SANYO

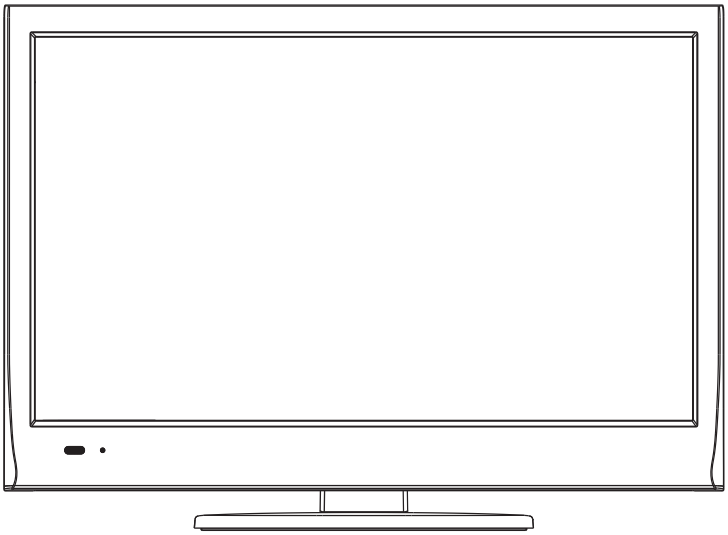
FILE NO.

SERVICE MANUAL

LED-LCD TV

LED-22XR10F

PRODUCT CODE No.
1 682 349 47: PAL-BG(CCIR)
NTSC(AV)



REFERENCE No.:SM0915111

CONTENTS

Attention: This service manual is only for service personnel to take reference with. Before servicing please read the following points carefully.

Safety precautions

1. Instructions

Be sure to switch off the power supply before replacing or welding any components or inserting/plugging in connection wire Anti static measures to be taken (throughout the entire production process!):

a) Do not touch here and there by hand at will;

b) Be sure to use anti static electric iron;

c) It's a must for the welder to wear anti static gloves.

Please refer to the detailed list before replacing components that have special safety requirements. Do not change the specs and type at will.

2. Points for attention in servicing of LED

2.1 Screens are different from one model to another and therefore not interchangeable. Be sure to use the screen of the original model for replacement.

2.2 The operation voltage of LED screen is 700-825V. Be sure to take proper measures in protecting yourself and the machine when testing the system in the course of normal operation or right after the power is switched off. Please do not touch the circuit or the metal part of the module that is in operation mode. Relevant operation is possible only one minute after the power is switched off.

2.3 Do not use any adapter that is not identical with the TV set. Otherwise it will cause fire or damage to the set.

2.4 Never operate the set or do any installation work in bad environment such as wet bathroom, laundry, kitchen, or nearby fire source, heating equipment and devices or exposure to sunlight etc. Otherwise bad effect will result.

2.5 If any foreign substance such as water, liquid, metal slices or other matters happens to fall into the module, be sure to cut the power off immediately and do not move anything on the module lest it should cause fire or electric shock due to contact with the high voltage or short circuit.

2.6 Should there be smoke, abnormal smell or sound from the module, please shut the power off at once. Likewise, if the screen is not working after the power is on or in the course of operation, the power must be cut off immediately and no more operation is allowed under the same condition.

2.7 Do not pull out or plug in the connection wire when the module is in operation or just after the power is off because in this case relatively high voltage still remains in the capacitor of the driving circuit. Please wait at least one minute before the pulling out or plugging in the connection wire.

2.8 When operating or installing LED please don't subject the LED components to bending, twisting or extrusion, collision lest mishap should result.

2.9 As most of the circuitry in LED TV set is composed of CMOS integrated circuits, it's necessary to pay attention to anti statics. Before servicing LED TV make sure to take anti static measure and ensure full grounding for all the parts that have to be grounded.

2.10 There are lots of connection wires between parts behind the LED screen. When servicing or moving the set please take care not to touch or scratch them. Once they are damaged the screen

would be unable to work and no way to get it repaired.
If the connection wires, connections or components fixed by the thermotropic glue need to disengage when service, please soak the thermotropic glue into the alcohol and then pull them out in case of dagmage.
2.11 Special care must be taken in transporting or handling it. Exquisite shock vibration may lead to breakage of screen glass or damage to driving circuit. Therefore it must be packed in a strong case before the transportation or handling.
2.12 For the storage make sure to put it in a place where the environment can be controlled so as to prevent the temperature and humidity from exceeding the limits as specified in the manual. For prolonged storage, it is necessary to house it in an anti-moisture bag and put them altogether in one place. The ambient conditions are tabulated as follows:

Temperature	Scope for operation	5 ~ +35 ^{o}C
	Scope for storage	-15~ +45 ^{o}C
Humidity	Scope for operation	20% ~ 80%
	Scope for storage	<= 80%

2.13 Display of a fixed picture for a long time may result in appearance of picture residue on the screen, as commonly called “ghost shadow”. The extent of the residual picture varies with the maker of LED screen. This phenomenon doesn’t represent failure. This “ghost shadow” may remain in the picture for a period of time (several minutes). But when operating it please avoid displaying still picture in high brightness for a long time.

3. Points for attention during installation

3.1 The front panel of LED screen is of glass. When installing it please make sure to put it in place.
3.2 For service or installation it’s necessary to use specified screw lest it should damage the screen.
3.3 Be sure to take anti dust measures. Any foreign substance that happens to fall down between the screen and the glass will affect the receiving and viewing effect
3.4 When dismantling or mounting the protective partition plate that is used for anti vibration and insulation please take care to keep it in intactness so as to avoid hidden trouble.
3.5 Be sure to protect the cabinet from damage or scratch during service, dismantling or mounting.

Alignment instructions

1. Safety Instructions

Be sure to switch off the power supply before replacing or welding any components or inserting/plugging in connection wire Anti static measures to be taken (throughout the entire production process!):

a) Do not touch here and there by hand at will;

b) Be sure to use anti static electric iron;

c) It's a must for the welder to wear anti static gloves.

Please refer to the detailed list before replacing components that have special safety requirements. Do not change the specs and type at will.

2. Test equipment

VG-848 (VGA, YPbPr signal generator)

VG-849 (HDMI digital video signal generator)

CA210 (color analyzer)

3 Alignment flow

3.1 Voltage of power supply test

According to the wiring diagram "9219KH7201JL", connect power board, main board, IR board correctly, then switch on main power and press key "standby" to turn on the TV set.

a) Test each pin voltage of socket X401 in turn, please refer voltage to Table 1:

X401	Pin1	2	3	4，5	6	7	8	9	10	11	12	13
Vol.	4.9 V～5.1 V	3.2 V～3.4 V	0	11.4 V～12.6 V	0	0	0	4.85 V ～5.35 V	0	4.85 V～5.35 V	0	>2.5 V

Table 1 Each pin voltage of X401

3.2 Alignment flow chart shown as Fig. 1

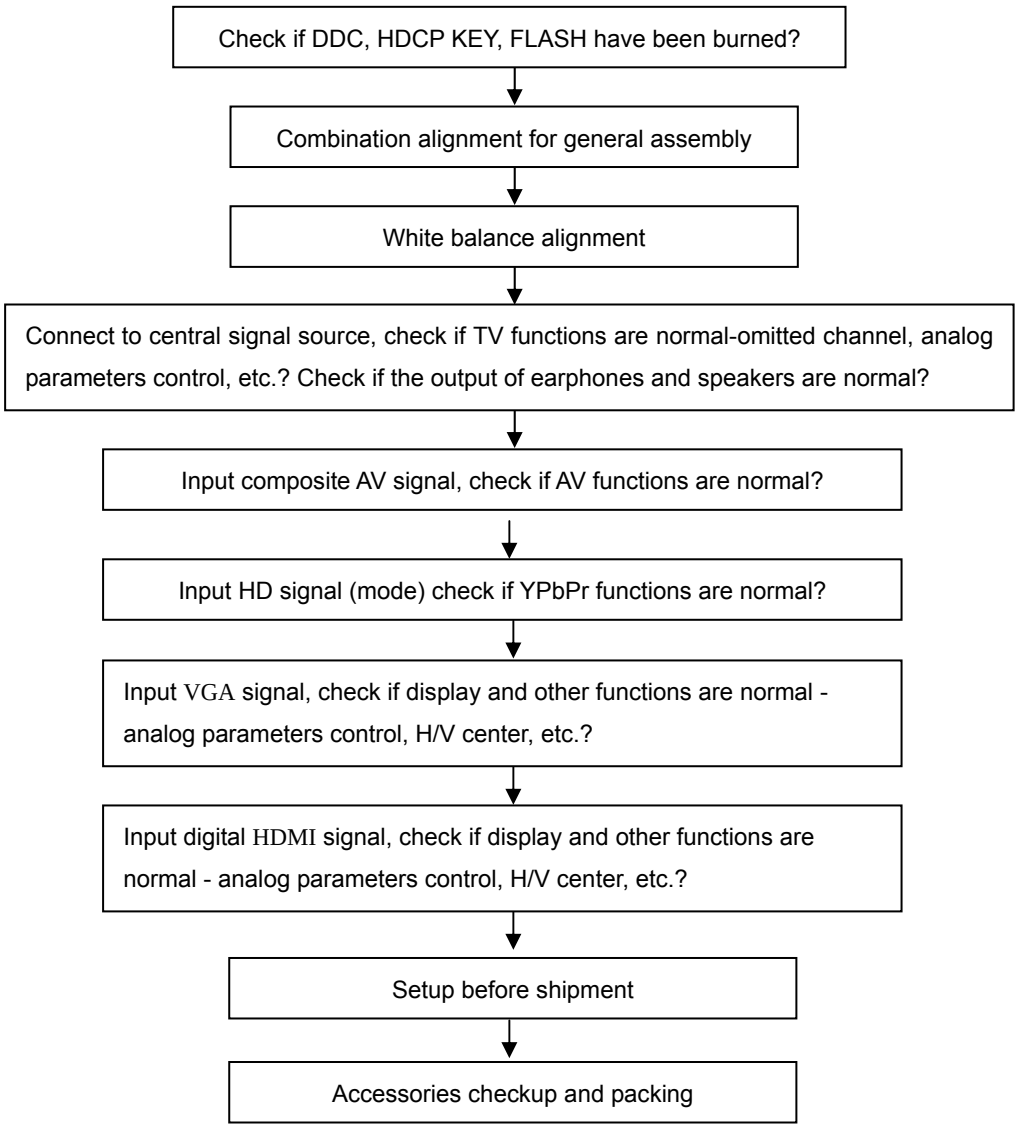


Fig. 1 Alignment flow chart

4 **Alignment instructions**

4.1 Unit adjustment

4.1.1 According to the wiring diagram "9219KH7201JL", connect power board, main board, IR board correctly, then switch on main power and press key "standby" to turn on the TV set, check if the display is normal.

4.1.2 Using method of factory menu

a) Press key "**SOURCE**" first, then press keys "**2**, **5**, **8**, **0**" in turn to enter into initial factory menu;

b) Press keys "▲" and "▼" to move cursor to the item of factory menu, press key "**OK**" to enter into the inferior factory menu from current menu page;

c) Press keys "▲" and "▼" to move cursor upwards or downwards within one page;

d) Press keys "◄" and "►" to change the value when cursor is moved onto one item;

e) Press key "**MENU**" to exit current menu to its superior factory menu;

f) Press key "**EXIT**" to exit factory menu in any case;

g) Press key "**OK**" to enter into inferior menu;

h) Factory menu item: **ADC ADJUST**, for ADC calibration of VGA and Component;

i) Factory menu item: **W/B ADJUST**, for white balance adjustment;

j) Factory menu item: **POWER Mode**, for setting power-on mode; the default setting is "Standby" mode unless specified by customer;

Standby: TV set will be in "standby" mode after power-on;

MEM: TV set will keep states before last power-off;

ForceOn: TV set will turn on automatically; it also can be used as aging mode at factory;

k) Factory menu item: **Other Setting-> AUDIO Curve Setting**, for sound curve adjustment; the item has been preset according to the model usually, so it should not need to be adjusted without special customer requirements;

l) Factory menu item: **EEPROM Init**, for factory and customer data initialization; TV set will reset and initial guiding interface will display after executing the item;

m) Factory menu item: **Fac. Channel Preset**., for factory channels presetting; it is necessary to connect to central signal source before operating the item; now digital frequency of central signal CH28（529.5 MHz）and CH33（564.5 MHz）are distributed to Australia programs DVB-T; original preset digital programs will not change along with the modification of central signal, so please operate item "DTV" of menu "Channel" to search digital programs, the operate will last 15s;

n) Factory menu item: **Shipment**, all ATV & DTV programs for factory adjustment will be cleared out first, then customer ATV channels will be preset according to order requirements; the item must be executed before shipment to clear out channels for factory adjustment;

o) Factory menu item: **Other Setting->ISP Mode**, default setting is "OFF", it will not be kept in memory, that is, it will always in "OFF" mode after turning on TV set again;

"**OFF**": DDC function of VGA port will recover;

"**ON**": software can be upgraded from VGA port after connecting ISP device ;

Note: Please execute "RESET ALL" before adjustment for the first time if EEPROM contains data or after software upgrading;

p) Factory menu item: **Backlight**, for adjusting brightness of backlight; test voltage of X401-12# (PWM) to make it within the range of PWM voltage corresponding to maximum brightness specified by panel specification; the item need not adjustment for it has been preset by software;

q) Factory menu item: **Software Update**, for software upgrade, please refer to software upgrade instruction in detail;

r) Factory menu item: **Other Setting->MST DEBUG**, default setting is "OFF", the item can not be kept, that is the setting is always "OFF" after power on again;
ON: it is convenient for debug;
OFF: RS232 function can be matched to design specification for engineering model;

s) Factory menu item: **Aging mode**, for machine aging at factory, enter into aging mode, press key "⏻" of remote control to begin aging process, press any key on key board can exit aging mode;

t) Factory menu item: **Other Setting->SSC ADJUST**, for expanded spectrum adjustment; the item need not adjustment for it has been preset by software;

4.2 ADC 校正

4.2.1 ADC calibration of analog VGA

a) Switch to VGA channel;

b) Press key "**SOURCE**", then press keys "**2**, **5**, **8**, **0**" in turn to enter into initial factory menu;

c) Move cursor to item "**ADC ADJUST**" and press key "**OK**" to enter into inferior factory menu; Input VGA signal（**VG848 Timing 856（1024×768/60 Hz）,Pattern 914 Color Temp**）; move cursor to item "**MODE** "，press keys "▲" and "▼" to select item "**RGB**"，then move cursor to item "**AUTO ADC**" and press key "**OK**" to begin auto-adjustment until prompt "**SUCCESS**" displays which means successful auto-calibration;

4.2.2 ADC calibration of analog YPbPr

a) Switch to analog YPbPr channel;

b) Press key "**SOURCE**", then press keys "**2**, **5**, **8**, **0**" in turn to enter into initial factory menu;

c) Move cursor to item "**ADC ADJUST**" and press key "**OK**" to enter into inferior factory menu;

d) Input analog YPbPr signal（**VG848 Timing 976（1080i）,Pattern 918 SMPTE Color Bar**）; move cursor to item "**MODE** "，press keys "▲" and "▼" to select item "**YPbPr**"，then move cursor to item "**AUTO ADC**" and press key "**ENTER**" to begin auto-adjustment until prompt "**SUCCESS**" displays which means successful auto-calibration.

4.3 White balance adjustment"

Unless specified by customer:

Default color temperature "**Cool**" is **12000K** and its chromatic coordinates is (**272**, **278**); color temperature "**Normal**" is **9300K** and its chromatic coordinates is (**285**, **293**); color temperature "**Warm**" is **6500K** and its chromatic coordinates is (**323**, **329**);

4.3.1 Adjustment procedure

TV set should be working over 30 mins to be in stabler state before white balance adjustment; Use white balance apparatus CA-210 and switch to its BBY channel;

a) Switch to HDMI1 channel;

b) Press key "**SOURCE**", then press keys "**2**, **5**, **8**, **0**" in turn to enter into initial factory menu;

c) Move cursor to item "**W/B ADJUST**" and press key "**OK**" to enter into inferior factory menu;

d) Input **DVI/HDMI** signal (**VG-848 Timing:856(1024×768/60 Hz)，Pattern:921(Gray 16 step(H)**); move cursor to item "**MODE**", press keys "▲" and "▼" to select item "**HDMI1**" or other HDMI channels, then move cursor to item "**TEMPERATURE**" and press keys "▲" and "▼" to select item "**COOL**";

e) Adjust items "**R-GAIN**, **G-GAIN**, **B-GAIN**" to set chromatic coordinates of **14th** scale as

（**272、278**）;

f) Adjust items "**R-OFFSET**, **G-OFFSET**, **B-OFFSET**" to set chromatic coordinates of **4th** scale as（**272、278**）;

g) During adjustment , make sure that chromatic coordinates errors of bright scale and dark scale are both (**X=272±10 Y=278±10**);

h) Move cursor to item "**COPY ALL**" again to copy data of white balance to other channels except DTV channel;

i) Check if chromatic coordinates of "**HDMI NORMAL**" and "**WARM**" meet the requirements or not, if not, adjust items "**R-GAIN/B-GAIN/R-OFFSET/B-OFFSET**" to meet them:
chromatic coordinates errors of bright & dark scales are both (**x±10, y±10**),

j) Check if "**COOL**, **NORMAL**, **WARM**" chromatic coordinates of other channels meet the requirements, if not, adjust them respectively with the same method as HDMI channel's and by using 16 grey step signal all, exit menu "**W/B ADJUST**" after completing adjustment, the data will be saved automatically;

k) DTV channel adjustment: switch to DTV channel, select 16 grey step program, enter into factory menu, adjust white balance followed by steps e), f), g);

l) Please refer to the adjusting rules as follows:
B Gun: coordinates of **X** and **Y** will increase when **B** gun is adjusted downwards;
coordinates of **X** and **Y** will decrease when **B** gun is adjusted upwards;
R Gun: adjusting **R** gun will effect coordinate of **X**, and value of **Lv** slightly;
coordinate of **X** will increase when **R** gun is adjusted upwards;
coordinate of **X** will decrease when **R** gun is adjusted downwards;
G Gun: adjusting **G** gun will effect coordinate of **Y**, and value of **Lv** greatly;
coordinate of **Y** will increase when **G** gun is adjusted upwards;
coordinate of **Y** will decrease when **G** gun is adjusted downwards.

4.4 Auto white balance adjustment

4.4.1 Block diagram as Fig. 3:

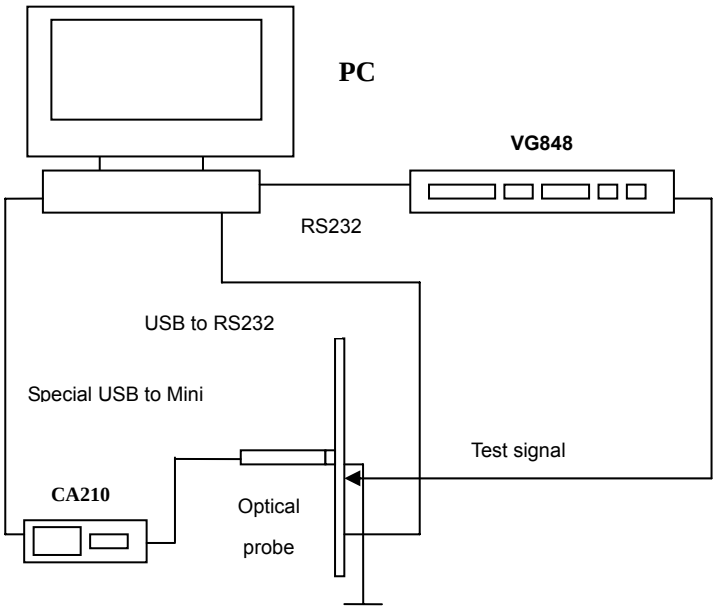


Fig.2 System block diagram

4.4.2 Driver and communication setup

4.4.2.1 Special driver must be installed for communication ports of PC and CA210, detailed processes are described as below:

a) Power on CA210, connect data line normally, a prompting dialog will display as Fig.4 for the first time of setup;

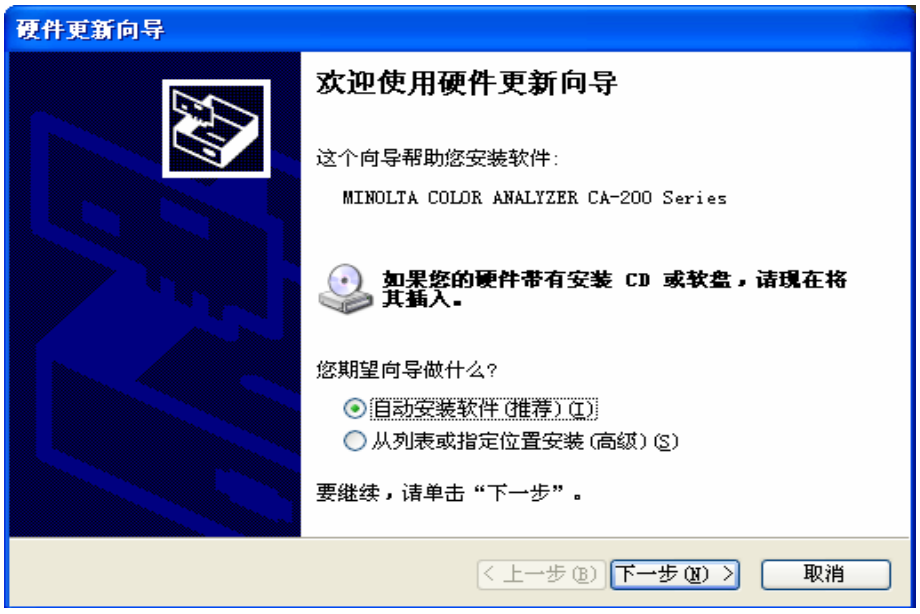


Fig.3

b) Select item “**Setting from list or specified location (advanced)**”, then press button “**Next**”, please refer to Fig. 4;

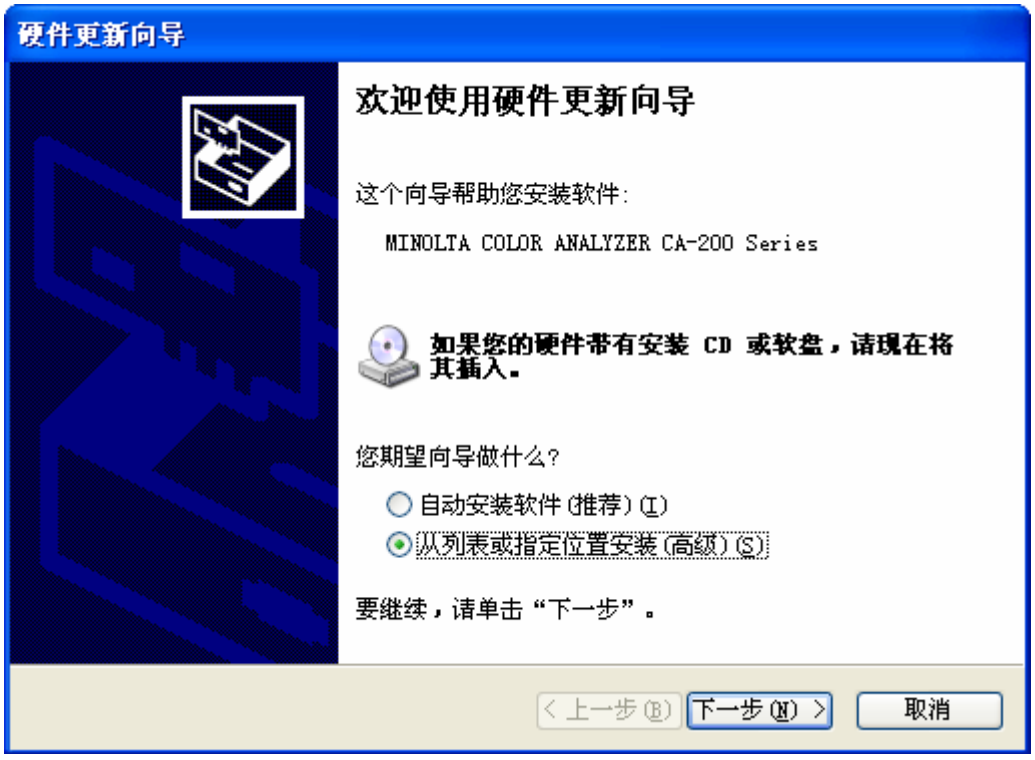


Fig.4

c) Select item “**Don’t search. I want to install driver by myself (D)**”, then press button “**Next**”, please refer to Fig. 5;

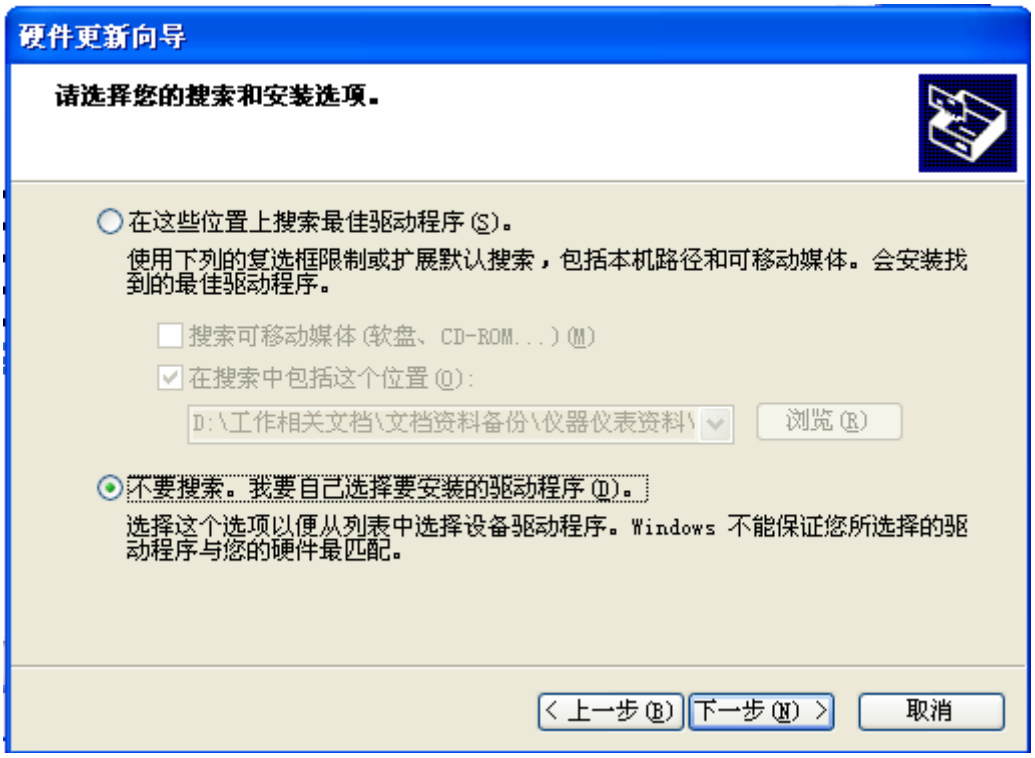


Fig. 5

d) Interface shown as Fig. 6 will display, select item "**Install from disk**";

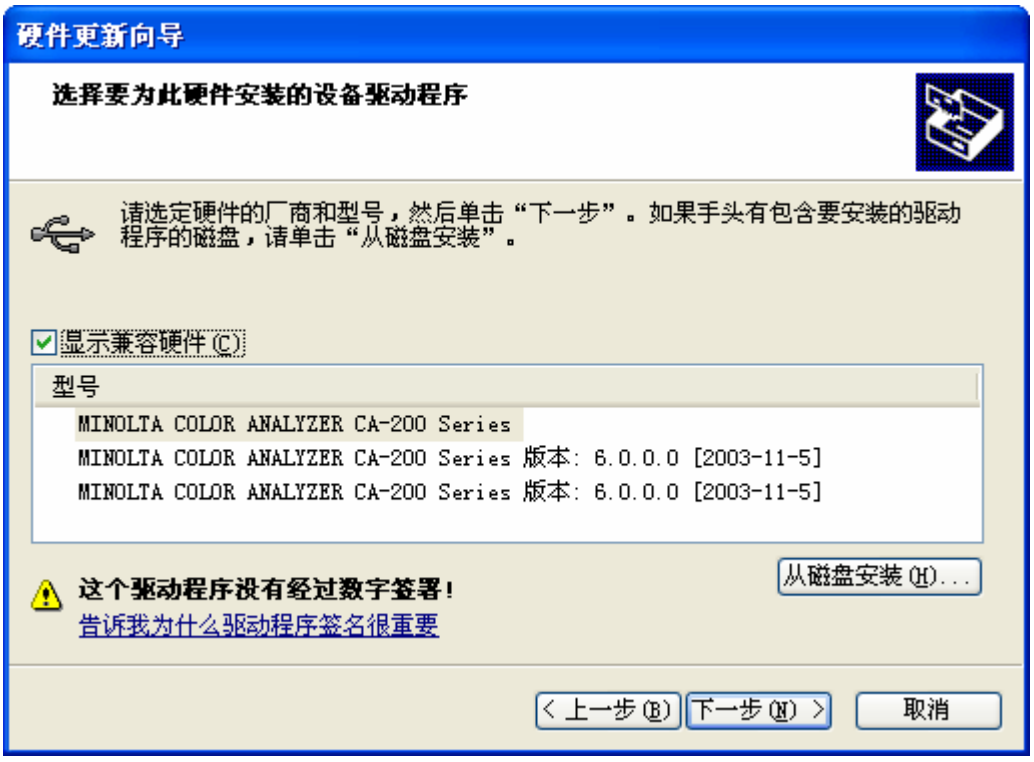


Fig. 6

e) Select directory of driver and file "**MLTCA200.INF**" to begin setup, ignore the prompt "**continue or not…**" if it displays during setup process, please refer to Fig. 7;

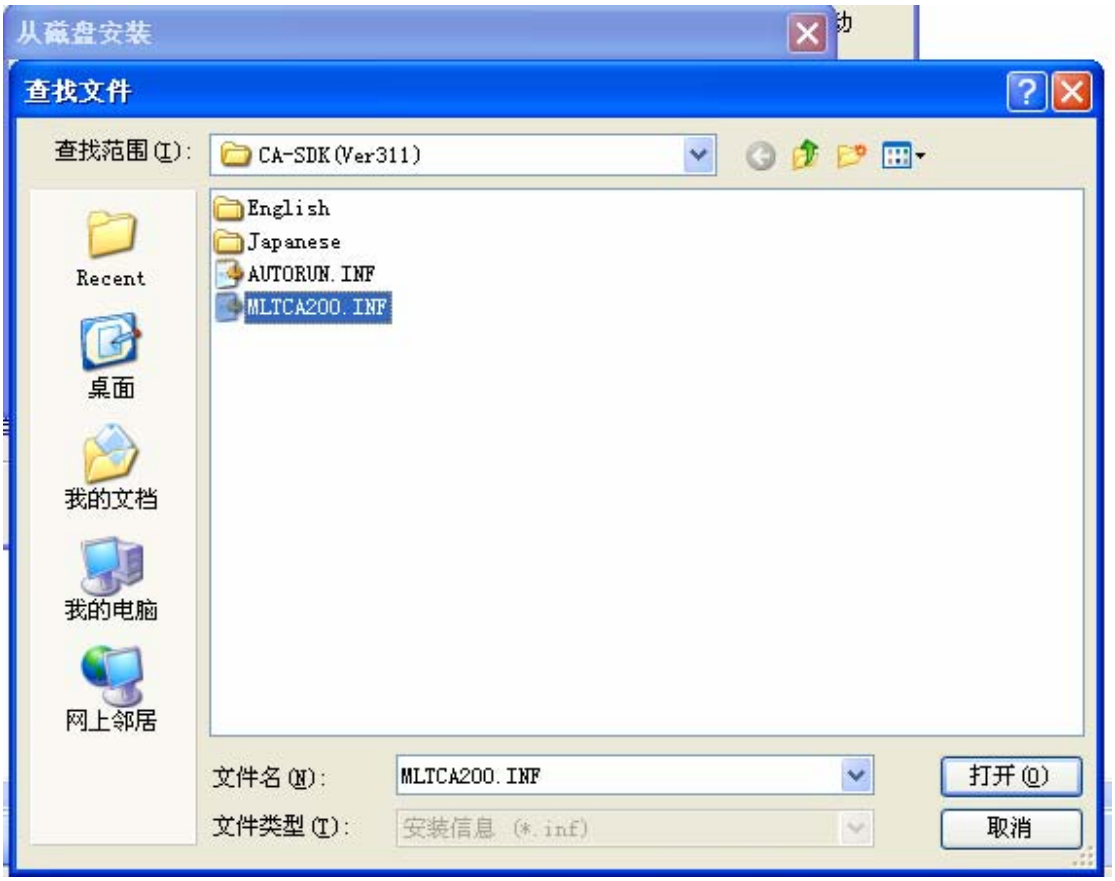


Fig. 7

f) CA210 SDK driver must be installed besides above setup, please refer to Fig. 8;

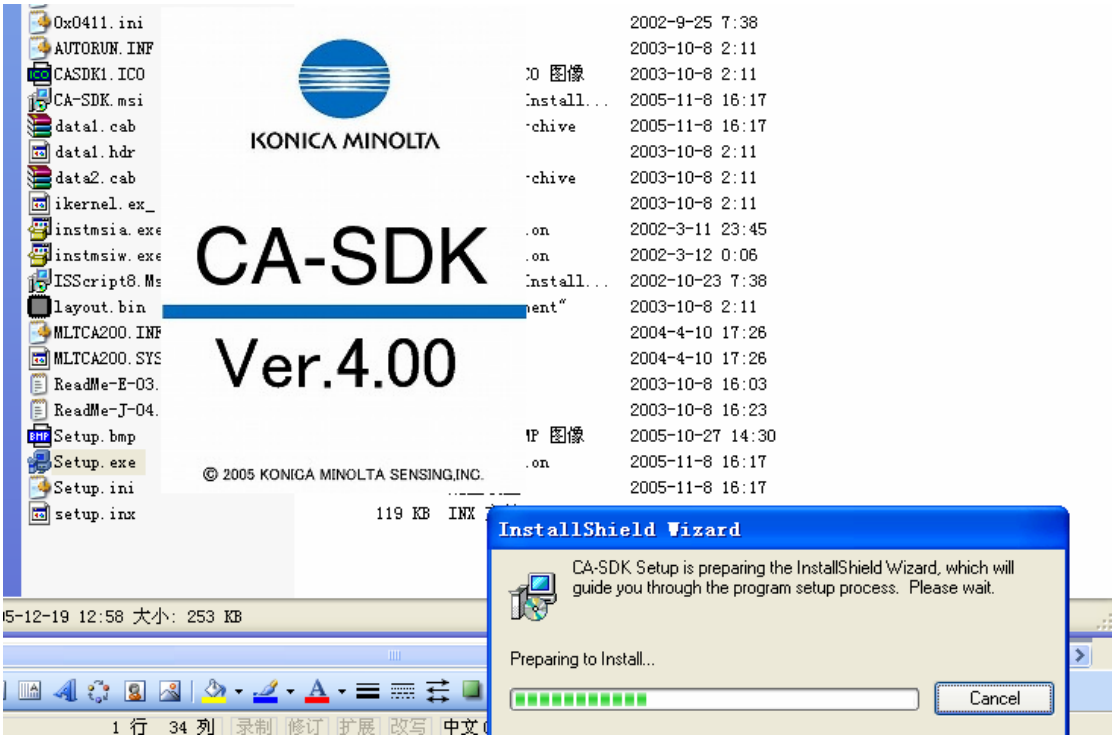


Fig. 8

g) File "**ISScript8.msi**" must be installed also, press button "**Next**" to begin setup, please refer to Fig. 9;

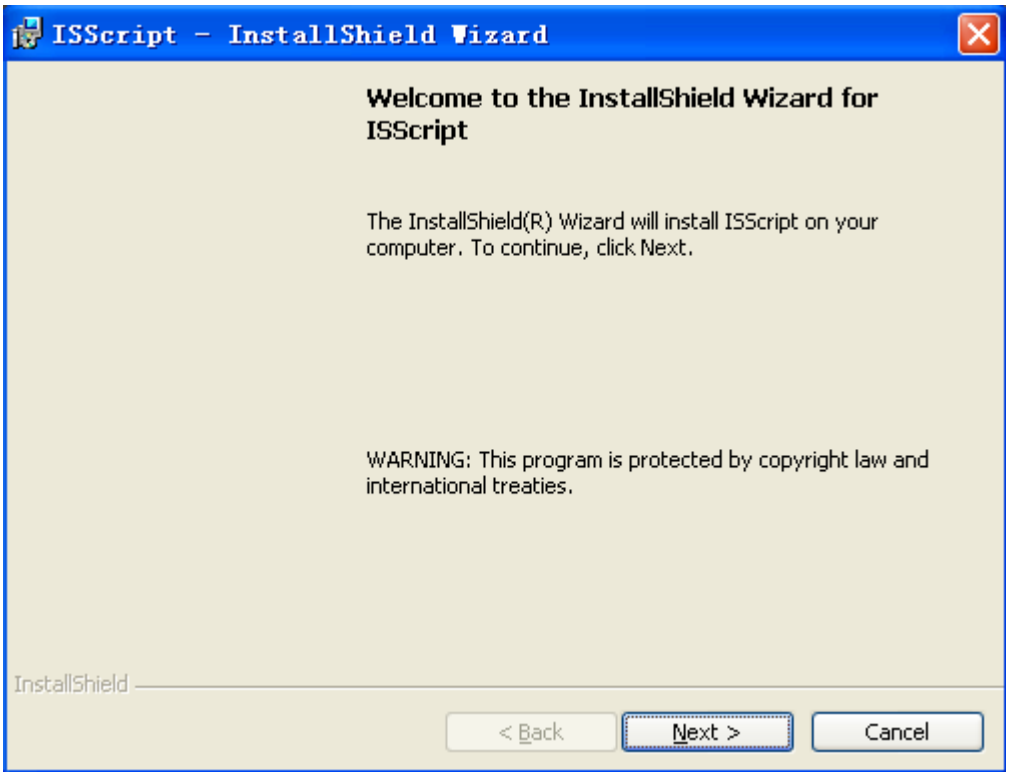


Fig. 9

4.4.2.2 Install driver for communication ports of PC and TV

Connective line is shown as Fig. 10

Fig. 10

Select file “**Setup.exe**” in the software package, Fig. 11 will display, then press button “Next” to complete setup;

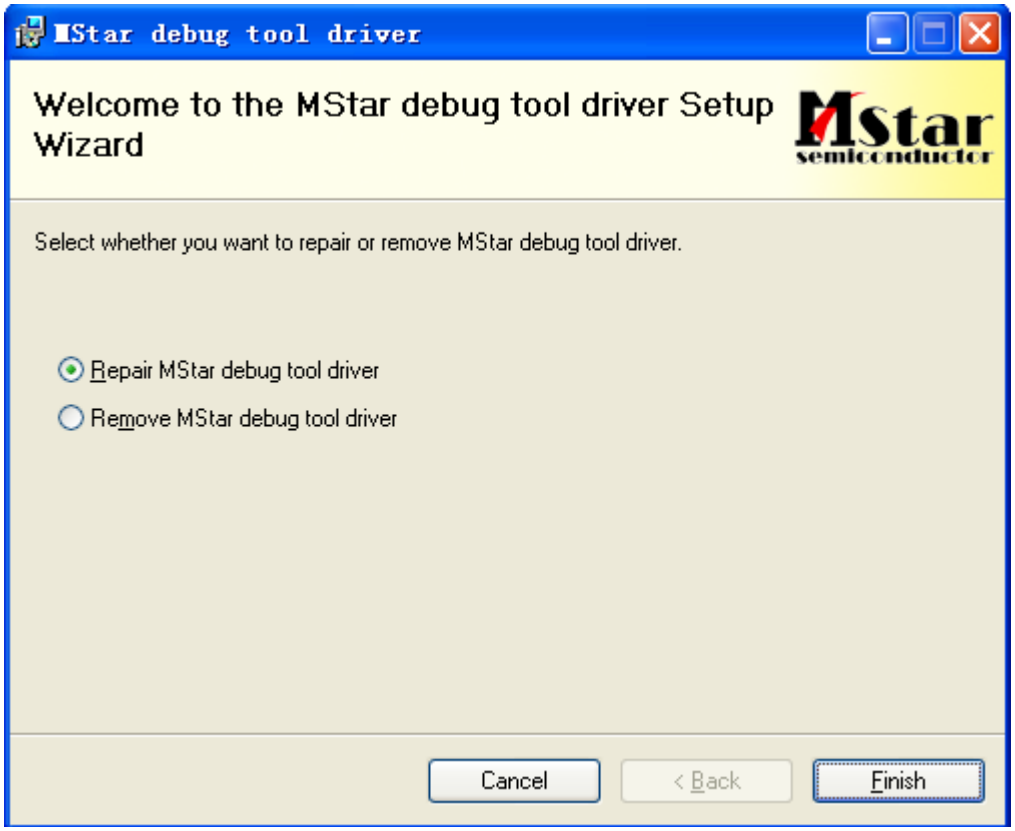


Fig. 11

4.4.2.3 VG848 RS232 communication setup:

a) VG848 physical communication protocol setup

Baud rate：9600bps

Data bits:8 bits

Parity: None

Stop bit:1 bit

Please refer to detailed setup as follow:

(1) Press the [FUNC] key, [5] key and [SET] key.

Select Function : 5 (0-E)

Config Edit

（2）RS232 communication setup are shown as Fig. 12

(7) Select the RS-232C baud rate (RS-Speed).

```
Cfg:RS-Speed :38400 (0-4)
RS-Dlen      :8     (0/1)
```

Fig. 4.1.7 Selecting the baud rate

Table 4.1.7 Baud rate selection

Key	LCD display	General description
0	9600	The baud rate is set to 9600 bps.
1	19200	The baud rate is set to 19200 bps.
2	38400	The baud rate is set to 38400 bps. (Factory setting)
3	57600	The baud rate is set to 57600 bps.
4	115200	The baud rate is set to 115200 bps.

(8) Select the RS-232C data bits (RS-Dien)

Table 4.1.8 Data bit selection

Key	LCD display	General description
0	7	7 bits are set as the data bits.
1	8	8 bits are set as the data bits. (Factory setting)

(9) Select the RS-232C parity (RS-Parity).

```
Cfg:  RS-Parity :NONE    (0-2)
      RS-Stop       : 1  (0/1)
```

Fig. 4.1.8 Selecting the parity

Table 4.1.9 Selection method

Key	LCD display	General description
0	NONE	"None" is selected as the parity. (Factory setting)
1	EVEN	"Even" is selected as the parity.
2	ODD	"Odd" is selected as the parity.

(10) Select the RS-232C stop bit (RS-Stop).

Table 4.1.10 Stop bit selection

Key	LCD display	General description
0	1	1 bit is selected as the stop bit. (Factory setting)
1	2	2 bits are selected as the stop bit.

Fig. 12

b) Communication connection

RS232 connective line must have dual female terminals (2#, 3# of one terminal should be exchanged commonly), only communication pin 2#, 3# and 5# need to be used;

4.4.2.4 Connect VG848 signal output terminal to TV signal input terminal

There are several signal input terminals, such as AV, YPbPr, VGA and HDMI, connect them according to needs, if there are several input terminals of AV, YPbPr, VGA or HDMI, only need to connect the first terminal respectively;

4.4.3 Signal connection

Signal from adjusted channel to VG848 must be connected normally, if there are several channels for one kind of signal, the first channel must be connected, for example, AV has three channels AV1, AV2 and AV3, YPbPr has two channels YPbPr1 and YPbPr2, so AV1 and YPbPr1 must be connected;

4.4.4 Adjusting interface are shown as Fig. 14 and Fig. 15

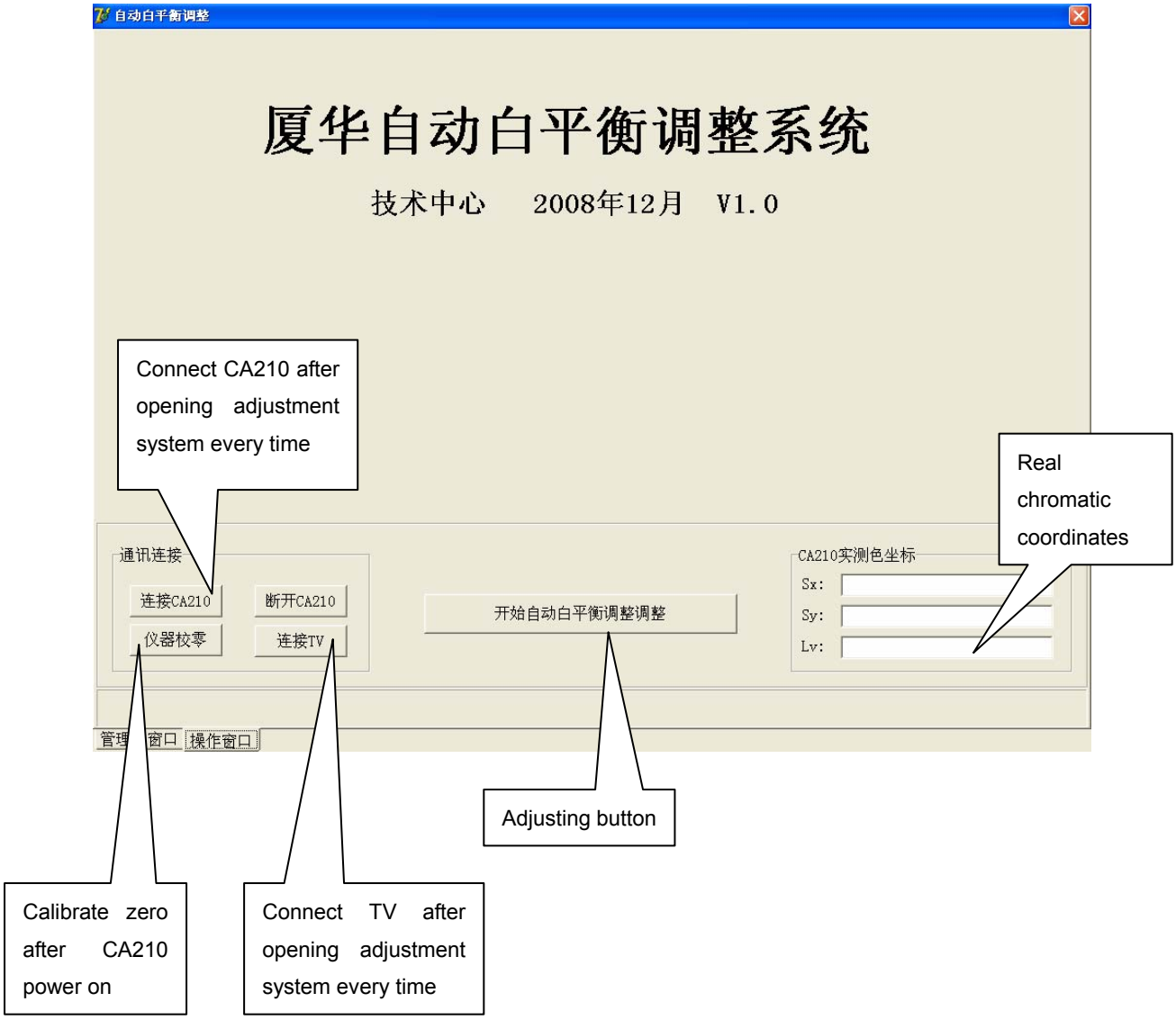


Fig. 13 Interface of Prima auto white balance adjustment system

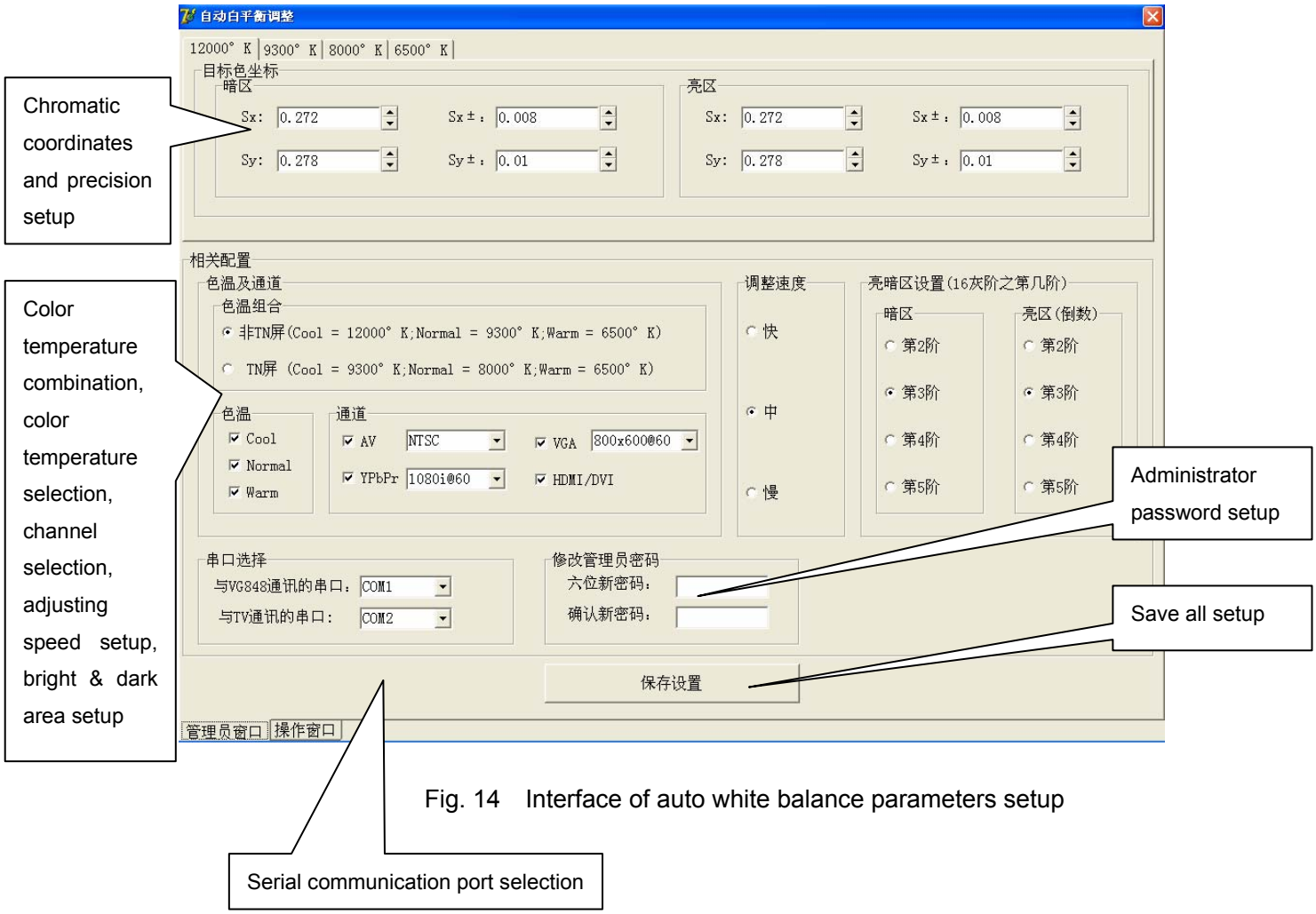


Fig. 14 Interface of auto white balance parameters setup

5 **Functions checkup**

5.1 Analog & digital TV functions

Input central signal to RF port, enter into menu "**CHANNEL**", then search channels automatically, check if there is any omitted channel, check if the output of speakers and the picture are normal.

5.2 Composite video of AV port

Input composite video signal to AV port, check if the picture and the sound are normal;

5.3 Analog component YPbPr/YCbCr port

Input analog YUV signal from VG848 signal generator with YUV formats listed as Table 2 respectively, check if the picture and the sound are normal under the circumstances of power-on/off, switching channel and format, etc.

Table 2 YUV signal formats

No.	Definition	H. - fre.（kHz）	V. – fre.（Hz）	Dot pulse fre.（MHz）	Note
1	720×480	15.734	60	13.5	480i(NTSC)
2	720×480	15.734	59.94	13.5	480i(NTSC)
3	720×576	15.625	50	13.5	576i(PAL)
4	720×480	31.469	60	27	480p(NTSC PROG)
5	720×480	31.469	59.94	27	480p(NTSC PROG)
6	720×576	31.25	50	27	576p(PAL PROG)
7	1280×720	45	59.94	74.18	720p(59p)
8	1280×720	45	60	74.25	720p(60p)
9	1280×720	37.5	50	74.25	720p(50p)
10	1920×1080	33.75	59.94	74.25	1080i(59i)
11	1920×1080	33.75	60	74.25	1080i(60i)
12	1920×1080	28.125	50	74.25	1080i(50i)
13	1920×1080	67.5	59.94	148.35	1080p(59p)
14	1920×1080	67.5	60	148.5	1080p(60p)
15	1920×1080	56.25	50	148.5	1080p(50p)
16	1920×1080	-	23.94/24	-	-
17	1920×1080	-	25	-	-
18	1920×1080	-	29.97/30	-	-

5.4 VGA port

Input VGA signal from VG848 signal generator to VGA port with VGA signal formats listed in Table 3 respectively, check if the display and the sound are normal, if there is any H/V offset, enter into main menu and select items "**PICTURE"->"Screen"->"Auto Adjusting**" in turn to make calibration automatically;

Table 3 VGA signal formats

No.	Definition	H. - fre.（kHz）	V. – fre.（Hz）	Dot pulse fre.（MHz）	Note
1	640×480	31.469	59.94	25.175	IBM
2	720×400	31.469	70.086	28.322	IBM
3	640×480	37.861	72.809	31.5	VESA
4	640×480	37.5	75	31.5	VESA
5	800×600	35.156	56.25	36	VESA
6	800×600	37.879	60.317	40	VESA

7	800×600	48.077	72.188	50	VESA
8	800×600	46.875	75	49.5	VESA
9	1024×768	48.363	60.004	65	VESA
10	1024×768	56.476	70.069	75	VESA
11	1024×768	60.023	75.029	78.75	VESA
12	1152×864	67.5	75	108	VESA
13	1280×960	60	60	108	VESA
14	1280×1024	63.98	60.02	108	VESA
15	1280×1024	80	75	135	SXGA
16	1440×900	-	60	-	-
17	1680×1050	-	60	-	-
18	1360×768	47.7	60	85.5	-

5.5 HDMI port

Input HDMI signal from VG849 signal generator with the formats listed in Table 2 and Table 3 respectively, check if the display and the sound (**32 kHz, 44.1 kHz, 48 kHz**) are normal under the circumstances of power-on, switching channels or formats, etc.

5.6 USB port

Media playing function

Insert USB memory containing files of picture, audio and video, check if the picture, the sound and other functions are normal;

5.7 MUSIC port (only for SANYO model)

Input audio signal to side music port from audio output device, check if the sound is normal;

5.8 Other functions checkup

a) Check if timing on/off, sleeping time, picture/sound mode, OSD, stereo, digital audio interface, etc., are normal;
b) Check if digital RADIO program is normal;
c) Check if the functions of LCN, OTA are normal;

6 User menu setup before shipment

Enter into "**LOCK**" user menu, select submenu item "**Restore Factory Default**" and then press key "**OK**" to make setup before shipment;

a) Clear out information of all programs;
b) Clear out information of VCHIP, etc.;
c) Recover default analog parameters;;
d) Set menu language as "**English**";
e) Set power-on mode as "**OFF**".

Method of software upgrading instructions

Factory software burned instructions listed as Table 4

Table 4　Factory software burned instructions

Loc. No.	Part No.	Part Type	Software function	Burned before SMT	Burning method
N103	5272564002	IC_EN25Q64-104HIP	FLASH	Yes	Use ALL-100 with write-protect, refer to Note 1 in detai
N106	5272404005	IC_CAT24C04WI-GT3	HDCP KEY	Yes	Use ALL-100, etc.
N301	5272402003	IC_CAT24C02WI	HDMI EDID	Yes	Use ALL-100, etc.
N311	5272402003	IC_CAT24C02WI	HDMI EDID	Yes	Use ALL-100, etc.
N305	5272402003	IC_CAT24C02WI	VGA　EDID	Yes	Use ALL-100, etc.

Note 1: Method of write-protect setup: enter into burning interface of ALL-100, tick option "**Config**", press item "**config Setting**", set option "**Protect**" as "**All Protect**"; make sure that option "**Config**" must be ticked before burning software and write-protect must be reset after ALL-100 burning software is opened every time.

Note 2: Method of burning and upgrading software online by using ISP burning device:

a) For main board upgrade: connect 4-pin cable of ISP burning device to Debug port of main board (**X107**); for the unit upgrade, connect both VGA ports of ISP burning device and main board, enter into factory menu and set item "**Other Settings->ISP Mode**" as "**ON**";

b) Using **Mstar** online burning program（**V4.4.2.0** and higher versions）, enter into menu "**Device**", tick option "**WP Pin pull to high during ISP**" , ensure that hardware write-protect of Flash is removed and erasing process is normal, please refer to Fig. 15;

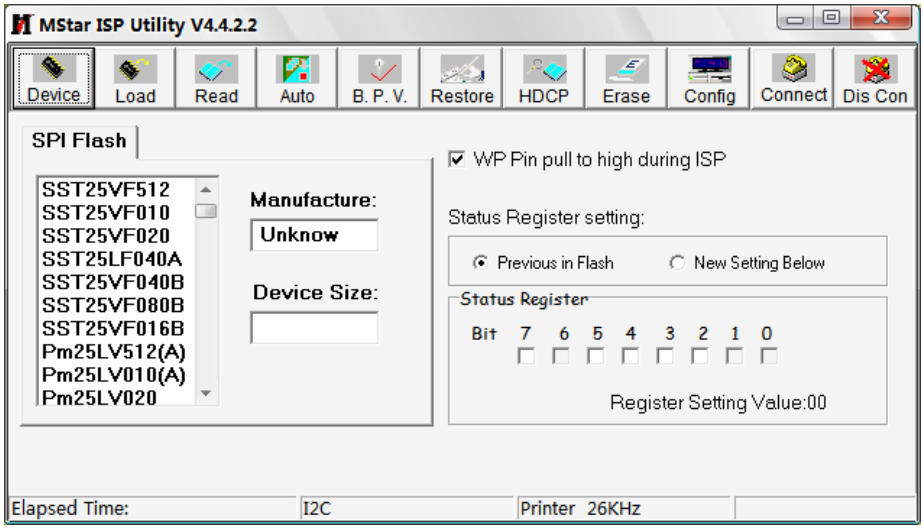


Fig. 15　Write-protect setup

c) Press menu "**Connect**", a dialog box "**Device Type is MX25L64** will pop up, that is, connection has been successful, please refer to Fig. 16; if connection is failed, press the first menu "**Device**" to select SPI Flash type "**MX25L64**" manually, then press menu "**Connect**" again;

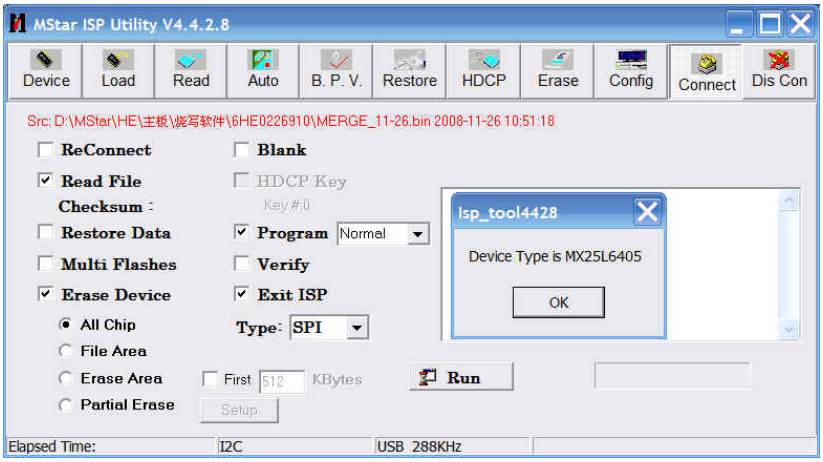


Fig. 16 Successful connection of device MX25L64

d) Press menu “**Read**”, select burning file, such as “**MERGE.bin**”, please refer to Fig. 17;

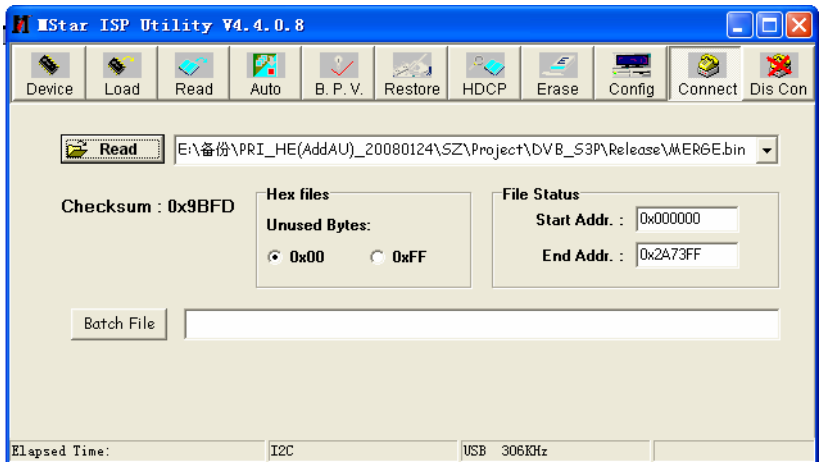


Fig. 17 Burning file

e) Press menu “**Auto**”, tick options “**All chip**”, “**program**” and relative option switches, please refer to Fig. 18, press key “**Run**” to begin burning;

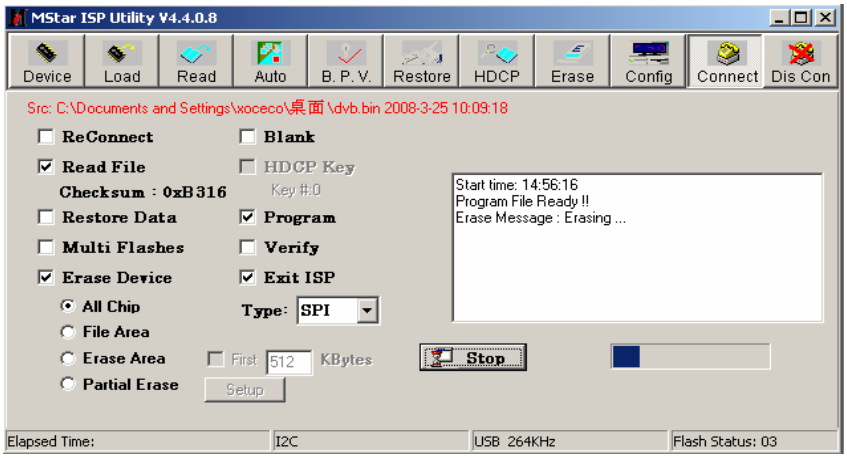


Fig. 18 Option switches

f) Burning process has two steps: **Erase** and **Program**;

1) First, the step "**Erasing…, Flash Status: 03**" will last for some time, or it is failed if it is passed by quickly, please confirm procedure 2） and begin burning process again;
2) Then the following step is "**Programming…，Flash Status:00**";
3) A prompt "**Pass**" will display at last;

g) A prompt "**Pass**" will display if burning process is successful, please refer to Fig. 19;

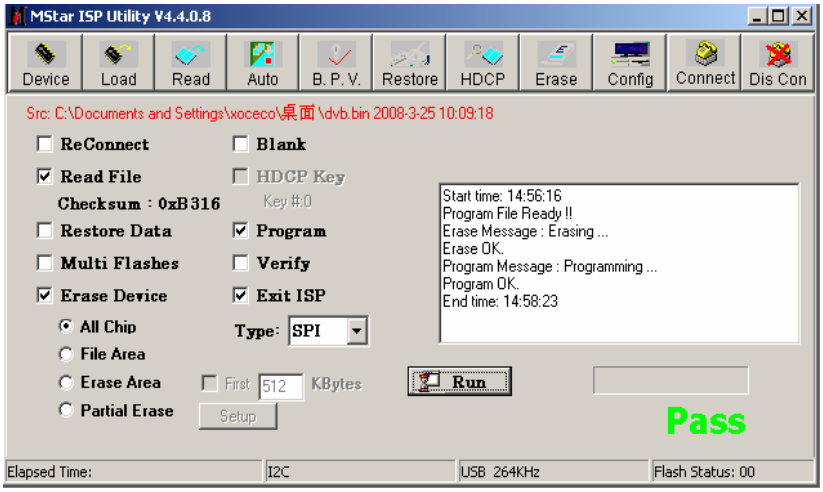


Fig. 19 Successful burning process

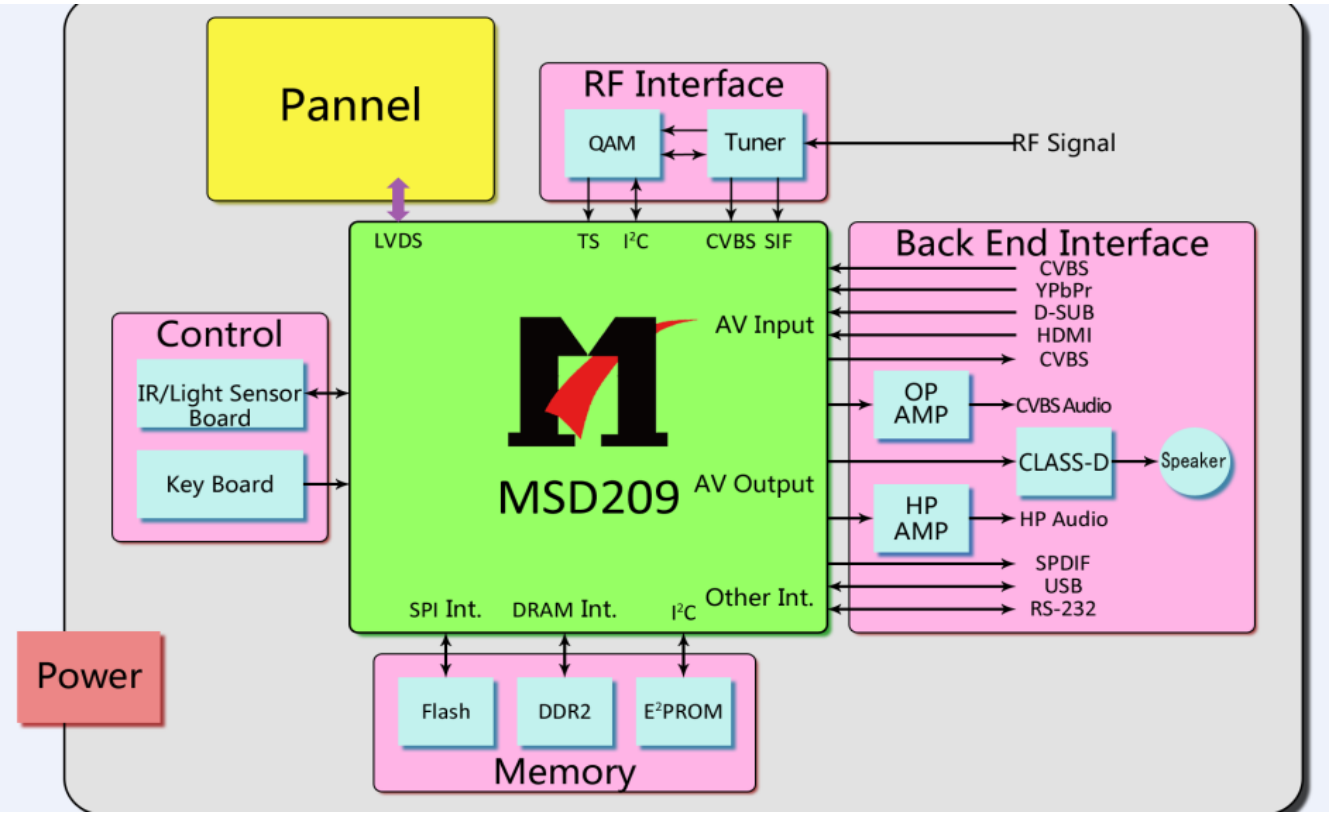
h) If there are other machines to be burned, remain **ISP** burning interface and repeat procedures **c**） to **e**） only;

Note 3: Method of online burning and upgrade through **USB**:

a) Make sure that U disk is formatted as "**FAT32**";
b) Copy firmware to U disk with name of "**Merge.bin**";
c) Turn on the TV set, make sure current channel is ATV or DTV;
   1) First, press key "**SOURCE**", press keys "**2**, **5**, **8**, **0**" in turn to enter into initial factory menu;
   2) Then, enter into factory menu, select item "**Software Update**" to begin upgrade;
d) Detailed upgrading processes are below:
   1) Read data from USB memory, while its indicating light is twinkling at the same time;
   2) Begin to burn flash, the unit will be in "standby" mode after burning;
e) Power off and then restart the unit, enter into factory menu, confirm software parameters – version and time, then execute "**RESET ALL**" to complete the whole upgrading processes;

*** USB burning method could not be sure to be applicable to all kinds of U disks, so please try other kinds of U disk if one is inapplicable.

Working principle analysis of the unit



Signal Flow

1、 **PAL/SECAM signal flow**

Send PAL/SECAM analog RF signal received from antenna to TUNER **FT21XX** which is controlled by main chip **MSD209GL** through **I²C** BUS; CVBS video signal and SIF audio differential signal will be outputted after demodulation;

CVBS video signal is sent into main chip **MSD209GL** to be processed by modules of video decoding, deinterlacing, video processing and zoom, then LVDS signal will be outputted to drive display panel;

SIF audio differential signal is sent into main chip **MSD209GL** to be demodulated to analog audio signal, then it is sent to earphone amplifier **BH3547F** to be amplified after the processes of preamplification, acoustic effect processing and volume control, and then it is divided into two, one is sent to earphone jack, the other is sent to audio power amplifier **TAS5711** (D class) to be amplified and then drive speakers.

2、 **DVB-T signal flow**

Send DVB-T digital RF signal received from antenna to TUNER **FT2112** which is controlled by main chip **MSD209GL** through **I²C** BUS; after down frequency conversion, differential IF signal will be inputted into demodulator IC **MSB1210** to be demodulated; then it will be sent to main chip **MSD209GL** with the standard format of serial or parallel TS stream for demultiplexing and decoding;

Video route: digital video signal is sent into main chip **MSD209GL** for decoding and video processing after demultiplexing, then LVDS signal will be outputted to drive display panel;

Audio route: digital audio signal will be sent into main chip **MSD209GL** for decoding and audio processing after demultiplexing, then dual-sound-track analog audio signal (stereo) is sent to earphone amplifier **BH3547F** to be amplified after the processes of preamplification, acoustic effect processing and volume control by main chip **MSD209GL**, then one is sent to earphone jack, the other is sent to audio power amplifier **TAS5711** (D class) to be amplified and then drive speakers.

3、 **AV input signal flow**

AV video signal is sent into main chip **MSD209GL** to be processed by modules of video decoding, deinterlacing, video processing and zoom, then LVDS signal will be outputted to drive display panel;

AV audio signal is sent into main chip **MSD209GL** for acoustic effect processing and volume control after the processing of voltage division, impendence matching and AC coupling, then it is sent to earphone amplifier **BH3547F** to be amplified, one is sent to earphone jack, the other is sent to audio power amplifier **TDA7266SA** (AB class) to be amplified and then drive speakers.

4、 **D-SUB/YPbPr input signal flow**

D-SUB/YPbPr video signal is sent into main chip **MSD209GL** to be processed by modules of A/D conversion, video decoding, deinterlacing, video processing and zoom, then LVDS signal will be outputted to drive display panel;

D-SUB/YPbPr audio signal is sent into main chip **MSD209GL** for acoustic effect processing and volume control after the processing of voltage division, impendence matching and AC coupling, then it is sent to earphone amplifier **BH3547F** to be amplified, one is sent to earphone jack, the other is sent to audio power amplifier **TAS5711** (D class) to be amplified and then drive speakers.

5、 **HDMI input signal flow**

HDMI video signal is sent into main chip **MSD209GL** to be processed by modules of video decoding, video processing and zoom, then LVDS signal will be outputted to drive display panel;

HDMI audio signal is sent into main chip **MSD209GL** for audio processing, preamplification, acoustic effect processing and volume control, then it is sent to earphone amplifier **BH3547F** to be amplified, one is sent to earphone jack, the other is sent to audio power amplifier **TAS5711** (D class) to be amplified and then drive speakers.

6、 **AV input signal flow**

Current active AV video signal is sent into main chip **MSD209GL** for video coding, then it is amplified by peripheral video amplified circuits and then outputted;

Current active AV audio signal is sent into main chip **MSD209GL** for preamplification, acoustic effect processing and volume control, then it is sent to operation amplifier to be amplified and then outputted.

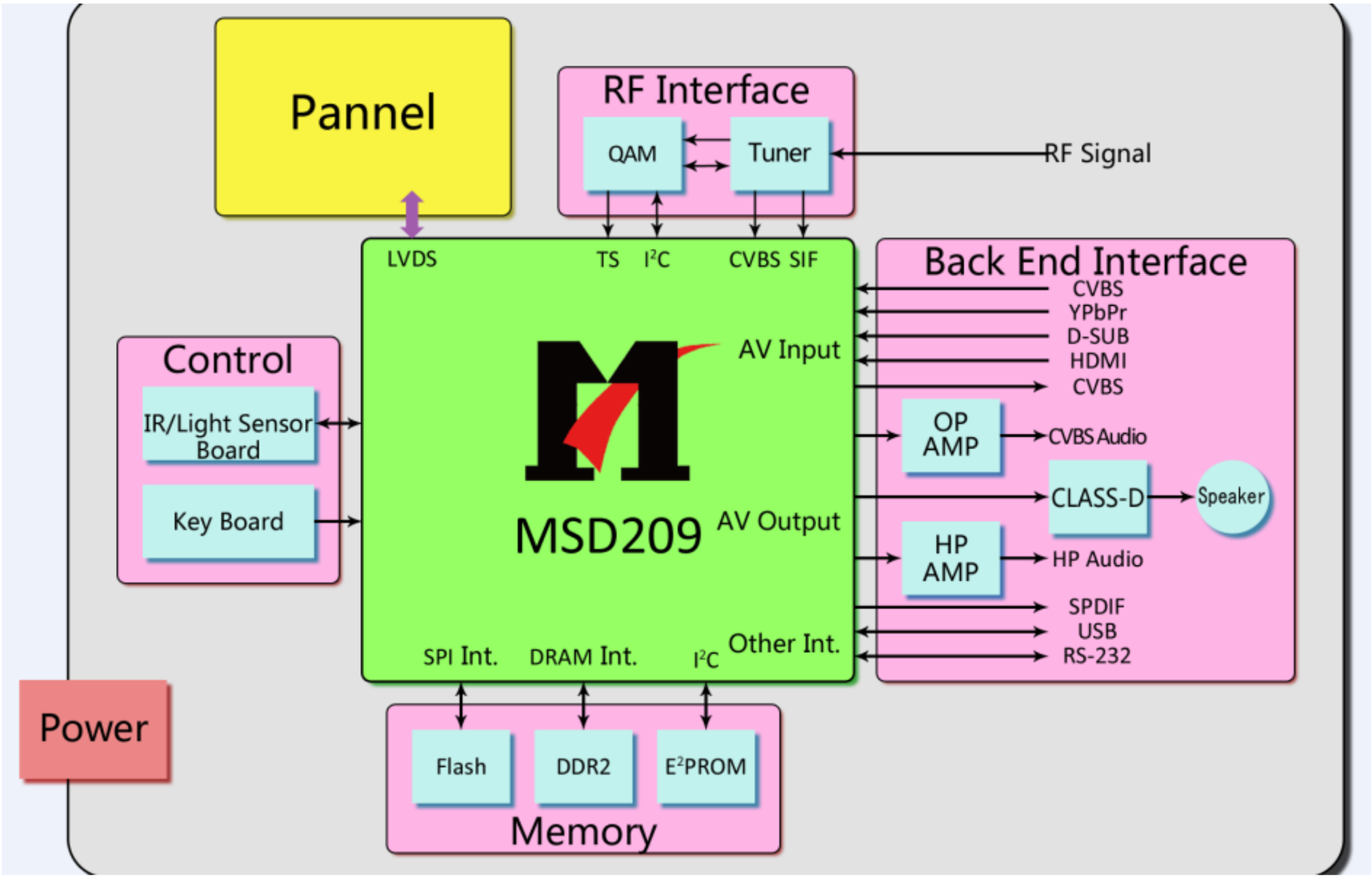
7、 **SPDIF input signal flow**

Current active AV audio signal is sent into main chip **MSD209GL** for acoustic effect processing, volume control and digital audio coding, then it is outputted.

8、 **MEMC input signal flow**

Current active AV video signal is sent into main chip **MSD209GL** for video coding, then LVDS signal is outputted to **MEMC** chip **6M20S** for frame insertion processing, and then frequency multiplication LVDS signal is outputted to drive display panel.

Block diagram



IC Block Diagram and Instruction

1、 MSD209GL-LF

GENERAL DESCRIPTION

The MSD209GL is a highly integrated controller IC for LCD/PDP DTV applications with resolutions up to full-HD(1920 x 1080). It is configured with an integrated triple-ADC/PLL, a multi-standard TV video and audio decoder, a motion adaptive video de-interlacer, a scaling engine, the MStarACE-3 color engine, an advanced 2D graphics engine, a transport processor, a high-definition (HD) MPEG video decoder, a high-definition (HD) H.264 video decoder, a RealVideo decoder, a JPEG video decoder, a MPEG-4 decoder, and a 24-bit DSP for MPEG audio decoding, a DVI/HDCP/HDMI receiver, and a peripheral control unit providing a variety of HDTV control functions.

For digital TV application, the MSD209GL comprises an MPEG-2 transport processor with advanced section filtering capability, an MPEG-2 (MP@HL profile) video decoder, a MPEG-4 decoder, a H.264 video decoder, and an audio DSP decoder for MPEG audio streams, MPEG layer I and II digital audio decoder with analog audio outputs that are designed to support existing and future DVB-T programs while handling conditional access. Furthermore,it is also possible to decode JPEG, RealVideo streams, and MP3 formats from external sources such as USB interface.

For analog TV, the MSD209GL includes NTSC/PAL/SECAM multi-standard video decoder comprising a 3D motion adaptive comb filter and time-based correction, and a NICAM/A2 audio decoder to support worldwide television standards. The MSD209GL is also configured with a VBI processor to decode digital information such as Close Caption/V-chip/teletext/WSS/CGMS-A/VPS. In addition, the MStar advanced LCD TV processor enhances video quality, motion adaptive de-interlacer, picture quality adjustment units, and MStarACE-3 color engine.

With USB 2.0 host controllers, UART, IR, SPI, I2C, and PWM, the MSD209GL fulfills all requirements in advanced DTV sets. To reduce system costs, the MSD209GL also integrates intelligent power management control capability for green-mode requirements and spread-spectrum support for EMI management.

MSD209GL Features：

Twin-turbo 8051 Micro-controller

- Twin-turbo 8051 MCU
- Interrupt controller
- Supports ISP
- Two full duplex UARTs
- DMA engine to speed up large data movement

Transport Stream De-multiplexer

- One external TS input and one internal TS data path
- Supports serial TS interface, with or without sync signal
- Maximum TS data rate is 104 Mb/sec
- 32 general purpose PID filters and section filters for each transport stream de-multiplexer
- One video PES and one audio PES channel
- Supports DVB subtitle and digital teletext

- Supports additional audio/video/PCR filters
- Supports TS DMA channel for time-shift
- Supports AES encryption/decryption

MPEG-2 A/V Decoder

- ISO/IEC 13818-2 MPEG-2 video MP@HL
- Automatic frame rate conversion
- Supports resolution in HDTV (1080i, 720p) and SDTV
- Supports MPEG-1, MPEG-2 (Layer I/II), Dolby Digital (AC-3), and AAC audio decoding
- Optionally Supports Dolby Digital Plus (E-AC-3) decoding, and Dolby Digital Compatible Output (DDCO) for HE-AAC to DD transcoding

MPEG-4 Video Decoder

- ISO/IEC 14496-2 MPEG-4 ASP video decoding
- Supports resolution in HDTV (1080p@30fps)
- Supports DivX^3 Home Theater or HD profile

H.264 Decoder

- ITU-T H.264, ISO/IEC 14496-10 (main and high
- profile up to level 4.0) video decoding
- Supports resolutions for all DVB, ATSC, HDTV,DVD and VCD
- Supports resolution up to 1080p@30fps
- Supports CABAC and CAVLC stream types
- Processing of ES and PES streams, extractions and provision of time stamps

RealMedia Decoder

- Supports maximum resolution up to 720p@30fps
- Supports RV8, RV9, RV10, RA8-LBR and HE-AAC decoders
- Supports file formats with RM and RMVB
- Supports Picture Re-sampling
- Supports in-loop de-block for B-frame

Hardware JPEG

- Supports sequential mode, single scan
- Supports both color and grayscale picture
- Operates in scan unit; hardware decoder will handle the bit stream after scan header
- Supports programmable region of interest (ROI)
- Supports format: 422/411/420/444/422T
- Decoded picture will be stored in DRAM with UYVY format
- Supports scaling down ratio: 1/2, 1/4, 1/8,applied to height and width simultaneously
- Supports picture rotation

NTSC/PAL/SECAM Video Decoder

- Supports NTSC-M, NTSC-J, NTSC-4.43, PAL (B,D, G, H, M, N, I, Nc), and SECAM
- Automatic TV standard detection
- Motion adaptive 3D comb filter for NTSC/PAL
- Seven configurable CVBS & Y/C S-video inputs
- Supports Teletext level-1.5, Closed Caption(analog CC 608/ analog CC 708/digital CC 608/digital CC 708), V-chip and SCTE
- Two CVBS video outputs

Multi-Standard TV Sound Processor

- Supports BTSC/A2/EIA-J demodulation in NTSC and A2/NICAM/FM/AM demodulation in PAL
- Supports MTS Mode Mono/Stereo/SAP in BTSC/EIA-J and Mono/Stereo/Dual in A2/NICAM
- L/R audio line-in x5 and SIF audio input
- L/R speaker and 2 additional L/R audio line-out
- Built-in audio sampling rate conversion (SRC)
- Built-in audio ADC
- Built-in audio DAC's
- Audio processing for loudspeaker channel,including volume, balance, mute, tone, EQ,virtual stereo/surround, and treble/bass
- Advanced sound**Optional** available (Dolby, SRS,BBE… etc)
- Supports digital audio format decoding:
  - MPEG-1, MPEG-2 (Layer I/II), MP3, AC-3 (Dolby Digital), AAC-LC, WMA
  - E-AC-3 (Dolby Digital Plus) decoding and E-AC-3 to AC-3 conversion at the same time

Digital Audio Interface

- I^2S digital audio input & output
- S/PDIF digital audio input & output
- HDMI audio channel processing capability
- Programmable delay for audio/video synchronization

Analog RGB Compliant Input Ports

- Three analog ports support up to 1080P
- Supports PC RGB input up to SXGA@75Hz
- Supports HDTV RGB/YPbPr/YCbCr
- Supports Composite Sync and SOG (Sync-on-Green) separator
- Automatic color calibration

Auto-Configuration/Auto-Detection

- Auto input signal format and mode detection
- Auto-tuning function including phasing,positioning, offset, gain, and jitter detection
- Sync Detection for H/V Sync

DVI/HDCP/HDMI Compliant Input Port

- Three DVI/HDCP/HDMI input ports support up to 225MHz @ 1080P 60Hz with 12-bit deep-color resolution
- Single link on-chip DVI 1.0 compliant receiver
- High-bandwidth Digital Content Protection
- (HDCP) 1.1 compliant receiver
- High Definition Multimedia Interface (HDMI) 1.3 compliant receiver with CEC (Consumer Electronics Control) support
- Long-cable tolerant robust receiving

MACE-4, MStar Advanced Color Engine year 2009 Edition, provides superb visual quality for wider gamut FHD panels

- Fully programmable shrink/zoom capabilities
- Panorama and various scaling supports
- 3D motion adaptive video de-interlacers with de-flickering and edge smoothing functions
- Automatic 3:2 pull-down & 2:2 pull-down detection and recovery

- Automatic picture enhancement:
  - Dynamic brilliant and fresh color
  - Dynamic *Blue Stretch*
  - Intensified contrast and details
  - Dynamic *Vivid Skin*
  - Dynamic sharpened Luma/Chroma edges
  - Enhanced depth of field perception
  - Accurate and independent color control
- Supports sRGB and xvYCC color processing
- Supports HDMI 1.3 deep color format
- Supports linear/nonlinear color mapping for wider gamut panels
- 10-bit internal data processing
- Programmable 12-bit RGB gamma CLUT
- 3D video noise reduction
- MPEG artifact removal including de-blocking and mosquito noise reduction
- Frame rate conversion

Output Interface

- Supports up to 10-bit dual LVDS full-HD (1920 x 1080) panel interface
- Supports 2 data output formats: Thine & TI data mappings
- Compatible with TIA/EIA
- With 6/8 bits optional dithered output
- Spread spectrum output frequency for EMI suppression

CVBS Video Output

- Supports CVBS bypass output
- Built-in video encoder for encoding digital video into CVBS output

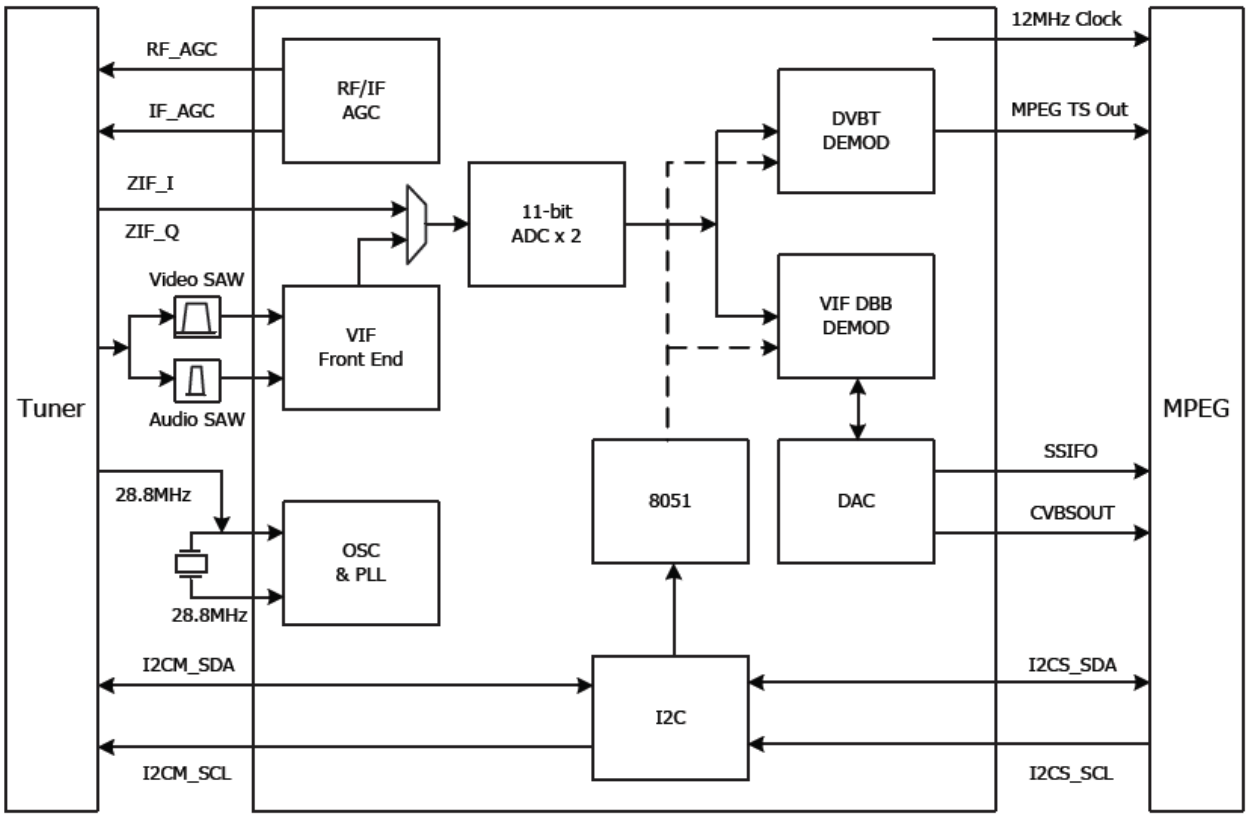
2D Graphics Engine

- Point draw, line draw, rectangle draw/fill and text draw
- BitBlt and stretch BitBlt
- Raster Operation (ROP)

Miscellaneous

- DRAM controller to support 16-bit DDR2 interface
- SPI serial interface for external SPI flash
- High efficiency power control module
- Two ports of USB 2.0 host controller with the flexibility for connecting external storage devices
- 256-pin LQFP package
- Operating at 1.26V (core), 1.8V (DDR2), and 3.3V (I/O and analog)

2、 MSB1210-LF



Integrated DVBT receiver

- Compliant with DVBT(ETSI ET 300 744)
- Supports 2K, 4K, 8K and 1/4, 1/8, 1/16, 1/32 guard interval (GI) and hierarchical,non-hierarchical modes
- Nordig Unified 1.0.3, D-Book, E-Book,IEC62002 (MBRAI) compliant
- Dual 11-bit ADCs: accept IF, low IF, zero-IF inputs in 5, 6, 7, 8MHz channel bandwidths
- All digital demodulation and timing recovery loops
- CCI and ACI rejection capability
- Independent ADC controls (for IF and RF)
- Configurable parallel/serial MPEG-2 transport stream interface
- Impulse-Noise suppression
- Advanced performance for SFN networks
- Supports single or dual AGC control
- Direct 36MHz, 44MHz IF sampling scheme from tuner
- Full-digital frequency offset recovery with wide acquisition range (+/-500kHz)
- IQ imbalance compensation for ZIF

Integrated VIF receiver

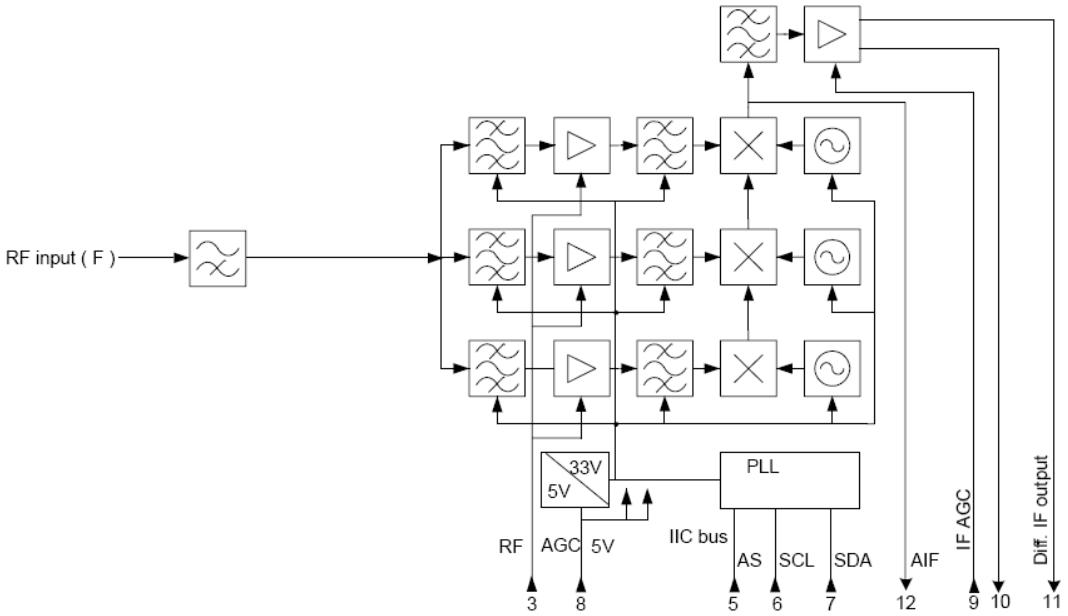
- Multi-standard analog TV receiver applications
- Digital low IF architecture
- Maximum IF gain of 48dB
- Programmable TOP to accommodate different tuner gain to optimize noise and linearity performance

Miscellaneous

- Embedded 8-bit MCU
- Clock generation from a single 20.48/ 28.8MHz crystal
- Supports I2C interface with bypass mode
- Operating voltage: 3.3V and 1.2V
- 48-pin LQFP package

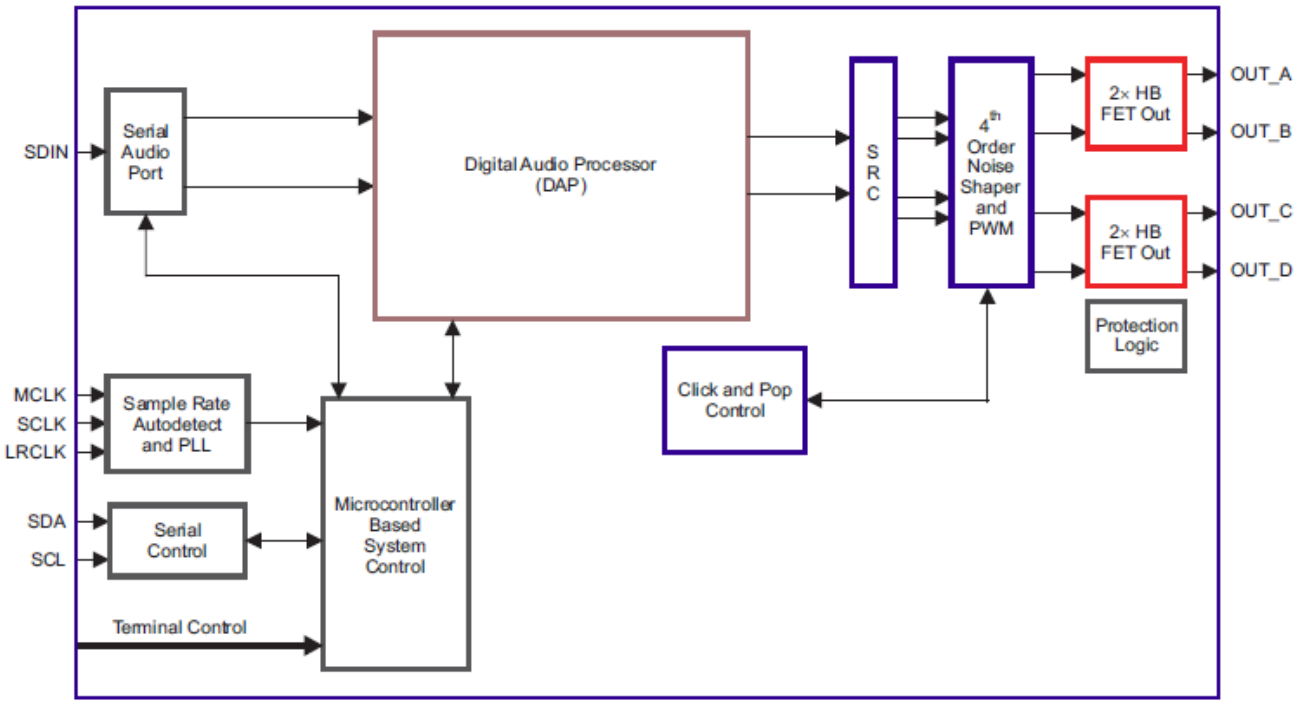
3、FT2112

FT 2112 are newly developed low-cost Half-NIM modules designed for both digital (DVB-T/C) and analog TV reception in compliance with the European ATV standards for analogue, as well as with the terrestrial standard ETS 300 744 and cable standard ETS 300429 for digital. It consists of a 3-band RF tuner, which receives RF signal and down-converts it to an IF frequency of 36MHz for digital and 38.9MHz for analog IF. The analogue IF output can directly drive a SAW filter. A digital IF Stage, which consists of one SAW filter & gaincontrollable IF that offers a sufficient output level to be connected directly to an A/D converter.

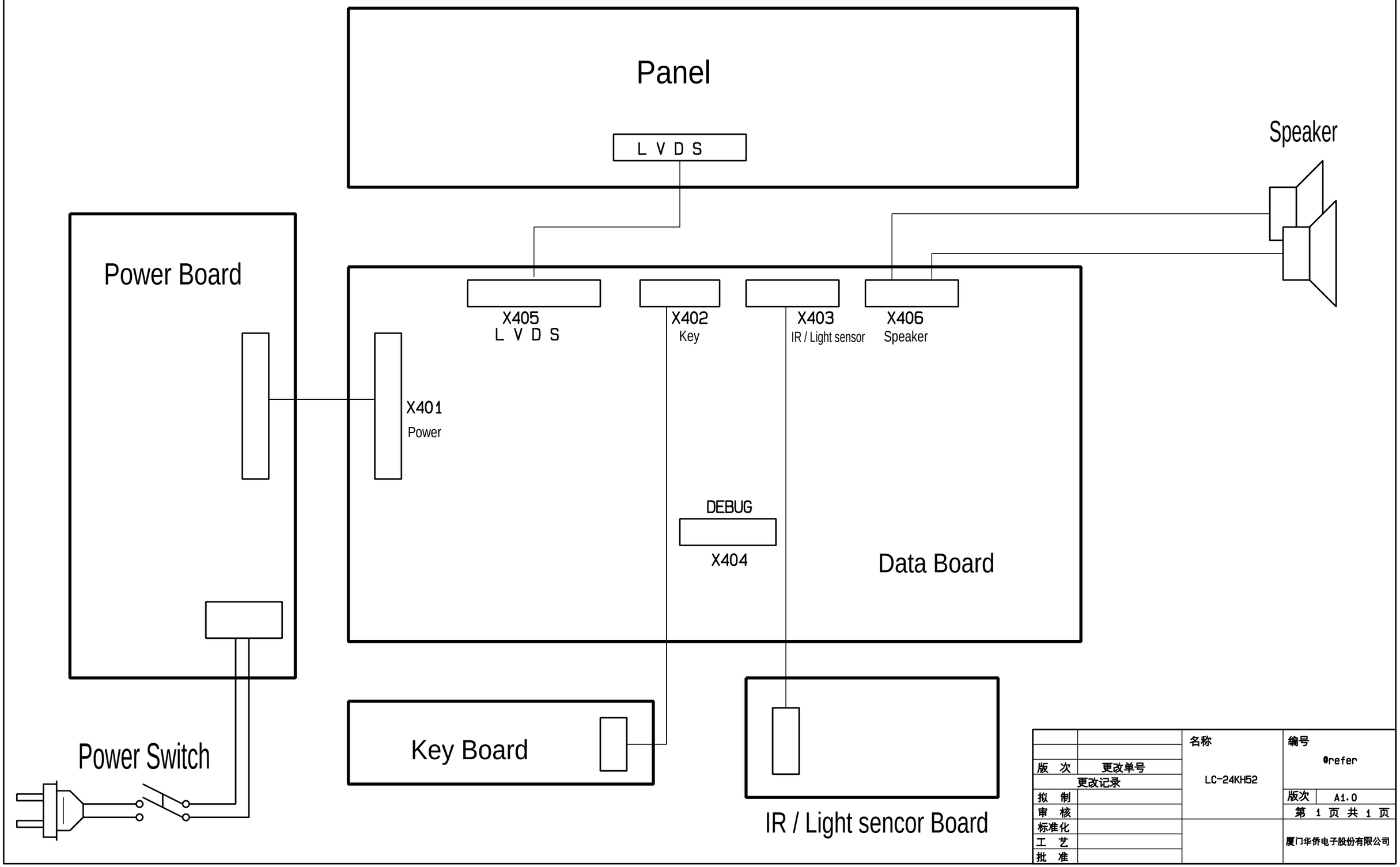


4、 TAS5711

• Audio Input/Output
–20-W Into an 8-Ω Load From an 18-V Supply
–Wide PVDD Range, From 8 V to 26 V
–Efficient Class-D Operation Eliminates Need for Heatsinks
–One Serial Audio Input (Two Audio Channels)
–2.1 Mode (2 SE + 1 BTL)
–2.0 Mode (2 BTL) –Single-Filter PBTL Mode Support –I2C Address Selection Pin (Chip Select) –Supports 8-kHz to 48-kHz Sample Rate (LJ/RJ/I2S) • Audio/PWM Processing
–Independent Channel Volume Controls With 24-dB to Mute –Separate Dynamic Range Control for Satellite and Subchannels
–21 Programmable Biquads for Speaker EQ and Other Audio Processing Features
–Programmable Coefficients for DRC Filters
–DC Blocking Filters
–Support for 3D Effects
• General Features
–Serial Control Interface Operational Without MCLK
–Factory-Trimmed Internal Oscillator for Automatic Rate Detection –Surface Mount, 48-Pin, 7-mm × 7-mm HTQFP Package
–Thermal and Short-Circuit Protection
–Support for AD or BD Mode
• Benefits
–Up to 90% Efficient
–AD and BD Filter Mode Support
–SNR: 106 dB, A-Weighted
–EQ: Speaker Equalization Improves Audio
Performance
–DRC: Dynamic Range Compression. Can
Be Used As Power Limiter. Enables
Speaker Protection, Easy Listening, Night-Mode Listening. –Separate DRC for Satellite and Subchannels
–Autobank Switching: Preload Coefficients for Different Sample Rates. No Need to Write new Coefficients to the Part WhenSample Rate Changes
–Autodetect: Automatically Detects Sample-Rate Changes. No Need for External Microprocessor Intervention
• Requires Only 3.3 V and PVDD


SDIN
Serial Audio Port
Digital Audio Processor (DAP)
S R C
4th Order Noise Shaper and PWM
2× HB FET Out
2× HB FET Out
OUT_A
OUT_B
OUT_C
OUT_D
Protection Logic
MCLK
SCLK
LRCLK
Sample Rate Autodetect and PLL
Click and Pop Control
SDA
SCL
Serial Control
Microcontroller Based System Control
Terminal Control

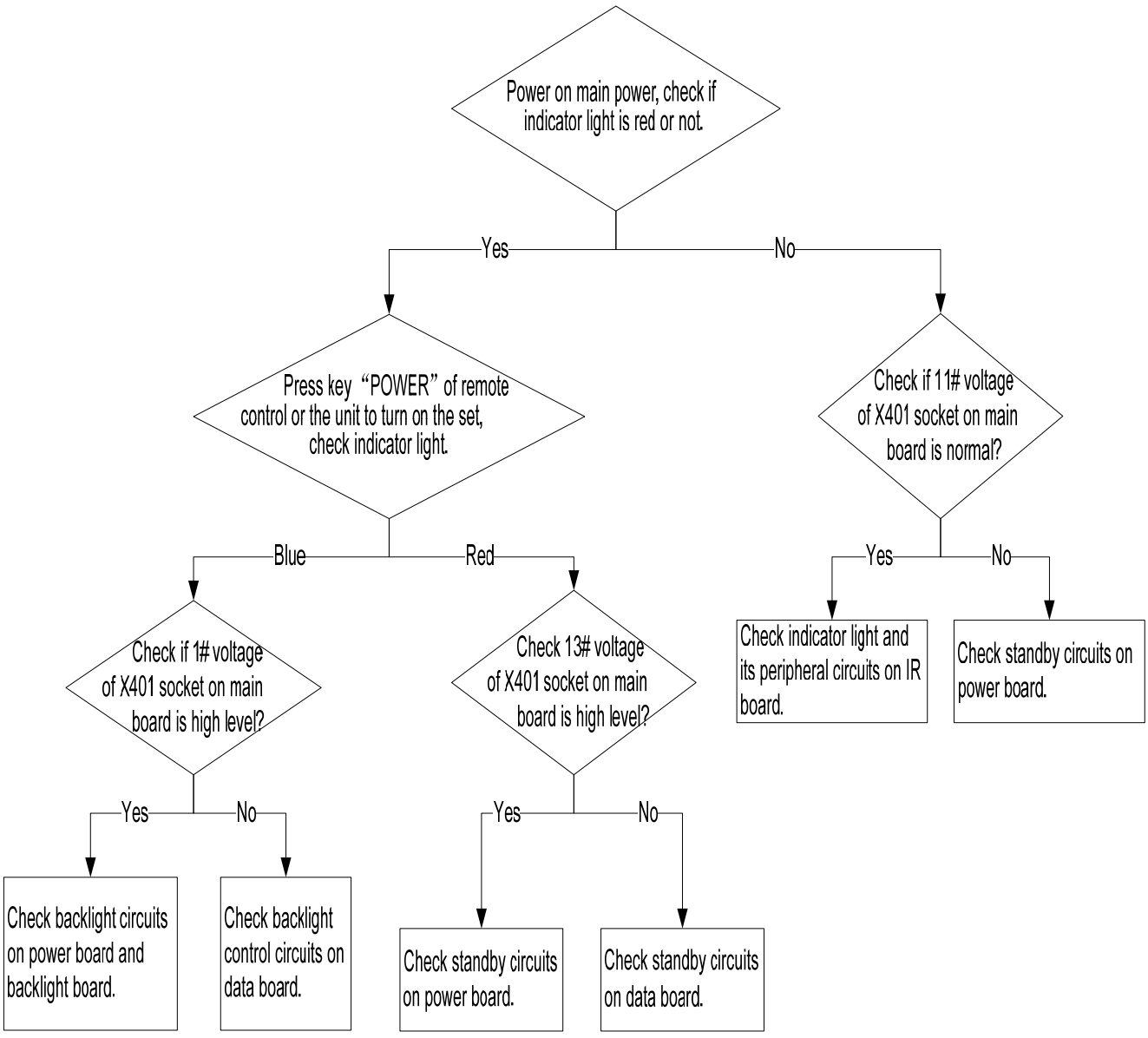
WIRING DIAGRAM



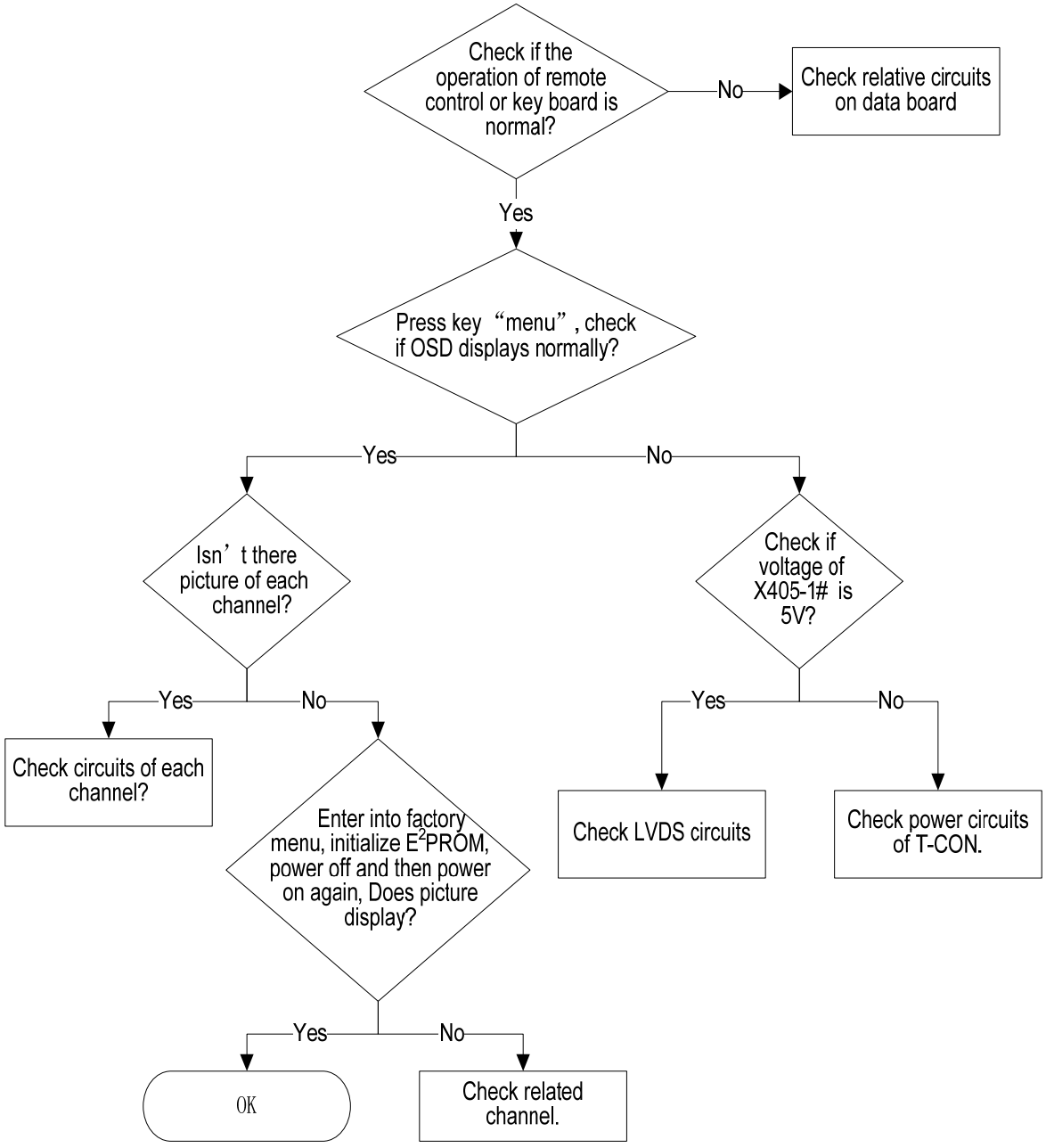
		名称	编号
			Orefer
版 次	更改单号	LC-24KH52	
更改记录			版次 A1.0
拟 制			第 1 页 共 1 页
审 核			
标准化			厦门华侨电子股份有限公司
工 艺			
批 准			

Troubleshooting guide

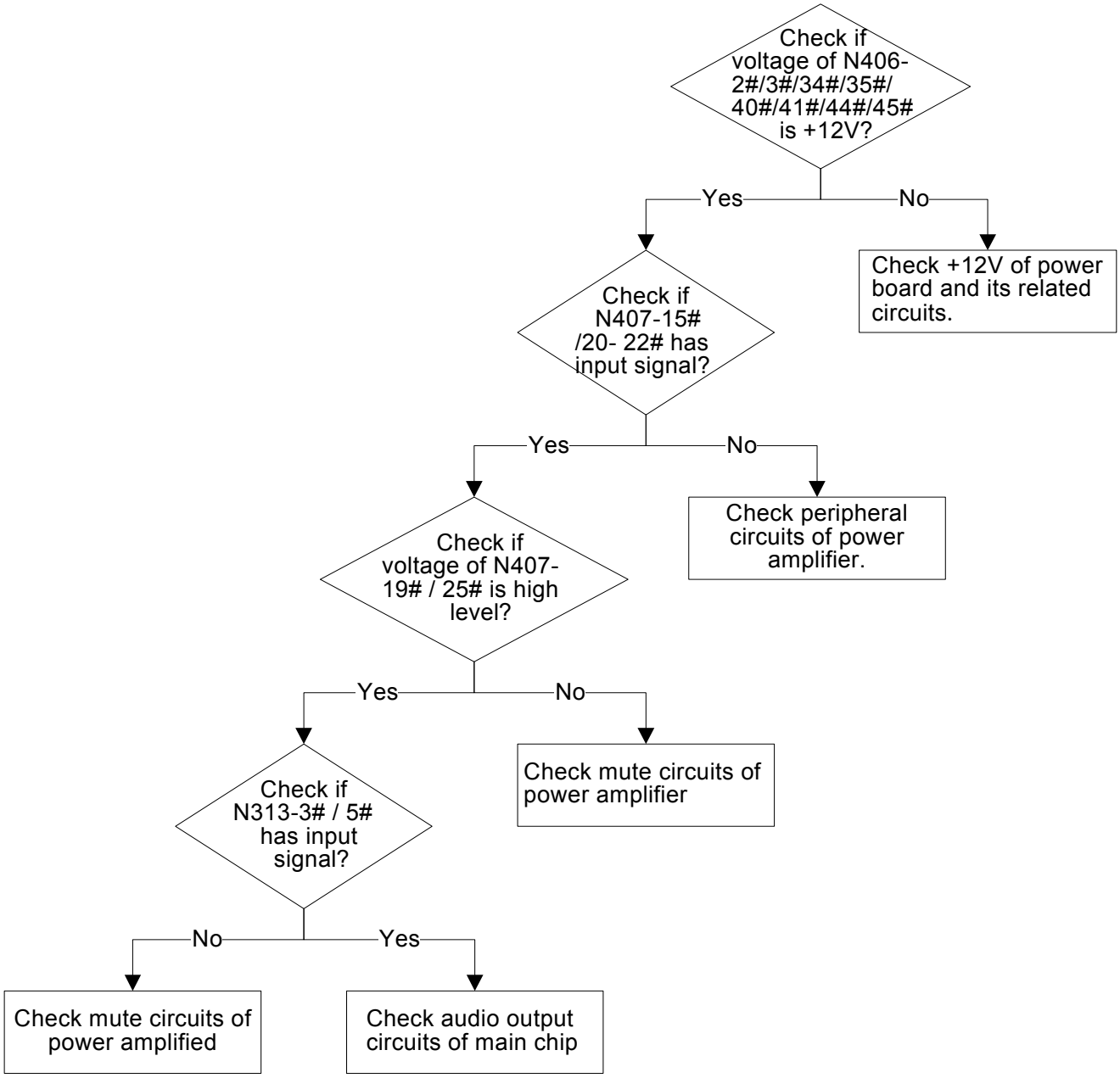
1、 No Backlight



2、 No Picture, but backlight is normal.



3、 No sound, but picture is normal.



N101
MSD209GL-LF

HDMI-in x2

RGB-in x3

CVBS-in x7
(incl. S-video)

CVBS-O x2

SIF x1
VIF x1(NC)

PM

SAR x4

PM-SPI

USB x1

UART &I2C-M

I2S-O&I

DDR2 x16
-Addr, CLK

DDR2 x16
-Data

Serial TS

Ethernet

LVDS X2
(10 bits)

AUDIO, Linx5, Lout x3

I2C-S

DDCx2

HDMI-in x1
DDC x1

USB X1

SPI

N102
APX810-29SAG-7

N103
EN25Q64-104HIP

N104
K4T1G164QE-HCF7

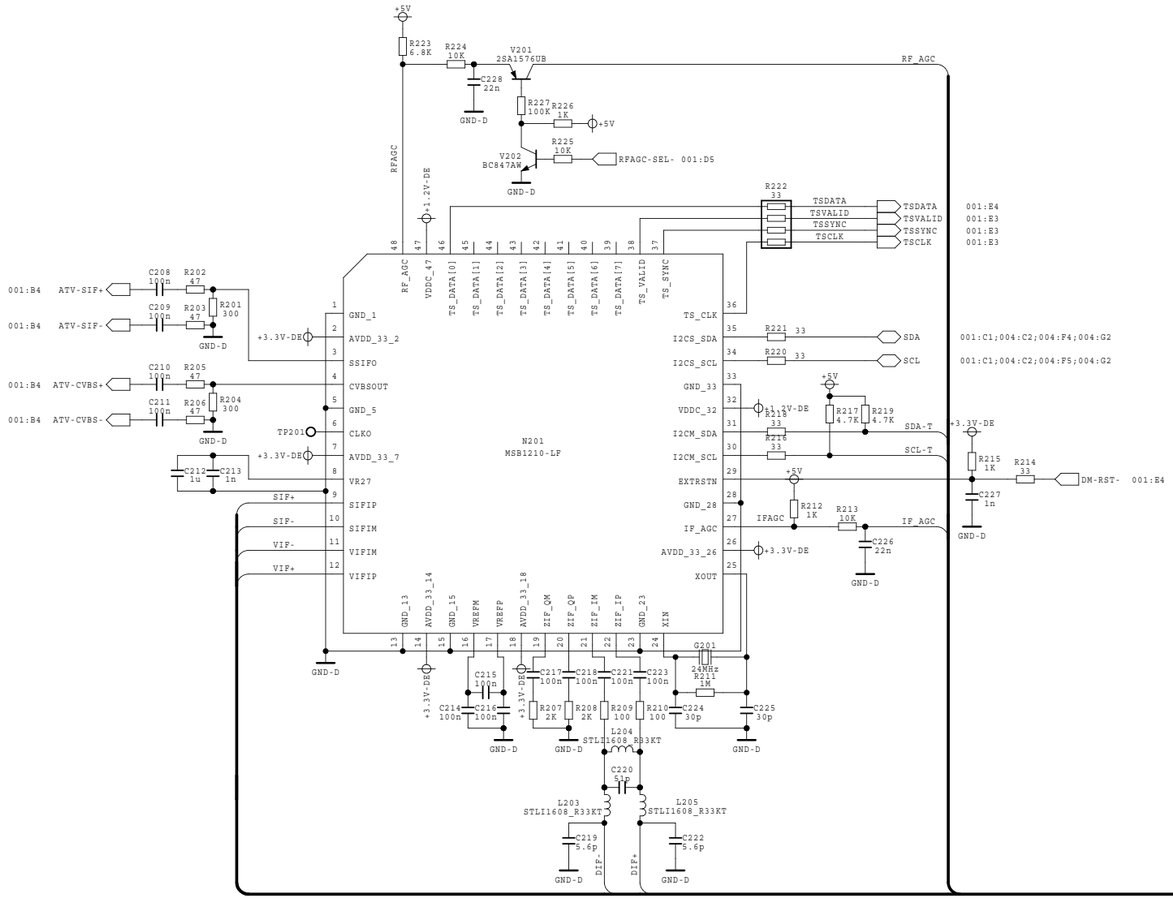
N105
AT24LC32A/SN

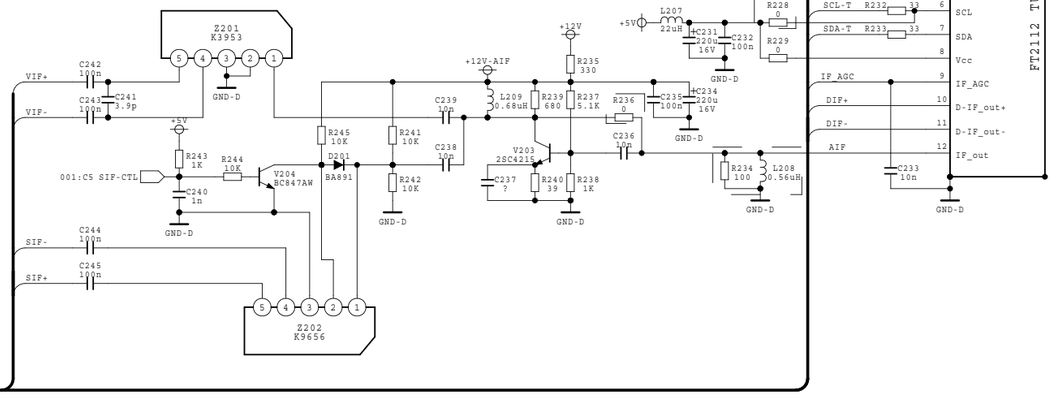
N106
CAT24C04WI

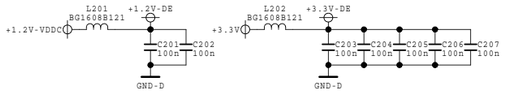
G101
12MHz

	TITLE: Core & Memory	DWG NO. 9222KH5101DL
DRAWN BY		REV. A1.0
APPROVED BY		Sheet 1 to 6

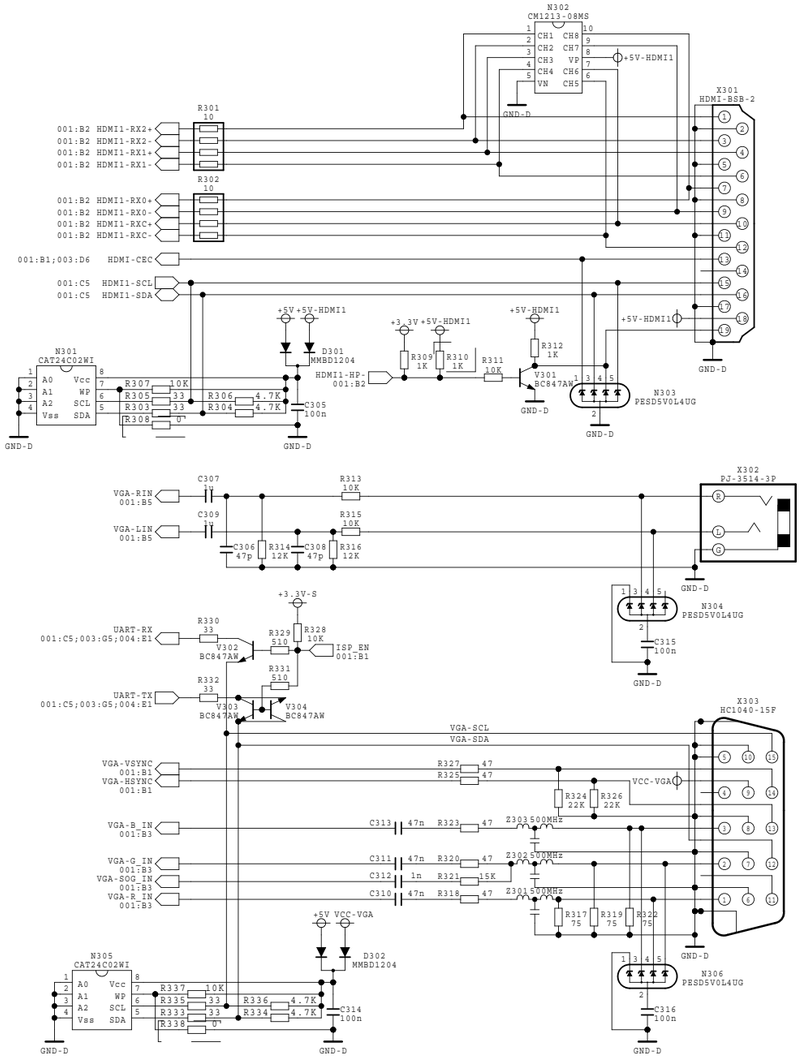
XOCECO
XIAMEN OVERSEAS CHINESE ELECTRONIC CO., LTD.


+5V
R223 6.8K
R224 10K
V201 2SA1576UB
RF_AGC
C228 22n
GND-D
R227 100K
R226 1K
+5V
R225 10K
V202 BC847AW
RFAGC-SEL- 001:D5
RFAGC
+1.2V-DE
R222 33
TSDATA
TSVALID
TSSYNC
TSCLK
001:E4
001:E3
001:E3
001:E3
C208 100n
R202 47
001:B4 ATV-SIF+
C209 100n
R203 47
R201 300
001:B4 ATV-SIF-
+3.3V-DE
C210 100n
R205 47
001:B4 ATV-CVBS+
C211 100n
R206 47
R204 300
001:B4 ATV-CVBS-
TP201
C212 1u
C213 1n
SIF+
SIF-
VIF-
VIF+
GND_1
AVDD_33_2
SSIFO
CVBSOUT
GND_5
CLKO
AVDD_33_7
VR27
SIPIP
SIPIM
VIPIM
VIPIP
N201
MSB1210-LF
TS_CLK
I2CS_SDA
I2CS_SCL
GND_33
VDDC_32
I2CM_SDA
I2CM_SCL
EXTRSTN
GND_28
IF_AGC
AVDD_33_26
XOUT
R221 33
R220 33
SDA
SCL
001:C1;004:C2;004:F4;004:G2
001:C1;004:C2;004:F5;004:G2
R218 33
R217 4.7K
R219 4.7K
SDA-T
SCL-T
R216 33
+3.3V-DE
R215 1K
R214 33
DM-RST-
001:E4
C227 1n
IFAGC
R212 1K
R213 10K
IF_AGC
C226 22n
GND-D
G201 24MHz
R211 1M
C215 100n
C217 100n
C218 100n
C221 100n
C223 100n
C214 100n
C216 100n
R207 2K
R208 2K
R209 100
R210 100
C224 30p
C225 30p
L204 STLI1608_R33KT
C220 47p
L203 STLI1608_R33KT
L205 STLI1608_R33KT
C219 5.6p
C222 5.6p
DIF-
DIF+

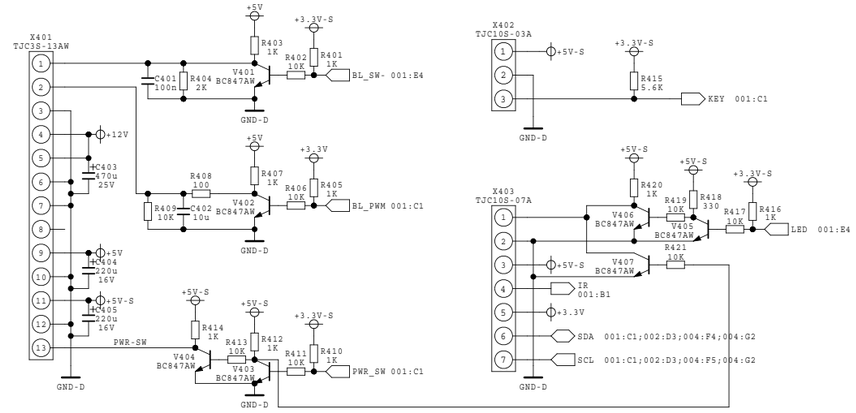

Z201 K3953
VIF+
VIF-
C242 100n
C243 100n
C241 3.9p
GND-D
+5V
R243 1K
001:C5 SIF-CTL
R244 10K
V204 BC847AW
C240 1n
SIF-
SIF+
C244 100n
C245 100n
Z202 K9656
R245 10K
R241 10K
D201 BA891
R242 10K
C239 10n
C238 10n
+12V-AIF
L209 0.68uH
R239 680
R237 5.1K
V203 2SC4215
C237 ?
R240 39
R238 1K
+12V
R235 330
R236 0
C236 10n
C235 100n
C234 220u 16V
L206 22uH
C229 220u 16V
C230 100n
L207 22uH
C231 220u 16V
C232 100n
R228 0
R229 0
R234 100
L208 0.56uH
RF_AGC
SCL-T
SDA-T
R230 33
R231 33
R232 33
R233 33
IF_AGC
DIF+
DIF-
AIF
C233 10n
FT2112 TUNER201
NC_1
NC_2
RF_AGC
Vt
AS
SCL
SDA
Vcc
IF_AGC
D-IF_out+
D-IF_out-
IF_out



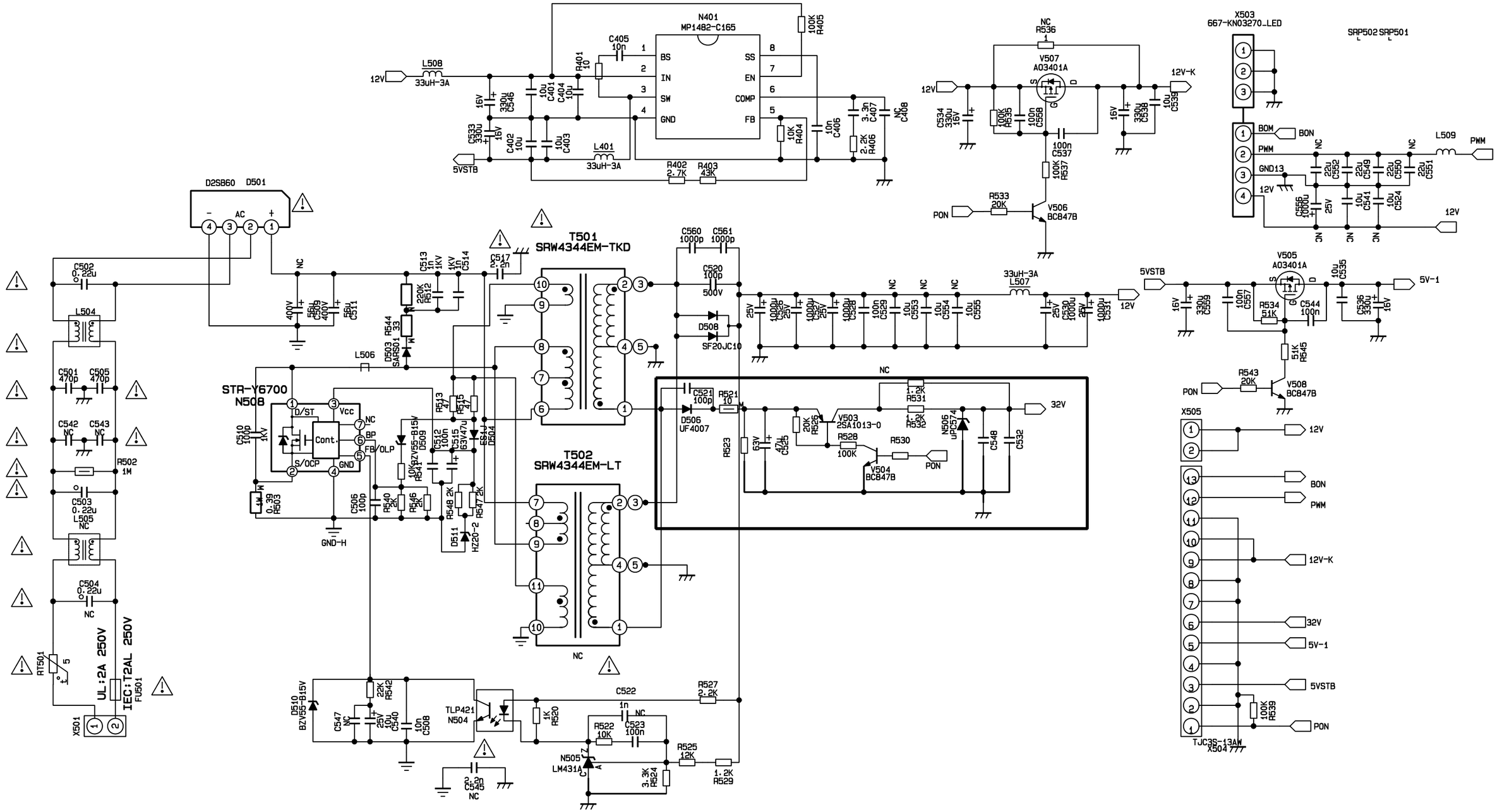
		TITLE: RF Demodulation	DWG NO. 9222KH5101DL
DRAWN BY			REV. A1.0
			Sheet 2 to 6
APPROVED BY			XOCECO XIAMEN OVERSEAS CHINESE ELECTRONIC CO., LTD.



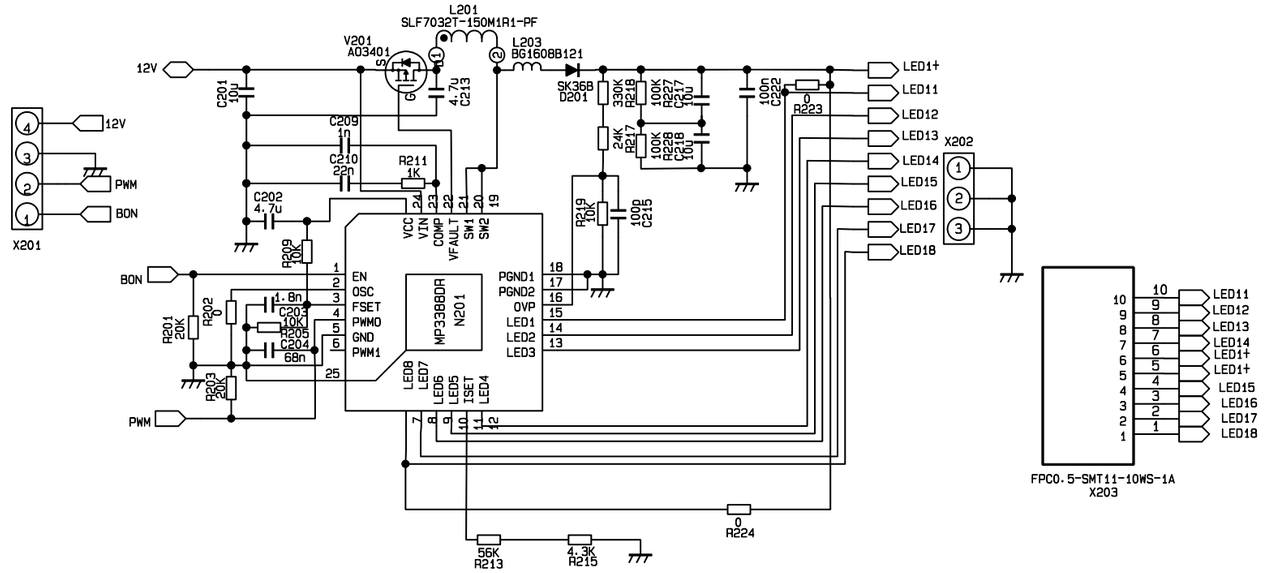
		TITLE: AV Interface	DWG NO. 9222KH5101DL
DRAWN BY			REV. A1.0
APPROVED BY			Sheet 3 to 6
			XOCECO XIAMEN OVERSEAS CHINESE ELECTRONIC CO., LTD.



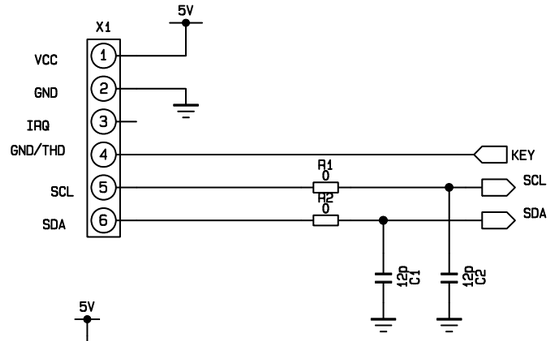
		TITLE: InternalInterface	DWG NO. 9222KH5101DL
DRAWN BY			REV. A1.0
APPROVED BY			Sheet 4 to 6
			XOCECO XIAMEN OVERSEAS CHINESE ELECTRONIC CO., LTD.

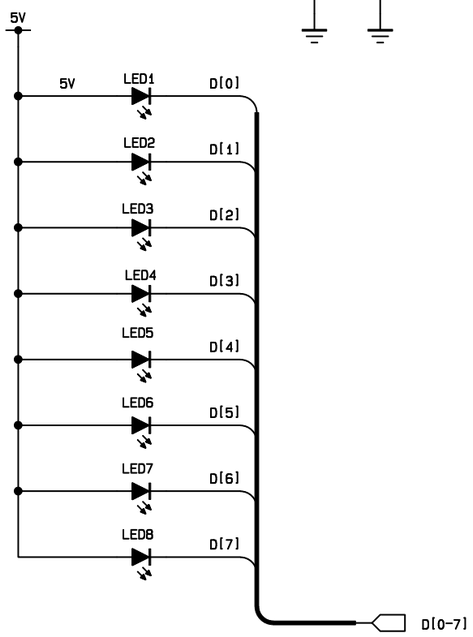


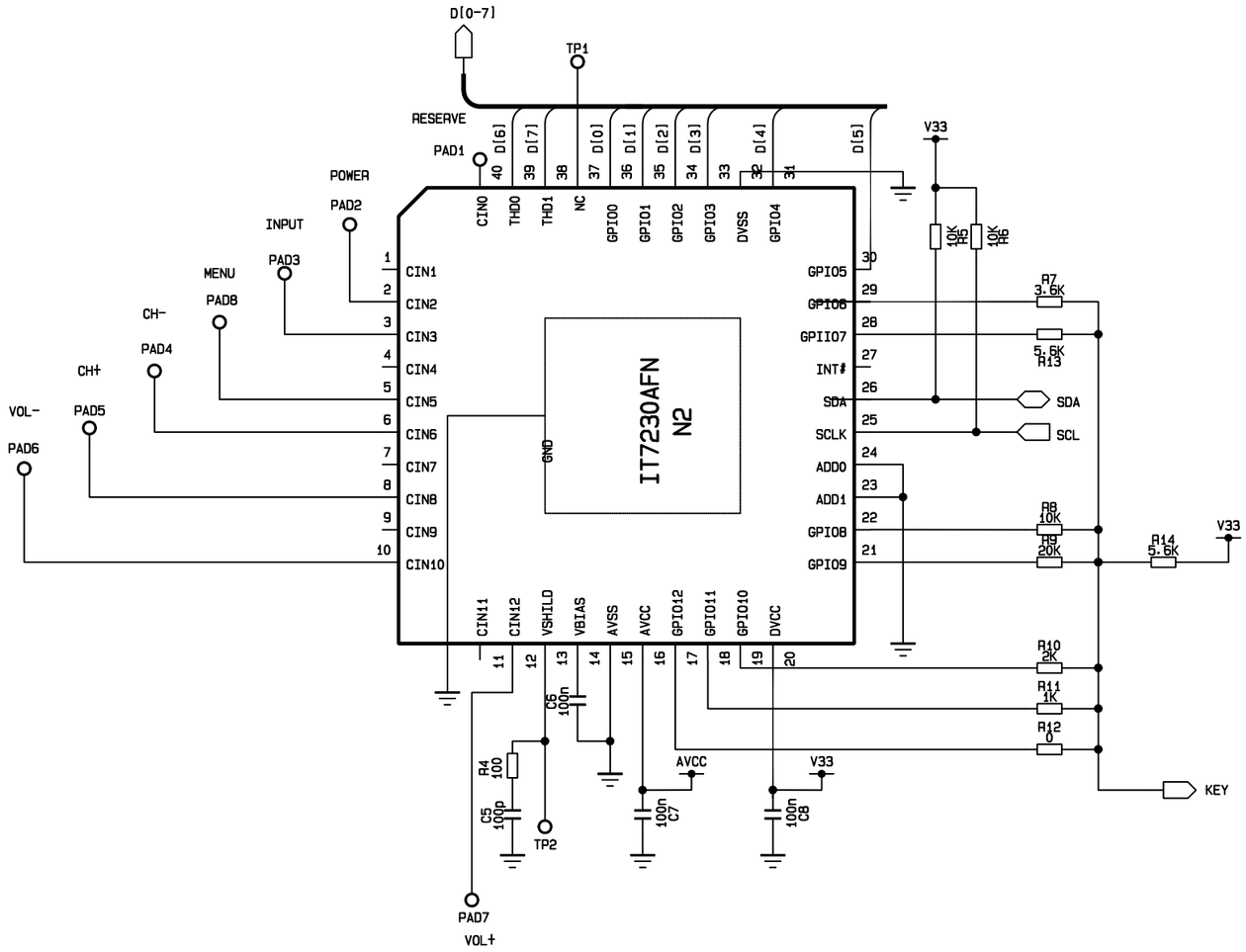
		名称	编号
		Power	
版 次	更改单号		版次
更改记录			第 页 共 页
拟 制			
审 核			
标准化			厦门华侨电子股份有限公司
工 艺			
批 准			

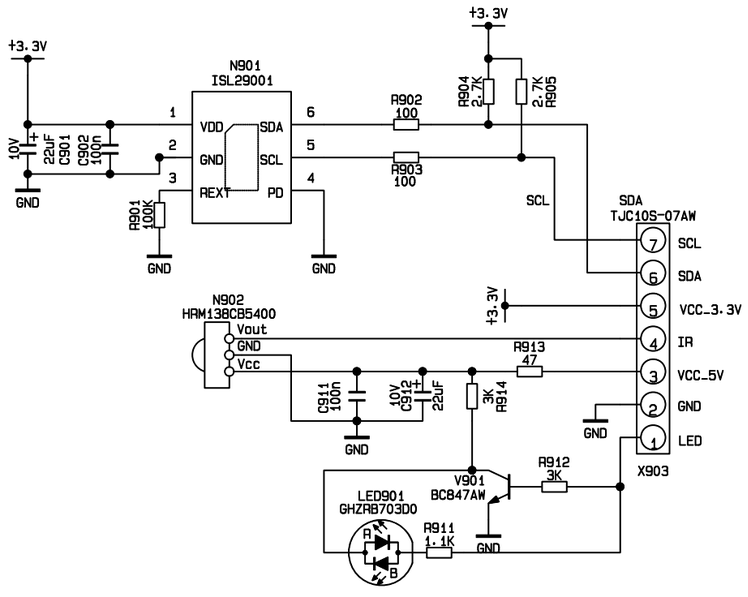


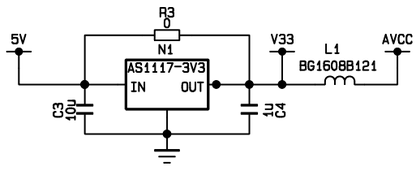
		名称	编号
		Backlight	
版 次	更改单号		版次
更改记录			第 页 共 页
拟 制			
审 核			
标准化			厦门华侨电子股份有限公司
工 艺			
批 准			









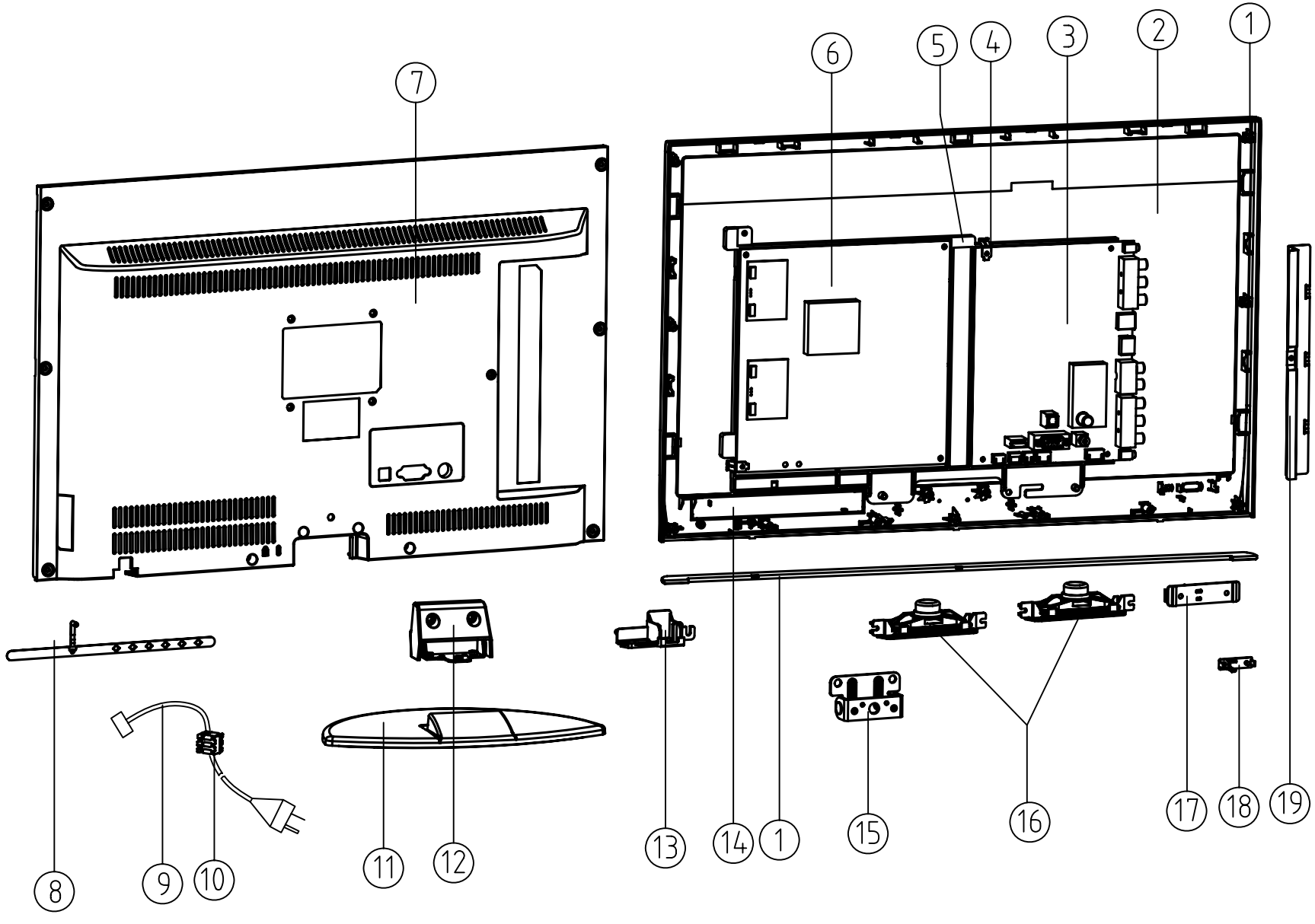


		名称	编号
		IR&Key	9224KH5210DL
版 次	更改单号		版次
更改记录			第 页 共 页
拟 制			
审 核			
标准化			厦门华侨电子股份有限公司
工 艺			
批 准			

APPENDIX-A: Main assembly 9222KH5110 LED-22XR10F

NAME	NO.	MAIN COMPONENT AND IT'S NO.	
Data processing board	XI6KH01301A0	N101 N201 N103 N406 N104 TUNER201	5270209002 MSD209GL-LF 5271210001 MSB1210-LF 5272564002 EN25Q64-104HIP 5275711001 TAS5711 5270164002 K4T1G164QE-HCF7 5524050028 FT2112
IR board	XI6KH0130910		
Key board	XI6KQ0020510		
Power board	XI6HE0432010		
Remote control	XI6010900501	RC-905-0A	
Panel	XI5203228202	CLAA215FA04-000	

APPENDIX-B: Exploded view (LED-22XR10F)



PART LIST OF EXPLODED VIEW

REF.No.	DESCRIPION
1	Front cabinet assembly
2	Display panel
3	Main board assembly
4	GND reed
5	Main frame assembly
6	Power board assembly
7	Back cover assembly
8	Adjustable clasp
9	Power cord
10	Power cord clip
11	Pedestal assembly
12	Standing pole assembly
13	Bracket of power cord clip
14	Touching key board assembly
15	Rotor assembly
16	Speaker assembly
17	IR asembly
18	Light guided pole
19	Interface baffle (side)

Note: design and specification are subject to change without notice.

PART LIST

LED-22XR10F ver.1.0

REF.No.	PARTS No.	DESCRIPION	Q'TY	REMARK
1	XI6622510020	Front cabinet assembly	1	
2	XI5203228202	Display panel	1	CLAA215FA04-000
3	XI6KH01301A0	Main board assembly	1	
4	XI592302860A	GND reed	2	
5	XI615328300C	Main frame assembly	1	
6	XI6HE0432010	Power board assembly	1	
7	XI672272L020	Back cover assembly	1	
8	XI5720124000	Adjustable clasp	1	
9	XI5602510001	Power cord	1	
10	XI572011201C	Power cord clip	1	
11	XI6151220000	Pedestal assembly	1	
12	XI6156105000	Standing pole assembly	1	
13	XI58B0A4231A	Bracket of power cord clip	1	
14	XI635KH00801	Touching key board assembly	1	
15	XI6158115000	Rotor assembly	1	
16	XI617081500A	Speaker assembly	1	
17	XI635KH00800	IR asembly	1	
18	XI570031901A	Light guided pole	1	
19	XI5810D72410	Interface baffle (side)	1	
20	XI6010900501	Remote control	1	
21	XI5944037610	User manual	1	

- Only the parts in above list are used for repairing.
- Other parts except the above parts can't be supplied.

Appendix: Installing the Stand

If the stand is provided, please read these instructions thoroughly before attempting this installation.

You must install your TV into the stand in order for it to stand upright on a cabinet or other flat surface. If you intend to mount your TV on a wall or other vertical surface, you must remove the stand column.

Cautions:

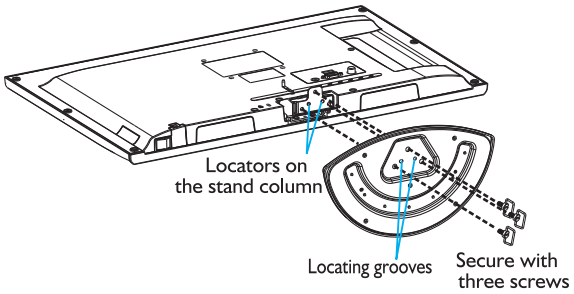
Make sure that you handle your TV very carefully when attempting assembly or removal of the stand. If you are not sure of your ability to do this, or of your ability to use the tools necessary to complete this job, refer to a professional installer or service personnel. The manufacturer is not responsible for any damages or injuries that occur due to mishandling or improper assembly.

When using a table or bench as an aid to assembly, make sure that you put down a soft cushion or covering to prevent accidental scratching or damage to your TV's finish.

The speaker is not intended to support the weight of your TV. Do not move or handle your TV by the speaker. This can cause damage to your TV that is not covered by the manufacturer's warranty.

Before attempting assembly or removal of the stand, unplug the AC power cord.

Installing the stand



To install the stand:

1. Remove the stand from the box and place it on a table or bench.

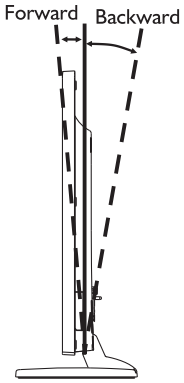
   You must pay attention to the direction of the stand. The wide portion of the stand should go towards the front of the TV.

2. Lay your TV flat (screen down) on the edge of a table or bench. Make sure that you put down a soft cushion or cloth so that your TV is not scratched.

3. Put the stand close to the TV back, move the stand gently until the locators on the stand column align with the locating grooves on the stand, and align the screw holes on the stand column with the holes in the stand, then secure the stand to the TV with provided screws .

   To remove the stand from the TV, perform these steps in reverse order.

Adjusting the viewing angle

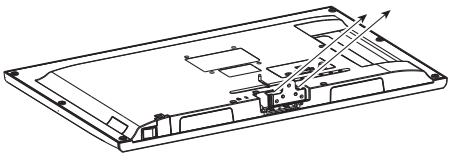


To adjust the viewing angle:

- Tilt the screen forward or backward.

Caution: When adjusting the viewing angle, be careful not to tip over your TV.

Installing a wall-mount bracket (not provided)



NOTE:

The appearance of this product in these illustrations may differ from your actual product, and is for comparative purposes only.

Note: To avoid interference between the jacks, wall-mount bracket, and wall, the wall-mount bracket must be more than 40 mm thick, and the RF or VGA cable must have a 90-degree plug.

To attach your TV to a wall-mount bracket (not provided)

1. Carefully place your TV screen face-down on a cushioned, clean surface to protect the screen from damages and scratches.
2. Remove the screws holding the TV to its stand and remove the stand.
3. Remove the stand column.
4. Secure the wall-mount bracket to the back of your TV using the four screws provided with the bracket.

WALL MOUNTING INSTRUCTIONS

Safety Precautions:

1. Be sure to ask an authorized service personnel to carry out setup.
2. Thoroughly read this instruction before setup and follow the steps below precisely.
3. The wall to be mounted should be made from solid materials. Only use accessories supplied by the manufacturer.
4. Very carefully handle the unit during setup. We are not liable for any damage or injury caused by mishandling or improper installation.
5. Be sure to place the unit on a stable and soft platform which is strong enough to support the unit.
6. Do not uplift the speaker when moving the display. The appearance of the unit may different from the actual ones.
7. Design and specifications are subject to change without notice.
8. Retain these instructions for future reference.

Note: All the wall mounting parts are optional and may be unavailable in your model.

Below we will show you how to mount the Display on the wall using our company's wall mounting components.

1

Take out these parts from the box.

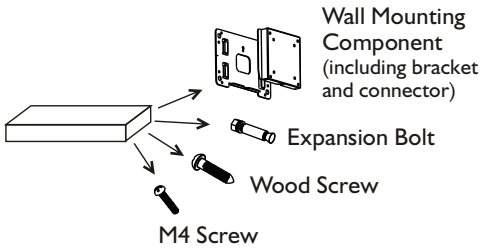


Fig. 1

2

Screw 4pcs expansion bolts to fix the wall mounting bracket on the wall.

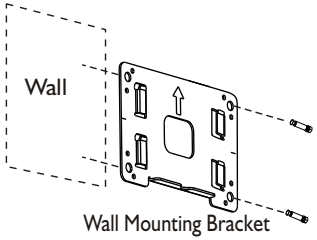


Fig. 2a

If your wall is a wooden structure, please fix the wall mounting bracket on the wall with 8 pcs wood screws.

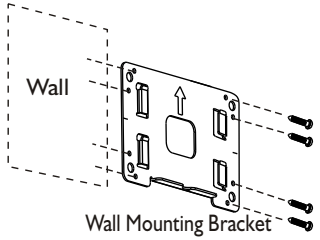


Fig. 2b

3

Use the 4pcs M4 screws to fix the wall mounting connector to the rear of the display unit.

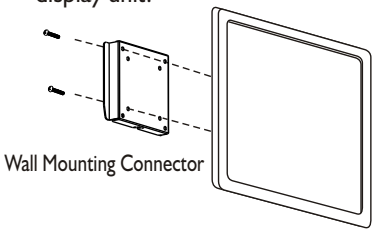


Fig. 3

4

Fully insert the two insertions on the wall mounting connector into the locating grooves on the wall mounting bracket from top to bottom end.

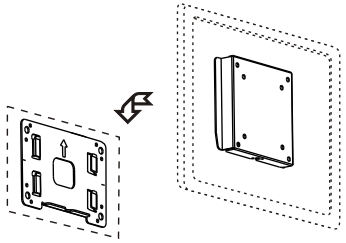


Fig. 4

5

Use screwdriver to revolve the Clasper to the Positioner following the direction of the arrow.

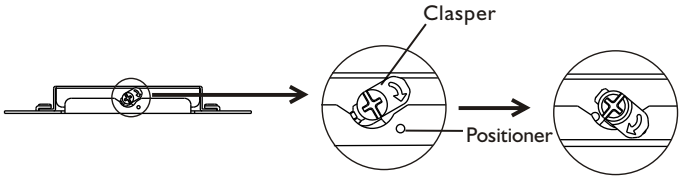


Fig. 5

July 2010

SANYO Electric Co., Ltd.