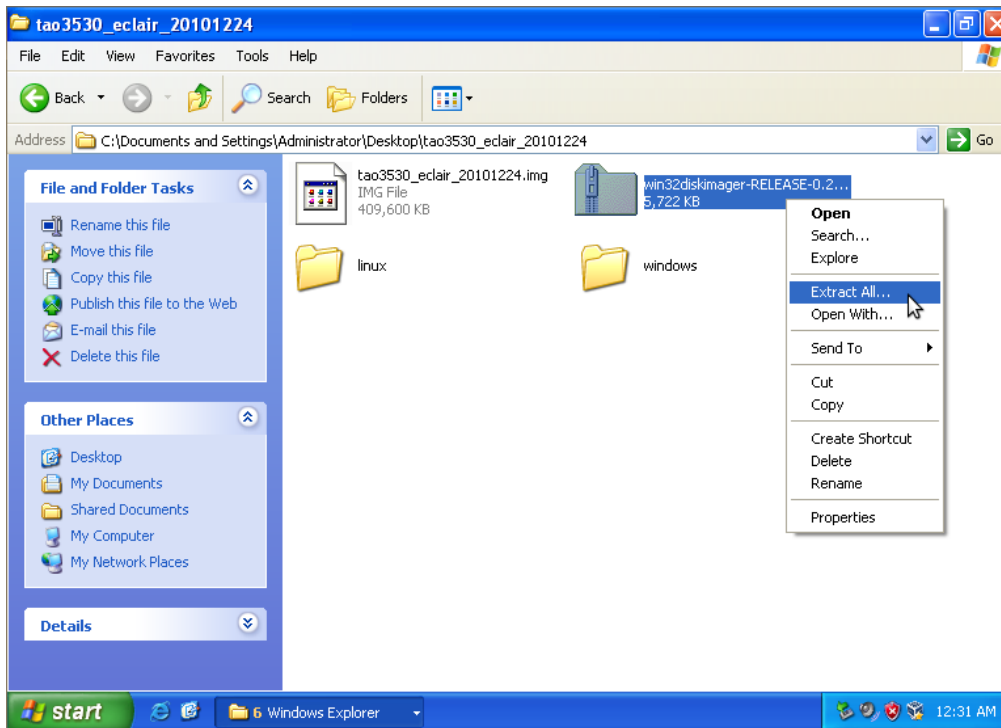


Figure 26: Extract the disk imager folder

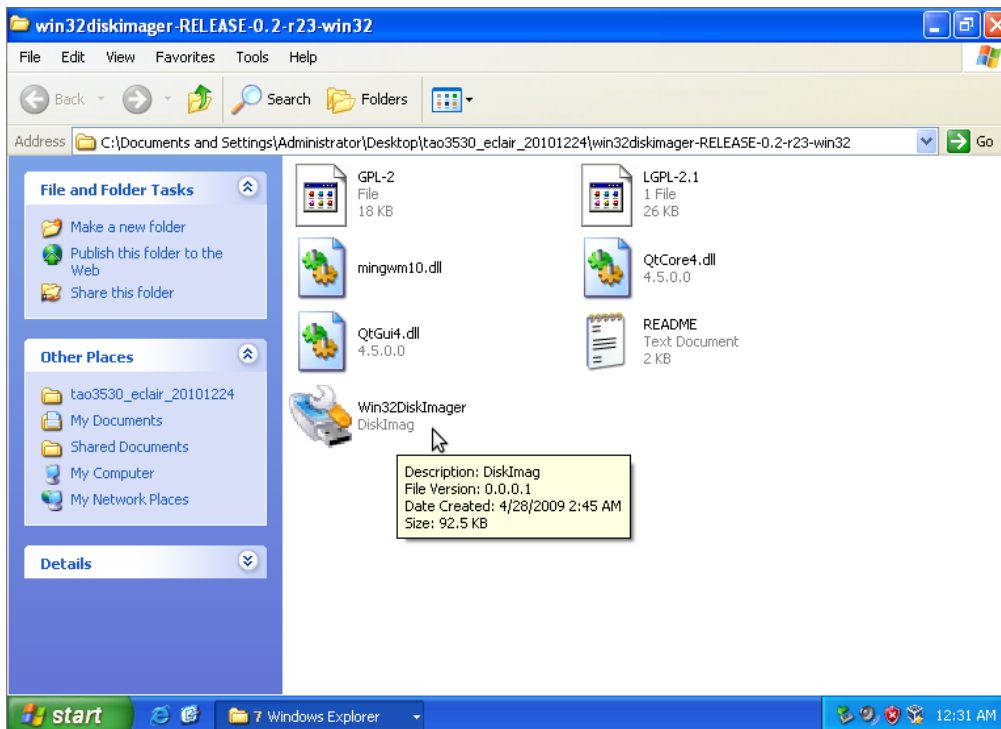


Figure 27: Run the disk imager (this disk imager can also be found at: <https://launchpad.net/win32-image-writer/+download> )

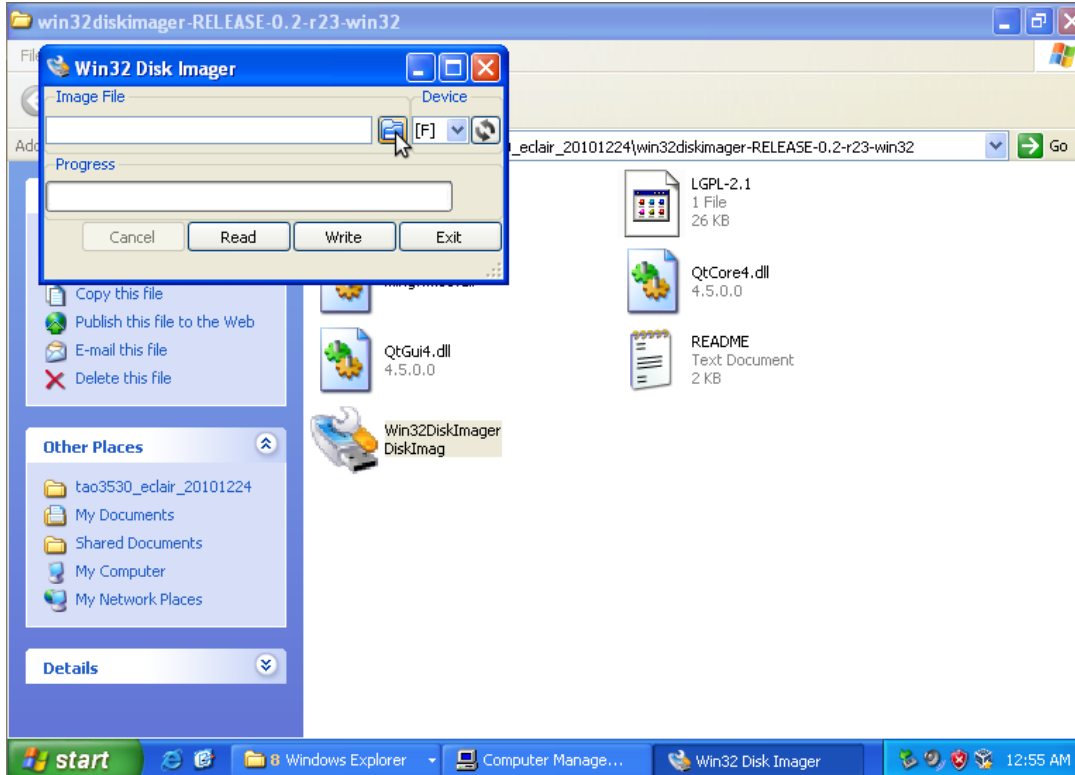
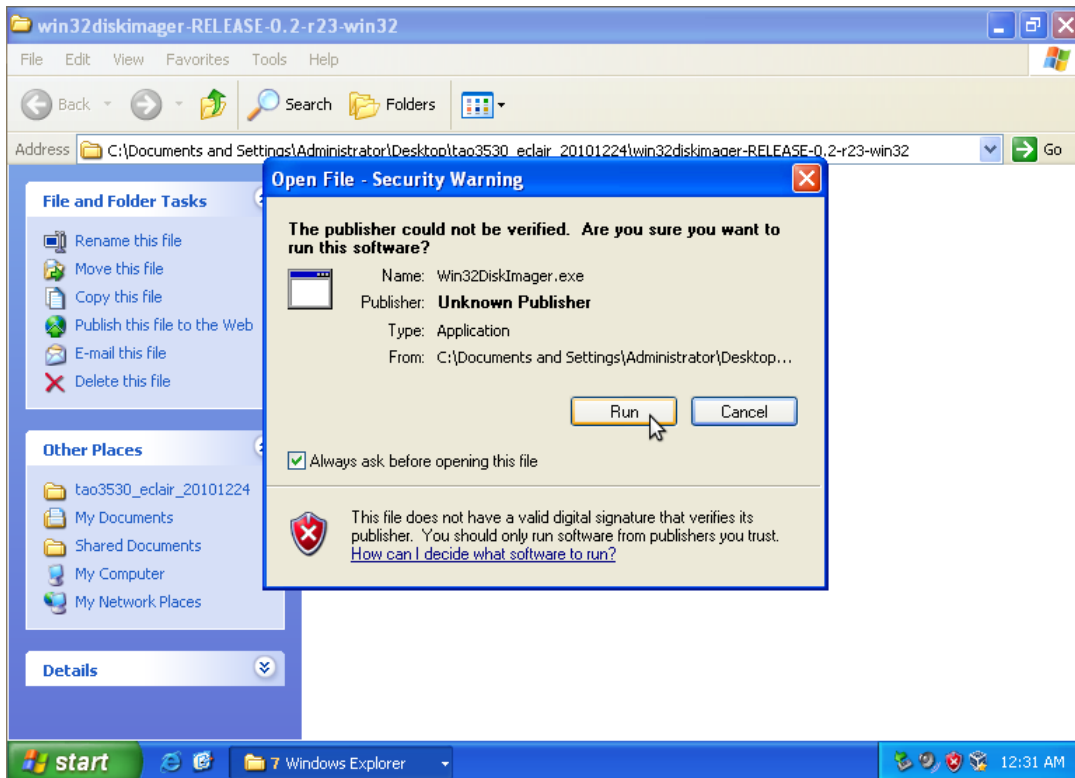


Figure 28-29: Select the SD-card as device

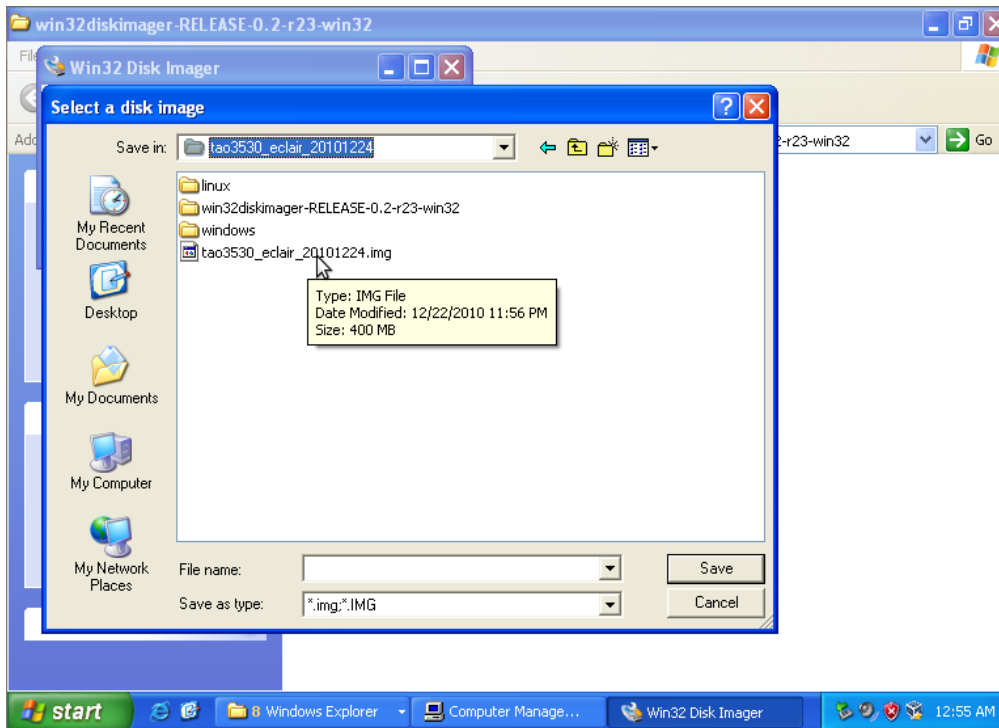


Figure 30: Browse to the image file

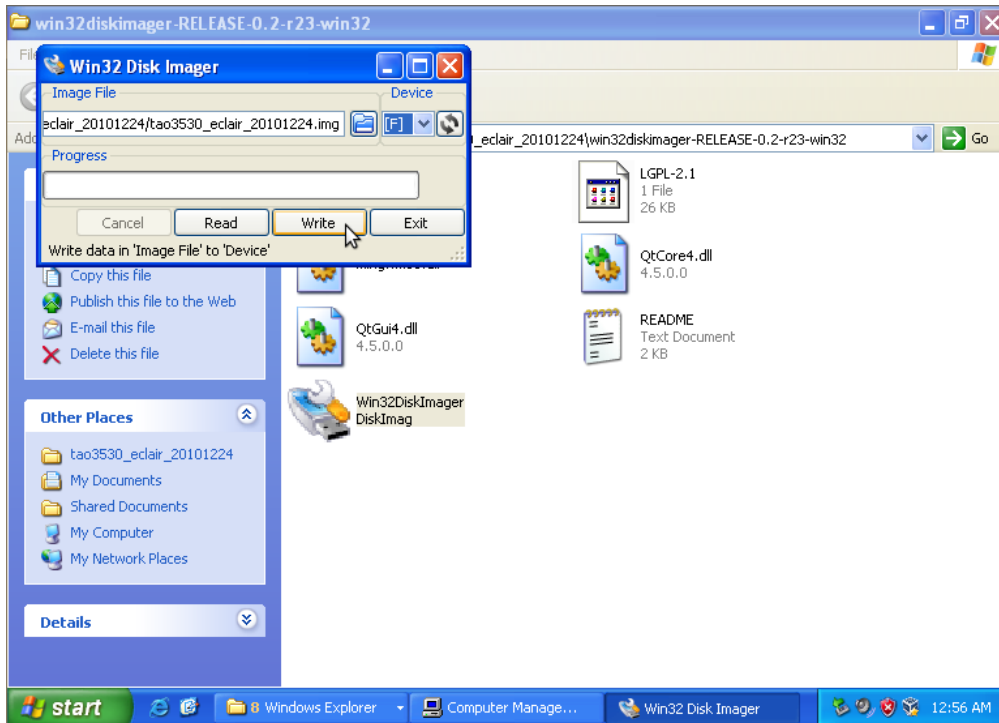


Figure 31: (plug the SD-card with an adapter into your computer). Click write to write the image to your SD-card

## 9.2.2 Step 2 - Using the SD-card to install an image in the NAND Flash of your board



**Warning!** This procedure will erase all the data that is present in the NAND Flash.



**Warning!** Be patient: The following procedure will take **5 minutes** to complete.

Set the dipswitch on your HMI (SW4) as follows:

<b>3</b>	<b>Operation:</b>
ON	Auto update

Put the SD-card in your HMI and plug in the power cable. LED2 on the TAM-3517 module will turn on and start to flash and after **5 minutes** will switch off, which means the software is installed.

**Take out the SD card, set the dipswitch 3 back to OFF** and then **reboot** again. It will now show Android.



### 9.3 Booting from the SD-card

One can also directly boot from the SD-card that was made in the previous paragraphs.

- Insert the SD-card
- Switch on the power to the power cable or reboot
- It will now boot from the SD-card with the operating system of your choice.

## 10 Software – Angstrom (Linux)

### 10.1 Installing an Angstrom (Linux) image in a Linux environment

This Chapter will explain how to install the Angstrom OS on your HMI.

If you wish to install your HMI with Android; then follow the instruction in the previous [chapter](#).

#### 10.1.1 Step1 - Making a SD-card with the image on your computer

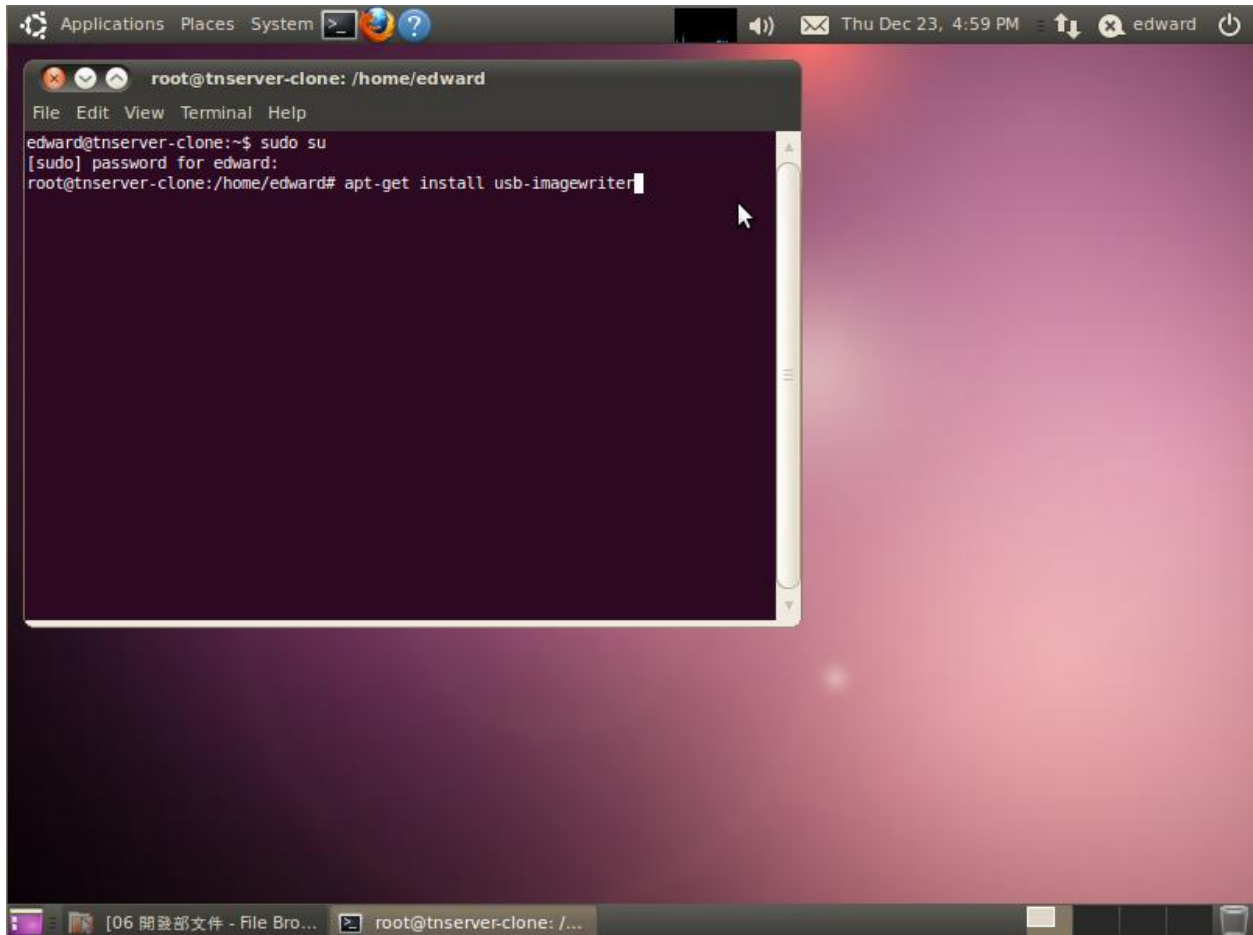


Figure 32: Download the image (tam3517-sd-angstrom.img.bz2) decompress it and install the image writer on your computer

(This Image writer can also be found at: <http://packages.ubuntu.com/lucid/usb-imagewriter> )

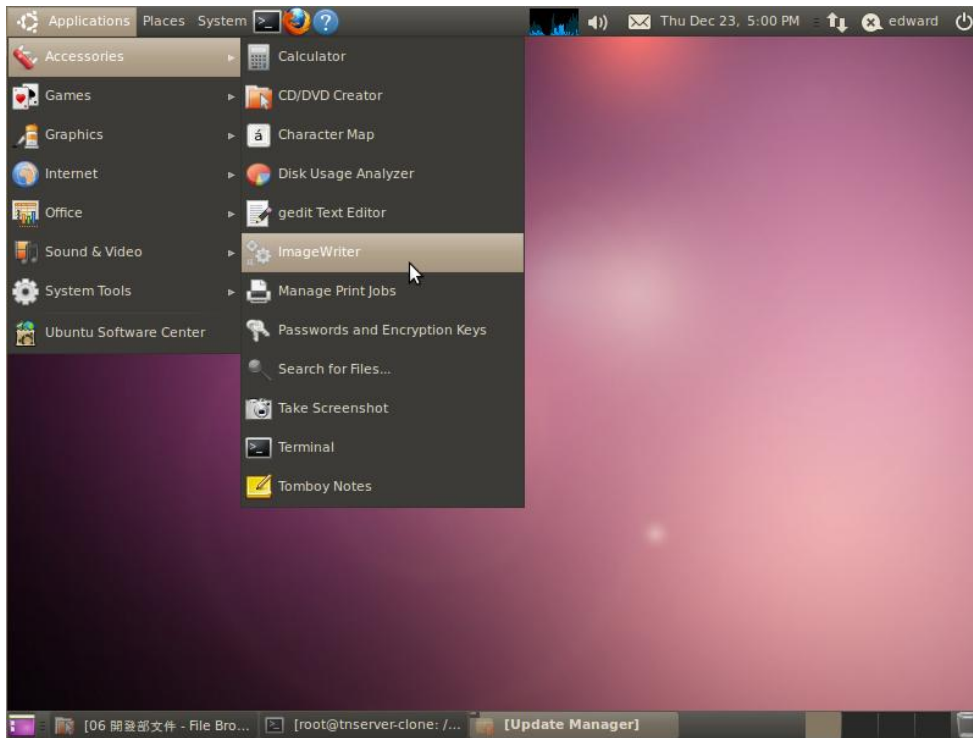


Figure 33: Start image writer



Figure 34: (plug the SD-card with an adapter into your computer). Select image and destination (SD-card), click write to device

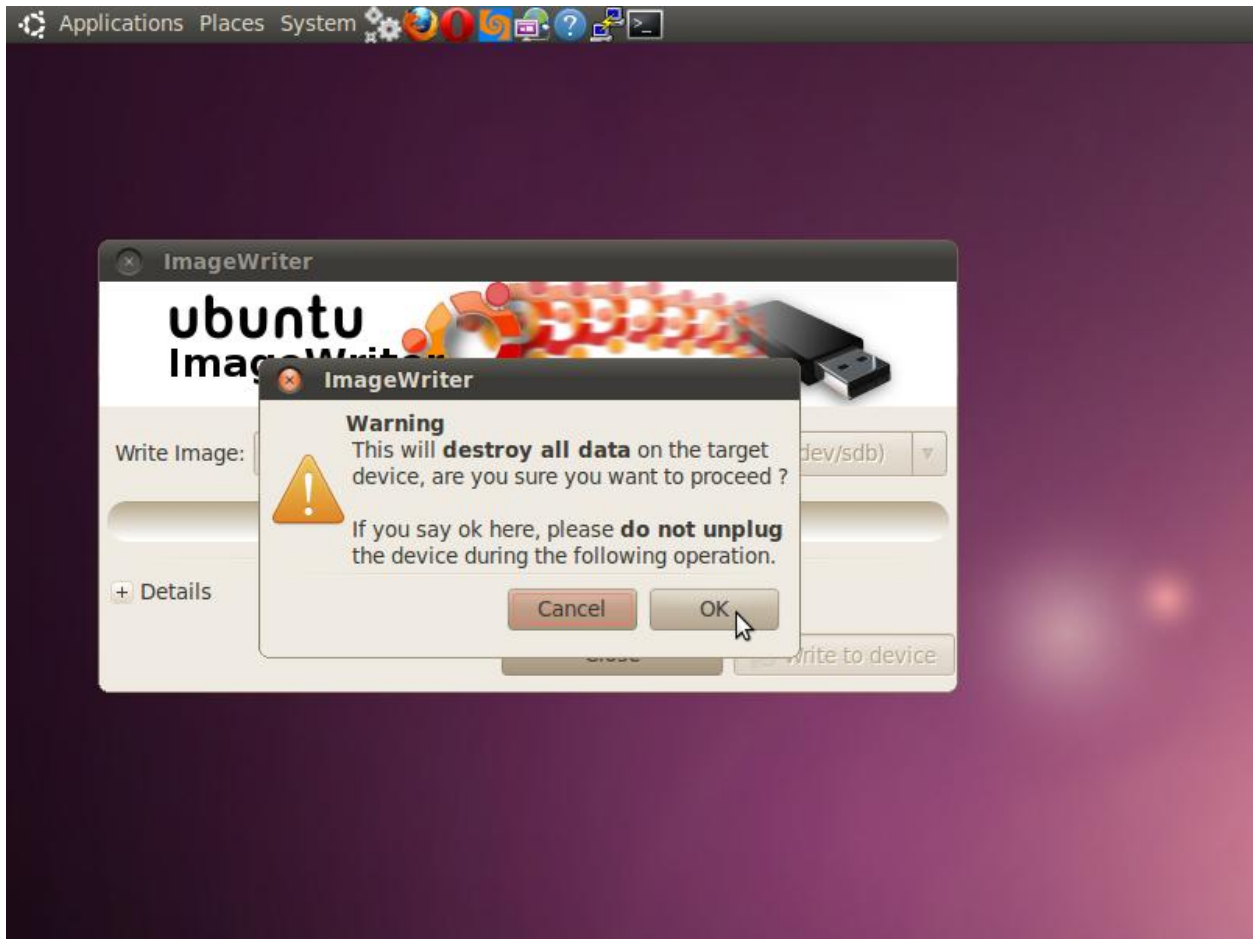


Figure 35: Confirm OK

### 10.1.2 Step 2 - Using the SD-card to install an image in the NAND Flash of your board



**Warning!** This procedure will erase all the data that is present in the NAND Flash.



**Warning!** Be patient: The following procedure will take **5 minutes** to complete.

Set the dipswitch (SW4) on your HMI as follows:

<b>3</b>	<b>Operation:</b>
ON	Auto update

Put the SD-card in your HMI and plug in the power cable. LED2 on the TAM-3517 module will turn on and start to flash and after **5 minutes** will switch off, which means the software is installed.

**Take out the SD card, set the dipswitch 3 back to OFF** and then **reboot** again. It will now show Angstrom Linux.

## 10.2 Installing an Angstrom (Linux) image in a Windows environment

This Chapter will explain how to install the Angstrom OS on your HMI.

If you wish to install your HMI with Android; then follow the instruction in the previous [chapter](#).

### 10.2.1 Step1 - Making a SD-card with the image on your computer

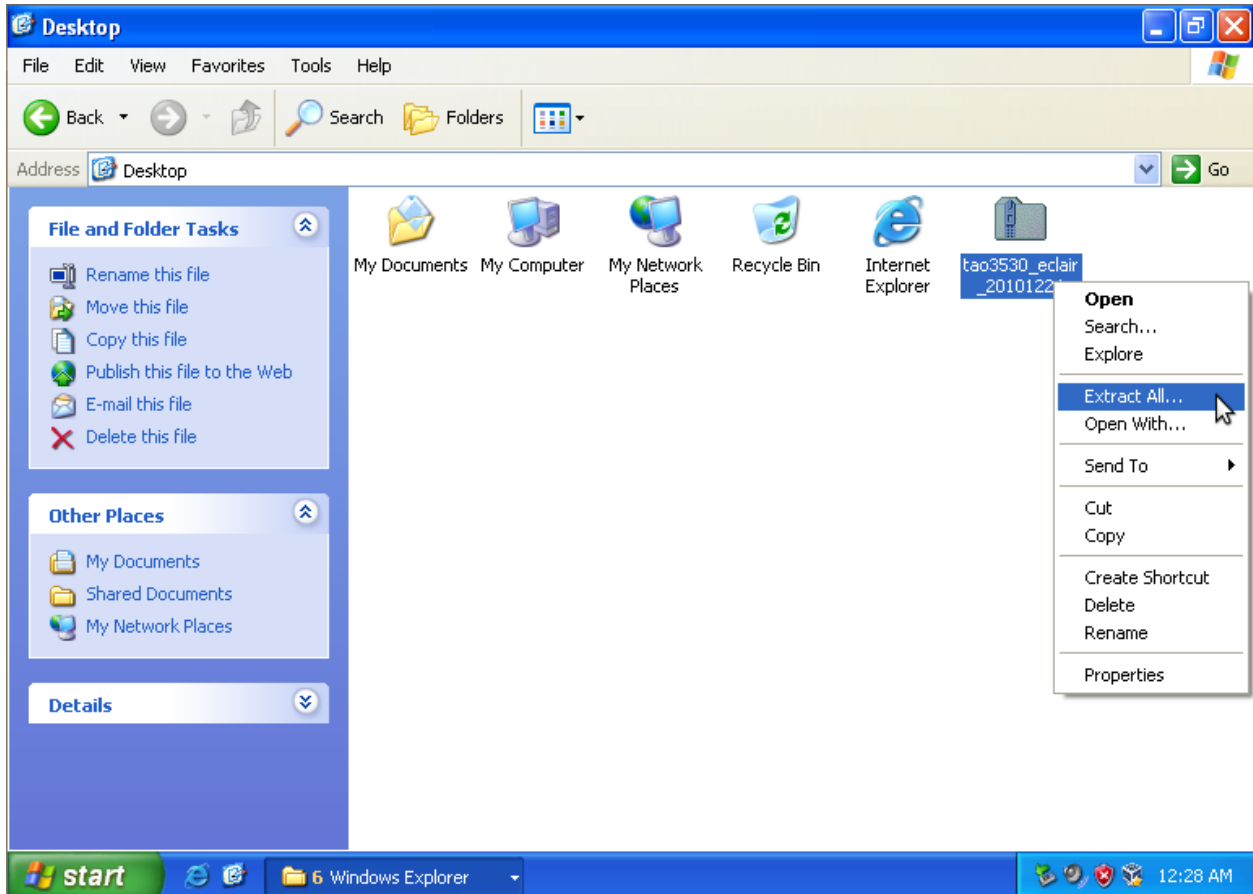
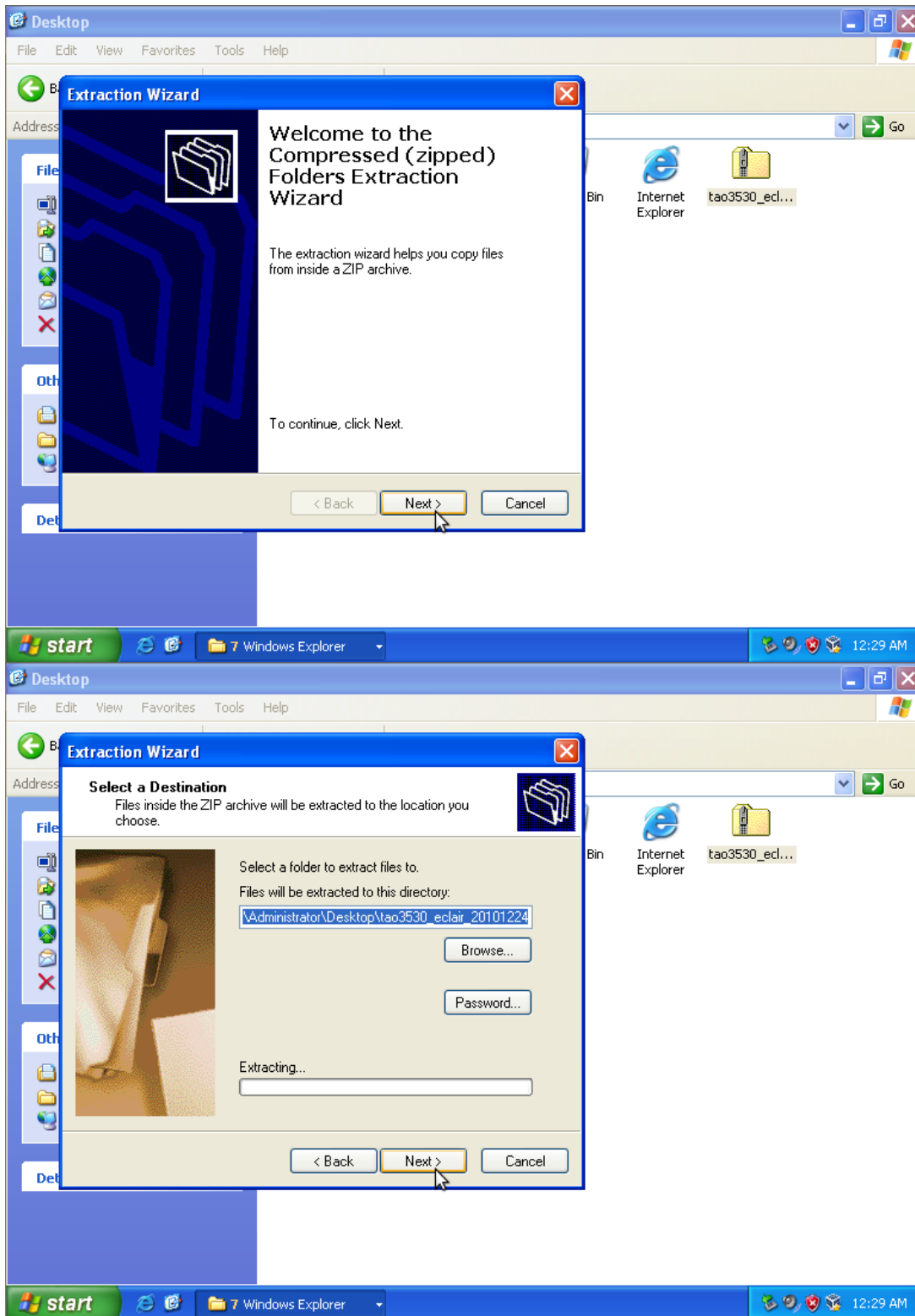


Figure 36: Download the image (tam3517-sd-angstrom.img.bz2) and extract it on your computer



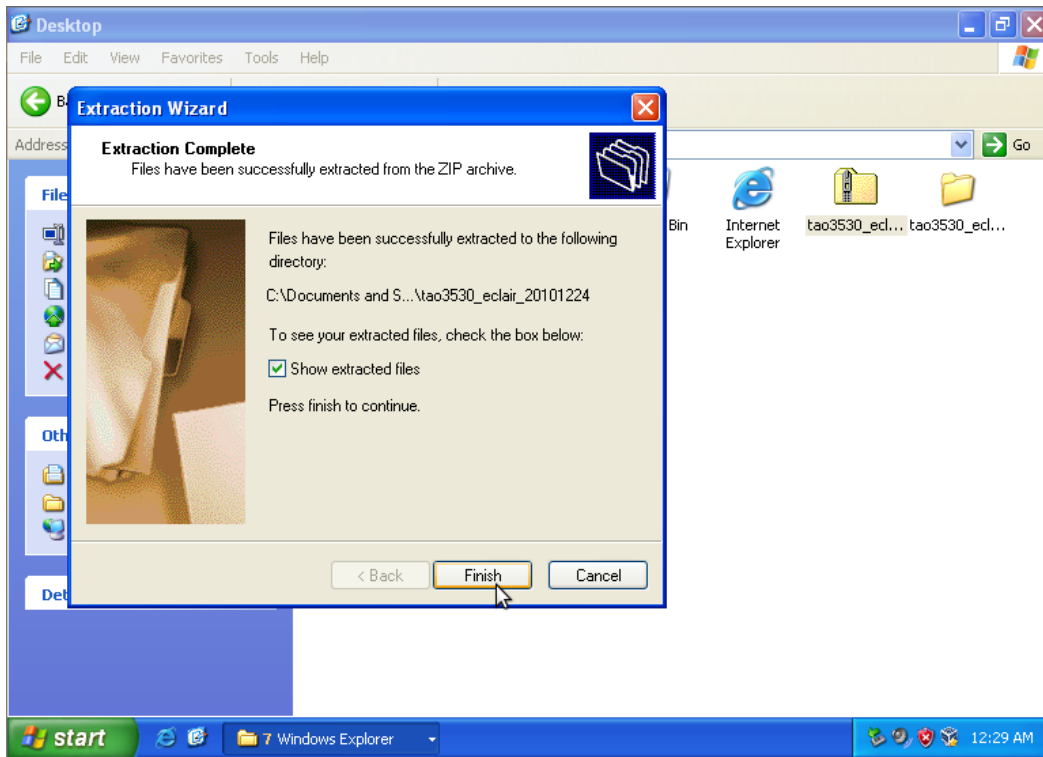


Figure 37-39: After extraction, click finish

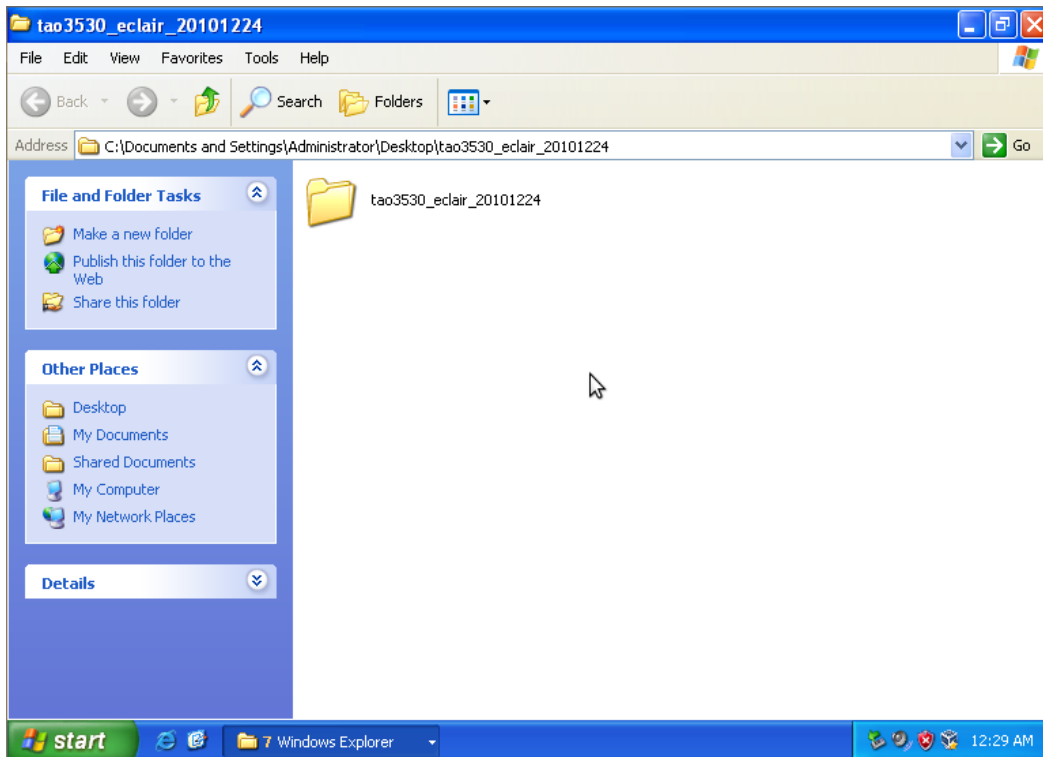


Figure 40: Browse to the folder on your computer



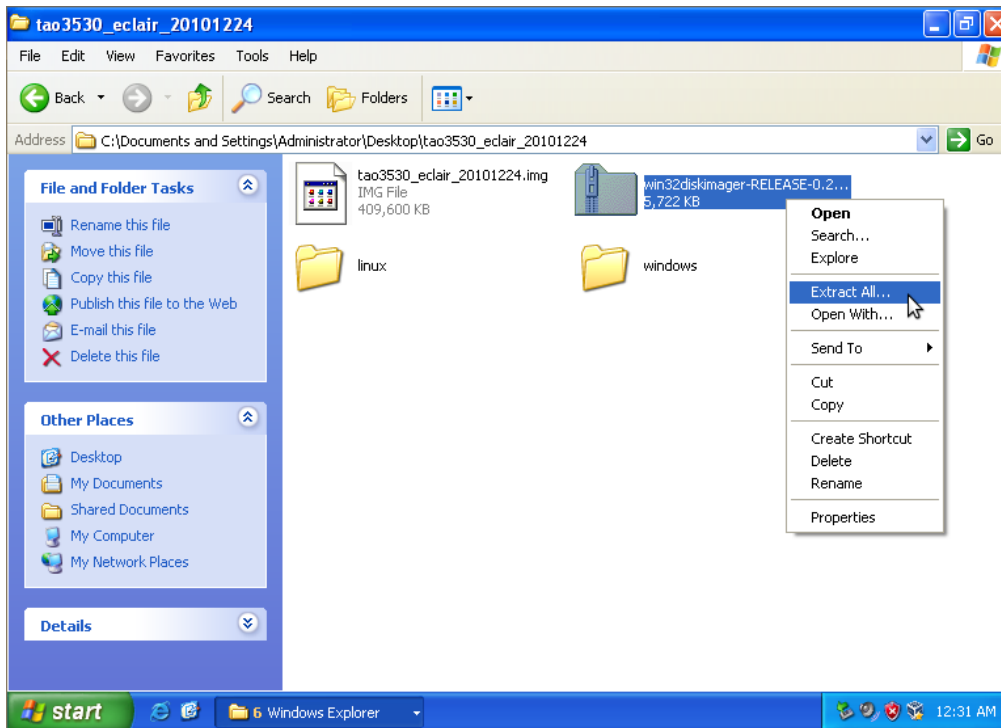
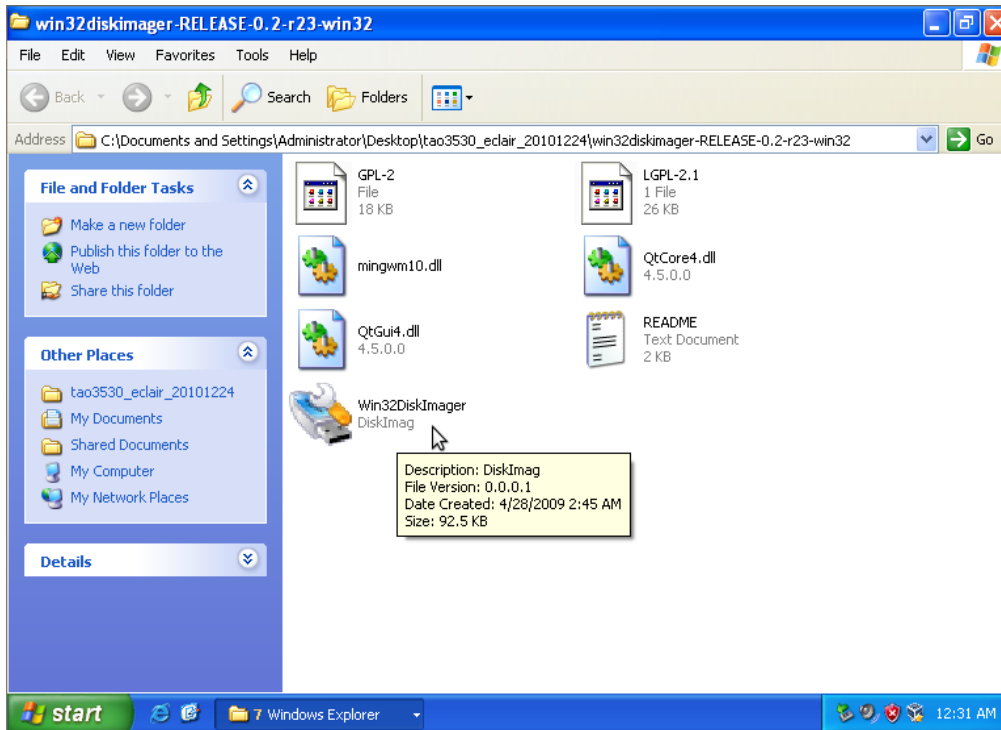


Figure 41: Extract the disk imager folder

Figure 42: Run the disk imager (this disk imager can also be found at: <https://launchpad.net/win32-image-writer/+download> )

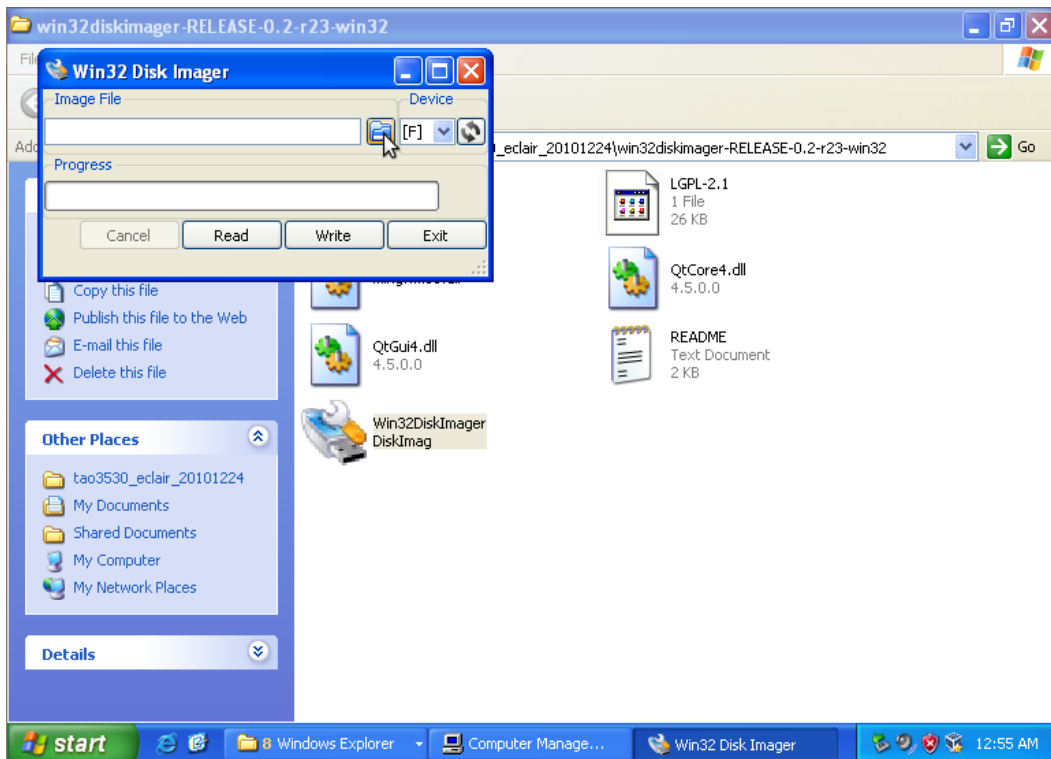
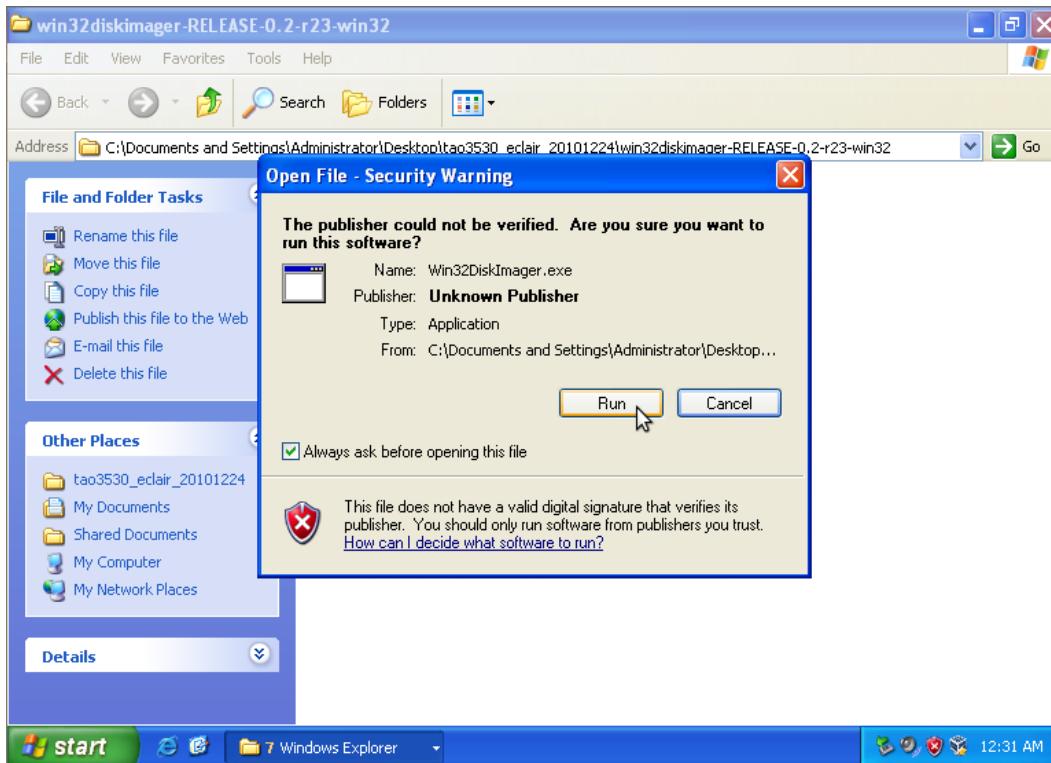


Figure 43-44: (plug the SD-card with an adapter into your computer). Select the SD-card as device

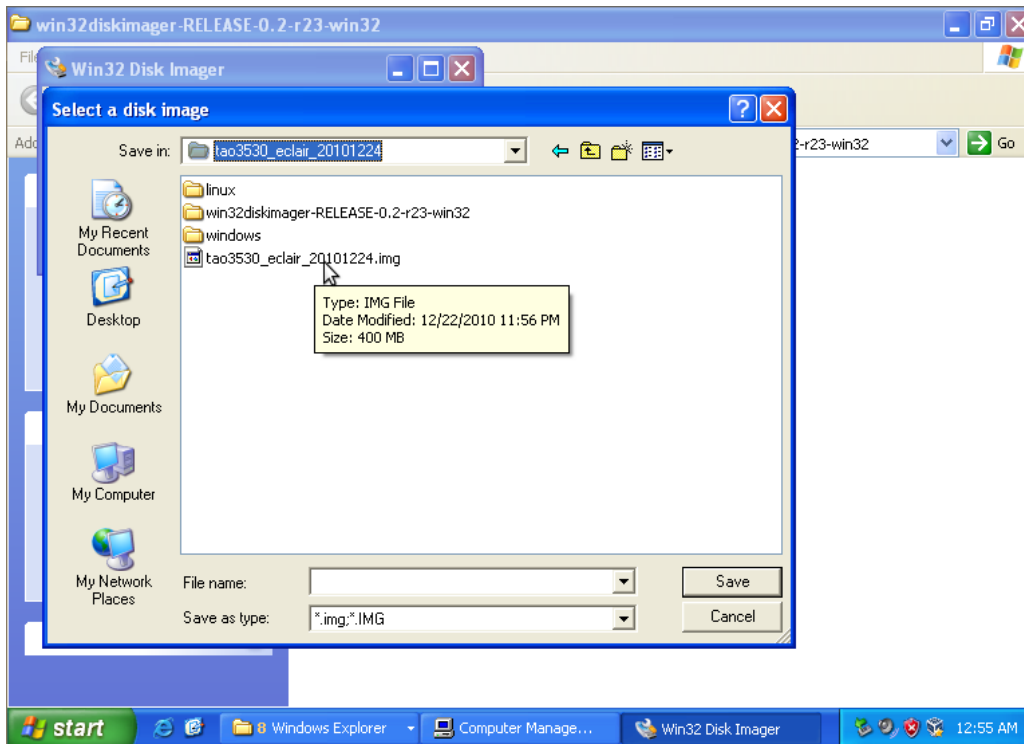


Figure 45: Browse to the image file

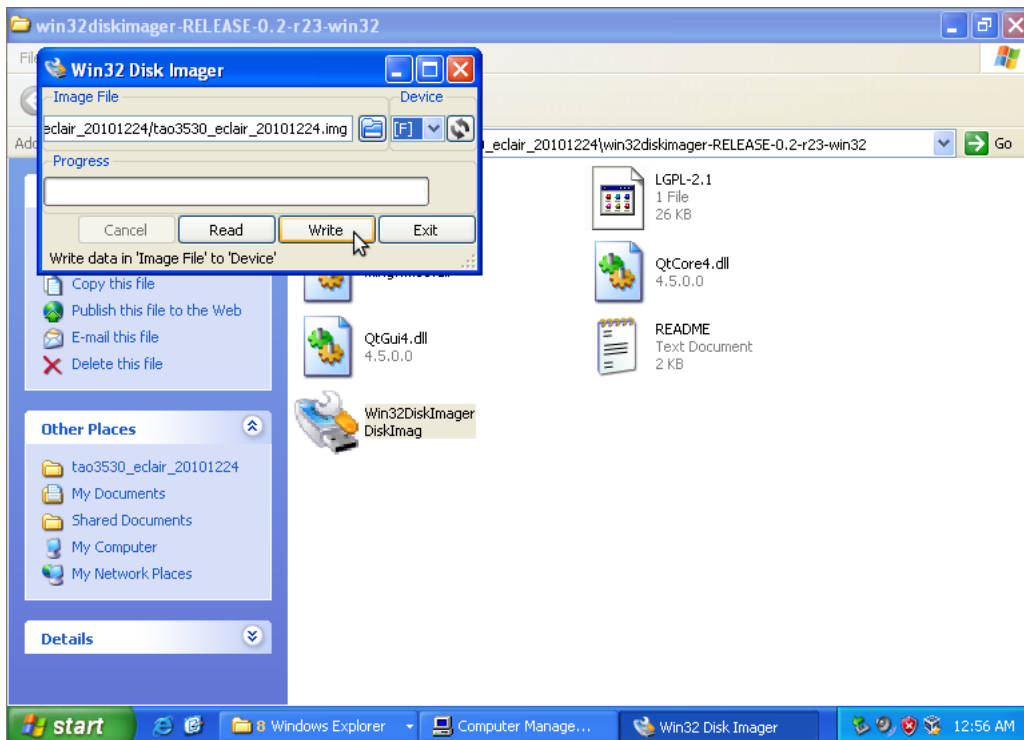


Figure 46: Click write to write the image to your SD-card

### 10.2.2 Step 2 - Using the SD-card to install an image in the NAND Flash of your board



**Warning!** This procedure will erase all the data that is present in the NAND Flash.



**Warning!** Be patient: The following procedure will take **5 minutes** to complete.

Set the dipswitch on your HMI (SW4) as follows:

<b>3</b>	<b>Operation:</b>
ON	Auto update

Put the SD-card in your HMI and plug in the power cable. LED2 on the TAM-3517 module will turn on and start to flash and after **5 minutes** will switch off, which means the software is installed.

**Take out the SD card, set the dipswitch 3 back to OFF** and then **reboot** again. It will now show Angstrom Linux.

### 10.3 Booting from the SD-card

One can also directly boot from the SD-card that was made in the previous paragraphs.

- Insert the SD-card
- Switch on the power to the power cable or reboot
- It will now boot from the SD-card with the operating system of your choice.

## 11 Software – Windows CE

### 11.1 Warning



**Warning!** To install Windows CE, you will need to open the back cover: This will void the warranty on the product.



**Warning!** Installing software is not easy. Finish the procedure completely and be patient to let the compilation and installation finish.



**Important!** To install Windows CE, you need a null modem to see what is going on.

### 11.2 Connecting a null-modem cable

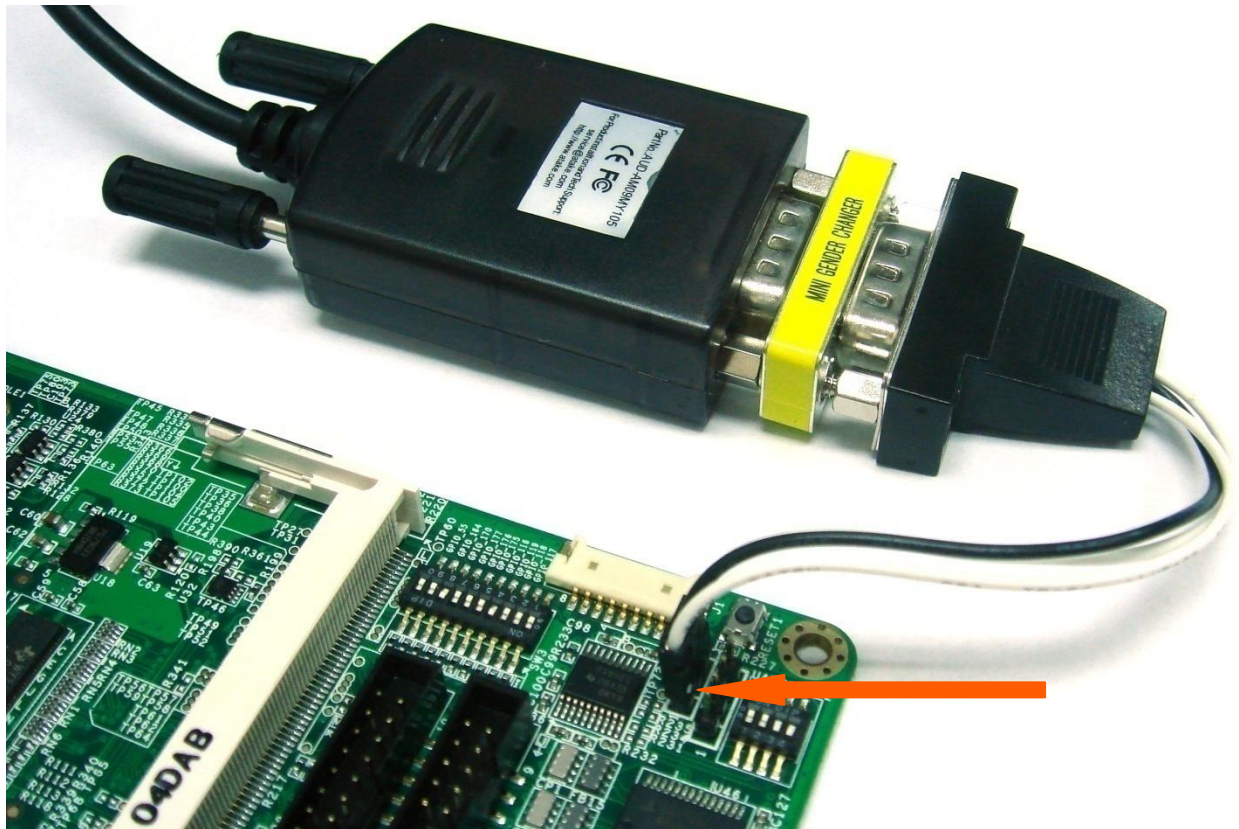


Figure 47: The null modem (to USB) connected to the UART1 connector (see arrow for position of the white dot)

- Start PuTTY on your computer and make sure the “Options controlling local serial lines” are as in figure 48:

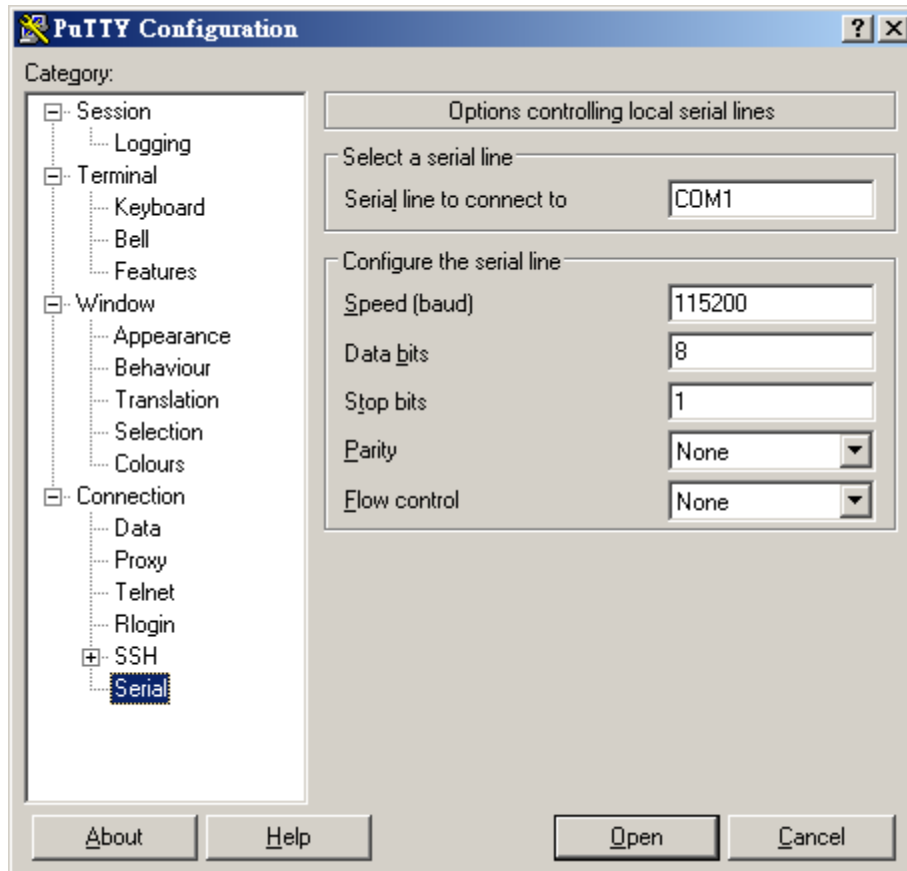


Figure 48: Settings

- Go to Session and check if “specify the destination you want to connect to “ is on Serial (See figure 49)
- Push open and a window will pop up (see figure 50)

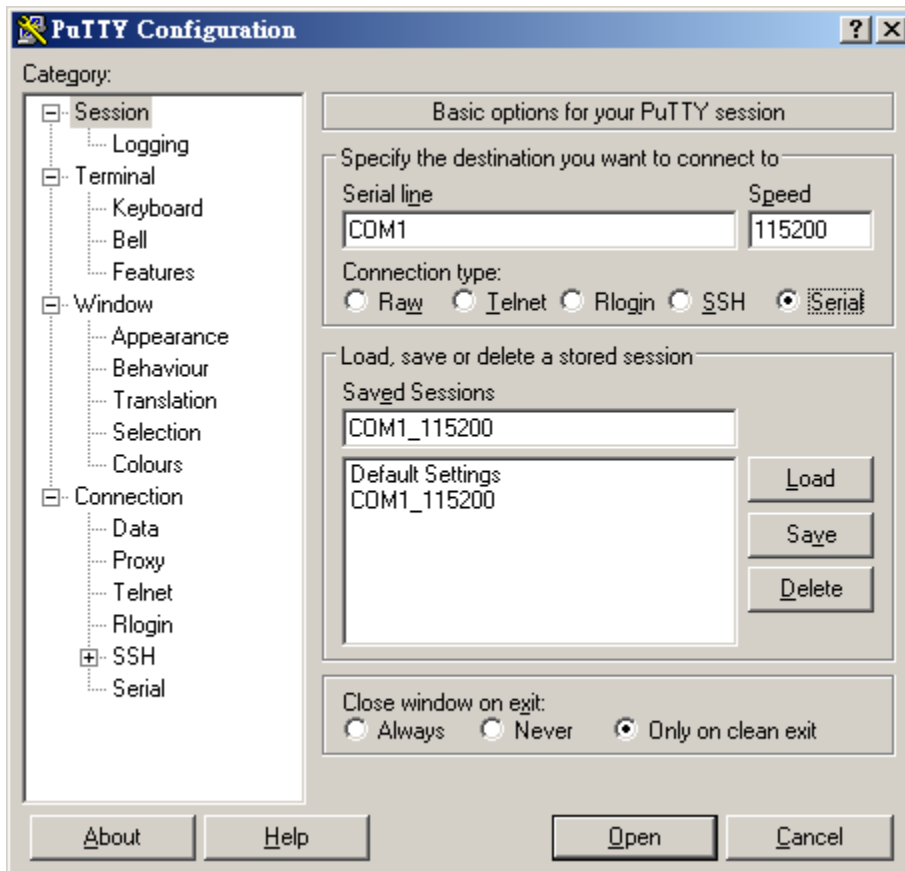


Figure 49: check if serial is selected and then select open

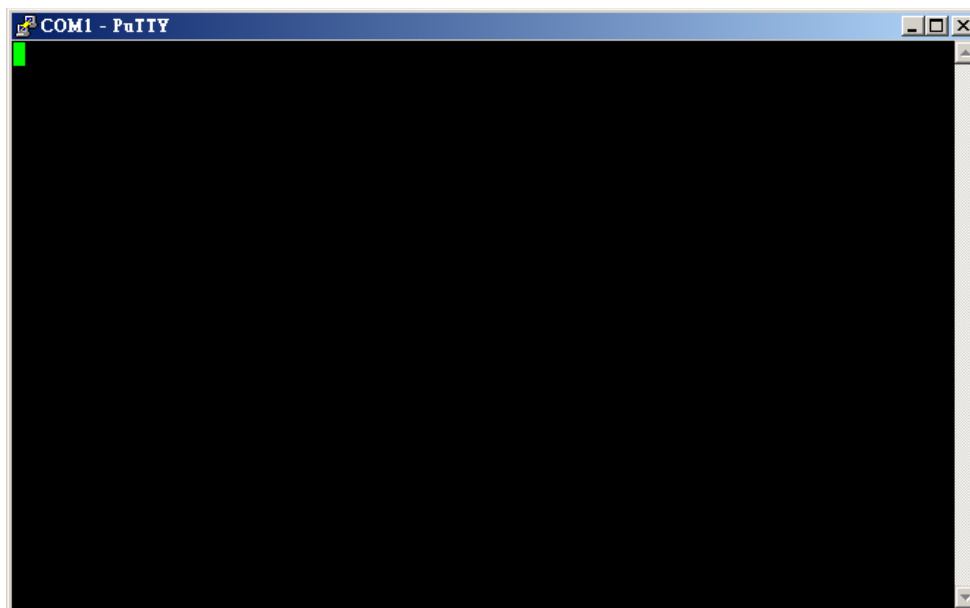


Figure 50: PuTTY terminal window



- You will now be able to see what is going on during the installation.
- If nothing happens then please check the settings and check if the cable is correctly connected to the UART1 pin header. Sometimes cables are not inverted, which can be solved by turning around the connector to the UART1 pin header (white dot turns 180 degrees).

### 11.3 Update to Windows Embedded CE6.0 R3

Make sure you have downloaded all R3 patches for Windows Embedded 6.0. The Patches can be found at Windows Embedded CE6.0 R3 on the Microsoft website

### 11.4 Get the BSP

#### 11.4.1 Download the BSP from the web-Site

- Go to [www.technexion.com/ service and support/ downloads](http://www.technexion.com/service_and_support/downloads)
- Click “HMI” and then download “TAM3517\_CE6.0\_versionnumber”.

#### 11.4.2 Install BSP to “Platform Builder for CE 6.0”.

- Decompress the downloaded file. (See figure 1)

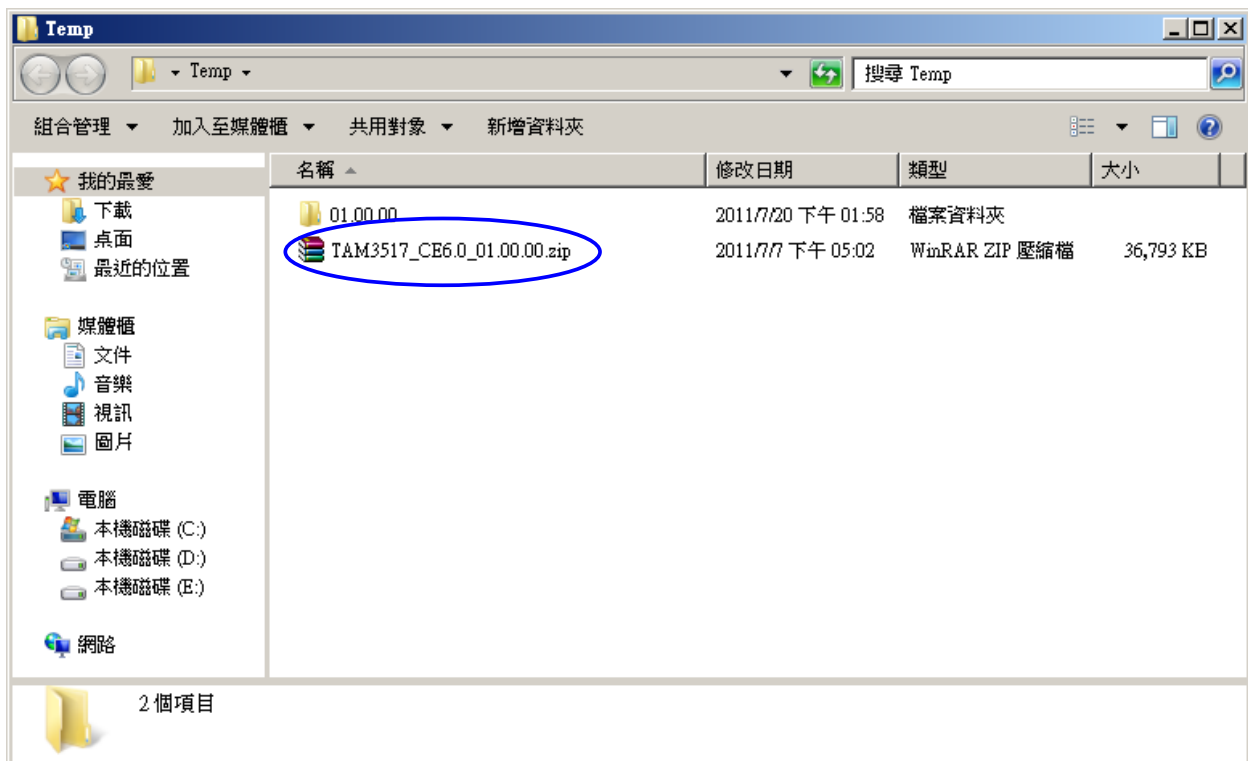


Figure 1

- After entering the “01.00.00\BSP” (version number) folder, copy the “TAM3517” folder to “C:\WINCE600\PLATFORM\”. (See figure 2 and figure 3)

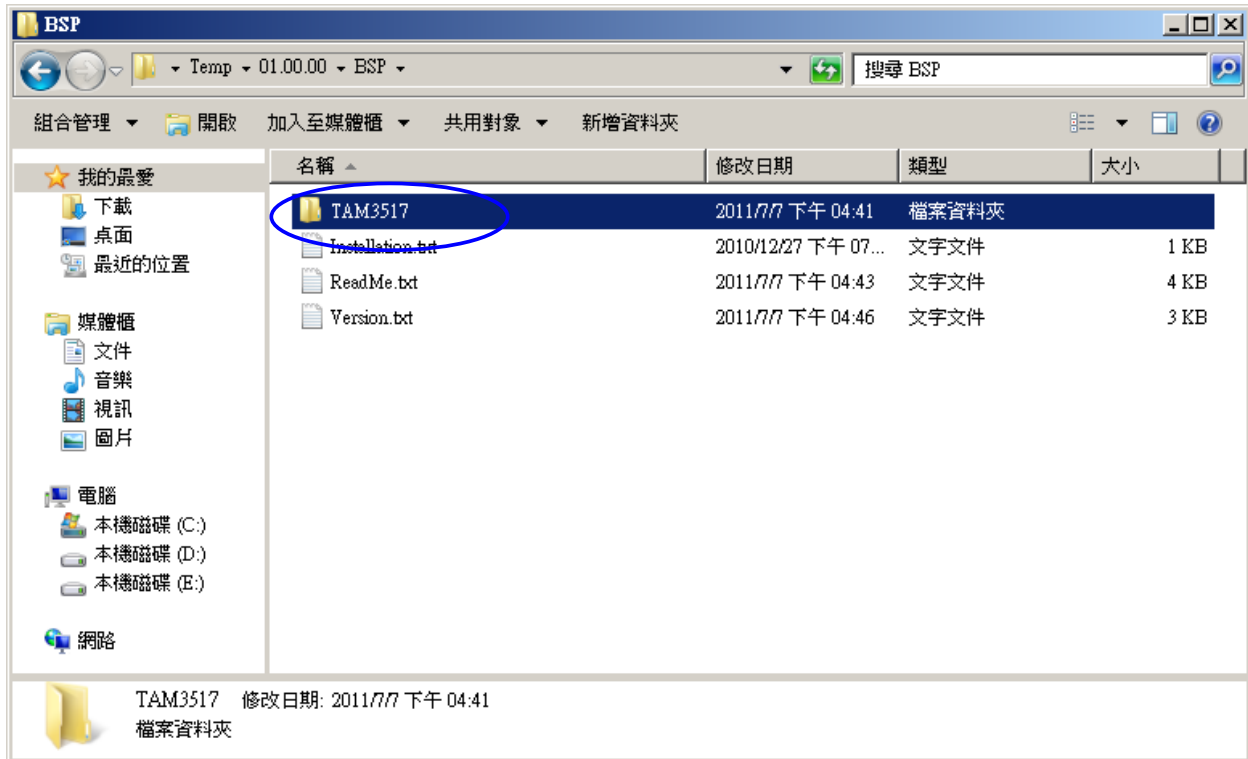


Figure 2

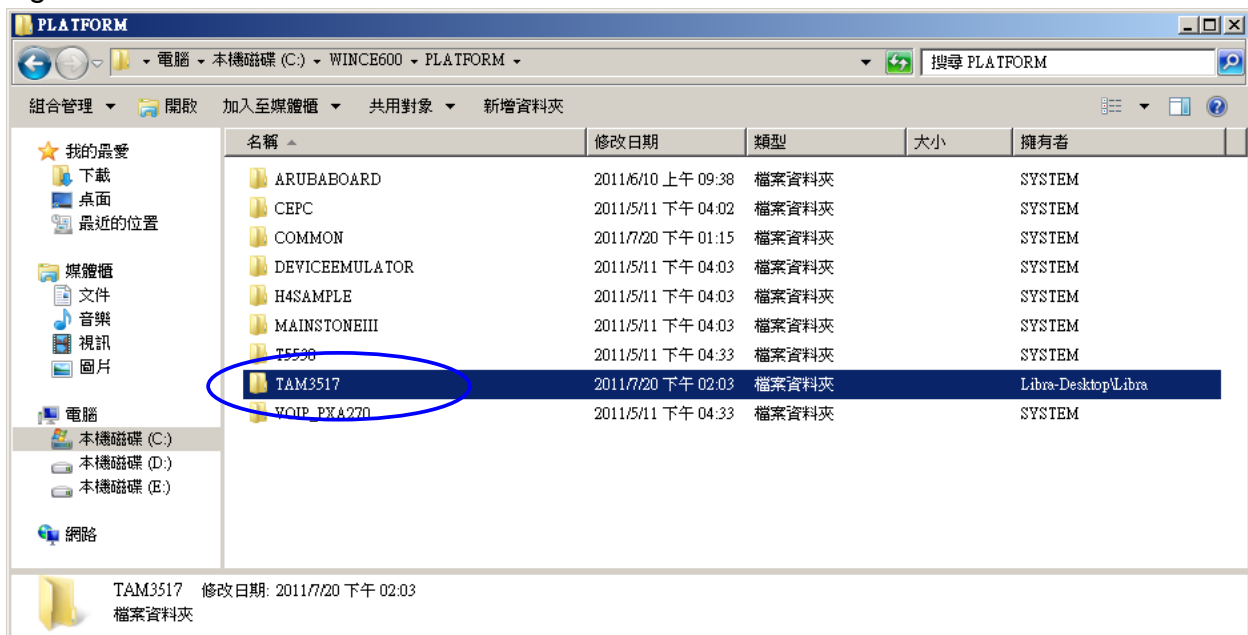


Figure 3

- Go back to the decompressed folder “01.00.00” folder, and copy the “OSDesigns” folder to “C:\WINCE600\”. (See figure 4 and figure 5)

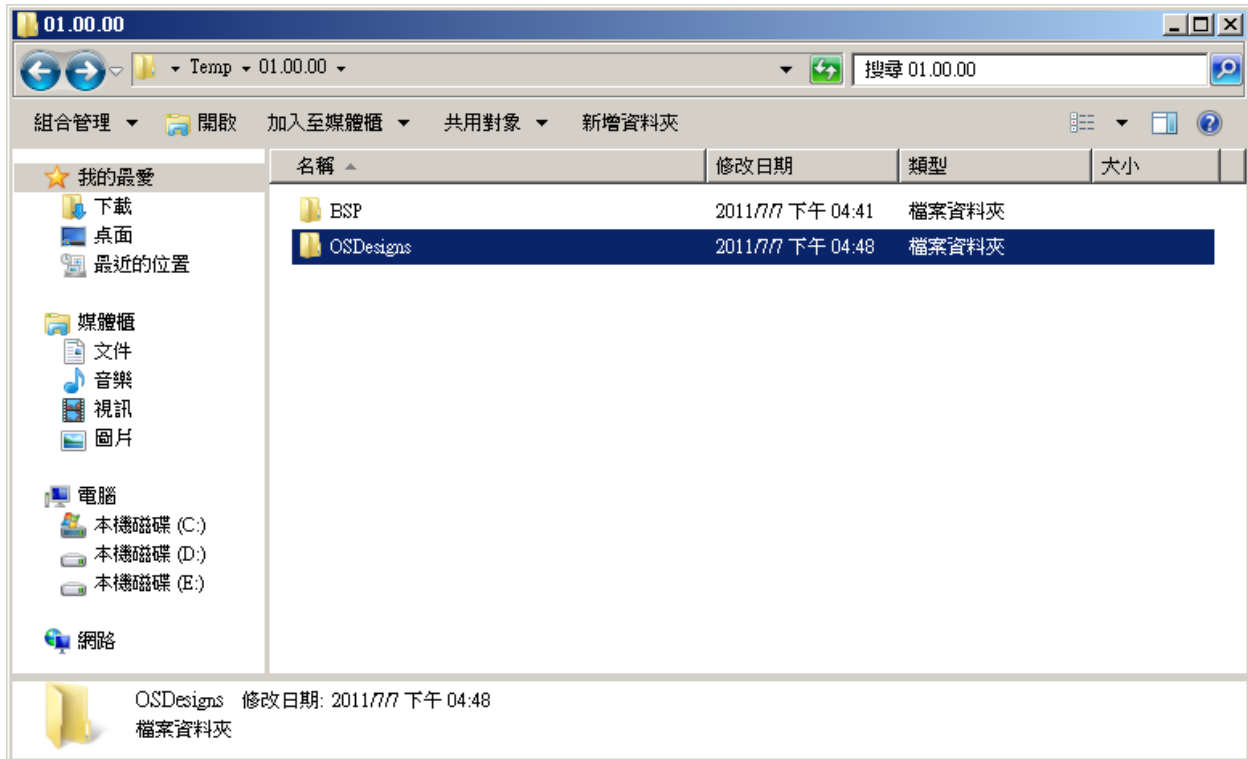


Figure 4

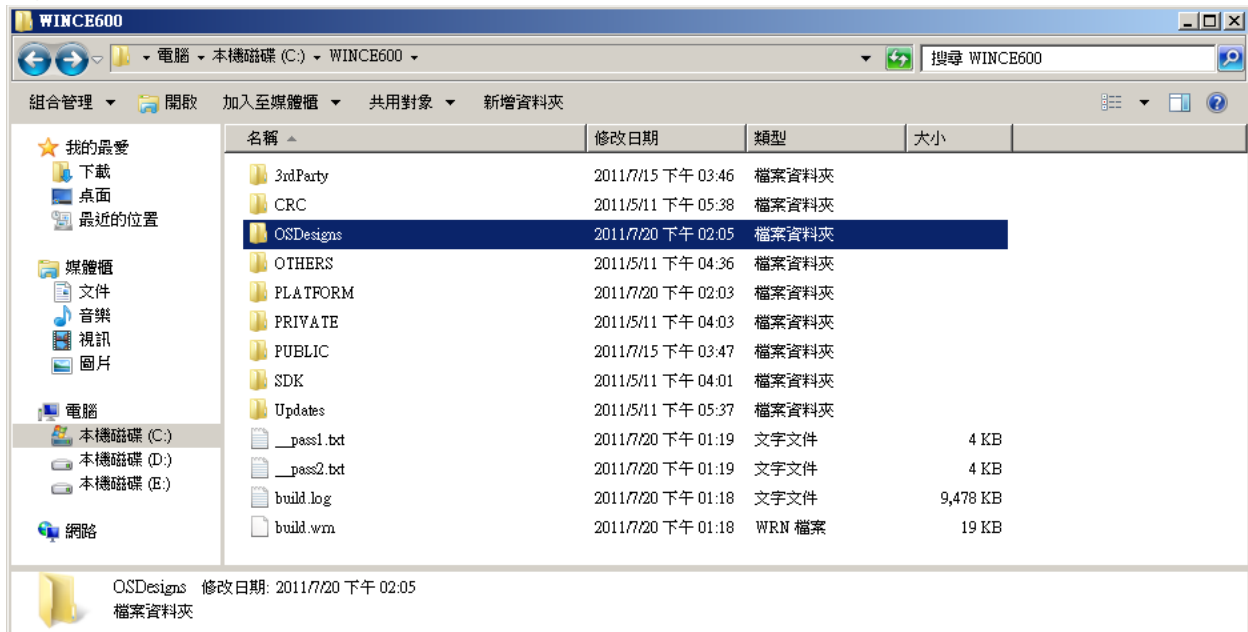


Figure 5

## 11.5 Create a SD card

This chapter describes making a SD card.

- Open “Microsoft Visual Studio 2005”. If that already open, Please reopen it.
- Click “File → Open → Project Solution” (See figure 6)

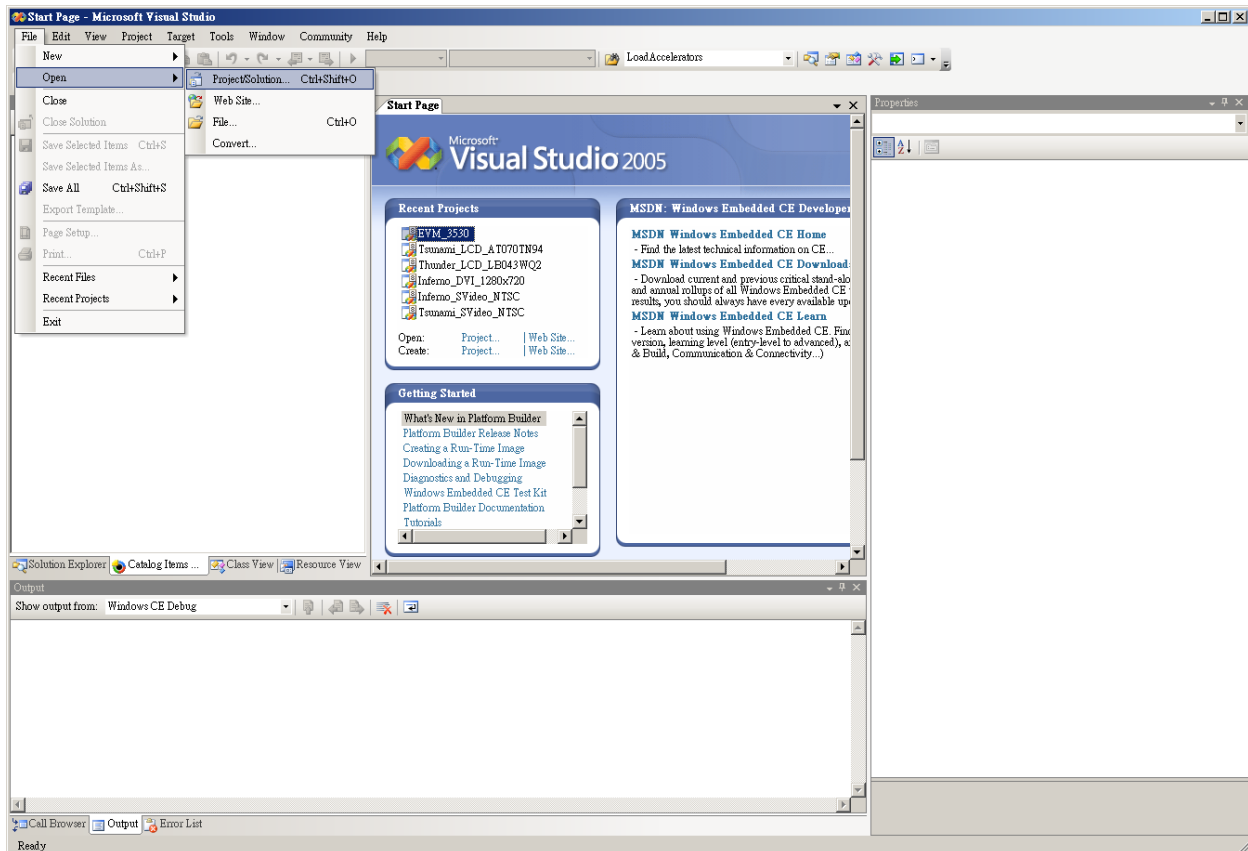


Figure 6

- Go into the folder and open the SLN-file of your HMI (As example in this manual we use “TH0735W” ) (See figure 7)

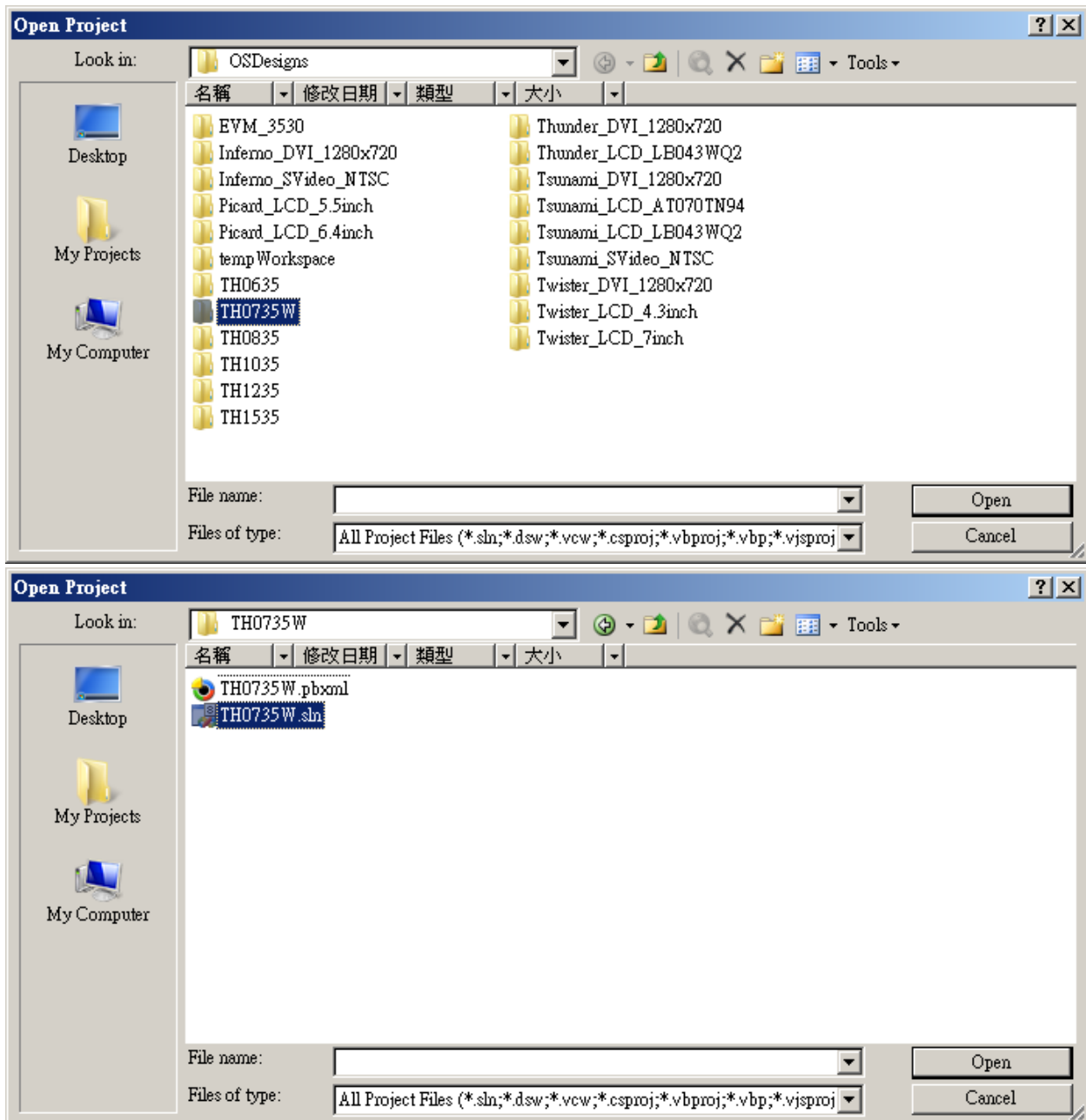


Figure 7

- In the menu click “build/advanced build command/Clean Sysgen” (See figure 8) This will take approximately 20 minutes, after which you will see “build complete” (see figure 9)



**Warning!** Be patient: let “clean sysgen” finish, this will take **20** minutes

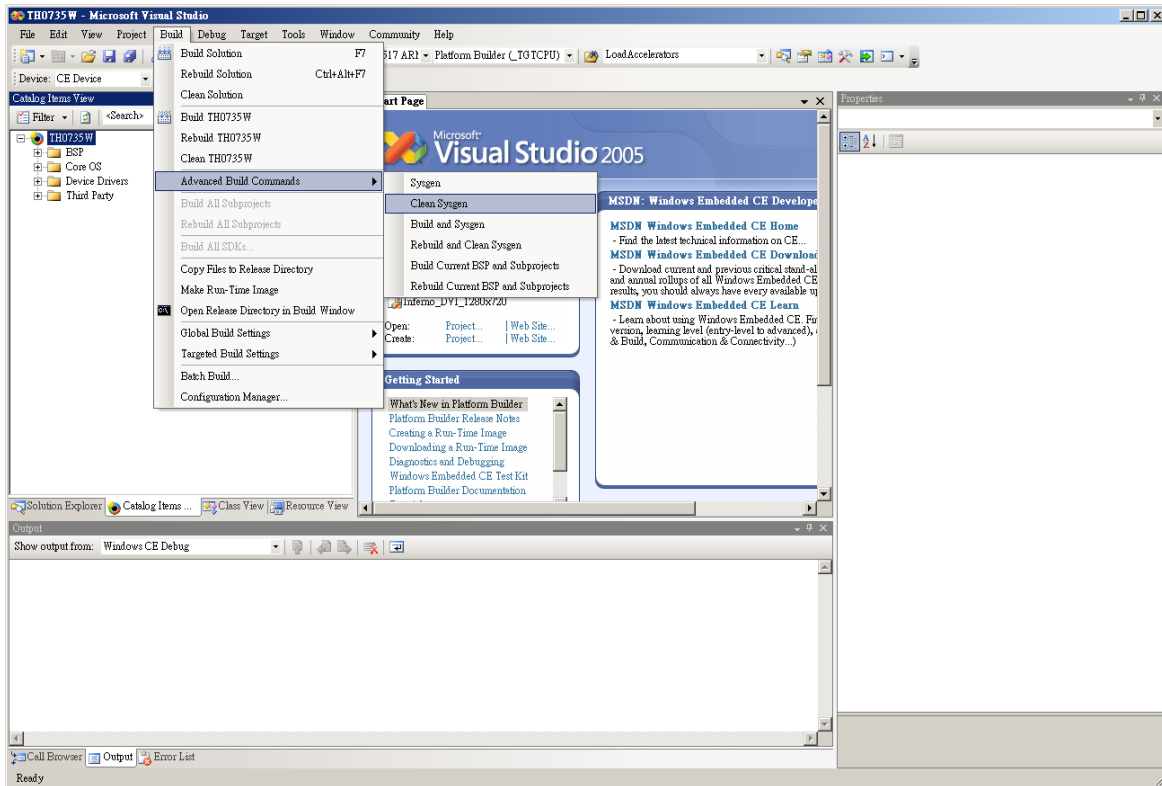


Figure 8

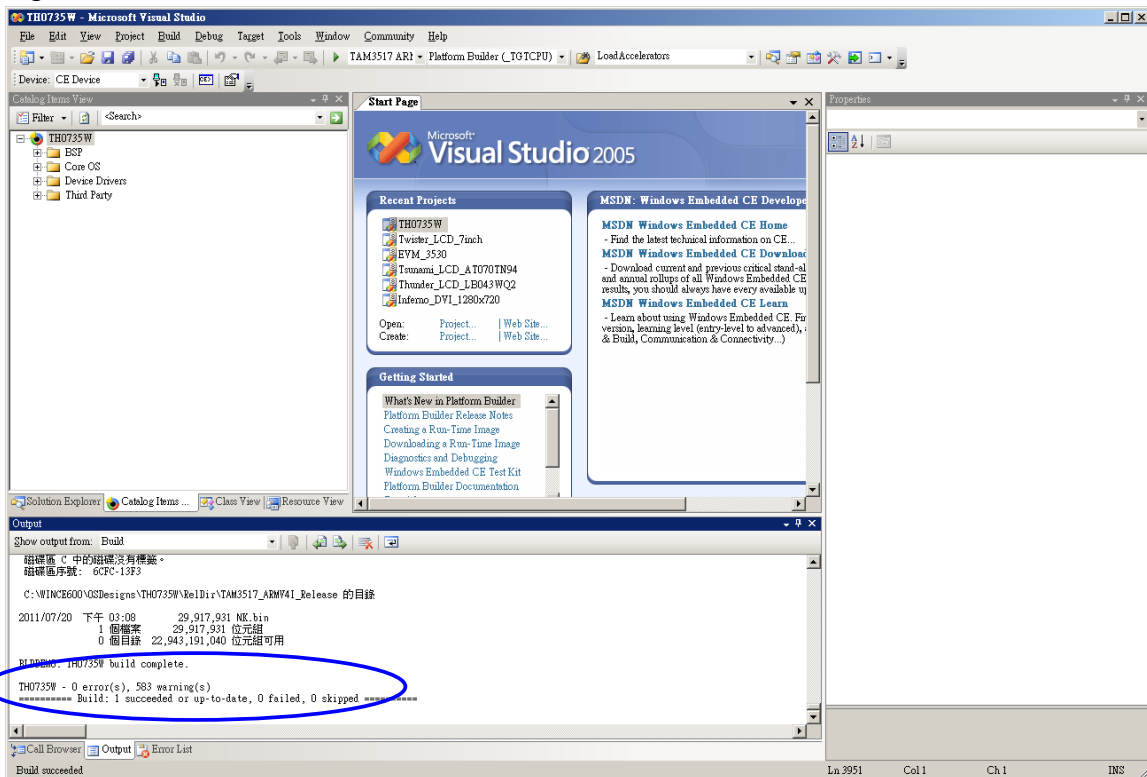


Figure 9

- Plug an microSD in your computer (with for instance a USB card reader)



- Open “active@partition manager” (freeware)
- Right click on removable disk and choose “new partition” (see figure 10)

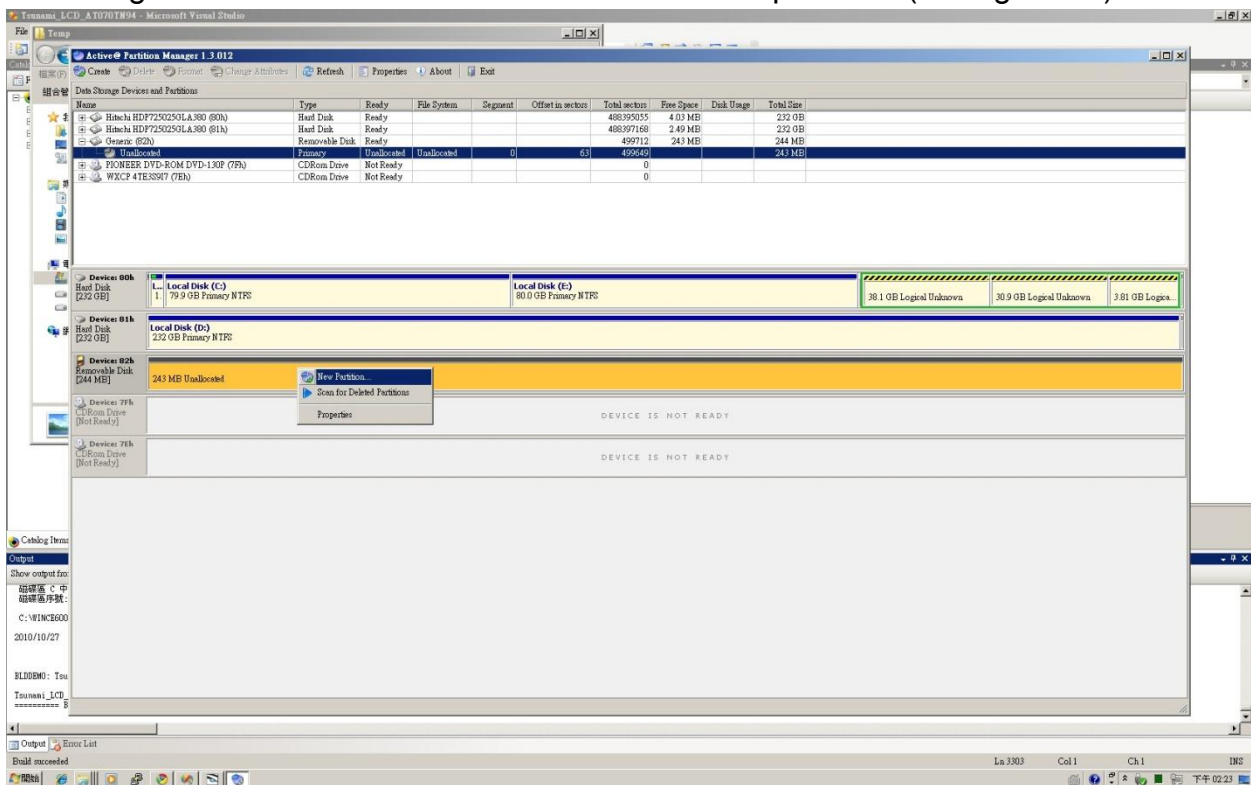


Figure 10

- In the menu mark “partition as active”, press OK, it will then show “successful” (see figure 11)

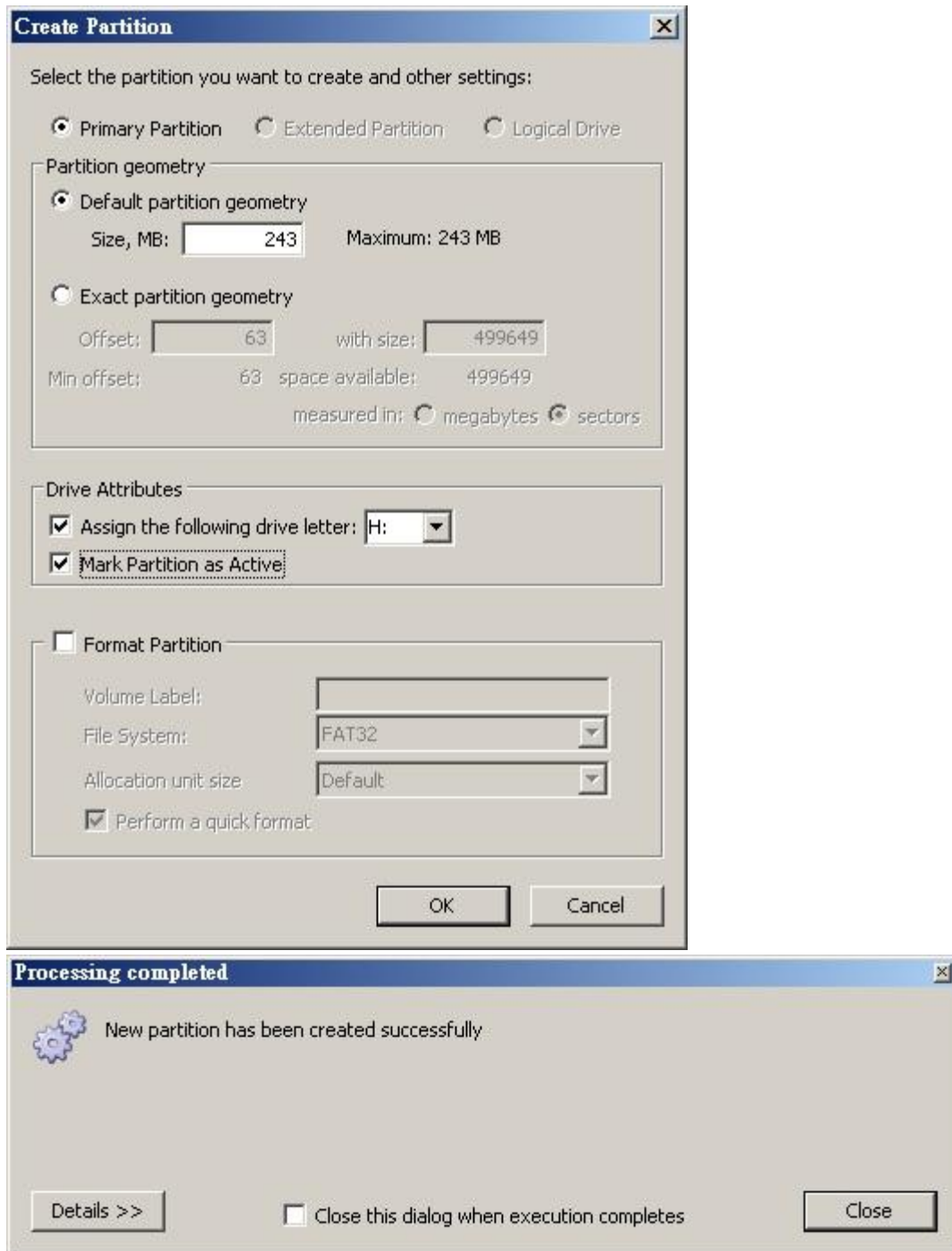


Figure 11

- Right click again and choose format, Click OK, finished (see figure 12)



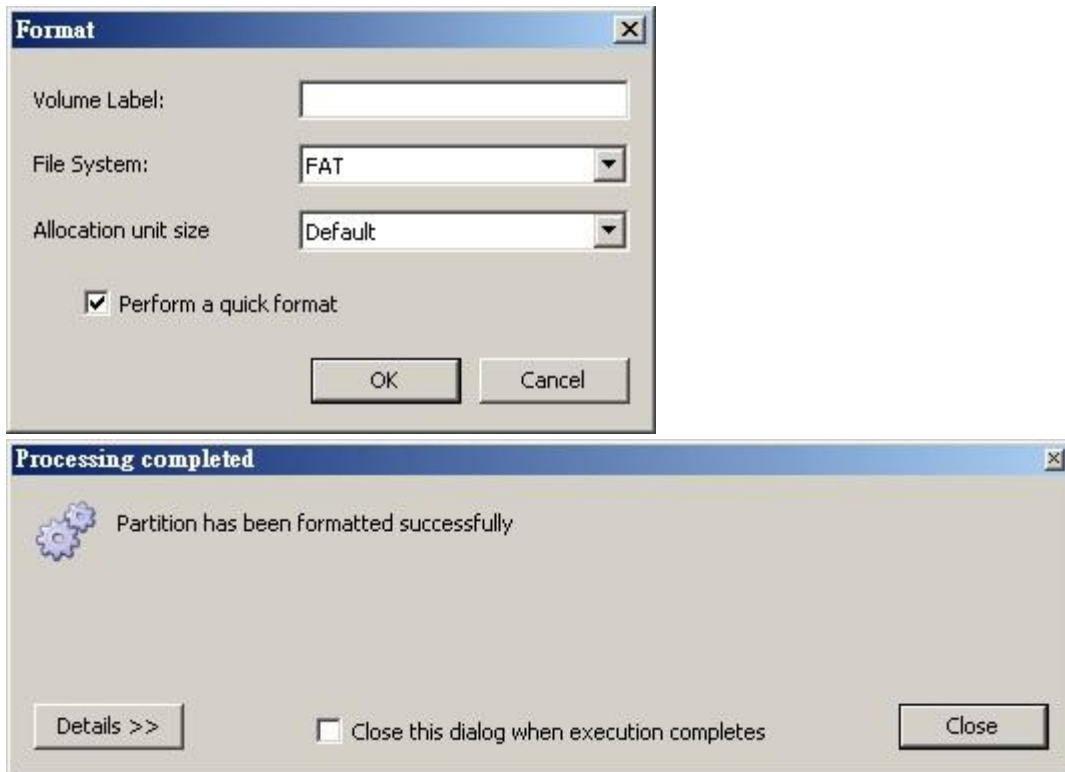


Figure 12

- Go to C:\WINCE600\OSDesigns\TH0735W” and open the folder “TAM\_3517\_ARMV4I\_release” (See figure 13). The folder contains files named: MLO, EBOOTSD.nb0, NK.bin (These files are needed for booting from a SD-card)

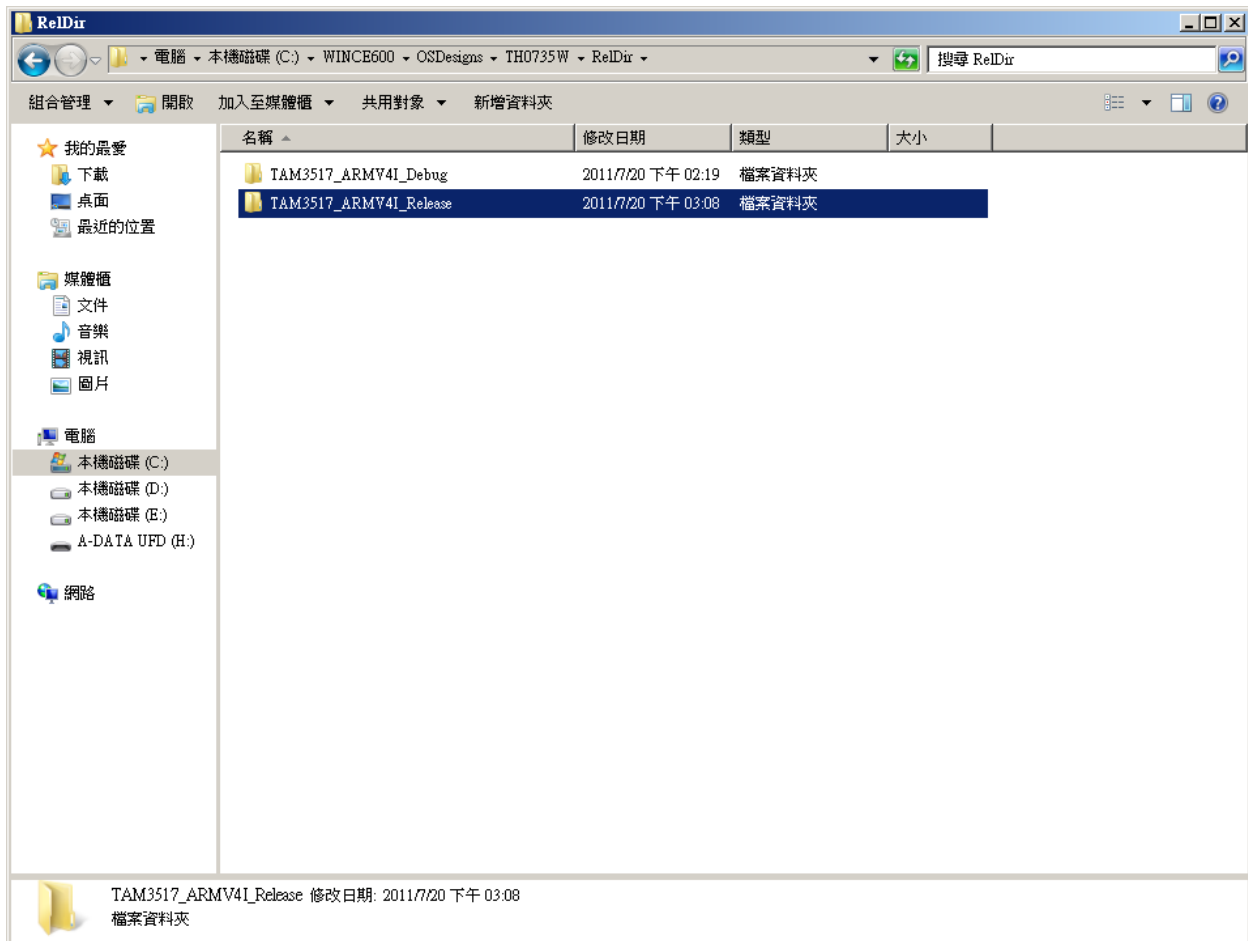


Figure 13

- First copy “MLO” to the microSD card (the order is important)
- Then copy “EBOOTSD.nb0” and “NK.bin” in the microSD card (See figure 14)
- Remove the MicroSD card

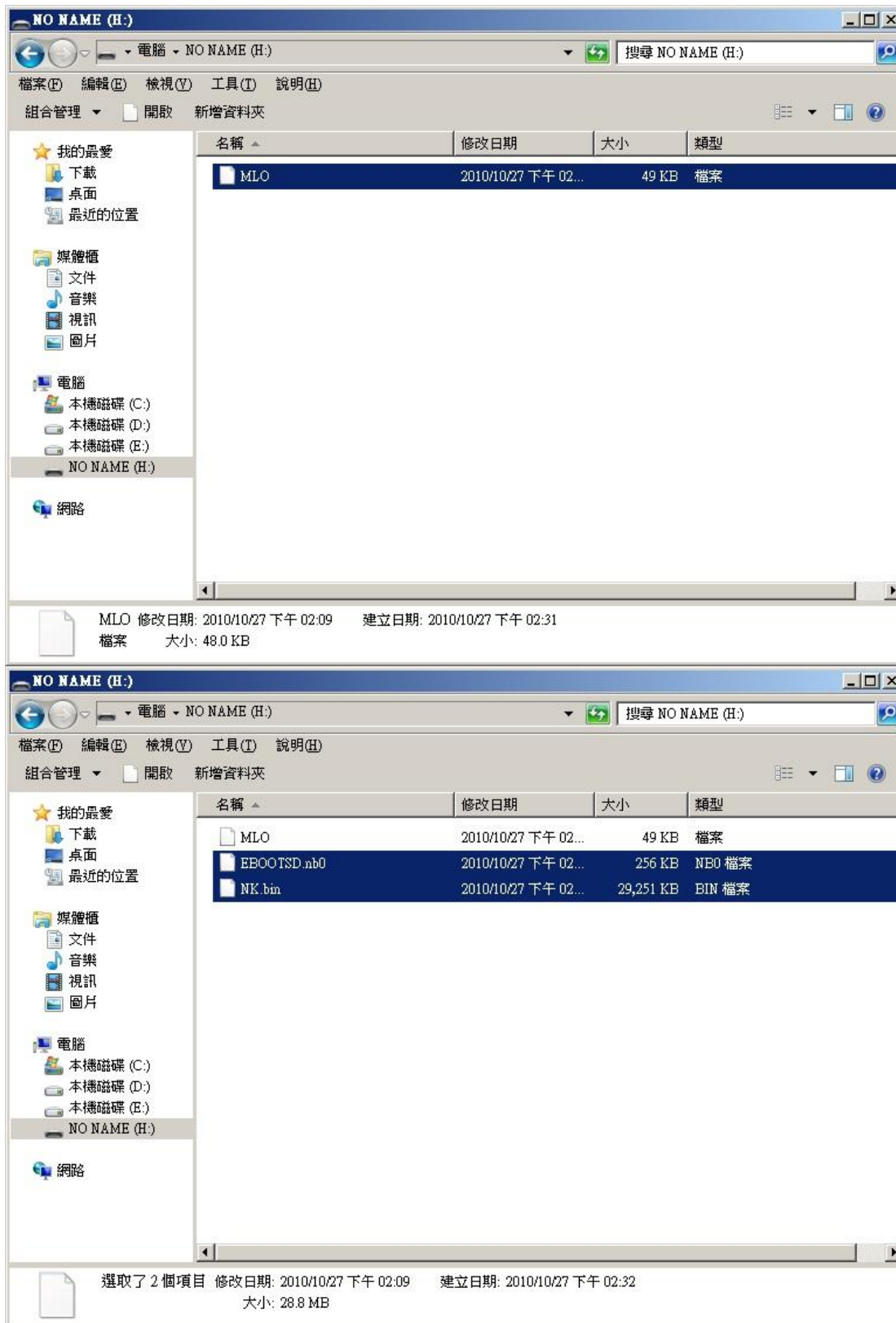


Figure 14

- Open a terminal (Hyperterminal or PuTTY). In this manual we use PuTTY.
- Make sure the terminal cable is connected
- Select a com port (for example COM1) and check that the settings are OK:
 

Baud rate	115200
Data bit	8
Stop bits	1
Parity	none
Flow control	none
- Press "Load"
- Now insert the microSD in your Baseboard
- Insert the power cable
- It will boot from SD
- You'll see "Hit space to enter configuration menu 5..." in PuTTY.  
Please push space key on the keyboard of PC.  
You'll see "Main Menu" in PuTTY.
- In the terminal choose option **Select Boot Device** (See figure 15)

```

COM1 - PuTTY
TI AM3517 Version 0x0 (Hawkeye 0xb868 / manufacturer ID 0x17)
System ready!
Preparing for download...
INFO: Predownload...
WARN: Boot config wasn't found, using defaults
INFO: SW4 boot setting: 0x2f

>>> Forcing cold boot (non-persistent registry and other data will be wiped) <<<
Hit space to enter configuration menu 5...
Hit space to enter configuration menu 4...
Hit space to enter configuration menu 3...

-----
Main Menu
-----
[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] SDCard Settings
[6] Set Device ID
[7] Save Settings
[8] Flash Management
[9] Enable/Disable OAL Retail Messages
[a] Select Display Resolution
[0] Exit and Continue

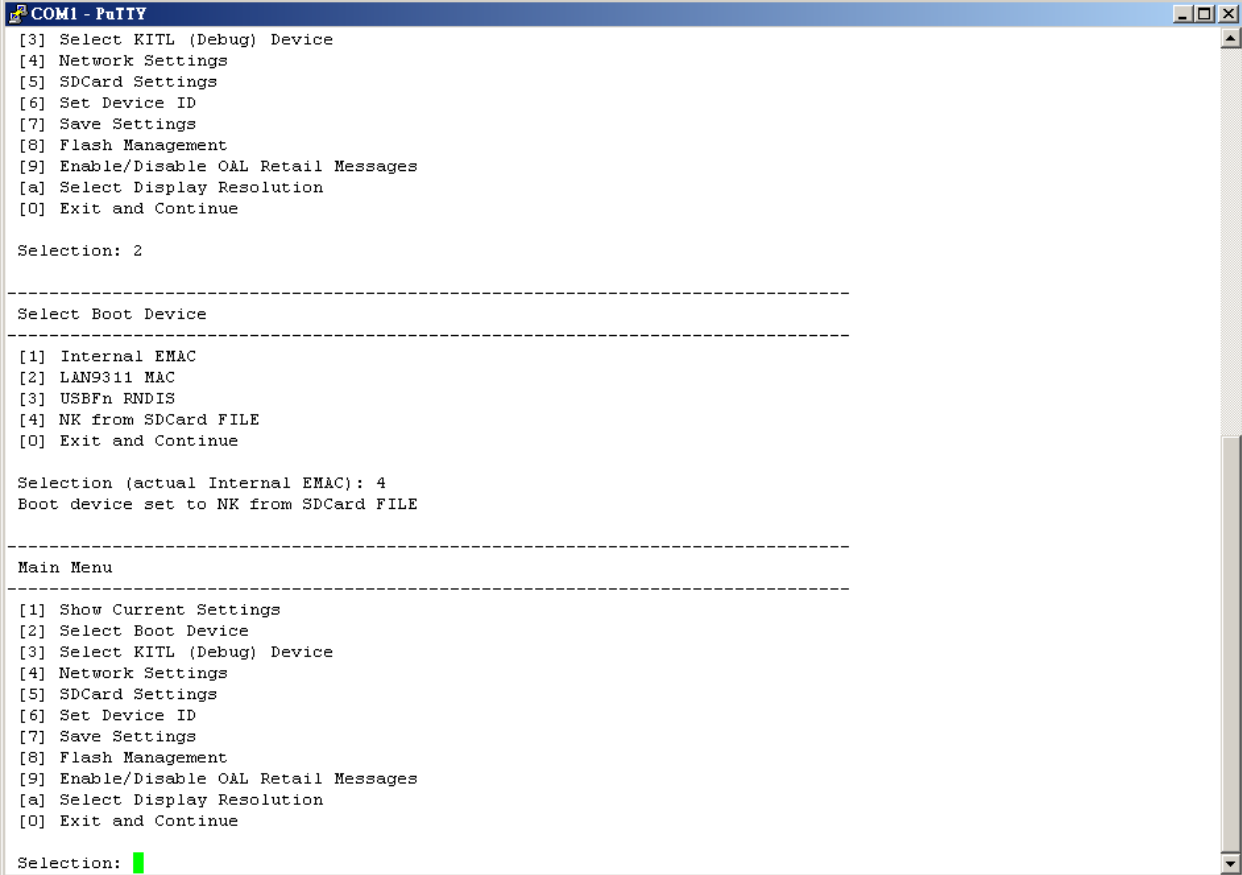
Selection: 2

-----
Select Boot Device
-----
[1] Internal EMAC
[2] LAN9311 MAC
[3] USBFn RNDIS
[4] NK from SDCard FILE
[0] Exit and Continue

Selection (actual Internal EMAC): █
  
```

Figure 15

- Select **NK from SD Card FILE** (See figure 16)



```
COM1 - PuTTY
[3] Select KITL (Debug) Device
[4] Network Settings
[5] SDCard Settings
[6] Set Device ID
[7] Save Settings
[8] Flash Management
[9] Enable/Disable OAL Retail Messages
[a] Select Display Resolution
[0] Exit and Continue

Selection: 2

-----
Select Boot Device
-----

[1] Internal EMAC
[2] LAN9311 MAC
[3] USBFn RNDIS
[4] NK from SDCard FILE
[0] Exit and Continue

Selection (actual Internal EMAC): 4
Boot device set to NK from SDCard FILE

-----
Main Menu
-----

[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] SDCard Settings
[6] Set Device ID
[7] Save Settings
[8] Flash Management
[9] Enable/Disable OAL Retail Messages
[a] Select Display Resolution
[0] Exit and Continue

Selection: █
```

Figure 16

- Select **Exit and Continue**
- It will start to load the image into the memory (see figure 17) and the base board will show Windows CE.
- FINISHED

```

COM1 - PaTTY
[6] Set Device ID
[7] Save Settings
[8] Flash Management
[9] Enable/Disable OAL Retail Messages
[a] Select Display Resolution
[0] Exit and Continue

Selection: 0
Init HW: controller RST
SDCARD: requested speed 1000000, actual speed 1000000
SDHC: command response timeout CTO!
MMC::MMCCommandResponse: MMCSendCommand error, command = 8
MMC::MMCCommandResponse: Command Response Error
Card size is = 499712 512 byte sectors
SDCARD: requested speed 25000000, actual speed 19200000
BLSDCardReadLogo: cannot open Logo.bmp
Turning on the LCD.
Turning on the LCD.

EL_IMAGE_TYPE_BIN

Download file information:
-----
[0]: Address=0x80002000 Length=0x01d05a2c Save=0x80002000
-----
Download file type: 1
.....rom_offset=0x0.
..ImageStart = 0x80002000, ImageLength = 0x1D05A2C, LaunchAddr = 0x80010E70

Completed file(s):
-----
[0]: Address=0x80002000 Length=0x1D05A2C Name="" Target=RAM
ROMHDR at Address 80002044h
Launch Windows CE image by jumping to 0x80010e70...

Windows CE Kernel for ARM (Thumb Enabled) Built on Nov  3 2010 at 07:30:04
****Profiler Build****
---High Performance Frequency is 12999914 hz---

```

Figure 17

## 11.6 How to put the WinCE image in the NAND Flash

In the previous section we showed how to boot from a SD card. Now we explain how to put the image in the NAND Flash so you can boot without the SD card.

### 11.6.1 Write the Bootloader and OS image to the NAND Flash.

- Format the SD Card with the USB Card Reader in the computer, using “Active@ Partition Manager” or another utility.
- Mark “partition as active”
- This needs “MLO”, “EBOOTSD.nb0”, “fldr.raw” or “fldrlogo.raw” and “nk.nb0”. These are in “C:\WINCE60\OSDesigns\Project Name\RelDir\TAM3517\_ARMV4I\_Release\”.
- You can choose between “fldr.raw” or “fldrlogo.raw” (the end result will be the same).
- First copy only the “MLO” file to the SD card. (the order is important) See figure 22)
- Then copy “EBOOTSD.nb0”, “fldr.raw” or “fldrlogo.raw” and “nk.nb0” files to the SD card. (see figure 23)
- Connect the UART cable. Open terminal setting:  
Chose Serial port: COM1 or other

Speed:	115200
Data bits:	8
Stop bits:	1
Parity:	None
Flow Control:	None

- Insert SD Card into the target board. Then connect the power cable.
- When it shows “Hit space to enter configuration menu”. Please push space button on the keyboard.
- It will show “Main Menu” in the terminal. (See figure 24)

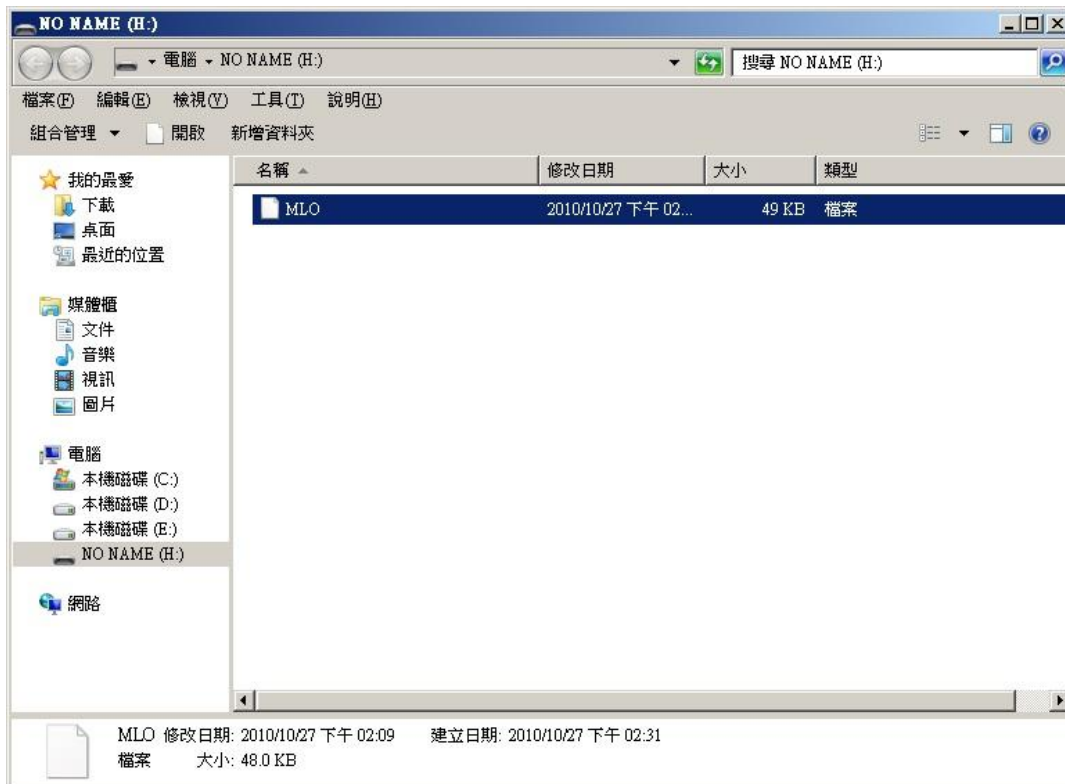
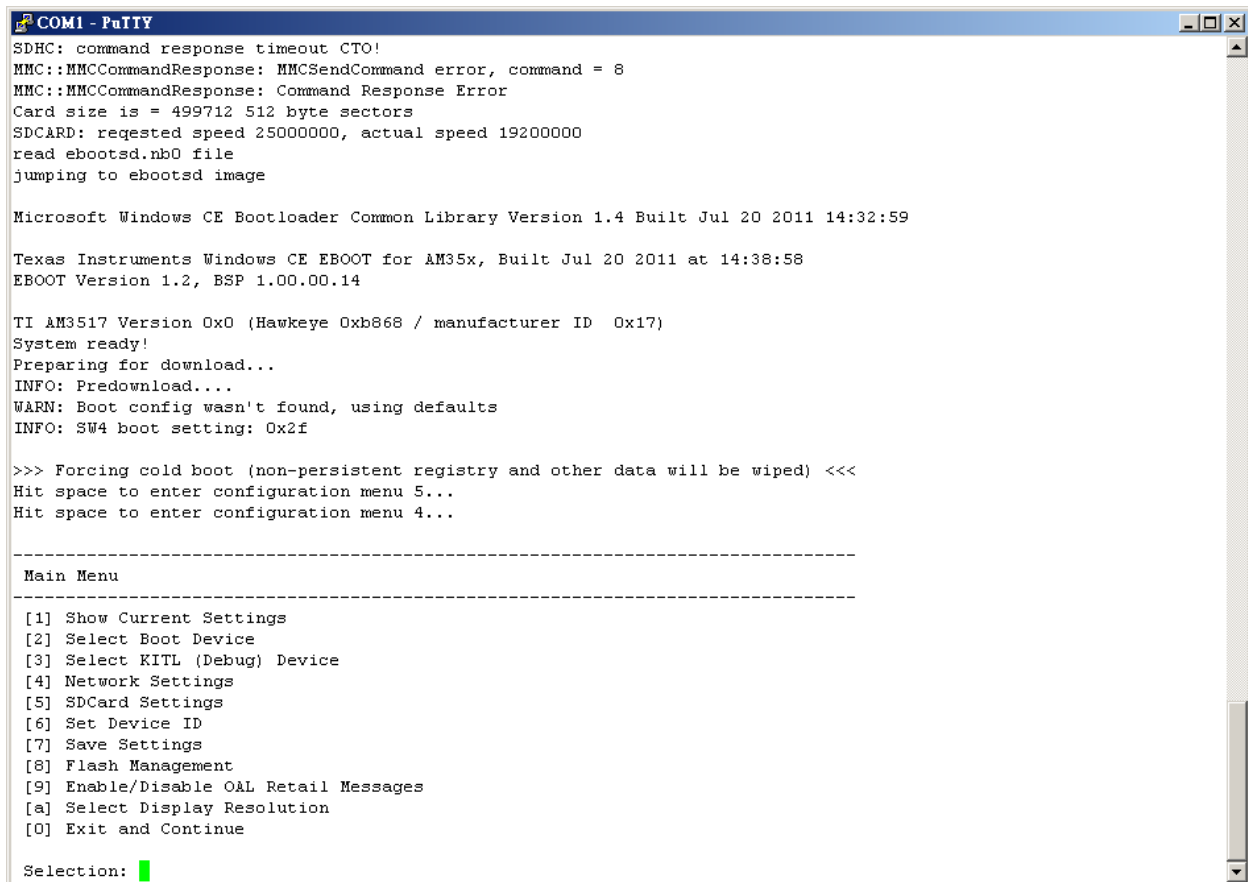


Figure 22



Figure 23





```
COM1 - PaTTY
SDHC: command response timeout CTO!
MMC::MMCCommandResponse: MMCSendCommand error, command = 8
MMC::MMCCommandResponse: Command Response Error
Card size is = 499712 512 byte sectors
SDCARD: requested speed 25000000, actual speed 19200000
read ebootsd.nb0 file
jumping to ebootsd image

Microsoft Windows CE Bootloader Common Library Version 1.4 Built Jul 20 2011 14:32:59

Texas Instruments Windows CE EBOOT for AM35x, Built Jul 20 2011 at 14:38:58
EBOOT Version 1.2, BSP 1.00.00.14

TI AM3517 Version 0x0 (Hawkeye 0xb868 / manufacturer ID 0x17)
System ready!
Preparing for download...
INFO: Predownload...
WARN: Boot config wasn't found, using defaults
INFO: SW4 boot setting: 0x2f

>>> Forcing cold boot (non-persistent registry and other data will be wiped) <<<
Hit space to enter configuration menu 5...
Hit space to enter configuration menu 4...

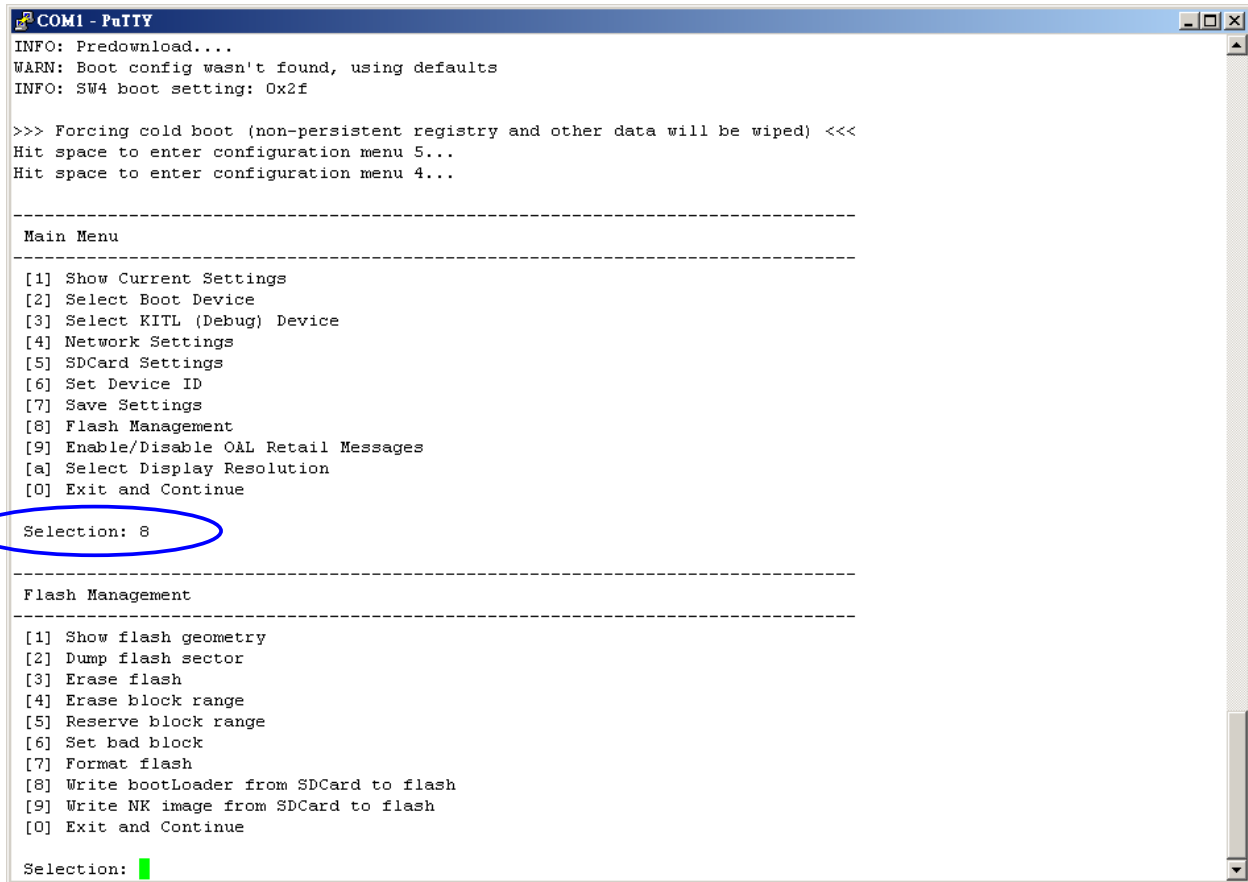
-----
Main Menu
-----

[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] SDCard Settings
[6] Set Device ID
[7] Save Settings
[8] Flash Management
[9] Enable/Disable OAL Retail Messages
[a] Select Display Resolution
[0] Exit and Continue

Selection: █
```

Figure 24

- Chose “Flash Management”. (See figure 25)



```
COM1 - PuTTY
INFO: Predownload...
WARN: Boot config wasn't found, using defaults
INFO: SW4 boot setting: 0x2f

>>> Forcing cold boot (non-persistent registry and other data will be wiped) <<<
Hit space to enter configuration menu 5...
Hit space to enter configuration menu 4...

-----
Main Menu
-----
[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] SDCard Settings
[6] Set Device ID
[7] Save Settings
[8] Flash Management
[9] Enable/Disable OAL Retail Messages
[a] Select Display Resolution
[0] Exit and Continue

Selection: 8

-----
Flash Management
-----
[1] Show flash geometry
[2] Dump flash sector
[3] Erase flash
[4] Erase block range
[5] Reserve block range
[6] Set bad block
[7] Format flash
[8] Write bootLoader from SDCard to flash
[9] Write NK image from SDCard to flash
[0] Exit and Continue

Selection: █
```

Figure 25

- Chose “**Show flash geometry**”. (See figure 26)
- It will show:
 

Flash Type:	NAND
Blocks:	4096
Bytes/block:	131072
Sectors/block:	64
Bytes/sector:	2048
- Chose “**Erase block range**”. (See figure 27)
- It will show “First Block Number:” Input “0”. Then enter.
- It will show “Last Block Number:” Input “(Blocks – 1)”. For example “4096-1=4095”, so type 4095 then enter.
- It will show “Do you want erase block 0-4095 [-/y]?” Input “y” (See figure 28)  
(You might need to repeat this step, until all blocks are erased)

```

COM1 - PuTTY
-----
Flash Management
-----
[1] Show flash geometry
[2] Dump flash sector
[3] Erase flash
[4] Erase block range
[5] Reserve block range
[6] Set bad block
[7] Format flash
[8] Write bootLoader from SDCard to flash
[9] Write NK image from SDCard to flash
[0] Exit and Continue

Selection: 1

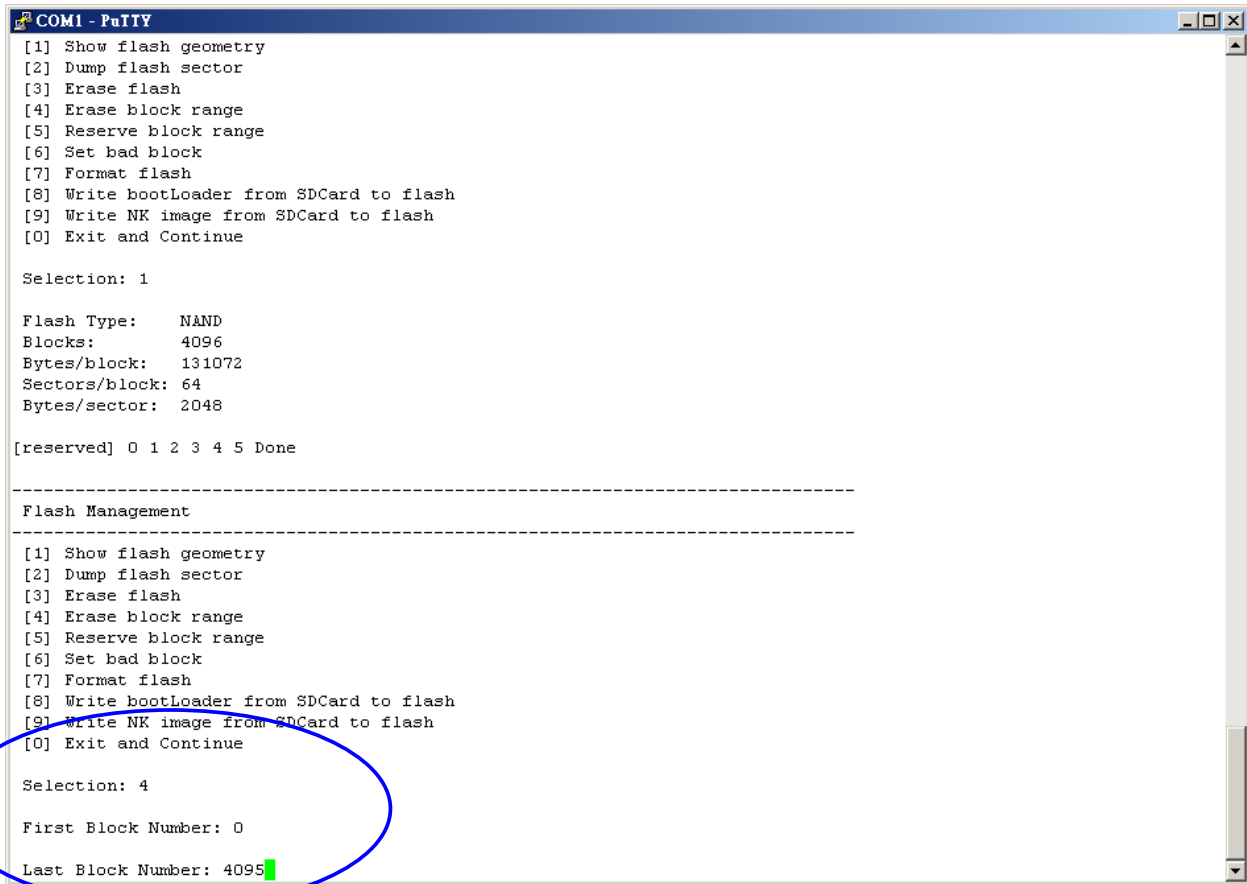
Flash Type:  NAND
Blocks:      4096
Bytes/block: 131072
Sectors/block: 64
Bytes/sector: 2048

(reserved) 0 1 2 3 4 5 Done

-----
Flash Management
-----
[1] Show flash geometry
[2] Dump flash sector
[3] Erase flash
[4] Erase block range
[5] Reserve block range
[6] Set bad block
[7] Format flash
[8] Write bootLoader from SDCard to flash
[9] Write NK image from SDCard to flash
[0] Exit and Continue

Selection: █
  
```

Figure 26



```
COM1 - PuTTY
[1] Show flash geometry
[2] Dump flash sector
[3] Erase flash
[4] Erase block range
[5] Reserve block range
[6] Set bad block
[7] Format flash
[8] Write bootLoader from SDCard to flash
[9] Write NK image from SDCard to flash
[0] Exit and Continue

Selection: 1

Flash Type:   NAND
Blocks:       4096
Bytes/block:  131072
Sectors/block: 64
Bytes/sector: 2048

[reserved] 0 1 2 3 4 5 Done

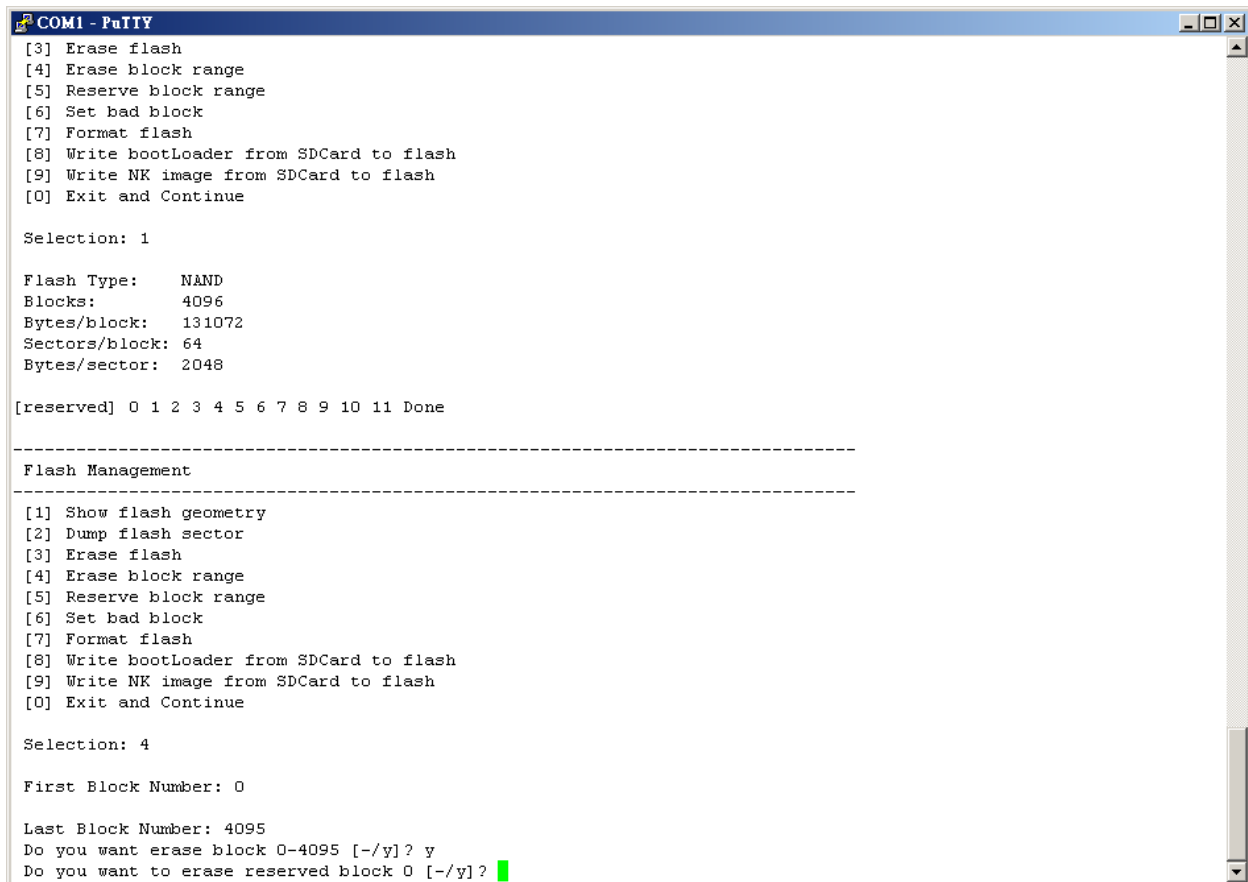
-----
Flash Management
-----

[1] Show flash geometry
[2] Dump flash sector
[3] Erase flash
[4] Erase block range
[5] Reserve block range
[6] Set bad block
[7] Format flash
[8] Write bootLoader from SDCard to flash
[9] Write NK image from SDCard to flash
[0] Exit and Continue

Selection: 4

First Block Number: 0
Last Block Number: 4095
```

Figure 27



```
COM1 - PaTty
[3] Erase flash
[4] Erase block range
[5] Reserve block range
[6] Set bad block
[7] Format flash
[8] Write bootLoader from SDCard to flash
[9] Write NK image from SDCard to flash
[0] Exit and Continue

Selection: 1

Flash Type:   NAND
Blocks:      4096
Bytes/block: 131072
Sectors/block: 64
Bytes/sector: 2048

[reserved] 0 1 2 3 4 5 6 7 8 9 10 11 Done

-----
Flash Management
-----

[1] Show flash geometry
[2] Dump flash sector
[3] Erase flash
[4] Erase block range
[5] Reserve block range
[6] Set bad block
[7] Format flash
[8] Write bootLoader from SDCard to flash
[9] Write NK image from SDCard to flash
[0] Exit and Continue

Selection: 4

First Block Number: 0

Last Block Number: 4095
Do you want erase block 0-4095 [-/y]? y
Do you want to erase reserved block 0 [-/y]? █
```

Figure 28

- Chose “Write Bootloader from SD-Card to flash”. (See figure 29)
- It will show “Do you want to write Bootloader to flash [-/y]?” Input “y”
- Then it will show “Bootloader Image written”. (See figure 30)



```
COM1 - PaTTY
DLL Last      : 0x4001c001
Physical First : 0x40200000
Physical Last  : 0x40206158
Num Modules   :      1
RAM Start     : 0x40209000
RAM Free      : 0x4020b000
RAM End       : 0x4020c000
Num Copy Entries :      1
Copy Entries Offset : 0x40205a68
Prof Symbol Length : 0x00000000
Prof Symbol Offset : 0x00000000
Num Files     :      0
Kernel Flags  : 0x00000000
FileSys RAM Percent : 0x80808080
Driver Glob Start : 0x00000000
Driver Glob Length : 0x00000000
CPU           :      0x01c2
MiscFlags     :      0x0002
Extensions    : 0x00000000
Tracking Mem Start : 0x00000000
Tracking Mem Length : 0x00000000
-----
BootLoader Image written
-----
Flash Management
-----
[1] Show flash geometry
[2] Dump flash sector
[3] Erase flash
[4] Erase block range
[5] Reserve block range
[6] Set bad block
[7] Format flash
[8] Write bootLoader from SDCard to flash
[9] Write NK image from SDCard to flash
[0] Exit and Continue
Selection: █
```

Figure 30

- Take the microSD card out of the Baseboard.
- Reboot from NAND Flash by pushing the reset button on the baseboard (See figure 31).
- It will make a partition and format and then show “Flash format complete!”

```

COM1 - PuTTY
CreatePartition: Start = 0x1, Num = 0x5fff.
Log2Phys: Logical 0x1 -> Physical 0x301
WriteMBR: MBR block = 0xc.
IsValidMBR: MBR sector = 0x300 (valid MBR)
OpenPartition: Partition Exists=0x0 for part 0xb.
CreatePartition: Enter CreatePartition for 0xb.
FindFreeSector: FreeSector is: 0x6000 after processing part 0x20.
CreatePartition: Num sectors set to 0x39a80 to allow for compaction blocks.
CreatePartition: Start = 0x6000, Num = 0x39a80.
WriteMBR: MBR block = 0xc.
Flash format complete!

>>> Forcing cold boot (non-persistent registry and other data will be wiped) <<<
Hit space to enter configuration menu 5...
Hit space to enter configuration menu 4...
Hit space to enter configuration menu 3...
Hit space to enter configuration menu 2...
Hit space to enter configuration menu 1...
OALFlashStoreOpen: 4096 blocks, 64 sectors/block
OALFlashStoreOpen: 2048 bytes/sector, 12 reserved blocks
Turning on the LCD.
Turning on the LCD.
Autonegotiation failed. Check the ethernet cable
ERROR: Boot device driver Init call failed

-----
Main Menu
-----
[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] Flash Management
[6] Set Device ID
[7] Save Settings
[8] Enable/Disable OAL Retail Messages
[9] Select Display Resolution
[0] Exit and Continue

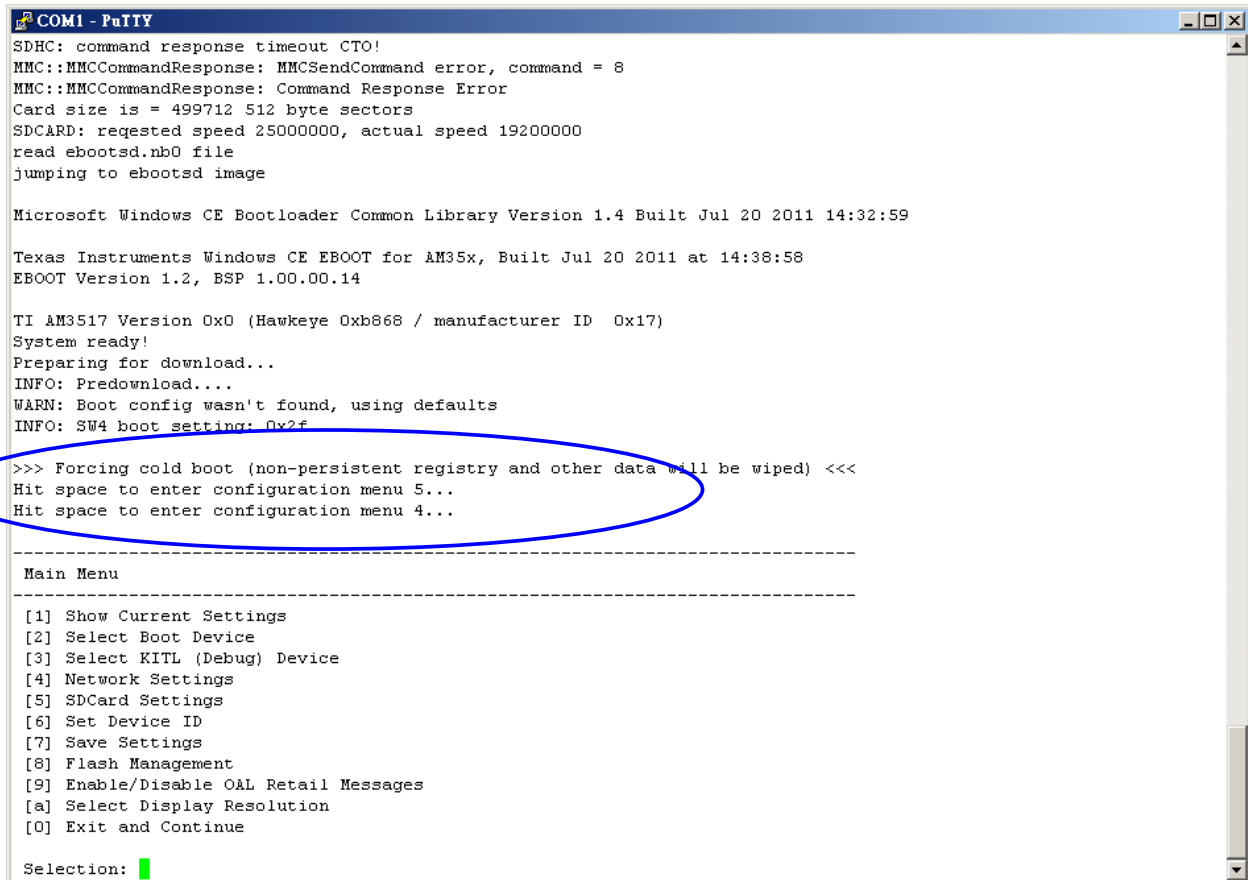
Selection: █

```

Figure 31

- Put the microSD card back into the baseboard. Unplug the power and insert the power again (=reboot from SD Card) (See figure 32), or push the reset button.
- When it shows “Hit space to enter configuration menu”. Please push space button on the keyboard.





```
COM1 - PaTTY
SDHC: command response timeout CTO!
MMC::MMCCommandResponse: MMCSendCommand error, command = 8
MMC::MMCCommandResponse: Command Response Error
Card size is = 499712 512 byte sectors
SDCARD: requested speed 25000000, actual speed 19200000
read eboot.sd.nb0 file
jumping to eboot.sd image

Microsoft Windows CE Bootloader Common Library Version 1.4 Built Jul 20 2011 14:32:59

Texas Instruments Windows CE EBOOT for AM35x, Built Jul 20 2011 at 14:38:58
EBOOT Version 1.2, BSP 1.00.00.14

TI AM3517 Version 0x0 (Hawkeye 0xb868 / manufacturer ID 0x17)
System ready!
Preparing for download...
INFO: Predownload...
WARN: Boot config wasn't found, using defaults
INFO: SW4 boot setting: 0x2f

>>> Forcing cold boot (non-persistent registry and other data will be wiped) <<<
Hit space to enter configuration menu 5...
Hit space to enter configuration menu 4...

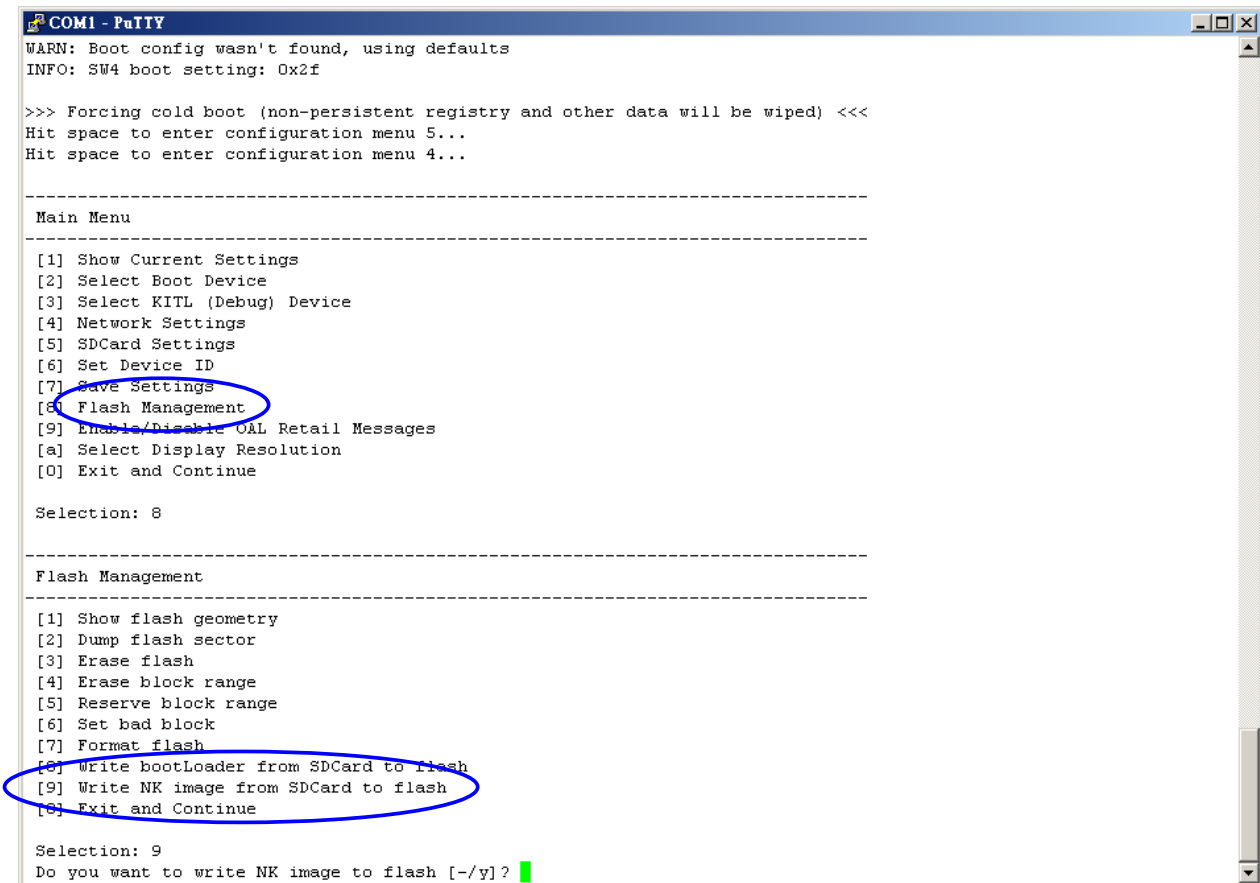
-----
Main Menu
-----

[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] SDCard Settings
[6] Set Device ID
[7] Save Settings
[8] Flash Management
[9] Enable/Disable OAL Retail Messages
[a] Select Display Resolution
[0] Exit and Continue

Selection: █
```

Figure 32

- Chose “Flash Management”. (See figure 33)
- Chose “Write NK image from SD-Card to flash”. (See figure 33)
- It will show “Do you want to write NK image to flash [-/y]?” Input “y”.
- Wait until it will show “NK image written”. (See figure 34)



```
COM1 - PaTTY
WARN: Boot config wasn't found, using defaults
INFO: SW4 boot setting: 0x2f

>>> Forcing cold boot (non-persistent registry and other data will be wiped) <<<
Hit space to enter configuration menu 5...
Hit space to enter configuration menu 4...

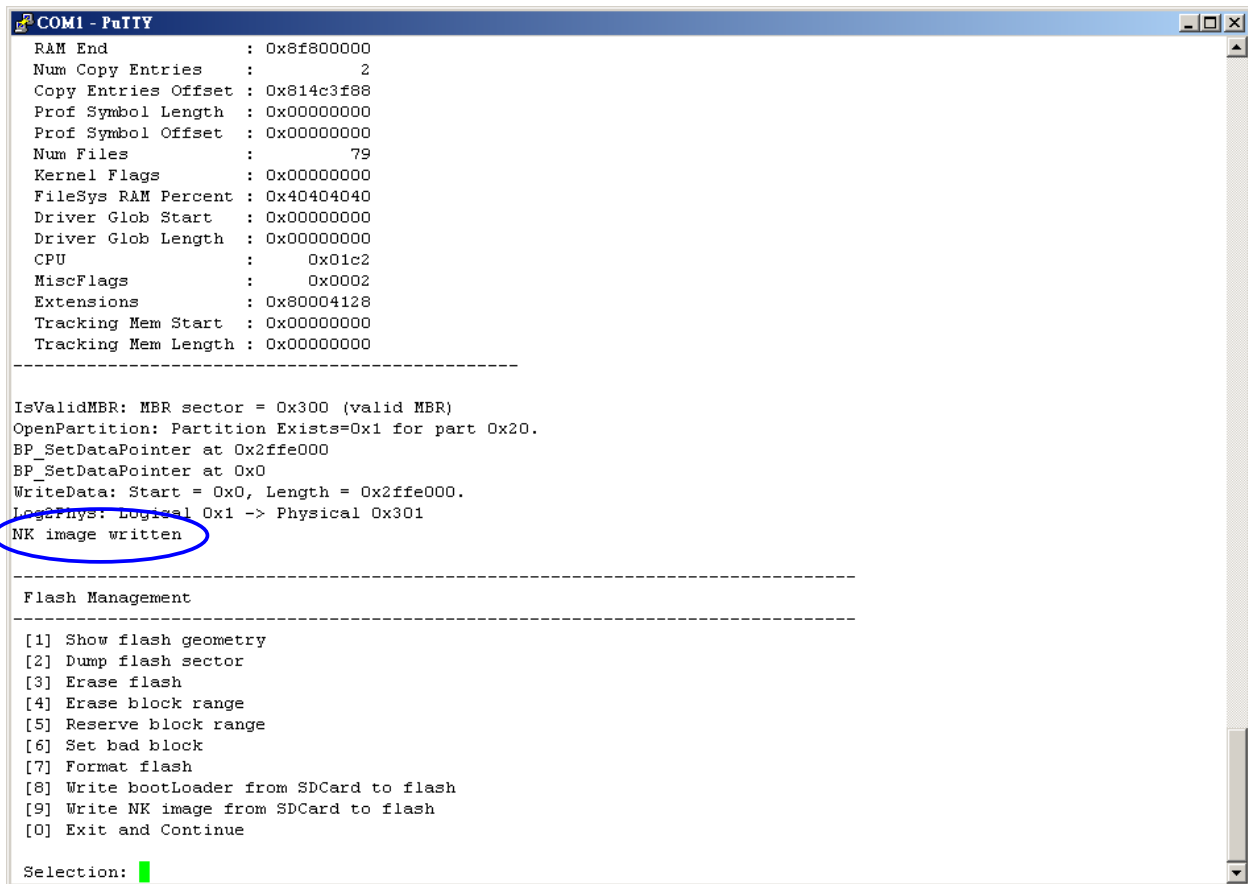
-----
Main Menu
-----
[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] SDCard Settings
[6] Set Device ID
[7] Save Settings
[8] Flash Management
[9] Enable/Disable OAL Retail Messages
[a] Select Display Resolution
[0] Exit and Continue

Selection: 8

-----
Flash Management
-----
[1] Show flash geometry
[2] Dump flash sector
[3] Erase flash
[4] Erase block range
[5] Reserve block range
[6] Set bad block
[7] Format flash
[8] Write bootLoader from SDCard to flash
[9] Write NK image from SDCard to flash
[0] Exit and Continue

Selection: 9
Do you want to write NK image to flash [-/y]? █
```

Figure 33

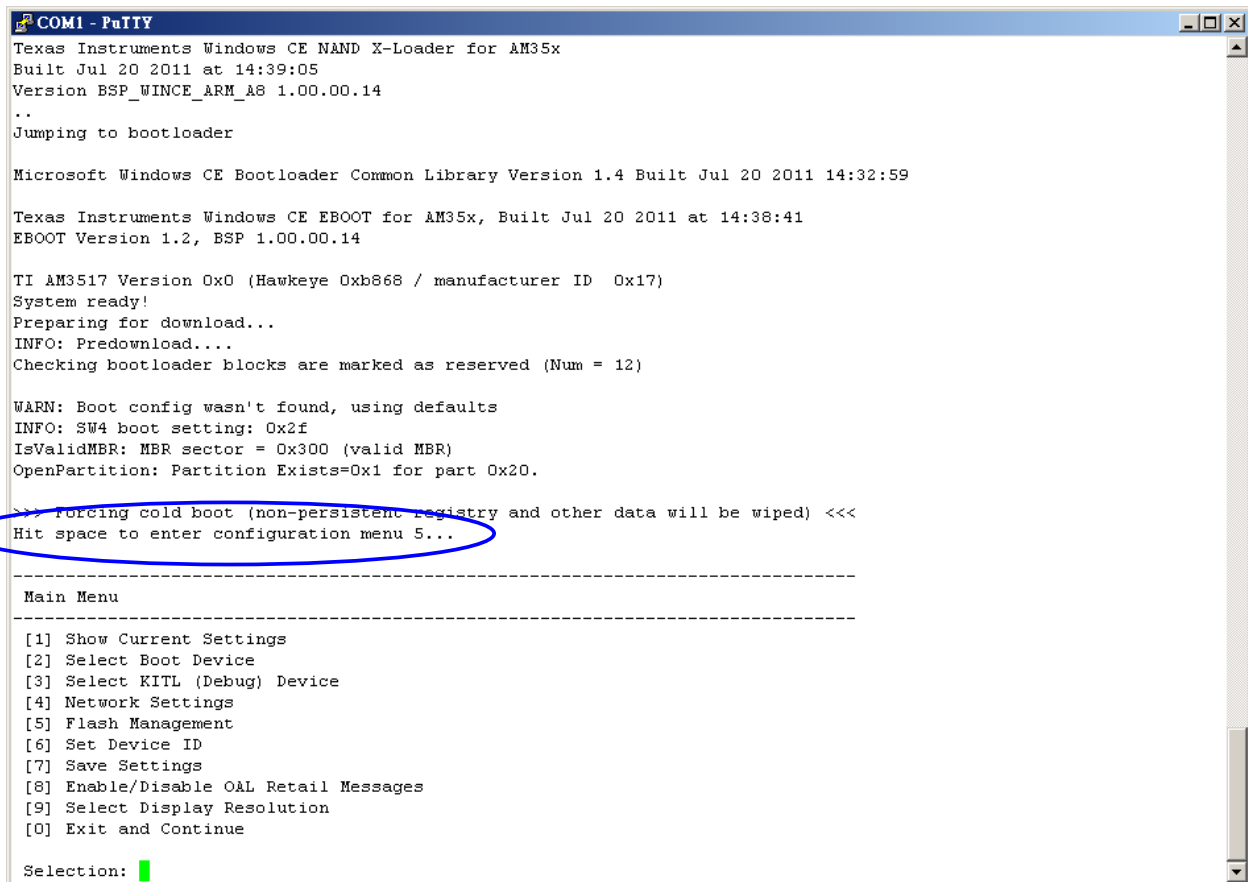


```
COM1 - PuTTY
RAM End      : 0x8f800000
Num Copy Entries : 2
Copy Entries Offset : 0x814c3f88
Prof Symbol Length : 0x00000000
Prof Symbol Offset : 0x00000000
Num Files    : 79
Kernel Flags : 0x00000000
FileSys RAM Percent : 0x40404040
Driver Glob Start : 0x00000000
Driver Glob Length : 0x00000000
CPU           : 0x01c2
MiscFlags    : 0x0002
Extensions   : 0x80004128
Tracking Mem Start : 0x00000000
Tracking Mem Length : 0x00000000
-----
IsValidMBR: MBR sector = 0x300 (valid MBR)
OpenPartition: Partition Exists=0x1 for part 0x20.
BP_SetDataPointer at 0x2ffe000
BP_SetDataPointer at 0x0
WriteData: Start = 0x0, Length = 0x2ffe000.
Log2Phys: Logical 0x1 -> Physical 0x301
NK image written
-----
Flash Management
-----
[1] Show flash geometry
[2] Dump flash sector
[3] Erase flash
[4] Erase block range
[5] Reserve block range
[6] Set bad block
[7] Format flash
[8] Write bootLoader from SDCard to flash
[9] Write NK image from SDCard to flash
[0] Exit and Continue
Selection: █
```

Figure 34

### 11.6.2 Boot from NAND flash.

- Take out the MicroSD Card from the Baseboard
- Press the reset button on the baseboard
- When it shows “Hit space to enter configuration menu”. Please push space button on the keyboard. (See figure 35)



```
COM1 - PaTTY
Texas Instruments Windows CE NAND X-Loader for AM35x
Built Jul 20 2011 at 14:39:05
Version BSP_WINCE_ARM_AB 1.00.00.14
..
Jumping to bootloader

Microsoft Windows CE Bootloader Common Library Version 1.4 Built Jul 20 2011 14:32:59

Texas Instruments Windows CE EBOOT for AM35x, Built Jul 20 2011 at 14:38:41
EBOOT Version 1.2, BSP 1.00.00.14

TI AM3517 Version 0x0 (Hawkeye 0xb868 / manufacturer ID 0x17)
System ready!
Preparing for download...
INFO: Predownload....
Checking bootloader blocks are marked as reserved (Num = 12)

WARN: Boot config wasn't found, using defaults
INFO: SW4 boot setting: 0x2f
IsValidMBR: MBR sector = 0x300 (valid MBR)
OpenPartition: Partition Exists=0x1 for part 0x20.

>> Forcing cold boot (non-persistent registry and other data will be wiped) <<<
Hit space to enter configuration menu 5...

-----
Main Menu
-----
[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] Flash Management
[6] Set Device ID
[7] Save Settings
[8] Enable/Disable OAL Retail Messages
[9] Select Display Resolution
[0] Exit and Continue

Selection: █
```

Figure 35

- Chose “[Select Boot Device](#)”. (See figure 36)
- Then chose “[NK from NAND](#)” (see figure 37)

```
COM1 - PaTty
Network:
KITL state:   enabled
KITL type:    active
KITL mode:    interrupt
DHCP:         enabled
IP address:   0.0.0.0
IP mask:      0.0.0.0
IP router:    0.0.0.0
Internal Eth MAC Addr: 00:1f:7b:15:06:90
External Eth MAC Addr: 00:1f:7b:15:06:91
VMINI:        enabled
Note: USBFN RNDIS MAC Addr cannot be changed.

-----
Main Menu
-----
[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] Flash Management
[6] Set Device ID
[7] Save Settings
[8] Enable/Disable OAL Retail Messages
[9] Select Display Resolution
[0] Exit and Continue

Selection: 2

-----
Select Boot Device
-----

[1] Internal EMAC
[2] LAN9311 MAC
[3] USBFn RNDIS
[4] SDCard FILE
[5] NK from NAND
[0] Exit and Continue

Selection (actual Internal EMAC): █
```

Figure 36

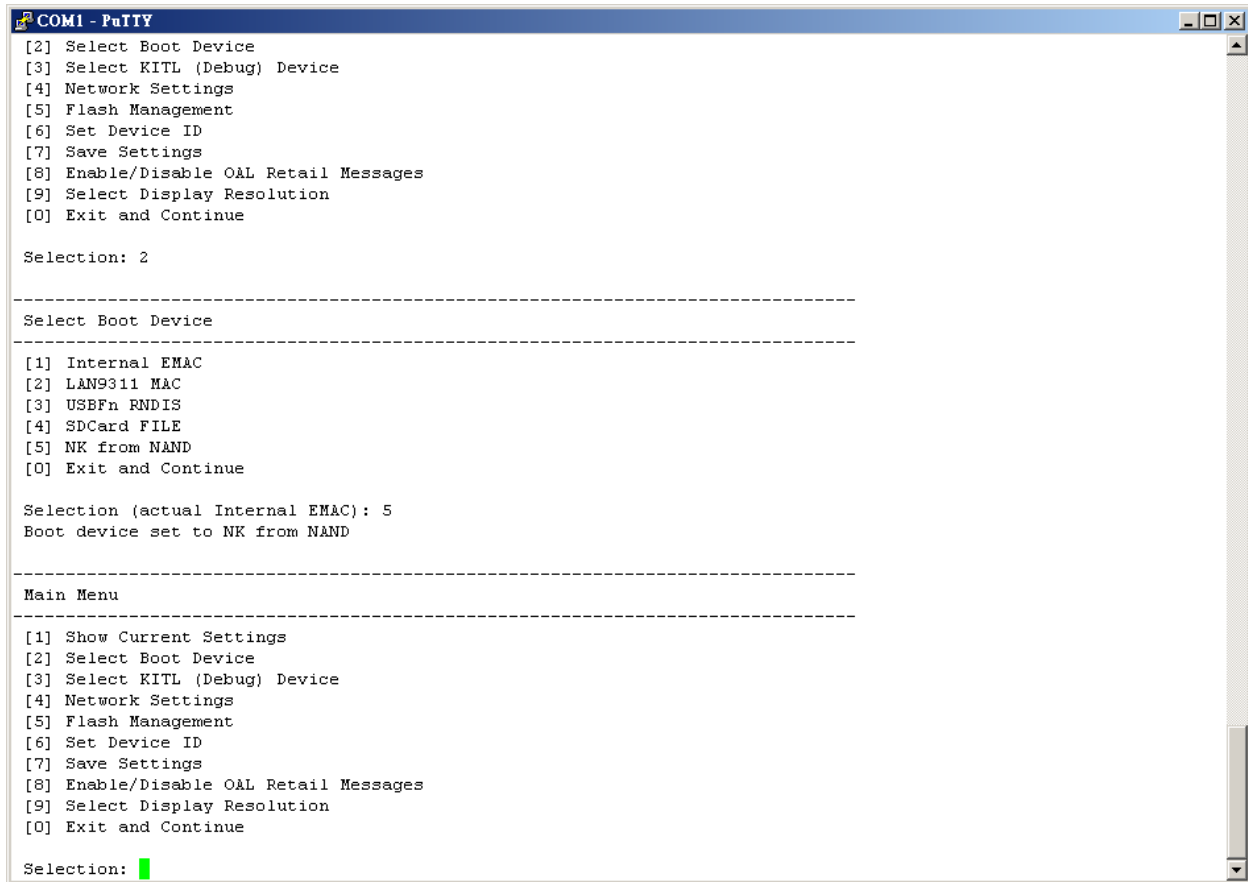


Figure 37

```
COM1 - PaTIV
[3] Select KITL (Debug) Device
[4] Network Settings
[5] Flash Management
[6] Set Device ID
[7] Save Settings
[8] Enable/Disable OAL Retail Messages
[9] Select Display Resolution
[0] Exit and Continue

Selection: 2

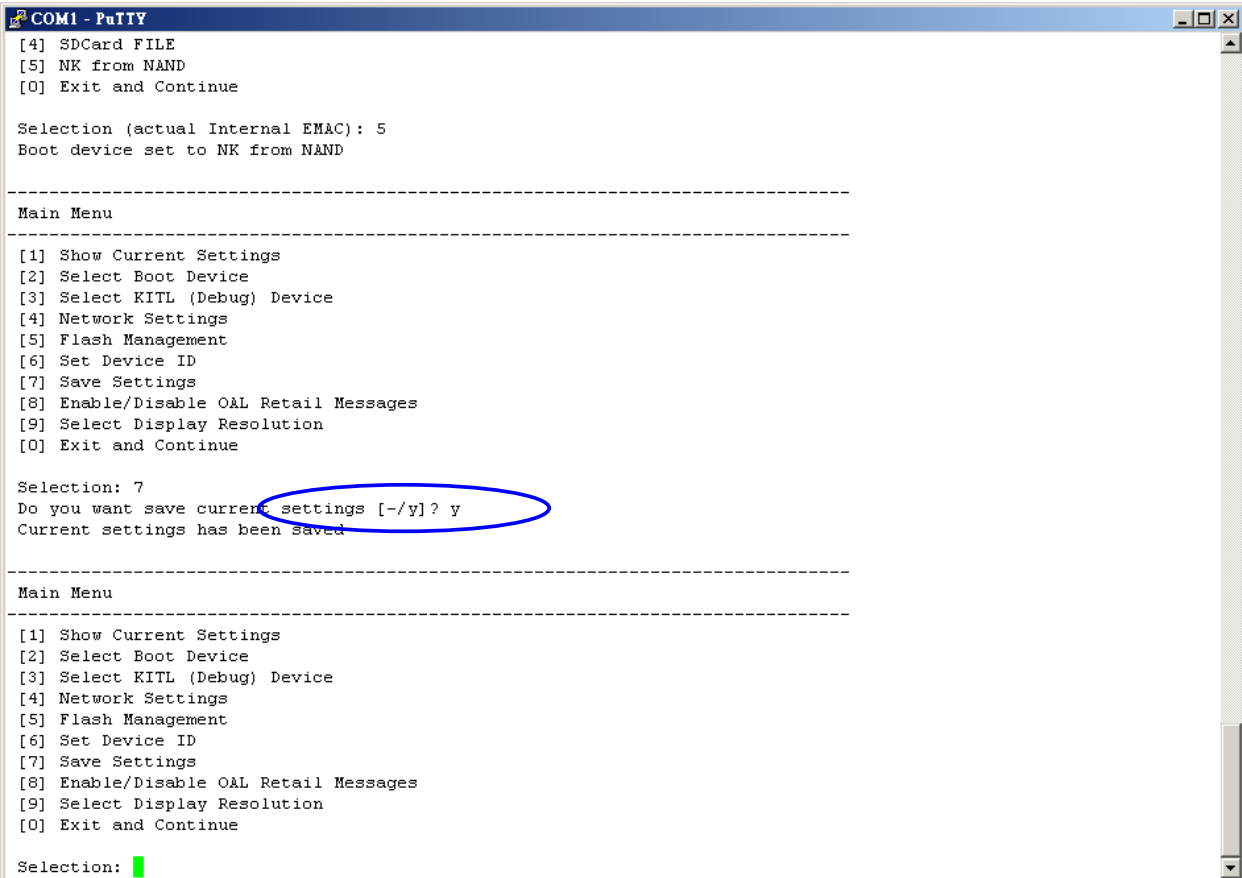
-----
Select Boot Device
-----
[1] Internal EMAC
[2] LAN9311 MAC
[3] USBFn RNDIS
[4] SDCard FILE
[5] NK from NAND
[0] Exit and Continue

Selection (actual Internal EMAC): 5
Boot device set to NK from NAND

-----
Main Menu
-----
[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] Flash Management
[6] Set Device ID
[7] Save Settings
[8] Enable/Disable OAL Retail Messages
[9] Select Display Resolution
[0] Exit and Continue

Selection: 7
Do you want save current settings [-/y]? █
```

Figure 38: Select save settings



```
COM1 - PaTTY
[4] SDCard FILE
[5] NK from NAND
[0] Exit and Continue

Selection (actual Internal EMAC): 5
Boot device set to NK from NAND

-----
Main Menu
-----
[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] Flash Management
[6] Set Device ID
[7] Save Settings
[8] Enable/Disable OAL Retail Messages
[9] Select Display Resolution
[0] Exit and Continue

Selection: 7
Do you want save current settings [-/y]? y
Current settings has been saved

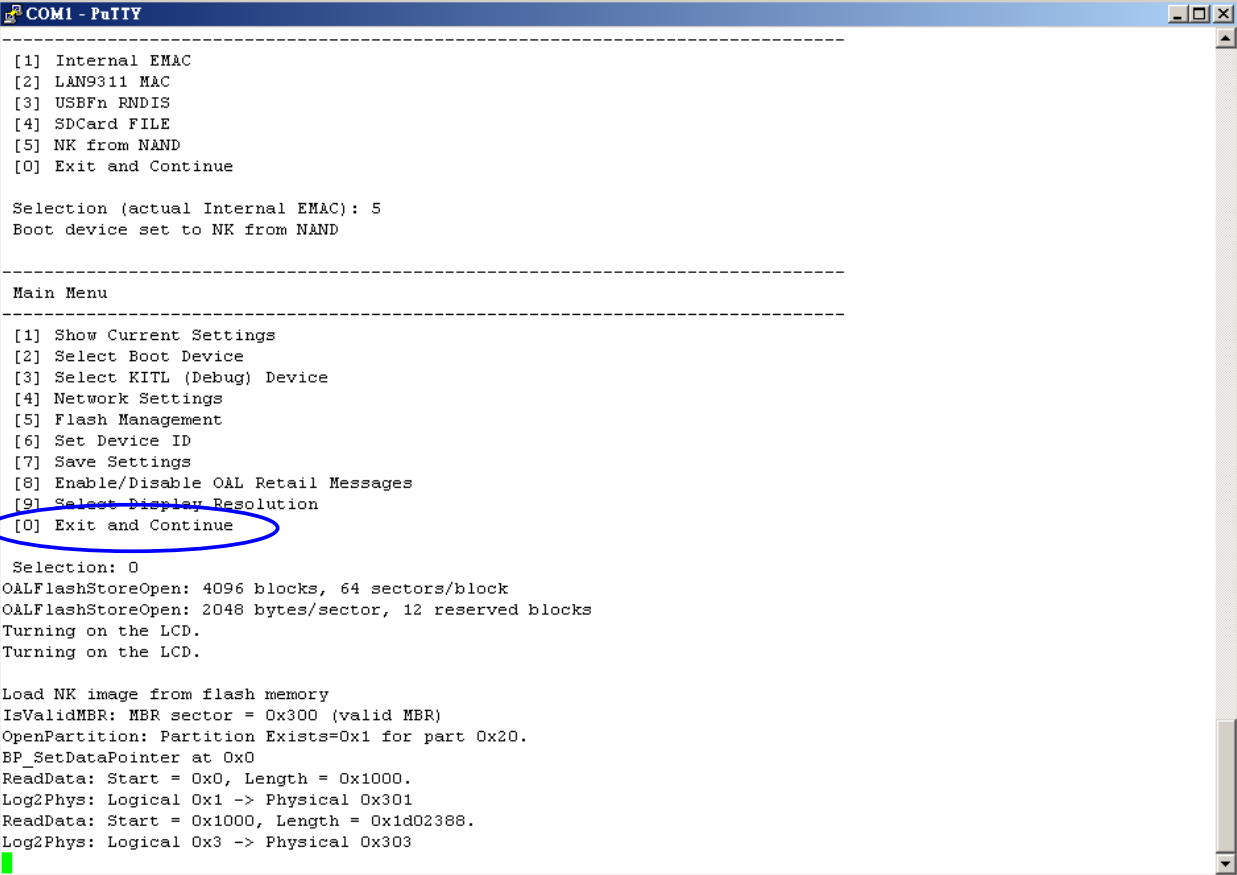
-----
Main Menu
-----
[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] Flash Management
[6] Set Device ID
[7] Save Settings
[8] Enable/Disable OAL Retail Messages
[9] Select Display Resolution
[0] Exit and Continue

Selection: █
```

Figure 39: Confirm selection “y”



- Chose “Exit and Continue”. (See figure 40)



```
COM1 - PuTTY
-----
[1] Internal EMAC
[2] LAN9311 MAC
[3] USBFn RNDIS
[4] SDCard FILE
[5] NK from NAND
[0] Exit and Continue

Selection (actual Internal EMAC): 5
Boot device set to NK from NAND

-----
Main Menu
-----
[1] Show Current Settings
[2] Select Boot Device
[3] Select KITL (Debug) Device
[4] Network Settings
[5] Flash Management
[6] Set Device ID
[7] Save Settings
[8] Enable/Disable OAL Retail Messages
[9] Select Display Resolution
[0] Exit and Continue

Selection: 0
OALFlashStoreOpen: 4096 blocks, 64 sectors/block
OALFlashStoreOpen: 2048 bytes/sector, 12 reserved blocks
Turning on the LCD.
Turning on the LCD.

Load NK image from flash memory
IsValidMBR: MBR sector = 0x300 (valid MBR)
OpenPartition: Partition Exists=0x1 for part 0x20.
BP_SetDataPointer at 0x0
ReadData: Start = 0x0, Length = 0x1000.
Log2Phys: Logical 0x1 -> Physical 0x301
ReadData: Start = 0x1000, Length = 0x1d02388.
Log2Phys: Logical 0x3 -> Physical 0x303
```

Figure 40

- Now it will start booting WinCE. (See figure 41)

```

COM1 - PaTTY
EP_SetDataPointer at 0x0
ReadData: Start = 0x0, Length = 0x1000.
Log2Phys: Logical 0x1 -> Physical 0x301
ReadData: Start = 0x1000, Length = 0x1d02388.
Log2Phys: Logical 0x3 -> Physical 0x303

ROMHDR (pTOC = 0x81d05334) -----
DLL First      : 0x4001c001
DLL Last       : 0x4196c0c6
Physical First  : 0x80002000
Physical Last   : 0x81d07a2c
Num Modules    :          240
RAM Start      : 0x81d10000
RAM Free       : 0x81d27000
RAM End        : 0x8f800000
Num Copy Entries :          2
Copy Entries Offset : 0x814c3f88
Prof Symbol Length : 0x00000000
Prof Symbol Offset : 0x00000000
Num Files      :          79
Kernel Flags   : 0x00000000
FileSys RAM Percent : 0x40404040
Driver Glob Start : 0x00000000
Driver Glob Length : 0x00000000
CPU            :    0x01c2
MiscFlags      :    0x0002
Extensions     : 0x80004128
Tracking Mem Start : 0x00000000
Tracking Mem Length : 0x00000000
-----

ReadData: Start = 0x1d03388, Length = 0x26a4.
Log2Phys: Logical 0x3a07 -> Physical 0x3d07
NK Image Loaded
Launch Windows CE image by jumping to 0x80002000...

Windows CE Kernel for ARM (Thumb Enabled) Built on Nov  3 2010 at 07:30:04
****Profiler Build****
---High Performance Frequency is 12999897 hz---

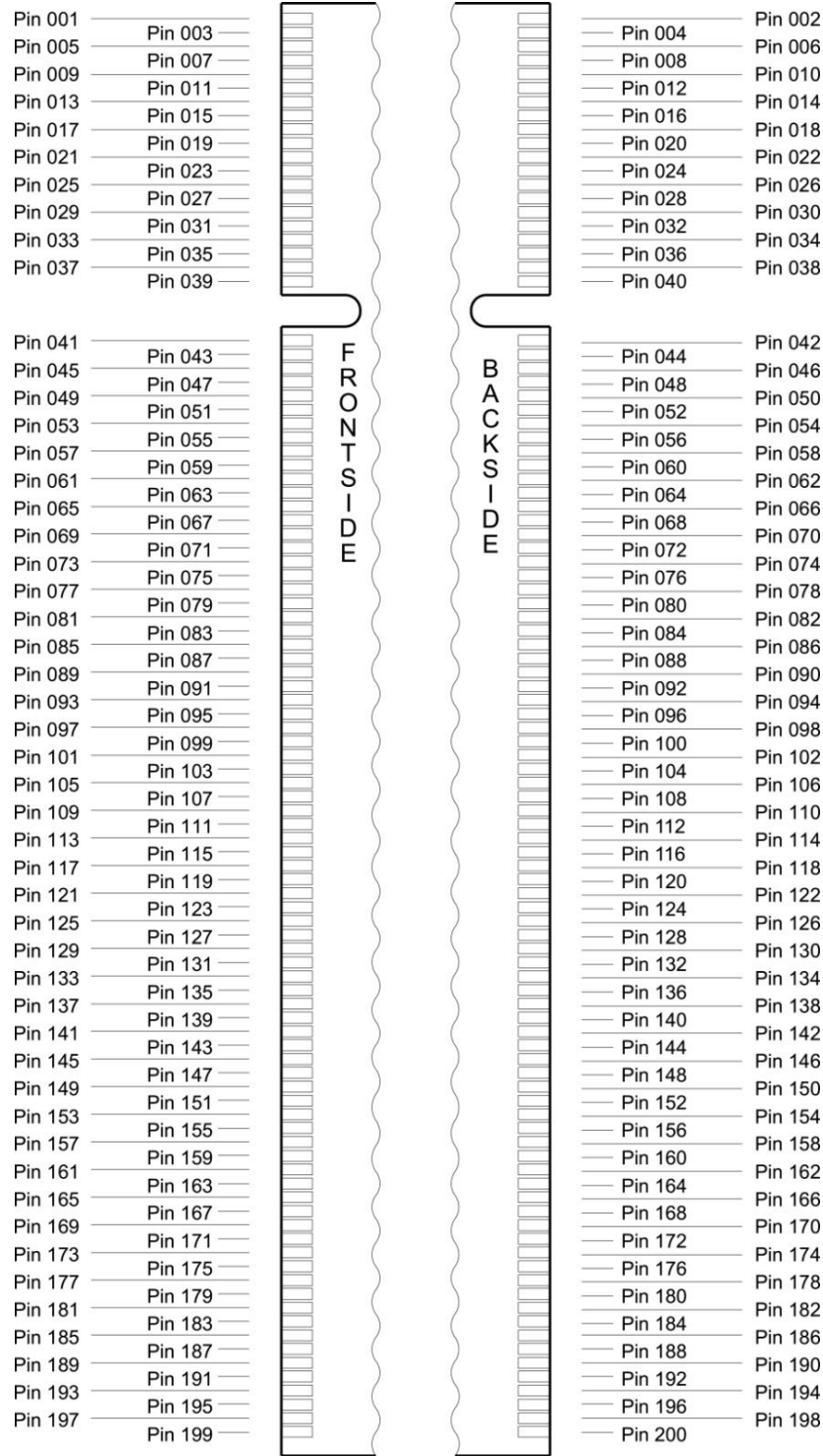
```

Figure 41

- FINISHED.

## 12 Appendix - Pin outs

### 12.1 Module connector

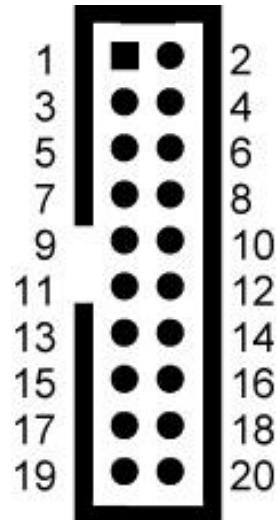


1	DC 5V	2	DC 5V
3	GND	4	VRTC
5	CODEC1_RLINEOUT	6	DC 5V
7	CODEC1_LLINEOUT	8	DC 5V
9	CODEC1_MICBIAS	10	DC 5V
11	CODEC1_MICIN	12	DC 5V
13	USB0_VBUS	14	DC 5V
15	CODEC1_RLINEIN	16	PWR_ON
17	CODEC1_LLINEIN	18	3V3
19	GND	20	IDMO
21	USB_5V	22	IDPO
23	I2C2_SCL	24	I2C3_SDA
25	I2C2_SDA	26	CAN_RX
27	SYS_nIRQ	28	nRESPWARM
29	CAN_TX	30	UART3_RX
31	DVI_nDISABLE	32	UART3_TX
33	GPIO_26	34	UART3_RTS
35	USB_RESET	36	UART3_CTS
37	GPIO_29	38	I2C3_SCL
39	GPIO_28	40	SYS_nRESPWRON
41	ETHER_TX-	42	CAM_PCLK
43	ETHER_TX+	44	CAM_WEN
45	ETHER_RX-	46	CAM_HD
47	ETHER_RX+	48	CAM_VD
49	CAM_FLD	50	CAM_D0
51	CAM_D1	52	CAM_D4
53	CAM_D3	54	CAM_D5
55	CAM_D7	56	CAM_D2
57	CAM_D6	58	ETHER_SPEED_LED
59	MMC1_CLK	60	ETHER_LINK_ACT_LEDn
61	MMC1_DAT2	62	MMC1_DAT1
63	MMC1_DAT0	64	MMC1_CMD
65	MMC1_DAT3	66	AGND
67	GND	68	GPIO_127
69	GPIO_128	70	LCD_PON
71	MMC1_DAT4	72	LCD_ENVDD
73	MCBSP3_FSX	74	GPIO_137
75	MCBSP3_CLKX	76	TS_nPEN_IRQ
77	MCBSP3_DR	78	GPIO_176
79	TV_SVIDEO_Y	80	3V3
81	TV_SVIDEO_C	82	MCSP1_CLK

83	3V3	84	3V3
85	MCSP11_SOMI	86	GPIO_177
87	GPIO_175	88	MCSP11_SIMO
89	MCSP11_CS0	90	MCSP12_CS1
91	MCSP12_CLK	92	MCSP12_SOMI
93	MCSP12_SIMO	94	MCSP12_CS0
95	DSS_PCLK	96	DSS_D11
97	DSS_HSYNC	98	DSS_D2
99	DSS_ACBIAS	100	DSS_D18
101	DSS_VSYNC	102	DSS_D12
103	DSS_D0	104	DSS_D13
105	DSS_D1	106	DSS_D20
107	DSS_D3	108	DSS_D7
109	DSS_D4	110	DSS_D17
111	DSS_D5	112	DSS_D14
113	DSS_D10	114	DSS_D15
115	DSS_D6	116	DSS_D22
117	DSS_D16	118	DSS_D19
119	DSS_D21	120	DSS_D23
121	DSI_DX1	122	DSI_DX2
123	DSS_D8	124	DSI_DX0
125	DSS_D9	126	DSI_DY2
127	MCBSP3_DX	128	GPIO_170
129	UART1_CTS	130	DSI_DY0
131	UART1_RTS	132	DSI_DY1
133	UART2_RX	134	B_GPMC_nCS0
135	UART2_TX	136	USB0_ID
137	CPEN	138	USB0_DP
139	uP_OBSCLK	140	USB0_DM
141	GPMC_WAIT2	142	GPMC_WAIT1
143	GPIO_55	144	LDC_ENBKL
145	GPIO_54	146	GPMC_A4
147	GPMC_A10	148	GPMC_nCS5
149	GPMC_A8	150	GPMC_A7
151	GPMC_A5	152	GPMC_A1
153	GPIO_42	154	GPMC_A6
155	GPMC_A2	156	GPMC_A3
157	GPMC_CLK	158	GPMC_WAIT3
159	GND	160	GPMC_nBE1
161	GPIO_116	162	UART1_TX
163	GPIO_119	164	UART1_RX

165	GPIO_118	166	UART2_CTS
167	GPIO_117	168	UART2_RTS
169	GPIO_152	170	B_GPMC_CLE
171	GPIO_153	172	B_GPMC_ALE
173	HOST_nOC	174	B_GPMC_nWP
175	GPIO_155	176	B_GPMC_WAITO
177	GND	178	GND
179	GPMC_D9	180	GND
181	GPMC_D12	182	GPMC_nOE
183	GPIO_52	184	GPMC_nWE
185	GPMC_D13	186	GPMC_D8
187	GPMC_D14	188	GPMC_D7
189	GPMC_D10	190	GPMC_D5
191	GPMC_D0	192	GPMC_D3
193	GPMC_D2	194	GPMC_D15
195	GPMC_D4	196	GPMC_D1
197	GPMC_D11	198	GPMC_D6
199	GND	200	GND

## 12.2 SPI1

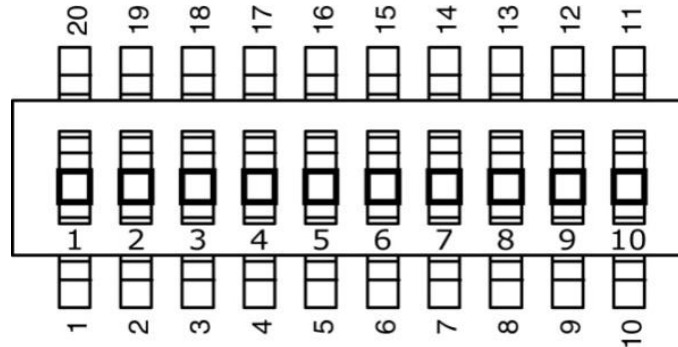


Marking on main board: SPI1

1	+3.3V	2	GPIO_117
3	MCSPi2_CLK	4	GPIO_118
5	MCSPi2_SIMO	6	GPIO_119
7	MCSPi2_SOMI	8	GPIO_116
9	MCSPi2_CS0	10	GPIO_175
11	MCSPi2_CS1	12	GPIO_176
13	I2C2_SCL_3V	14	GPIO_177
15	I2C2_SDA_3V	16	GPIO_170
17	GND	18	SYS_nIRQ
19	GND	20	uP_OBSCLK

NOTE: SPI1 @3.3V

### 12.3 GPIO Switch (SW3)



Marking on main board: SW3

4	3	2	1	Function: Display settings
Off	Off	Off	Off	Panel LG LB043WQ2 (4.3")
Off	Off	Off	ON	Panel Innolux AT070TN93 (7")
Off	Off	ON	Off	LVDS AUO-B089
Off	Off	ON	ON	DVI/ HDMI/ VGA 1280x720@60
Off	ON	Off	Off	TV out NTSC
Off	ON	Off	ON	TV out PAL
Off	ON	ON	Off	LVDS auo-g065vn01
Off	ON	ON	ON	LVDS promate-97g121s1n4f
ON	Off	Off	Off	LVDS auo-g150xg01
ON	Off	Off	ON	LVDS auo-g070vw01
ON	Off	ON	Off	LVDS promate-97g084s5n5f
ON	Off	ON	ON	LVDS promate-97g104s2n2f
7	6	5		Reserved
Reserved	Reserved	Reserved		Reserved
Reserved	Reserved	Reserved		Reserved



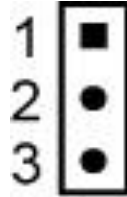
10	9			Function: Root file system path
Off	Off			NAND
Off	ON			MMC
ON	Off			NFS (remote server, default host IP 192.168.1.5, default server IP 192.168.1.4)( can change in u-boot)

### 12.3.1 Auto Update Procedure

It is possible to automatically update the system that is in the NAND Flash. Chapter 9 to 10 describes how to update. (THIS IS AN INTERNAL SWITCH, Please use [SW4](#) as described in chapter 9 to 10)

8				Function: Auto update mode
Off				Normal operation
ON				Auto update from MMC

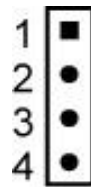
## 12.4 UART 1/UART 3



Marking on main board: UART1

1	RS232_RX3
2	GND
3	RS232_TX3

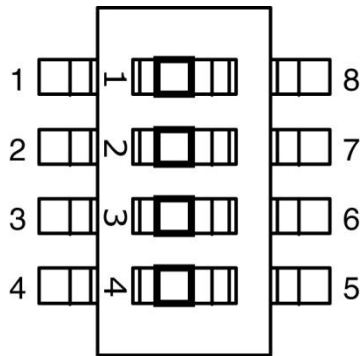
Note: RS-232 serial console cable might need a gender changer when connected to, for example, a null-modem. One can also reverse the connected cable (pin 1 becomes 3 and pin 3 becomes 1)



Marking on main board: UART2

1	3.3V
2	UART3 TX
3	UART3 RX
3	GND

Switch between UART1 and UART3



Marking on main board: SW2

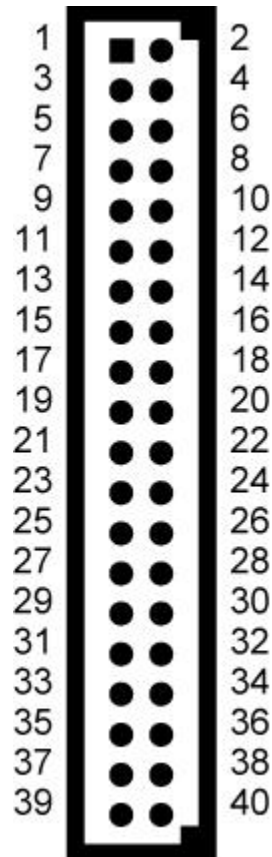
1&2 on, 3&4 off

UART1 (debug port)

1&2 off, 3&4 on

UART3

## 12.5 LVDS connector

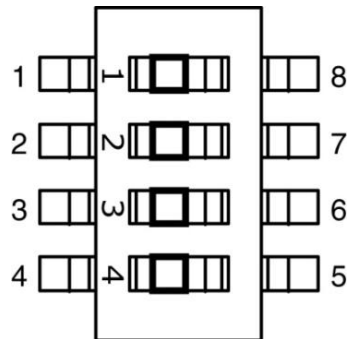


Data connector is 40 pin

Marking on main board: LVDS1

1	Vcc12V	2	DC_5VM
3	Vcc12V	4	DC_5VM
5	LCD Enable @5V	6	Backlight on @5V
7	LCD Enable @3.3V	8	Backlight on @3.3V
9	GND	10	GND
11	SEL68	12	3.3V
13	TXD0-	14	3.3V

15	TXD0+	16	REV
17	GND	18	R/L
19	TXD1-	20	U/D
21	TXD1+	22	LVDS_I2C_SCL
23	GND	24	LVDS_I2C_SDA
25	TXD2-	26	LED Enable @3.3V
27	TXD2+	28	LVDS_LED+ (Backlight Power +)
29	GND	30	LVDS_LED+ (Backlight Power +)
31	TXC-	32	LVDS_LED+ (Backlight Power +)
33	TXC+	34	LVDS Enable @3.3V
35	GND	36	LVDS_LED- (Backlight Power -)
37	TXD 3-	38	LVDS_LED- (Backlight Power -)
39	TXD 3+	40	LVDS_LED- (Backlight Power -)



### Marking on main board: SW5

1	R/L
2	U/D
3	REV
4	SELECT 6 / 8 bit

### Default setting SW5:

HMI screen size	1	2	3	4
6.5"	Off	Off	Off	ON
7"	Off	Off	Off	Off
8.4"	Off	Off	Off	ON
10.4"	Off	Off	Off	ON
12.1"	Off	Off	Off	ON
15"	Off	Off	Off	Off

## 12.6 GPIO Switch (SW4)

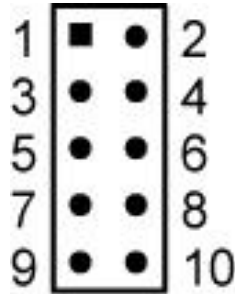


Marking on main board: SW4

NOTE: Switch 7 is reserved and should be off

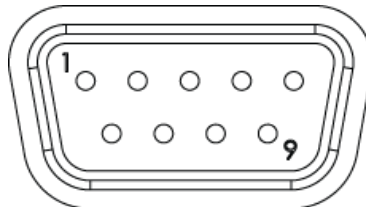
Function: Root file system path	Boot from NAND	Boot from MMC	Boot from NFS
1	OFF	OFF	ON
2	OFF	ON	OFF
Function: Auto update mode	Normal mode	Auto update mode	
3	OFF	ON	
Function: RS-xxx select (COM2)	RS-xxx=RS-232	RS-xxx=RS-485	RS-xxx=RS-422
4	ON	OFF	OFF
5	OFF	ON	OFF
6	OFF	OFF	ON
7			
Function: CAN bus terminal	Normal mode	Terminal	
8	OFF	ON	

## 12.7 CANBUS



Marking on motherboard: CANBus1

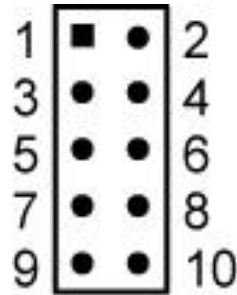
1	Reserved	2	CAN LOW
3	CAN GND	4	Reserved
5	CAN Shield	6	Optional GND
7	CAN HIGH	8	Reserved
9	DC 5VM	10	X



1	Reserved	2	CAN LOW
3	CAN GND	4	Reserved
5	CAN Shield	6	Optional GND
7	CAN HIGH	8	Reserved
9	DC 5VM		



## 12.8 GPIO connector

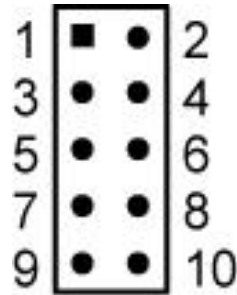


Marking on motherboard:J2

1	DC 5VM	2	GPIO1
3	GPIO2	4	GPIO3
5	GPIO4	6	GPIO5
7	GPIO6	8	GPIO7
9	GPIO8	10	GND

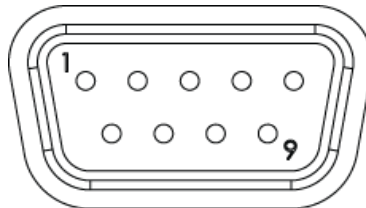
NOTE: J2 @5V

## 12.9 RS-232, RS-232/422/RS-485



Marking on motherboard: COM1

1	JDCD1#	2	JSIN1
3	JSOUT1	4	JDTR1#
5	GND	6	JDSR1#
7	JRTS1#	8	JCTS1#
9	JRI1#	10	X

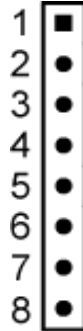


Marking on motherboard: COM1 (RS-232) & COM2 (RS-232/422/485)

PIN	RS-232	RS-422	RS-485
1	DCD	TxD – (A)	Data – (A)
2	RxD	TxD + (B)	Data + (B)
3	TxD	RxD + (B)	X
4	DTR	RxD – (A)	X
5	GND	GND	GND
6	DSR	X	X

7	RTS	X	X
8	CTS	X	X
9	RI	X	X

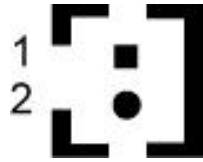
## 12.10 Touch panel PCB connector



Marking on motherboard: J1

- |   |             |
|---|-------------|
| 1 | DC 5VM      |
| 2 | LCD 3V3     |
| 3 | MCSP11 CLK  |
| 4 | MCSP11 CS0  |
| 5 | MCSP11 SIMO |
| 6 | MCSP11 SOMI |
| 7 | TS nPEN IRQ |
| 8 | GND         |

### 12.11 Speaker connector



Marking on motherboard: RIGHT & LEFT

- 1 OUT +
- 2 OUT -

### 12.12 Microphone connector



Marking on motherboard: MIC1

- 1 CODEC1 MIC IN
- 2 GND

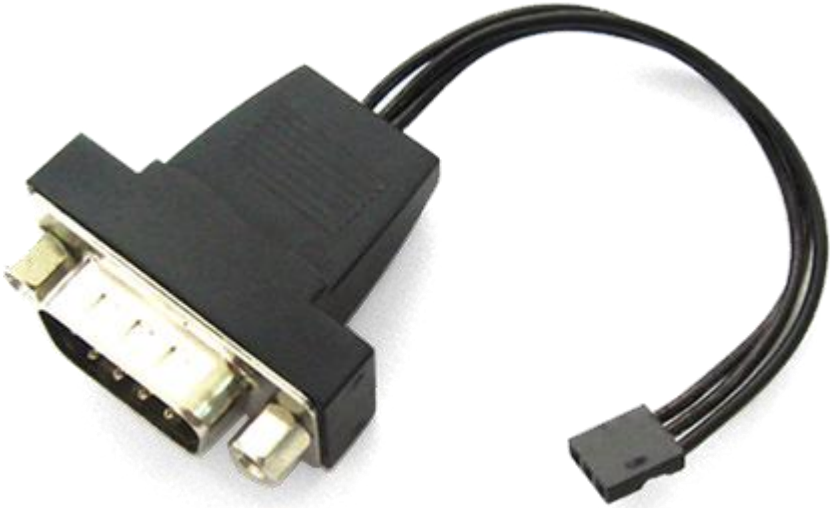
### 12.13 Battery connector



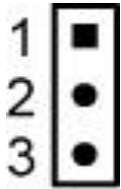
Marking on motherboard: J4

- 1 +
- 2 -

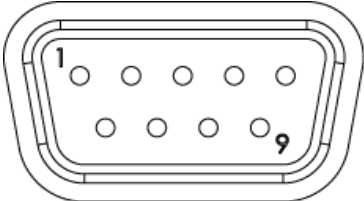
12.14 RS-232 cable



Accessory



1 (white dot)  
 2  
 3



3  
 5  
 2

# 13 Schematics

## 13.1 Schematics of Thb-3517

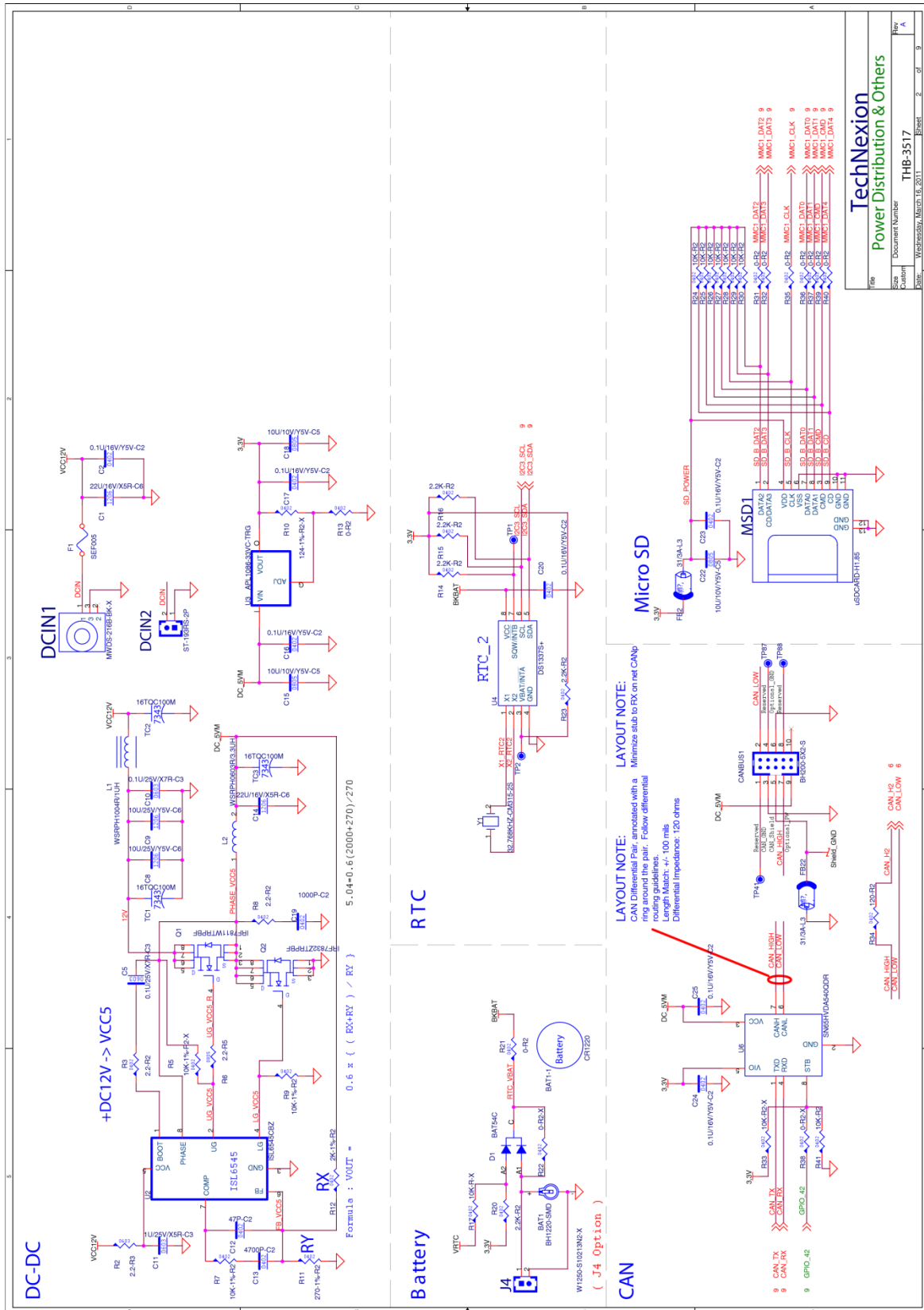
**THB-3517 REV:A**  
**PCB SN:100300230610**  
**L=6,147 x 102 mm(5.8" x 4")**

PAGE	TITLE
P01	Index
P02	Power Distribution & Others
P03	USB-HUB-1(Genesys)
P04	USB-HUB-2(SMSC)
P05	Audio & RJ45
P06	GPIO & Touch Connector
P07	TTL to LVDS (24 Bit)
P08	RS-232/485/422
P09	B to B Connectors

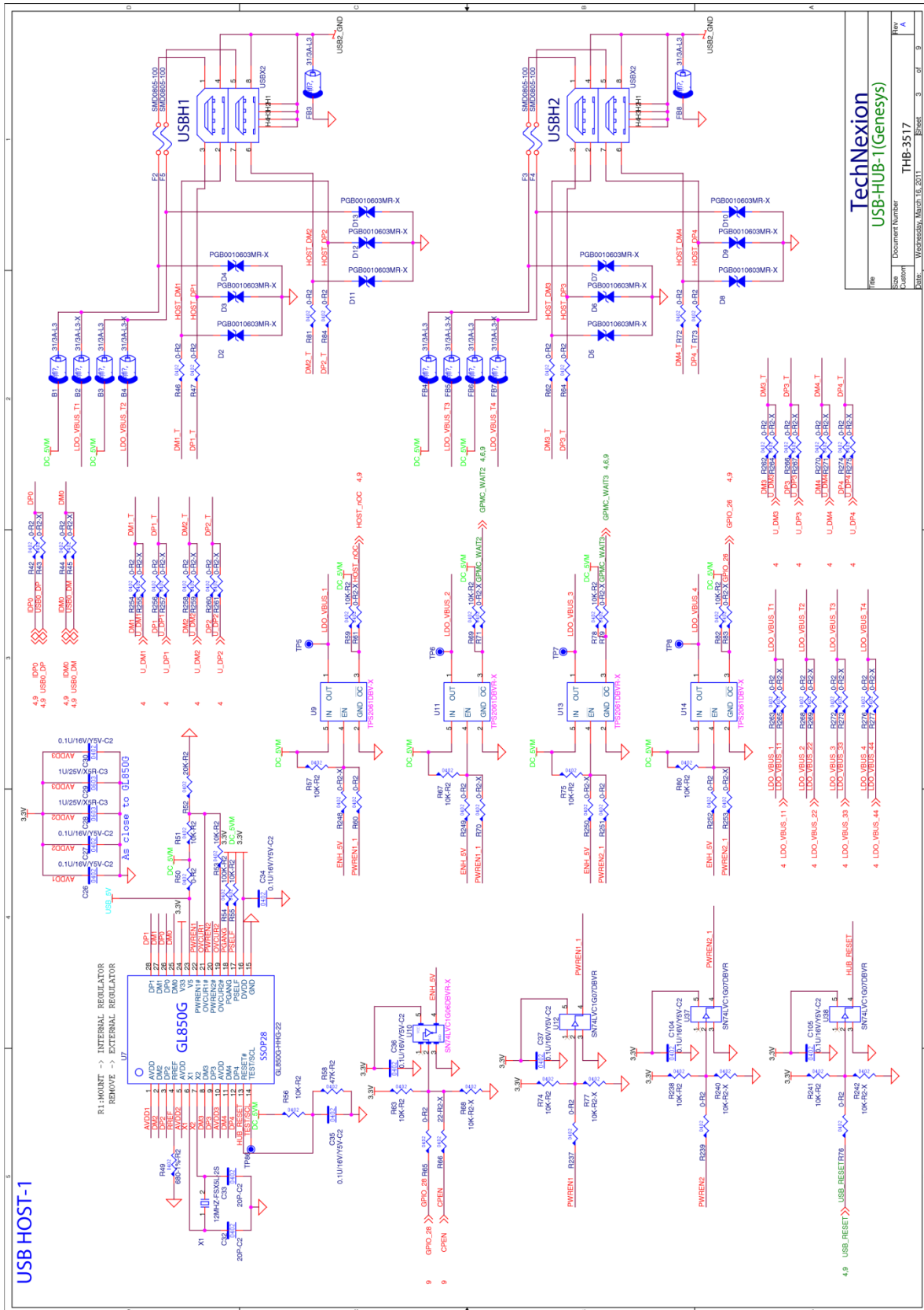
**Note:**

R243->100 Ohm;  
 R153, R158, R160, R162->10 Ohm;  
 R156, R159, R161, R163->10K Ohm;  
 R157, R158, R199->10 Ohm;  
 R202, R203, R204, R206->0 Ohm;  
 R360, R390, R361, U51, U52->Nothing;

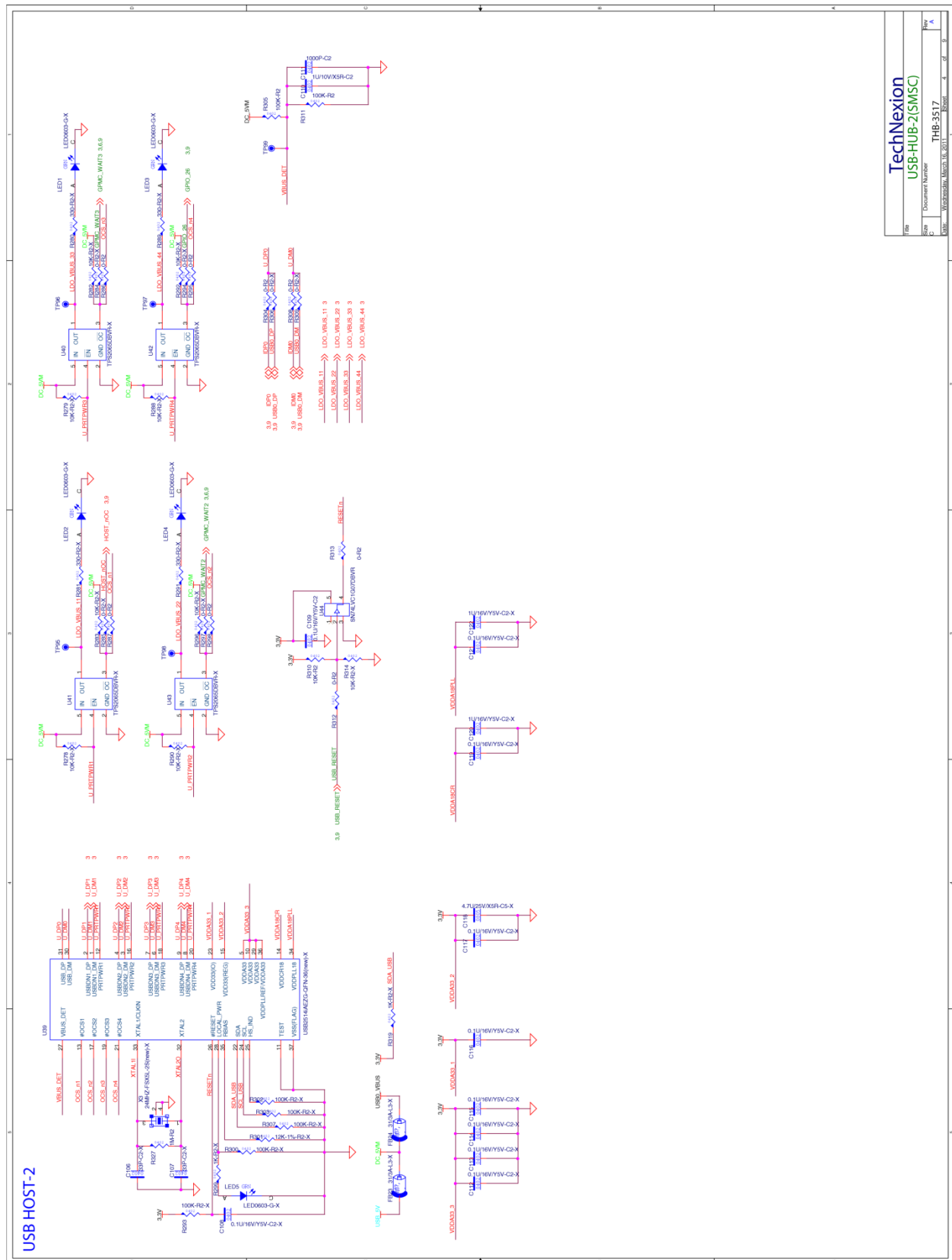
Doc: THB-3517  
 Date: Wednesday, March 16, 2011  
 Page: 1 of 9







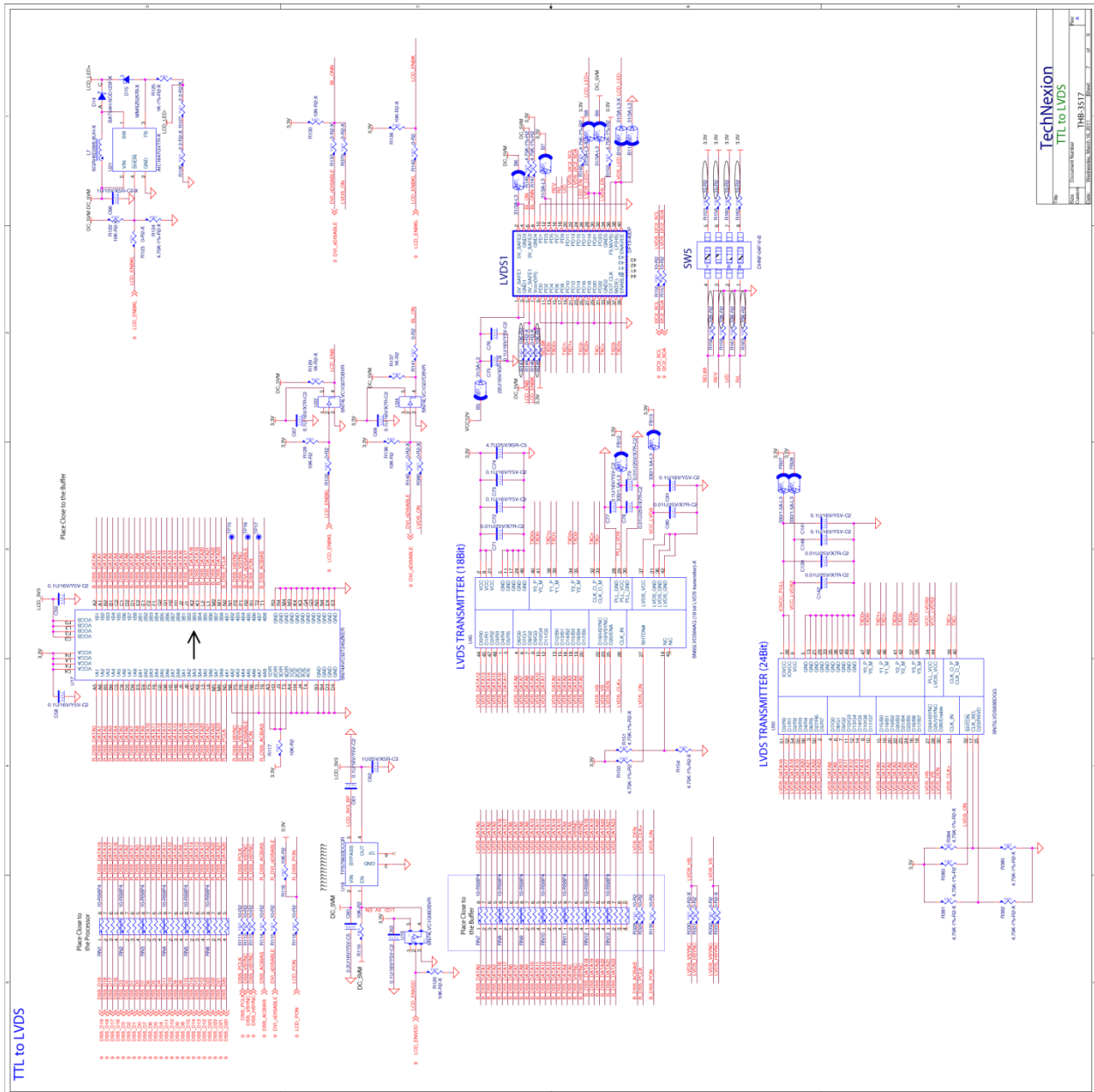
File	Document Number	Rev
USB-HUB-1(Genesys)	THB-3517	A
Date	Wednesday, March 16, 2011	Sheet 3 of 9



TechNexion			
USB-HUB-2(SMSC)			
File	Document Number	THB-3517	Rev. A
Size			
Ver.	Workshop	Model	18_0211
		Sheet	4 of 9







TechNexion  
TTL to LVDS  
THB-3517





### 13.2 Schematics of Touch Panel PCB

**TN29 REV:B**  
PCB SN:101100290220  
L=2,25mm x 32mm  
PAGE TITLE  
P01 Index  
P02 Touchscreen

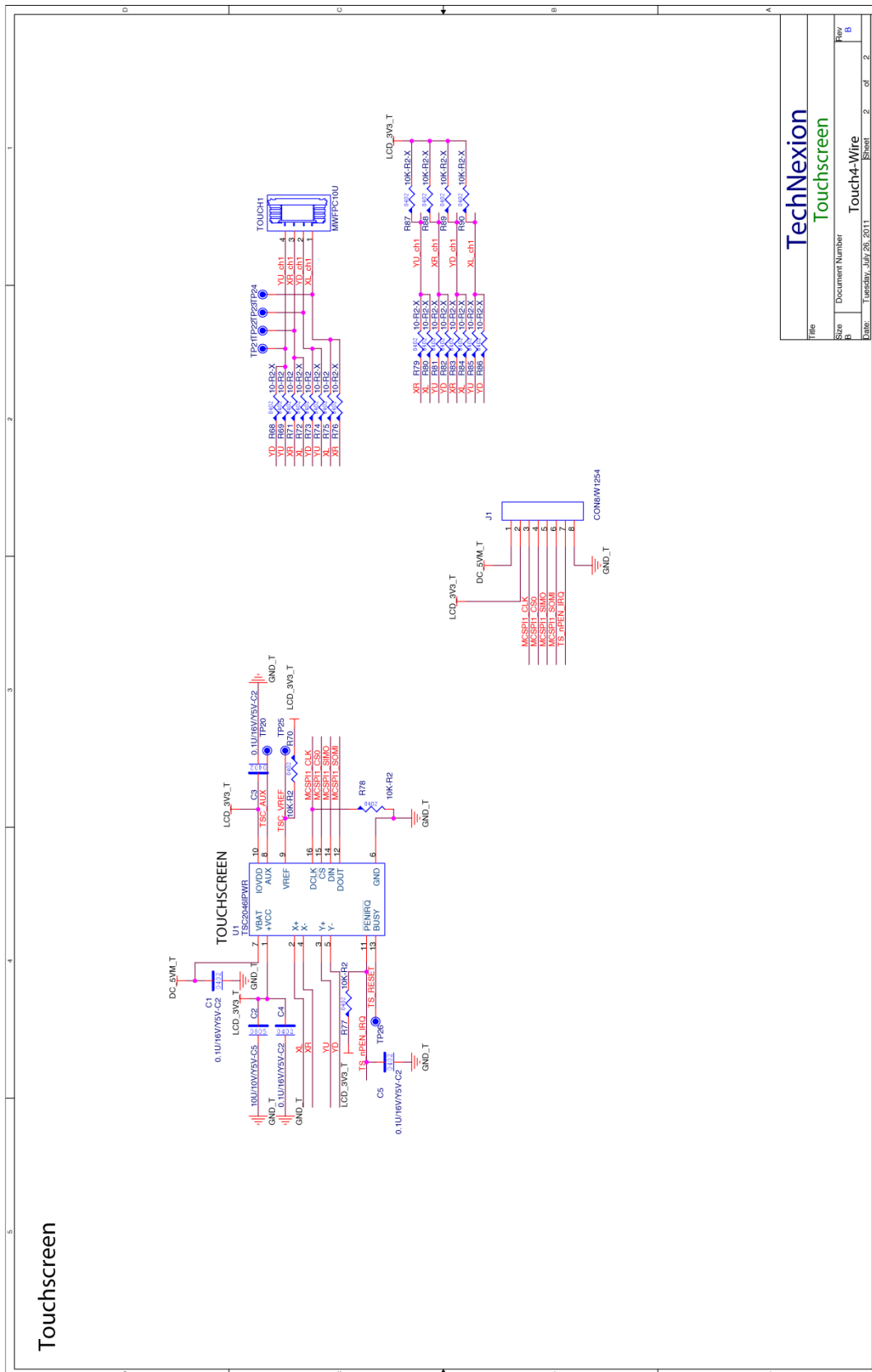
Note: 2011.02.11 2 LEVELS LAYERS

PCB  
PCB:TN29B0  
H5 HOLE:303,1-X HOLE:303,1-X  
H6 HOLE:303,1-X HOLE:303,1-X  
H7 HOLE:303,1-X HOLE:303,1-X  
H8 HOLE:303,1-X HOLE:303,1-X

RoHS compliant

TechNexion  
Index  
Touch4-Wire  
Document Number  
Date Tuesday, July 26, 2011  
Page 1 of 2





TechNexion  
Touchscreen  
Touch4-Wire  
Date: Tuesday, July 26, 2011  
Sheet 2 of 2

### 13.3 Schematics of Keypad PCB

**GPIO Keypad REV:0.1**  
PCB SN:?

L=2,97.5mm x 14mm

PAGE TITLE

P01 Index

P02 GPIO Board

-----

-----

-----

-----

-----

-----

-----

FM1 FM2  
FM40S-X FM40S-X

J2 Terminal PCB:12 J3 Terminal PCB:12

H1 H2

HOLE6\_303\_1-X HOLE6\_303\_1-X

PCB1 PCB02FN1R01

PCB

**RoHS**  
compliant

**TechNexion**  
Index

File		Rev.	0.1
Size		Document Number	TN31
Date	Wednesday, February 16, 2011	Sheet	1 of 2

