TCL WW R&D
FPD CENTER

Factory Alignment Specification of normal SIACP
For Hannstar serial
Version 0.20

MT10B: A slim edition of MT10

MT10L: A normal edition of MT10

MT10F: A Full Function edition of MT10

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Revision History

Status, Ver	Date, Drafter	Description of changes
V0.10	2010-10-25	This is the draft version of normal SIACP ・HDMI as the main absolute input ・The password of factory menu is 9735 ・Use RC to change project ID
V0.20	2010-12-15	・Add MT10F and MT10L series ・Upgrade factory menu structure

These chassises are designed for European LCD TV with MPEG4. The main chip is from Mediatec (MT5310 series) and supports below inputs and outputs:

class	item	MT10B	MT10L	MT10F1	MT10F2
Input & Output	**ATV** (PAL B/G D/K I, SECAM B/G D/K L/L)	√	√	√	√
	DTV (DVB-T,DVB-C,DVB-S)	DVB-T DVB-C	DVB-T DVB-C	DVB-T DVB-C	DVB-T DVB-C DVB-S/S2
	HDMI (480i/p, 576i/p, 720p up to 1080i/p, compliant v1.2. with HDCP)	3	2	4	4
	VGA	1	1	1	1
	VGA/DVI audio	1	1	1	1
	CMP (YPrPb can support from 480i up to 1080p,audio)	1	1	1	1
	SCART1 (CVBS & RGB,audio)	√	√	√	√
	SCART2 (CVBS & YC,audio)				
	Side AV or back AV (CVBS,audio)				
	USB player (picture,video,audio)	Picture, Video, Audio	Picture, Video, Audio	Picture, Video, Audio	Picture, Video, Audio
	SCART1 output (CVBS,audio)	√	√	√	√
	SCART2 output (CVBS,audio)				
	Headphone output	√	√	√	√
	SPDIF output	Optical	Optical	Optical	Optical
function	**MEMC**				
	CI+			√	√
Others	**Serial connector**	F402		F402	F402
	VGA connector	P406	P406	P406	P406
	I2C connector of MEMC module				

Serial connector of MT5310B definition:
Pin1:VCC   Pin2:RXD   Pin3:TXD   Pin4:GND
VGA connector of MT5310B definition:
VGA: Pin4:RXD   VGA Pin11:TXD

INFO:

✆ All tests and measurements mentioned hereafter have to be carried out at a normal mains voltage (**220 ~ 240 VAC**)

✆ All voltages have to be measured with respect to ground, unless otherwise stated

✆ All final tests have to be done on a complete set including LCD panel in a room with temperature of **25+/-7°C**

✆ The White Balance (color temperature) has to be performed into subdued lighted room after at least **1 hour** of warm-up/burn-in. This is applicable for both Alignment and Picture Performance evaluation at OQA in order to be set free of any temperature drift (colorimetry vs time)

1. Electrical Assembly Alignment

1.1. *Preconditions – DC/DC Check*

Before power on, please check the board according to the relevant block diagram and circuit diagram, and make sure that no serious error should destroy the board. For example,the output of DC/DC and LDO should not shorted to ground.

Supply a suited voltage and power on , then check the voltage according to the relevant block diagram , circuit diagram and voltage spec . the error should less than 5% .For example, the voltage for main chip(DV33, AV33,DV18,DV11,etc.), the voltage for DDR (DDRV) , the voltage for amplifier(AUDIO_PWR),etc. Only the standby voltage is necessary if there is no software in the flash .

1.2. *SW download*

Download the latest release MT10B_SW into the flash using MTK SW tool. See Appendix❶ "**How to download FLASH SW**". Or upgrade the SW from USB port See Appendix❷ "**How to upgrade FLASH SW from USB**".

Rememer to do "Reset all" after upgrade the SW.

1.3. *Panel ID check and modify*

There is different ID stored in the NVM depended on different Panels. Modify it with Hyper terminal if the initial ID or a wrong ID make the set can not display clearly. See Appendix❸. It can be checked and modified in **Factory menu**->**Project info**->**Project ID** if the set can display clearly . The set should be restart if the project ID is changed .

1.4. *Functional Test*

Once the boards (chassis, KB, IR, PSU…) and the panel are well interconnected, connect all external generator devices to relevant inputs/outputs below according to their respective test patterns format and check picture content and sound quality accordingly:

Source	Test signal (generator)	Test pattern (format/image)
Analog /Digital Tuner	RF cable	Full Band (VHF/UHF) + CATV DVB-T
Composite(CVBS)	Chroma/Fluke	PAL Half Color & Gray bars
SCART1 (CVBS) SCART1 (RGB)	Chroma/Fluke	PAL Half Color & Gray bars Half Color & Gray bars
SCART2 (CVBS) SCART2 (Y/C)	Chroma/Fluke	PAL Half Color & Gray bars
VGA	Chroma/QuantumData	1024x768@60Hz

		Half Color & Gray bars
CMP (YPrPb)	Chroma/QuantumData	1080i@60Hz
		Half Color & Gray bars
HDMI	DVD with HDMI compliancy	Movie 720p@60Hz
Headphone	RF cable	First channel
Loud Speakers	RF cable	First channel
SCART1 (CVBS out)	RF cable	First channel
SCART2 (CVBS out)	Chroma/Fluke	PAL Half Color & Gray bars

Audio tones can be defined by the factory (ie: 1KHz & 3KHz, sweep, …).

Picture video formats can be changed by the factory according to their own standard.

1.5. DDC & EDID Test

The E-EDID data structure are according to VESA Enhanced EDID 1.3 (and EIA/CEA-861B for HDMI).

Both VGA and HDMI have their own separate bin files:

For EDID check, it's needed to check whether the correct EDID is downloaded by checking corresponding EDID NVM Checksum or read them out to check bit by bit if it is in line with the released EDID bin file.

1.6. HDCP Test

For HDCP compliancy, it's needed to check whether the HDCP key has been well set.

1.7. CI+ Key activation and test (This step is only for the models with CI+ function)

Select **Factory menu**-> **Update CI+ Credential**-> **Update CI+ Credential** , then press "**OK**" key on RemoteControl to active the CI+ KEY. The Valid(CI+ state) state turn to "Yes" and Cus Code(Custom Code), Serial Num display if succeed. Download the CI+ Key and try to active it again if fail.

2. Final Assembly Alignment

2.1. FactoryMenu

Follow the below steps to pop-up the Factory Menu in case of "**FactoryKey**" is disable:

- press RemoteControl key "**MENU**" to display main menu
- Select "Picture" and press "**OK**" key to enter the picture submenu
- Select "Contrast" item
- press the subsequence RemoteControl keys "**9**", "**7**", "**3**" and "**5**"

Press RemoteControl key "**Return**" To pop-up the Factory Menu in case of "**FactoryKey**" is enable.

The status of "**Factory Key**" can be changed in **Factory Menu**->**Hotkey**

Press RemoteControl "**OK**" key or "**RIGHT**" key to enter the submenu.

Press RemoteControl "**Menu**" key to go back to the root menu.

Press RemoteControl "**RIGHT**"or "**LEFT**" key to change the values.

Press RemoteControl "**OK**" key run the function.

Press RemoteControl "**Exit**" key exit the factorymenu.

2.2. *Entering to "P" Mode*

Turned on the factory key to enter into "P" mode.The TV will display the following info in bottom left corner in "P" mode.
-main version   ***
-project ID   ***
-CI+ status   ***
-P/PS/D   ***

2.3. *White Balance Alignment*

Make sure that the picture mode is **"vivid"**, enter to **"P" mode**(turned on the factory key) and **switch off** "**Pic. Enhance**" in **Factory Menu**-> **White Balance** before white balance alignment .
VGA,**CMP**,**SCART RGB**,**DTV**,**CVBS_PAL** Color Coordinates are relative to HDMI.
CVBS_SECAM and **CVBS_NTSC** Color Coordinates are relative to CVBS_PAL.
Warm and **Cool** Color Coordinates are relatives to **Normal** mode.
Only **HDMI(YUV 720p@60Hz)** input requires color temperature adjustment. **All the Relative Matrix Offsets** should be set while doing alignment.

- ▪ **Expected Targets and Tolerances**

The measured parameters should be "x, y" coordinates.
The White Balance alignment should be performed using a contact less analyzer (ei: Minolta CA-210). The analyzer may not touch the screen surface, and measurement must be performed in a dark environment keeping the probe(s) at 90+/-2° from the panel.
The result should measure up the relevant spec.

2.4. *High Pot. and Insulating Resistance Tests*

At the end of the process, a High Pot. and an Insulating Resistance tests are required for matching Safety Electrical requirements (ei: xxxx)
- ▪ **High Voltage Withstanding requirements**

- "Voltage"	⇨ **3500 VAC**
- "Max Leakage Current"	⇨ **10 mA**
- "Test Time"	⇨ **5 sec**

- ▪ **Insulating Resistance requirements**

- "Voltage"	⇨ **DC500V**
- "Threshold Min"	⇨ **4M**Ω
- "Test Time"	⇨ **3 sec**

3. Factory default settings
Do the "Reset shop" before packing.The detail of reset shop follow OOB setting.

"Factory Menu" Definition

1). Hotkey

Item	Sub-item	Value	Note
Hotkey		Off/On	OFF: hotkey is invalid ON : hotkey(Return key) is availability

2). Burning Mode

Item	Sub-item	Value/Sub-item	Note
Burning Mode		Off/On	Select panel On with left/right key, Press "EXIT" key to enter the burning mode; Press "Menu" key on keyboard to exit the burning mode

3). ADC（Need not to do ADC when alignment）

4). White Balance

Item	Sub-item	Value	Note
White Balance	Source	HDMI,etc	For balance source：HDMI,VGA,DTV,PAL,SECAM,NTSC,Scart RGB,CPM, HDMI
	Color Temperature	Normal /Warm/Cool	The value of Warm and cool is the offset of Normal mode. Cool is the preset status
	R Gain		R White balance
	G Gain		G White balance
	B Gain		B White balance
	R Offset		R Gray balance
	G Offset		G Gray balance
	B Offset		B Gray balance
	White Balance Init		Press "Right" key to initial the preset RGB Gain/Offset value
	Pic. Enhance	On/Off	Press "Right" key to switch off all of the items in the feature submenu. This should be done before white balance alignment. If it's off, the way to switch it on is to reset user/shop or set on the features in Feature sub-item manually.
	Picture related	Flesh tone	Select On/Off to open/close the function
		Adaptive luma control	Select On/Off to open/close the function
		Light sensor	Select On/Off to open/close the function
		Dynamic backlight	Select Auto/High/Mid/Low to set the backlight control
		Back light	0~100 Set the backlight

5). Reset Shop

Item	Sub-item	Value	Note
Reset Shop			Clear date of NVM in user menu,include the value related installation,and Clear date of factory menu except the item of Balance and sound ,set to default value

6). Reset ALL

Item	Sub-item	Value	Note
Reset ALL			Clear NVM values，and set to default value

7）. Power Mode

Item	Sub-item	Value	Note
Power Mode		Boot/Standby/ Last Status	Boot: Enter power on mode Standby: Enter standby mode Last Status: power on according to last status

8）. USB Clone Mode

| Item	Sub-item	Value	Note
USB Clone Mode	USB Clone Mode	All/ChannelList /EEPROM/ User Setting	Select to choose the things you want to clone
	TV TO USB	DO	Press "Right" key to copy the data(WB,ADC,picture setting,etc) to USB
	USB TO TV	DO	Press "Right" key to set the data(WB,ADC,picture setting) from USB

9) . Other

Item	Sub-item	Value	Note
Upgrade CI+ Credential	Update CI+ Credential	DO	Press "OK" key to active the CI+ KEY
	Update from USB	DO	Press "OK" key to download the CI+ KEY from USB
	Erase CI+ Credential	DO	Press "OK" key to erase the CI+ KEY
	Valid		Show the CI+ state
	Cus Code		Show the CI+ custom code
	Serial Num		Show the CI+ serial number
Project info	Project ID	***	
	Project Name	***	
	Panel ID	***	
	Panel	***	
	Version	***	
	Date	***	
	Time	***	
	MCU Version	***	
	RCU	***	
	PSU	***	
	Region	***	
	Product S/N	***	

Appendix ❶ "How to download FLASH SW"

 Prepare MTK SW tool for update.
1. Connect the PC to the serial connector on board using a special serial device (USB or COMx).
2. Provide the a correct voltage to the board
3. Start "**MTKTOOL.exe**" application under MTKxx folder, and set the parameters as below picture(notice:select MT536X chassiss):
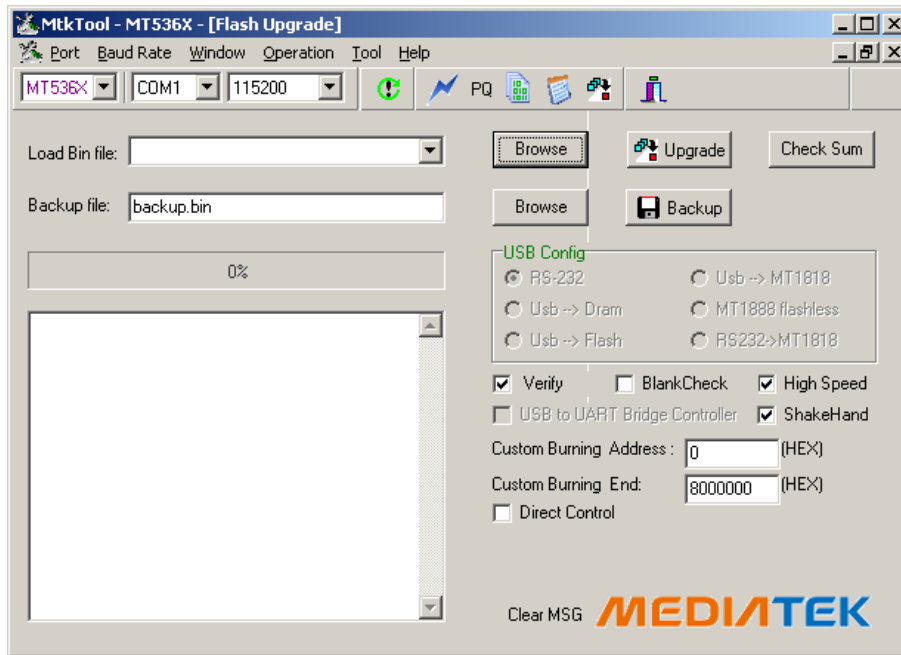
4. Press "Browse" button to select the corresponding SW bin file to upload
5. Press "Upgrade" button to start downloading the SW and wait the gauge displayed "100%" that means the SW has been successfully downloaded.
   In the meanwhile, all operations such erasing flash and so… are parsed into the debug window script.
6. Once the SW is downloaded, switch-off/on the chassis board and wait few seconds for eeprom update.

Appendix❷ "How to upgrade FLASH SW from USB"

Upgrade with loader:
1. Save the new software file(*.pkg) in the root directory of USB, and modify it's name as upgrade.pkg.
2. Plug in the USB when TV set is "power off" or "standby" (TV set should be on "standby" status if using a touch sensing keyboard).
3. Press down "power" key on keyboard, power on if it is on "power off" status , release the "power" key 2~5 second later , the LED on IR board will flash after upgrade begin, the TV set will start up if upgrade succeed.The LED is on but no flash if upgrade fail,check the set and try again.

Upgrade without loader(The TV set should be able to display normally):

1. Save the new software file(*.pkg) in the root directory of USB, and modify it's name as upgrade.pkg.
2. Plug in the USB.
3. Upgrade the SW follow the indication display on the screen

Appendix ❸ "Modify panel ID with RC"

   "Modify panel ID without panel but via a RC"

   ➢ **062598+MENU+xxx (xxx:Panel ID)**