HK950 Service Manual

HISENSE INTELLIGENT COMMERCIAL SYSTEM CO. LTD.

Ⅰ. Product Introduction

1.1 basic introduction

The all-in-one POS HK950 is a new commercial POS with features of high performance, rich configuration, low power consumption and easy maintenance. It provides more choices for customers. HK950 fits for commercial department stores, restaurants, boutiques, cosmetics stores and other industries, to provide a complete set of solutions.

1.2 basic configuration:

● Mainboard system platform:

● 1) Intel® Celeron® processor 3955U (Skylake) SOC 2.0Ghz dual-core dual-thread power consumption 15W

● 2) Intel® Core® processor i3-6100U (Skylake) SOC 2.3Ghz dual-core four-thread power consumption 15W

● Memory DDR4L 4G maximum support 8GB

● Hard disk:

● 1) HDD SATA 2.5 inch (500Gb Standard)

● 2) SATA 64 Gb SSD (larger capacity optional) or Larger

● 15 inch touch one machine, resistive screen, capacitive screen optional

● 2 * 20 VFD guest, structure and HK900 / HK870 compatible

● Second screen off, 15 inch (optional)

● wireless network optional

● Multi-function card reader, support for MSR, RFID, USB interface fingerprint reader

● 4 * RJ50 serial port; (COM2, COM3, COM4 can be connected to customer's display 5V / 12V power supply optional.)

● 4 * USB 2.0 (2 Side, 2Rear), 2 * USB3.0

● 1 * RJ45, support 1000M Ethernet

● 1 * cash drawer interface

1.3 The composition of whole machine

The whole machine is composed by LCD screen, touch screen, multi-card reader, customer display, base composition.
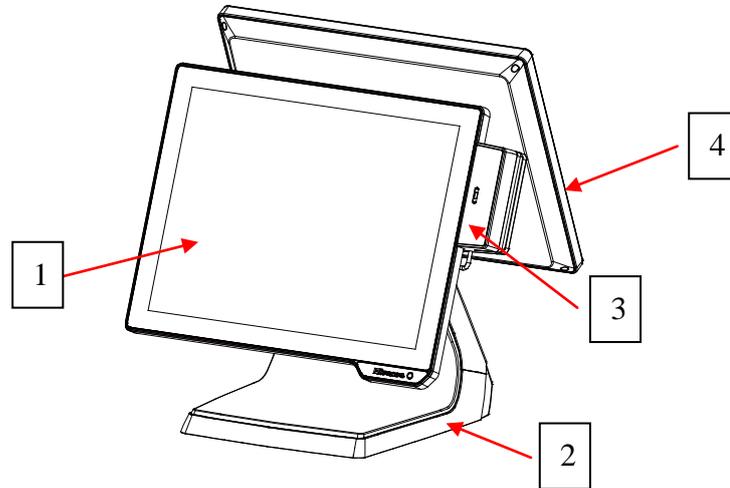
1.screen	2.base	3. MSR or RFID card reader
4.secondary screen		

IO panel

COM 4	COM 3	COM 2	COM 1	USB	HD MI	VGA	Cash drawer	24V power in	12V DC out	LAN port	AUDIO

1.4 Use environment
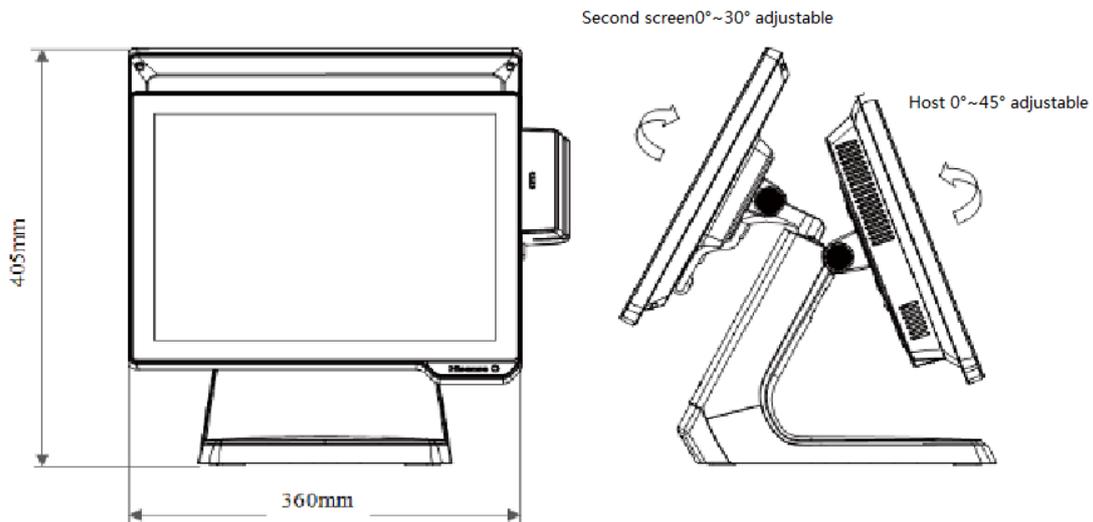
Voltage: DC 24V bipolar with ground

Current: 2.5A.

Operating temperature: -10 ℃ ~ 50 ℃. (Suggestion: 15 ℃ ~ 30 ℃)

Working humidity: 10% ~ 90%. (Suggestion: 40% ~ 70%)

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Storage temperature: -30 ℃ ~ 70 ℃. (Suggestion: 15 ℃ ~ 30 ℃)

Storage humidity: 10% ~ 90%. (Suggestion: 40% ~ 70%)
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1.5 Machine size and rotation angle

Ⅱ. Product main hardware configuration and specifications

2.1.Power

The whole machine adopts FSP060-DAAN2 24V DC power supply, input voltage range: AC 100V ~ 240V; input frequency: 50Hz ~ 60Hz; output current: 2.5A; rated power: 60W;

1）Output specifications

Standard value	Prescribed value	Minimum value	Maximum value
+24.0V	22.8V-25.2V	0A	2.5A

2）Input voltage specifications

Minimum value	NOM.	Maximum value
90V	90/264	264V

3）Temperature specifications

Operating mode	0°C ~ +40°C
Storage mode	-20°C ~ +70°C

4）Humidity specifications

Operating mode	10%~90% RH，non-condensing
Storage mode	10%~90% RH，non-condensing

2.2 Mainboard

The Mainboard can use the following two types of system platforms:

1 \ Intel® Celeron® processor 3955U (Skylake) SOC 2.0Ghz dual-core dual-thread power consumption 15W.

2 \ Intel® Core® processor i3-6100U (Skylake) SOC 2.3Ghz dual-core four-thread power consumption 15W.

2.2.1 Mainboard appearance is as follows:
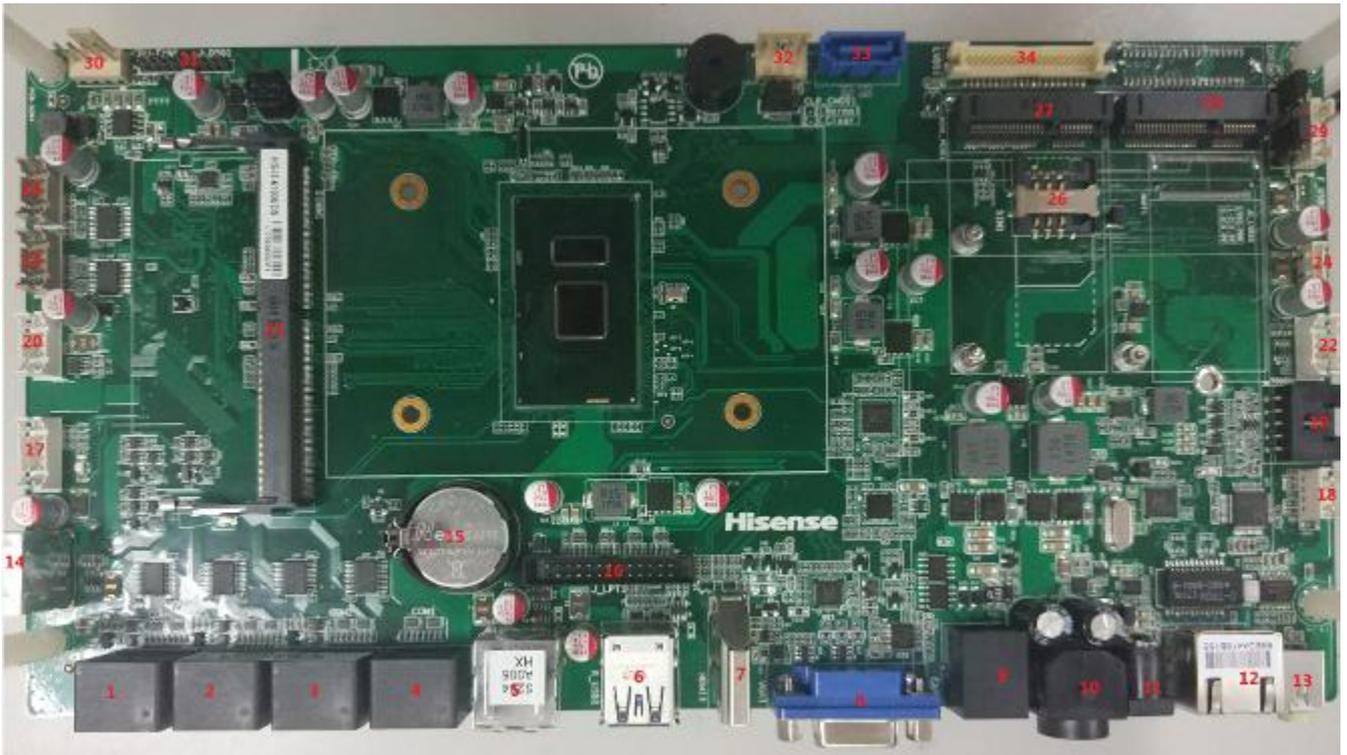
Mainboard identifies	port	Port details
1.COM4	Serial port connector	Serial port 4 (live 5V / 12V)
2.COM3	Serial port connector	Serial port 3 (live 5V / 12V)
3.COM2	Serial port connector	Serial port 2 (live 5V / 12V)
4.COM1	Serial port connector	serial port 1
5.R_USB3	USB connector	rear double USB2.0 interface
6.R_USB1	USB connector	rear double USB3.0 interface
7.HDMI1	HDMI connector	rear HDMI interface
8.VGA1	VGA connector	Rear VGA port
9.CASH1	RJ11 connector	RJ11 interface ,24Vcash drawer
10.DC_IN1	DC 24V power connector	System power connector
11.DC_OUT1	DC 12V power output	12V power output
12.RJ45_1	LAN connector	Network Interface
13.JACK1	Headphone connector	Headphone jack
14.R_USB2	USB connector	Rear double USB2.0 interface
15.BAT1	CMOS Battery	Mainboard COMS battery
16.J_LPT1	LPT connector	Parallel printer interface
17.F_PANEL1	Front Panel connector	Switch board interface
18.J_SPK1	1*4Pin 2.0mm wafer box	Onboard speaker output connector
19.TOUCH1	Resistive touch connector	Resistive touch screen interface
20.F_USB3	USB header	On-board USB interface
21. DIMM1	1*260pin SO-DIMM Socket	DDR4 memory interface
22. F_USB2	USB header	On-board USB interface
23.J_COM6	Serial port header	Onboard serial port 6
24.F_USB4	USB header	On-board USB interface
25. J_COM6	Serial port header	Onboard serial port 5

26.SIM1	MINIPCIE	SIM card
27.MINI_PCIE1	MINIPCIE	Wireless network card
28.MINI_PCIE2	Mini SATA	MSATA hard drive interface
29.LVDS_P1	LVDS Inverter power connector	LVDS power connector
30.CPU_FAN1	FAN connector	Smart fan interface
31.J_DEG1	Debug	debugging interface
32.P_SATA1	Serial Advanced Technology Attachment Power Connector	SATA power connector
33.S_ATA1	Serial Advanced Technology Attachment Connector	SATA data line interface
34.LVDS1	Low Voltage Differential Signaling Transmitter Interface	LVDS interface

Mainboard rear IO ports panel
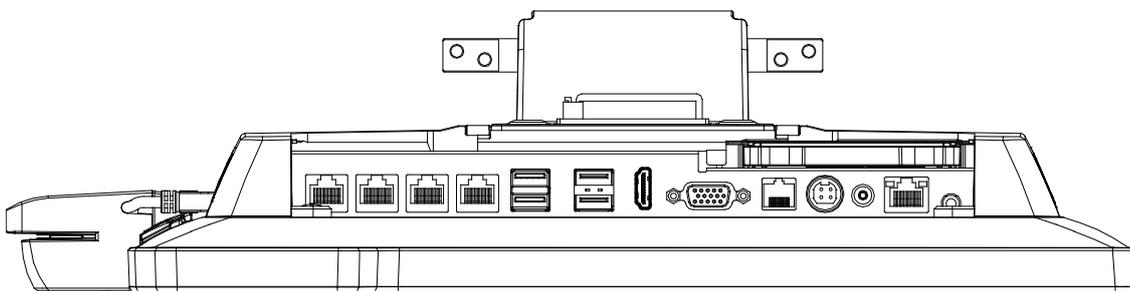
2.2.2 Mainboard basic parameters

PCB		
PCB	Layer/size	6 layer/245*135mm
	special	/
Chipset		
CPU	Skylake-U 15W TDP 3955U/I3-6100U	
CHIPSET	SOC	
SUPER IO	ITE8785E/ITE8786E	
RAM		
RAM	PORT AMOUNT	1*channel
	PORT TYPE	SODIMM
	SPECS	DDR4
	NOTES	

Ports definition

Graphics		
VGA	Port Amount	1
	Port Type	DB15+socket
	DB15	1
	Socket	Wafer 12*1 2.0mm
	Fake Load	Null
	Notes	
HDMI	Port Amount	1
	Port Type	Type A Vertical 90°
	Notes	
LVDS	Port Amount	1
	Port Type	2*20 1.25mm white socket SMD

	Bus type	PS8625 convert
	Brightness control	PWM control
	Notes	

Network card:

Network card		
Network card	Chip	Realtek 8111F
	Port Amount	1
	Port Type	RJ45
	Wake on the internet	Support
	ESD	Support
	BYPASS	Null
	NOTES	

Audio card:

Audio card:				
Audio card:	Chip	ALC662-VD		
	Amplifier type	TPA6017		
	Port Type	I2S PORT		
	Pins	1*LINE OUT+WAFER 4*1 2.00mm		
	Notes	Amplifier definition		
		1	R-	2	R+
		3	L+	4	L-

COM Port

COM port				
COM port	Port Amount	6		
	Port Type	COM 1-4 RS232 RJ50 10 PINS COM 5-6 RS232 WAFER 5*2 PHD connectors		
	Live com ports	COM 2-4 jumper pin 10th RI\5V\12V selectable		
	Pins			
	Notes	COM1		

COM1

1	NC	2	DCD
3	DSR	4	RXD
5	RTS	6	TXD
7	CTS	8	DTR
9	GND	10	RI

COM2-4

1	NC	2	DCD
3	DSR	4	RXD
5	RTS	6	TXD
7	CTS	8	DTR
9	GND	10	RI\5V\12V

COM5-6

DCD	RXD
TXD	DTR
GND	DSR
RTS	CTS
RI	NC

PS/2		
Ps/2	Keyboard DB	1
	Mouse DB	1
	Pins	6*1 2.00 PH pins
	Keyboard Startup	null
	Notes	

Power in

24V DC IN		
24V DC IN	Port Amount	1
	Port Type	S terminal 4pin
	Voltage Range	24V
	Notes	1●2● 3●4● 4pin DC jack definition <table><tr><td>1.24V</td><td>2.24V</td></tr><tr><td>3.GND</td><td>4.GND</td></tr></table>
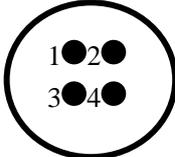
Cash drawer:

Cash drawer:		
Cash drawer:	Port Amount	1
	Port Type	STANDARD 24V RJ11 port
	Notes	1.GND 2.CD1_OPEN 3.CD_SENSE 4.+24V 5.CD2_OPEN 6.GND

2.3 LCD display

Item	Specification		
Product Type	15.0" TFT Liquid Crystal Display module with LED Backlight units and 20 pins LVDS interface		
Best display resolution	1024 x 768 XGA mode		
Display color	16.2M/262k colors.		
Frame size	307.4(H) x 231.3(V)		
Visual area size	304.1 (H) x 228.1(V) (15.0" diagonal)		
Operating mode	Temperature range	Humidity range	Remarks
	-30°C ~ +80°C	90 %RH Max. (Ta $\leqq$ 40℃)	
Storage Mode	-40°C ~ +85°C	90 %RH Max. (Ta $\leqq$ 40℃)	

2.4 Capacitive touch screen

Item	Specification
Product Type	Projected Capacitive Touch Screen
Touch mode	Finger touch, pen touch
connection	FPC connection cable (length 90mm)

Connection mode	USB		
Frame size	354.1 mm X 277.1 mm X 2.4T		
Visual area size	305.1 mm X 229.1 mm		
total thickness	3.20 ± 0.20 mm		
Operating mode	Temperature range	Humidity range	Remarks
	-10°C ~ +60°C	90% RH at max 50°C	
Storage Mode	-20°C ~ +70°C	90% RH at max 50°C	
Transmittance	85% ± 2%		
Operating life	click life of not less than 1 million times		
	Strokes life of not less than 100,000 times		
Support OS	Android、Linux、XP、Win7、Win8、Win10		
Touch point	support 10 points touch		

2.5 OS supported

	OS	version	touch	notes
windows	win10	32BIT	supported	
		64BIT	supported	
	WIN7	32BIT	supported	
		64BIT	supported	
LINUX	Redhat Server	64BIT	supported	
	CentOS 6.4	64BIT	supported	
	Ubuntu 14.04	64BIT	supported	
	ubuntu-14.10-desktop-i386		supported	

Ⅲ. Product disassembly and replacement of major parts

3.1 disassemble tool

The main tools:

1) Phillips screwdriver

Specifications: Length 150-200mm (not included)

Uses: When used to disassemble parts, unscrew or install the fixing screws.

2) screw box:

Uses: used to place the screws removed.

3) Flathead screwdriver

Uses: used to remove the drawing chassis.

3.2 machine disassemble and replacement steps

3.2.1.MSR removal and replacement

Step 1: Remove the card reader USB cable and the fixed card under pressure;

Step 2: According to the direction of construction plans to promote the magnetic card reader to remove it for replacement;

3.2.2. Hard disk removal and replacement

Step 1: Press both sides of the hard disk with plastic fixing bracket and pull the bracket in the direction of the arrow to remove the hard disk.

Step2: Remove the hard disk from its mounting bracket and replace it;

3.2.3. second screen LCD disassembly and replacement

Step 1: Dial the lock to "⌣" as shown, remove the front bezel as the picture shows;

Step 2: Remove the second screen from the base by removing the three screws on the second screen mounting bracket (base end) and the two fixing screws on the pressboard.

Step 3: Remove the second screen of the four screws (monitor side) after the second screen to be replaced;

3.2.4. Mainboard and memory removal and replacement

Step 1: repeat the action of 3.2.3, remove the base front cover and unplug the connection cable on the Mainboard side;

Step 2: Remove the two fixing screws of the mainframe to remove it from the base as shown in the figure;

Step 3: Remove the two fixing screws of the rear case of the main body and remove it.

Step 4: Remove the hard disk bracket, heat sink, Mainboard screws, remove all kinds of cables on the Mainboard, Mainboard and memory replacement;

SSD bracket

Heat sink

RAM
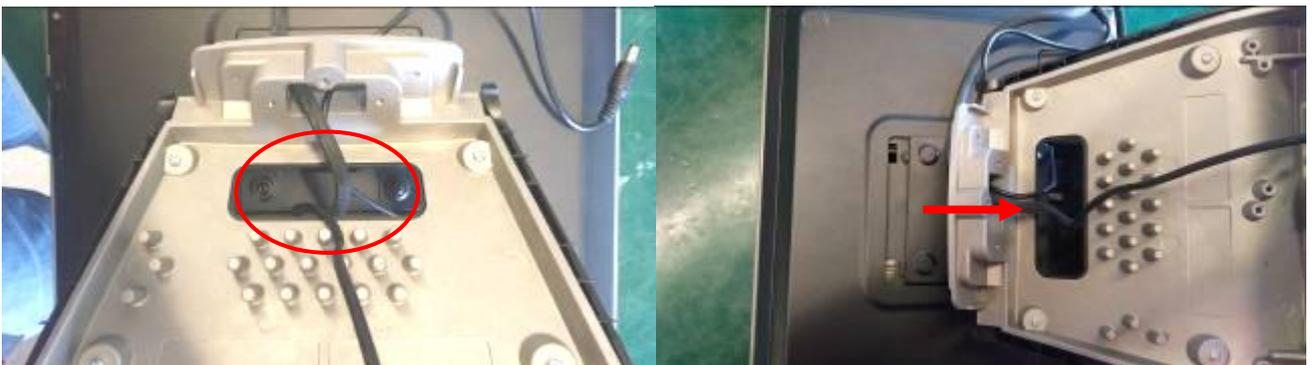
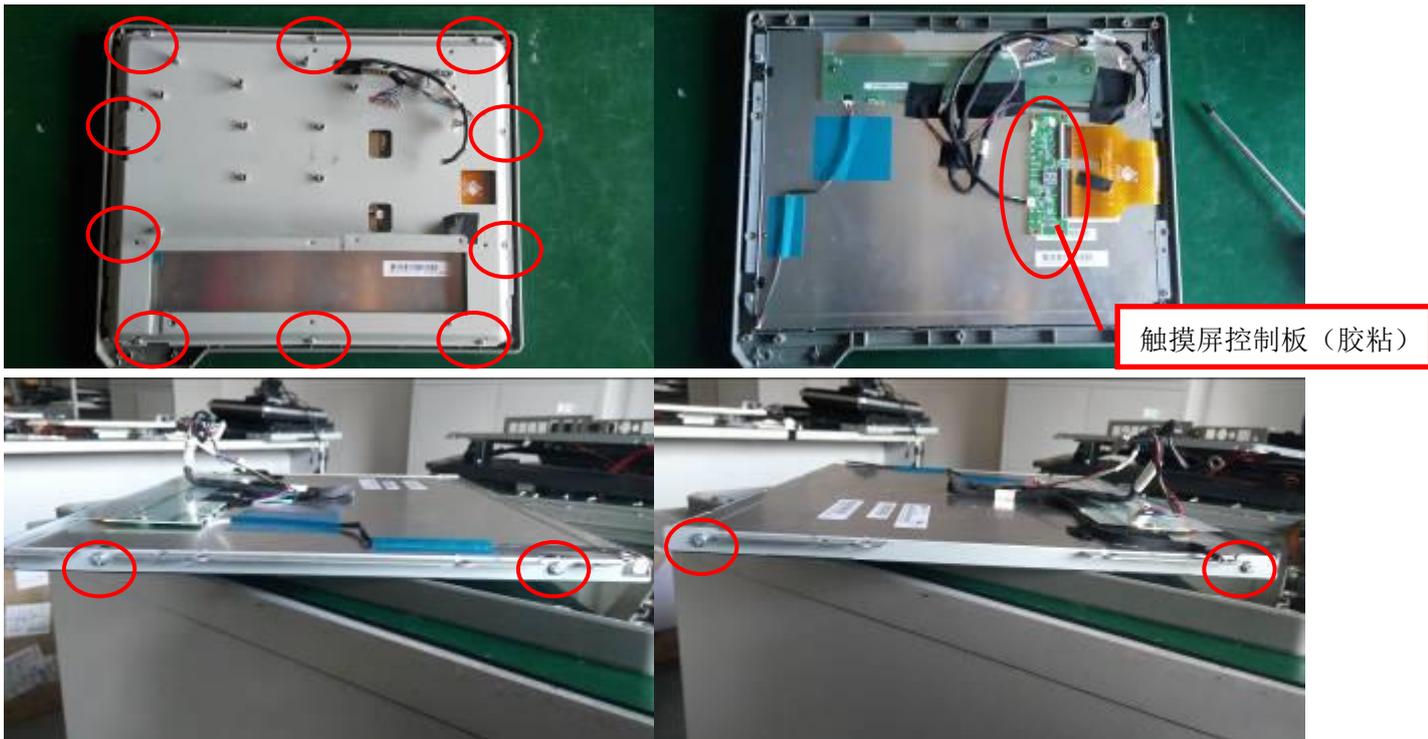## 3.2.5. LCD screen (main screen) removal and replacement

Step 1: Repeat the actions of 3.2.3 and 3.2.4, remove the main frame and remove the cable between the LCD panel and the Mainboard;

Step 2: The LCD panel metal shield 10 fixed removed and removed;

Step 3: Remove the cable and touch panel (glue) from the LCD panel;

Step 4: Remove theLCD fixing screws (two on each side) on the fixing bracket to replace the LCD panel;

触摸屏控制板（胶粘）

3.2.6. Touch screen removal and replacement

Step 1: Repeat the actions of 3.2.4 and 3.2.5 to remove the components of the touch screen and the front shell kit;

Step 2: Take a new touch screen and front shell kit, installed on the host;

Notes: touch panel is pasted to front shell by 3M tape tightly, so it is hard to disassemble the touch screen and front shell, so we suggest you may replace front shell and touch panel assy to avoid part damage. The parts needed as below：

PART CODE	DESCRIPTION	QUAN	NOTES
P013100	Touch panel\DY1502S-2209	1	PCT touch
P0360126	Front shell\HK950 主机\HZS8.074.207\ABS\银\喷漆\无丝印	1	
P065024	Double side tape	1	

Ⅳ. Ⅳ.Common Fault Analysis And Solution

4.1 Possible Cause of Common Faults

1）normal malfunctions: mainly caused by normal wear and end of service life, or natural aging;

2）human-caused malfunctions: components are damaged due to not complying with the operating rules such as insert and pull the plug in a working condition etc.

3）hardware malfunctions: problems of manufacturing process or material quality problem；poor contact between boards and connectors；board solder joint is broken or unstable、the connecting wires break down etc.

4）software malfunctions：it can be divided into the fault caused by the human reason、the fault caused by system software and the application itself, and the fault caused by virus;

5）impact caused by the environment：it mainly includes voltage anomaly fluctuation, temperature and humidity, dust, electromagnetic radiation, electrostatic and other factors ；

4.2 Principle of handling faults

1）From software to hardware：The fault should be analyzed first from the operating system and software，for example: The partition table is missing、COMS is improperly set up、the virus destroy the system.The error of hard disk main boot sector or the register file. After eliminating the errors of software, we can start diagnosis the cause of the failure from the hardware aspect.

2）From the outside to the inside：We should diagnosis the peripheral first ，then turn to the host, fault diagnosis should be based on the system error；

3）Power supply first：Power supply is the key to whether the machine can work normally, so we should check the power supply first and then diagnosis the other parts.

4）From general to special：Consider the most likely cause of failure, for example: If the hard disk cannot work normally, we should check if the power cable and the data line is loose, reconnecting them can solve the problem.5）From simple to complex：First eliminate some faults that are easy to work out, then eliminate those faults that are not easy to solve.

4.3 Common methods of eliminating the faults

1）observation

Choose what to observe based on the specific situation , use your eyes、ears、nose and other organs to judge the failure, observe if there is charred、variant、abnormal sound、falling off and other phenomena;

The principles of observation are as follows：

From outside to inside：observe the environment of the outside and inside of the machine；

From simple to complex：look、listen and smell；then have a measurement or test.

2）re-install method

Remove the board which may have a fault ，wipe it clean with rubber and then re-insert to make sure it is in a good contact.

3） replacement method

Replace the defective part with a similar one which have the same functions to find out if the failure is gone.

4）minimum system method

Remove all the peripheral components and host hardware remaining power supply、Mainboard、cpu these three

components，plug in and observe if it works normally, if there is no faults we can install other parts step by step until

the whole machine cannot work normally, find out the error part and repair it.

5）heating and cooling method

Use finger to touch the heating part and observe if there is overheating; cool the abnormally heating part with an absorbent cotton swab containing absolute ethanol, if the failure eliminates, it can proves that the failure is caused by the overheating stability.

4.4 Common Troubleshooting

1）common error message tips and solutions when the boot

Error prompt	Cause	Solution
BIOS ROM checksum error: System halted	BIOS ROM program data has been changed or BIOS chip is damaged	1) Restart the computer into the BIOS and load the default settings 2) Remove the CMOS battery for about 10 seconds, discharge the CMOS, and then enter the BIOS to load the default settings
CMOS battery failed or CMOS battery state low	CMOS battery power shortage	Replace a new CMOS battery
CMOS checksum error-Defaults loaded	CMOS battery power shortage, or may be caused by CIH virus problems	1) enter into the BIOS to load the default settings, 2) for the CMOS battery discharge, and then load the BIOS default settings, 3) try another CMOS battery
CMOS System Options Not Set	The data stored in the CMOS is corrupted or does not exist	Load BIOS default settings
Press F1 to continue Del to setup	BIOS settings problems, it may be a hardware installation problems, such as hard disk installation is not correct	1) load the BIOS default settings; 2) or check the hardware whether has problem
Memory Test Fail	Memory installation is not strong or damaged, it may not memory compatibility, or BIOS and memory-related settings are not appropriate, such as memory frequency and actual value does not match	1) first load the BIOS default settings try, 2) re-insert the memory or replace the new memory to try
Keyboard Error	Keyboard damage or poor connection status	Check whether the keyboard is plugged well or the keyboard interface is good
Hard disk Install Failure	HDD port bad connection or HDD damaged	Check whether the hard disk interface is connected properly, replace the new hard drive to test
HDD controller Failure	HDD port not good	Check whether the hard disk interface is connected properly
Hard disk(s) diagnosis fail	HDD damaged	Connect the hard disk to another device to check for proper operation
Primary master hard disk fail	HDD fault	1) Load the BIOS default settings to try 2) Check the hard disk interface status is good
C drive error	The BIOS does not receive a signal from the hard disk C	1) Check the hard disk interface is correct 2) load the BIOS default settings to try
Override enable-defaults	BIOS settings are not suitable	1) Load the BIOS default settings to try

loaded	for the device (for example, the memory can only run 1000 MHz, but the actual set to 1333MHz)	2) CMOS discharge to load the BIOS default settings
Disk BOOT failure ,Insert system disk and press enter	Hard disk is not well installed or hard disk master boot record error	1) reinstall the hard disk, 2) load the BIOS default settings to try, 3)load into the DOS with boot disk, execute the F disk / MBR command
Invalid partition table	Invalid partition table	1)load into the DOS with boot disk, implement of F disk / MBR command 2) re-partition for the hard disk
Miss operation system	Can not find hard disk DOS boot record	Format C drive: Format C / s
Long stay in the "Verifying DMI pool Data" interface	Hard disk master boot record is corrupted or operating system problems	1) check the BIOS set up with what equipment to start the system, and changed to hard disk boot; 2) see if the BIOS can detect the hard disk, if not detect, then bad hard disk or hard disk damage; 3) if the hard disk installation or Their own have no problem, if no important data, hard disk can be re-zoning; 4) re-partition for the hard disk, re-install the operating system

2）common error message tips and solutions of LCD

Common fault	Cause reason and solution
Black screen	Possible cause：mainboard fault, LVDS cable or LED cable faulty、LCD faulty；solution: Use the substitution method to troubleshoot the relevant parts in the following order LVDS or LED cable LCD mainboard
Flower screen ,white screen ，unormal color	Possible cause：mainboard fault, LVDS cable or LED cable faulty、LCD faulty solution: Use the substitution method to troubleshoot the relevant parts in the following order LVDS cable LCD mainboard
Screen dark（no display、flickering screen）	Possible cause：mainboard fault, LVDS cable or LED cable faulty、LCD faulty solution: Use the substitution method to troubleshoot the relevant parts in the following order LCD cable LCD mainboard
Bright line	Possible cause：LCD cable faulty or LCD faulty solution: replace new LCD or replace new LCD cable

3）common error message tips and solutions of Touch panel

Common fault	Cause reason and solution
Touch panel not working good	Possible cause：touch controller fault, driver lost; touch screen faulty ,mainboard faulty, cable faulty or cable bad connection status solution: Use the substitution method to troubleshoot the relevant parts in the following order drivers USB cable touch controller touch screen mainboard
Touch panel no function	Possible cause：touch controller fault, driver lost; touch screen faulty ,mainboard faulty, cable faulty or cable bad connection status solution: Use the substitution method to troubleshoot the relevant parts in the following order drivers USB cable touch controller touch screen mainboard

4）common error message tips and solutions of Mainboard

Common fault	Cause reason and solution
Startup automatically when connected to power	Possible cause：maybe mainboard is faulty Solution: replace the mainboard
not power on	Possible cause: faulty adapter ; mainboard faulty; RAM damaged ; BIOS faulty Solution: 1) replace new mainboard 2) replace new adapter 3) remove the cmos battery and short-circuit related IC and install cmos battery back 4) replace new RAM.
Port not working	Possible cause: port faulty, port cable status bad, mainboard faulty Solution: replace new mainboard or replace related I/O board or related cables
Not access to LAN	Possible cause: drivers lost; port damaged 1) replace the mainboard 2) install drivers 3) replace new LAN cable

5）common error message tips and solutions of HDD or SSD

Common fault	Cause reason and solution
Can't access to OS; It prompt："Device error" when startup，or："Non－System disk or disk error, Replace and strike any key when ready"	Possible cause :CMOS fault ,mainboard fault ,OS fault , hard drive fault Solution 1)remove the CMOS battery and short-circuit related IC, then install back CMOS battery 2)reinstall OS 3)replace HDD or SSD 4)replace new mainboard
It prompts："Invalid partition table"	Possible cause: SSD record data fault solution： 1) reload OS 2) replace new SSD and reload OS
It prompts "Error loading operating system"or"Missing operating system"	Possible cause :CMOS fault ,mainboard fault ,OS fault , hard drive record data fault Solution: 1)remove the CMOS battery and short-circuit related IC, then install back CMOS battery 2)reinstall OS 3)replace HDD or SSD 4)replace new mainboard
It prompts "TRACK 0 BAD，DISK UNUSABLE"	Possible cause: SSD fault； solution： 1)replace new SSD；
SSD read/write speed slow,OS crash or reboot	Possible cause: OS fault; SSD fault, solution： 1) replace new SSD； 2) reload OS； 3) use software to recover SSD

6）common error message tips and solutions of RAM

Common fault	Cause reason and solution
Cannot access to OS and alarm	Possible cause:RAM slot faulty,RAM faulty ,OS faulty ,mainboard faulty Solution: 1)reload OS 2)replace new RAM,3)replace new mainboard.
Blue screen or crash	Possible cause:OS fault, software fault,RAM fault ,mainboard fault Solution: 1)reload OS, 2)replace new RAM , 3)replace new mainboard
System reboot automatically many times when system boot.	Possible cause:OS fault ;RAM faulty or mainboard faulty Solution: 1)reload OS, 2)replace new RAM or replace new mainboard