DCY2.782.A3800WC/V8.1/A-E

Apogee 3800

Digital Ultrasound Imaging System

SERVICE MANUAL

SIUI

Shantou Institute of Ultrasonic Instruments Co., Ltd.

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Chapter 1

System Composition & Technical Specifications

1.1 System Composition

The system consists of a main unit, a monitor, probes and peripheral devices. The main unit includes a probe interface board, a T/R board, a digital processing board, a power board, a computer, a control panel (console) and an ATX power supply. See Fig. 1-1. This system can be connected with 4 probes at the same time. By using the circuitry on the probe interface to switch the probes, the user may select the required probe via the control panel.

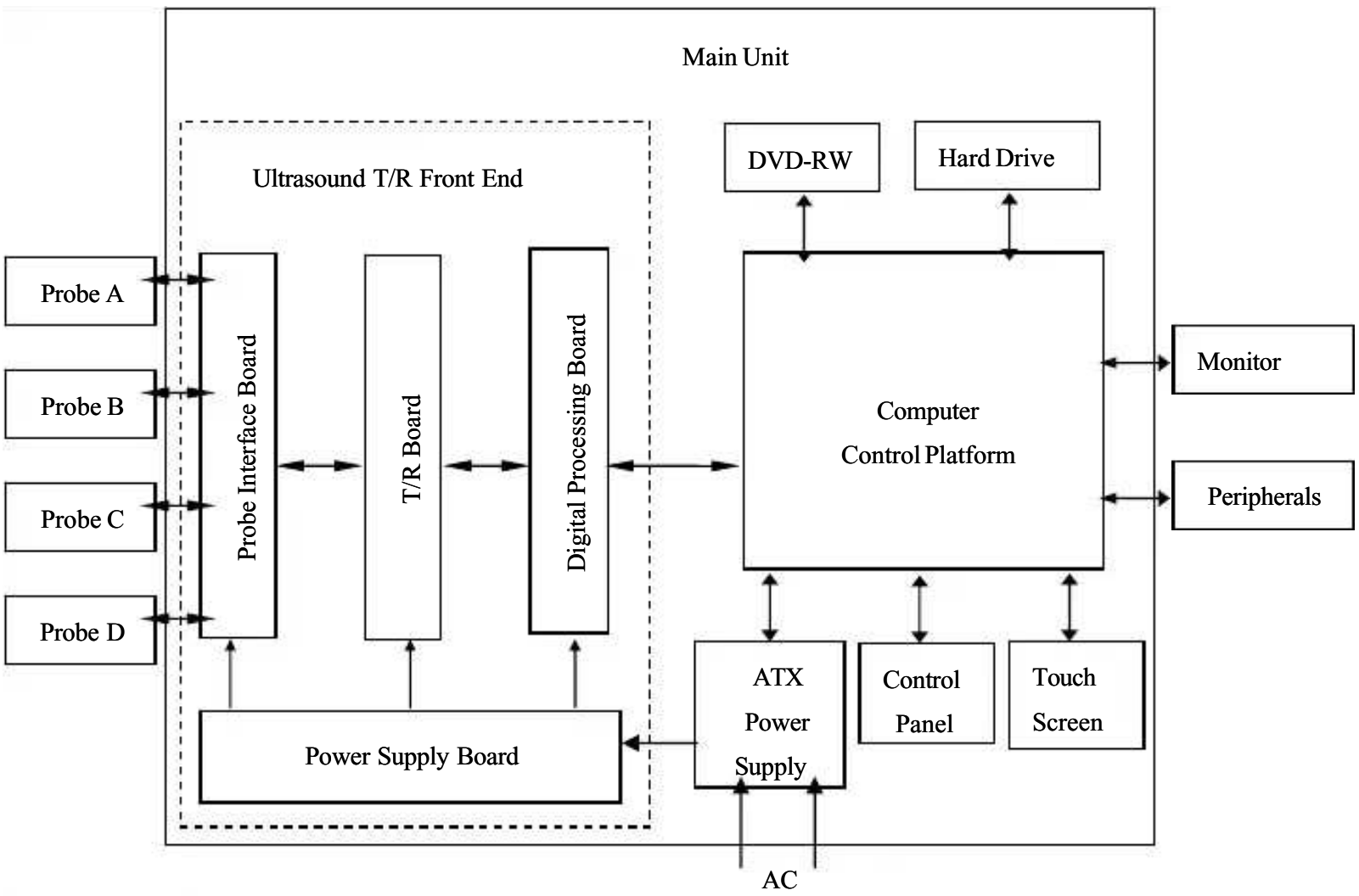


Fig. 1-1 Main unit Composition Block Diagram

1.2 Working Principle

Basic operation principle of the main unit is as follow:

The Digital Processing Board on the one hand transmits digital image signals to the computer control system, on the other hand receives control information from the computer control system and generates corresponding control data to achieve control of the ultrasound T/R front end.

Here is the working process of the system:

Based on control actions from the control panel, the computer control system generals control commands and parameter data automatically. The Digital Processing Board receives commands and control parameters from the computer control system, distributes them to each functional module.

The real-time controller on the Digital Processing Board generates live scan control signals and controls transmission of the front-end T/R Board and Probe Interface Board.

The beam-forming module on the Digital Processing Board receives amplified echo signals from the T/R Board and performs digital beam forming, then sends beam data to the subsequent digital signal processing module. As a key technique, digital signal processing plays an important role in ultrasound systems. This technology ensures image information being transmitted and converted with high fidelity; and it will have further processing to acquire better images, which is conducive to correct diagnosis by doctors. Data information such as image data processed by digital signals is sent to the computer control system for further processing and image display.

Every time when ultrasound is transmitted, the excitation high-voltage from the Probe Interface Board generates and sends a set of excitation pulses to the current working probe. One element group in the transducer is excited and ultrasound is transmitted. Ultrasound is propagated in and reflected by the human tissue, and the ultrasound returned to the probe is received by the same element group and then sent to the preamplifier on the T/R Board for pre-amplification, depth gain compensation and programmable gain amplification. After this process, signals are sent to the digital processing board.

The power module, including ATX power and the power supply board for ultrasound T/R front end, provides all kinds of power required by the system.

Based on operator button actions, relevant information is sent from the computer control panel to the computer control system. The platform generates control commands and parameter data automatically, and sends them to the digital processing board.

The computer control system is the managerial center of the whole system, which receives operation command from the operation panel, and control the whole system based on the current state of the system. The other functions that the computer control system fulfills also include measurement and calculation, screen display and video processing, management of patient data and images, as well as control of storage, printing and communication.

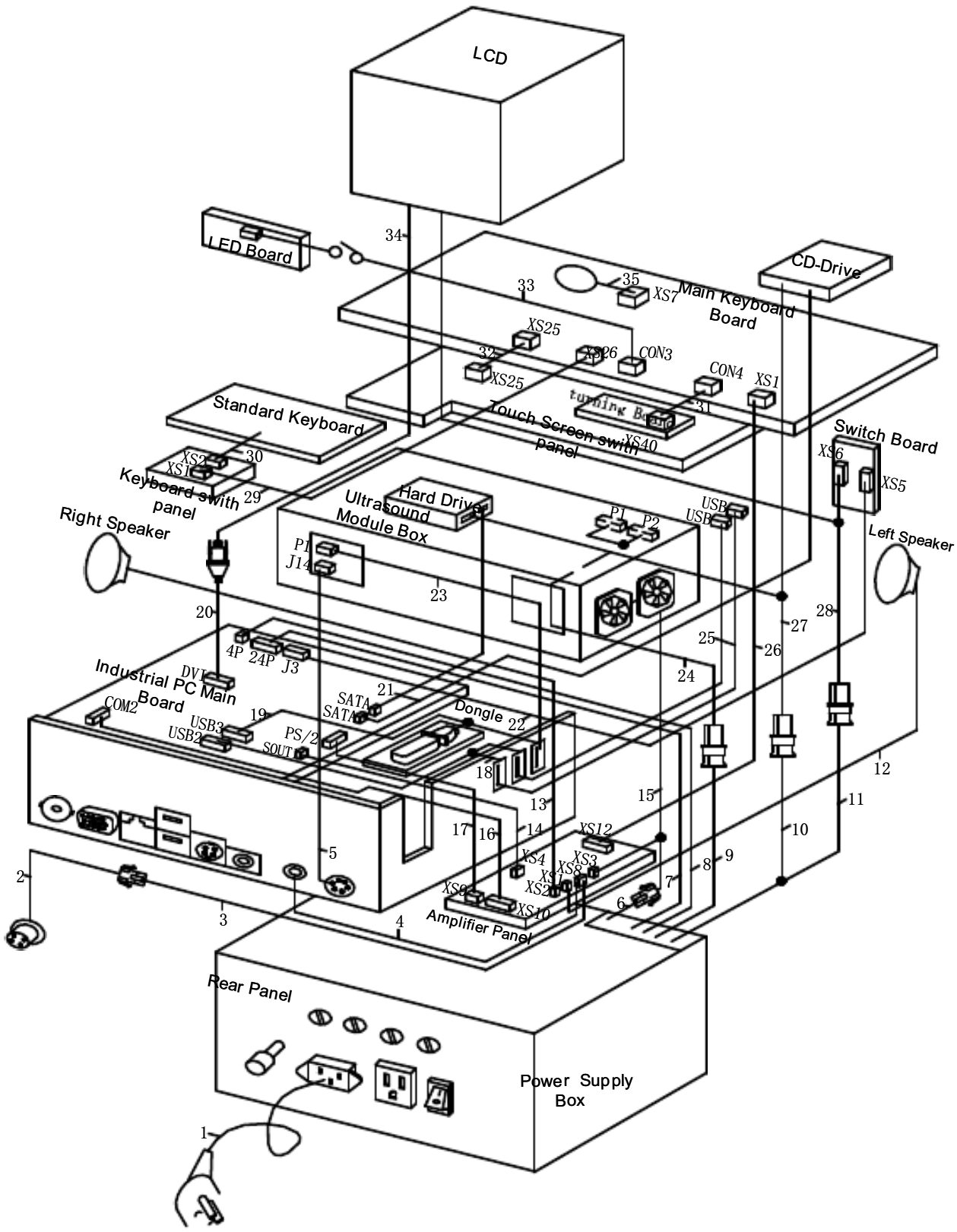
1.3 Technical Specifications

Please refer to Apogee 3800 Digital Ultrasound Imaging System Operation Manual.

Chapter 2

Trouble Checkout and Shooting

2.1 Whole Unit Wiring Diagram and Wiring Definition Table



1-External AC Power Wire	13-Right Speaker Wire	25-Front Panel Extended USB Wire
2-Power Switch Wire 1	14-Industrial PC Audio Wire	26-Main Keyboard and Amplifier Board Signal Wire
3-Power Switch Wire 2	15-Fan and Amplifier Board Power Wire	27-DVD-RW , Hard Drive Power Wire
4-Print Control Wire	16-COM2 Wire	28-LCD, Indicator Power Wire
5-ECG Wire	17-Industrial PC PS/2 Wire	29-Laptop Keyboard PS/2 Wire 1
6-ATX +12V Power Wire	18-Industrial PC Extended USB Wire 1	30-Laptop Keyboard PS/2 Wire 2
7-24P Power Wire	19-Industrial PC Extended USB Wire 2	31-Main Keyboard and Tuning Board Signal Wire
8-CPU Power Wire	20-DVI Wire 1	32-Keyboard and Touch Screen Adapter Board Signal Wire
9-ATX Big 4D Power Wire 1	21-DVD-RW , Hard Drive SATA Data Wire	33-Micro Switch Wire
10-ATX Big 4D Power Wire 2	22-Startup Wire	34-Trackball Wire
11-ATX Big 4D Power Wire 3	23-Ultrasound Module USB Wire	35-DVI Wire 2
12-Left Speaker Wire	24-Power Board Power Supply Wire	

Fig. 2-1 Wiring Diagram for Whole System

2.2 Functions and Possible Failures of PCBs

As shown in Fig. 1-1 Block Diagram of System Composition, the system consists of 7 PCBs (modules). They are: 1) Probe Interface Board (PBSW Board); 2) Transmit-Receive (TX-RV) Board; 3) Digital Processing Board (FEP Board); 4) Power Supply Module (ATX and power supply board);5) Control Panel; 6) Computer Module; and 7) LCD Display

Module.

The potential failures of each PCB (Module) are shown below.

2.2.1 Probe Interface Board (PBSW Board)

As shown in Fig. 2-2, the main function of the PBSW Board is probe switch.

If any failure occurs on this PCB, the following (but not limited to the following) failures may be found:

a) The probe cannot be switched; or the screen prompts no probe, or cannot identify the probe.

b) One black strip in the ultrasound image.

c) One white strip in the ultrasound image.

d) Multiple echo signals are displayed when using the edge of a coin to scrape the probe (one echo signal only in normal situation).

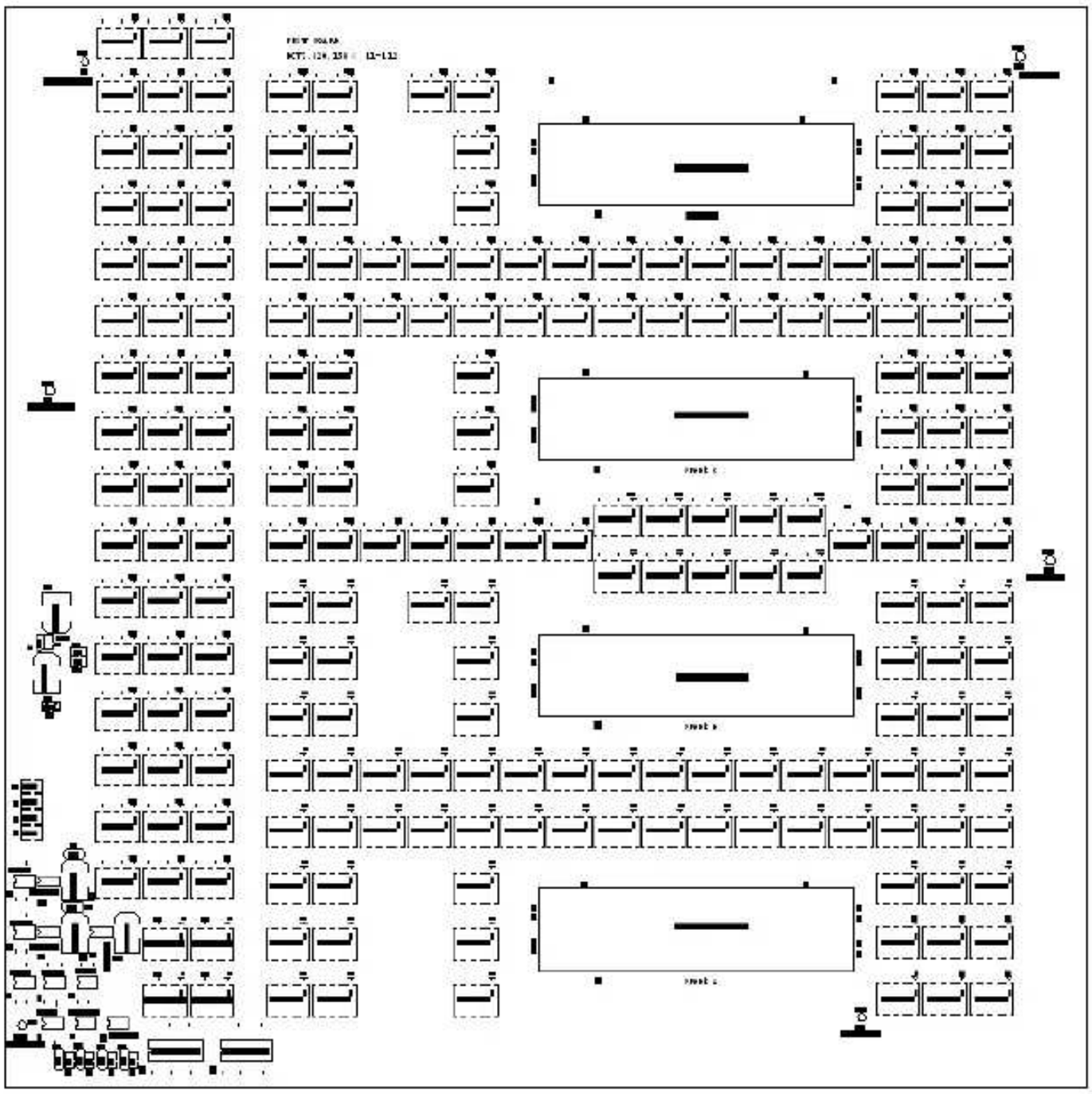


Fig. 2-2 PBSW Board

2.2.2 Transmit-Receive (TX-RV) Board

As shown in Fig. 2-3, the main functions of the Transmit-Receive Board include transmit signal driving, high-voltage excitation pulse transmission, receive signal pre-amplification and TGC amplification.

If any failure occurs on this module, the following (but not limited to the following) failures may be found:

a) Multiple black strips in the ultrasound image.

b) Multiple white strips in the ultrasound image.

c) No ultrasound image is displayed.

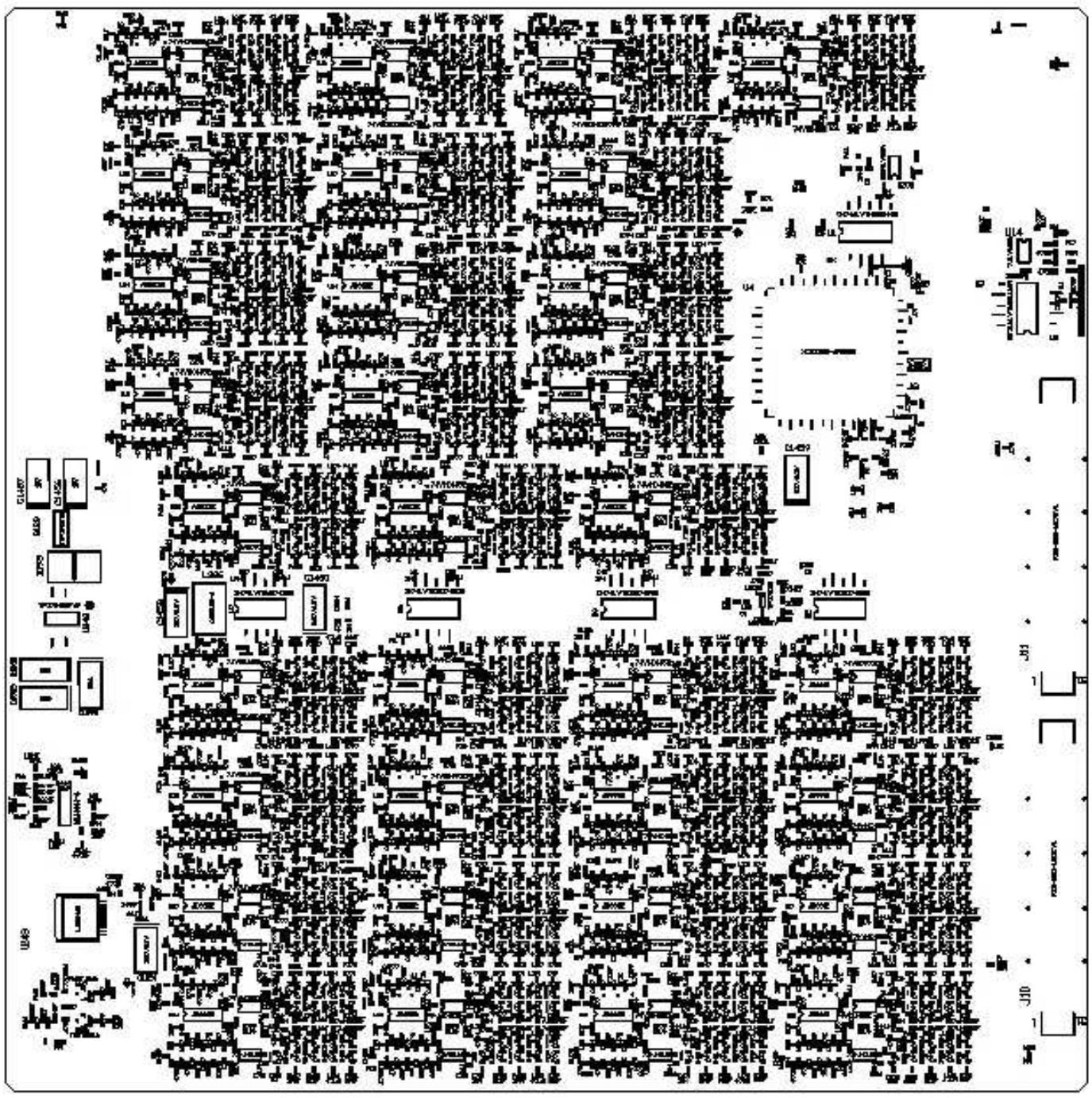


Fig. 2-3 Transmit-Receive Board

2.2.3 FEP Board

The main functions of the FEP Board include: anti-aliasing filtering, A/D conversion, digital beam forming, dynamic filtering, tissue imaging processing, transmit pulse generation, probe switch control, and T/R element select control, TGC control voltage and real-time scan control.

If any failure occurs on this PCB, the following (but not limited to the following) failures may be found:

a) No ultrasound image is displayed.

b) The ultrasound image is mal-positioned, or only half of the image is displayed.

c) Black strip(s) displayed in the echo signal when using the edge of a coin to scrape the probe (no black strip in normal echo signal).

d) The whole ultrasound image is too dark or too bright.

e) Many black strips in the ultrasound image.

f) Many white strips in the ultrasound image.

2.2.4 Power Supply Module

The main function of the Power Supply Module is to transform AC power input into different DC voltages required by the system. The system consists of computer part and ultrasound part, both of which have their own special requirements, so the power supply is divided into ATX power supply and Power Supply Board for the ultrasonic transmit-receive front-end (Fig. 2-4). ATX power supply is for the computer part, and it also supplies power to the Power Supply Board for the ultrasonic transmit-receive front-end. The power supply board then transforms the power into different DC voltages required by the ultrasound part and supplies to it. In Table 1, the specific standard voltages for each test point on the power board are listed.

Table 1 voltages for each test point on the power supply board

(Voltage value in no-load state)

No.	Test Item	Test Point	Voltage（V）	Remarks
1	+5VIN	Any end of L8	+5±0.25	
2	+12VIN	Any end of L6	+12±0.6	
3	1.2V	1.2V test point	+1.2±0.06	
4	2.5V	2.5V test point	+2.5±0.125	
5	3.3	3.3V test point	+3.3±0.165	
6	+5V	+5V test point	+5±0.25	
7	-5V	-5V test point	-5±0.25	
8	-15V	-12V test point	-15±0.75	
9	-20V	D15 positive pole	-20±1	
10	VPP	VPP test point	+146±7	
11	+105V	Any end of L9	+110±6	
12	+70V	Any end of L7	+73±4	
13	VNN	VNN test point	-57±3	
14	3.3VCC	3.3VCC test point	+3.3±0.2	Use ECG_GND as the reference ground
15	+5VEE	+5VEE input test point	+5±0.6	Use ECG_GND as the reference ground
16	-5VEE	-5VEE input test point	-5±0.8	Use ECG_GND as the reference ground

If any failure occurs on the Power Supply Board, firstly check if voltage input and output of each group is normal. If abnormal, check if the abnormality comes from abnormal power board output or from abnormal loading. Here is the detailed instruction: when abnormality happens on the system and it is determined that the failure comes from the power board, disassemble the system, measure the voltage of each test point and compare with Table 1. If certain voltage is different from the value in Table 1, try to disconnect the Power Supply Board and the FEP Board, measure the voltage again. If the voltage complies with the value in Table 1, it can be determined that the voltage decreases due to other PCB(s). If all the output voltages are abnormal when measuring each test point, the problem in input

voltage shall be considered. Disconnect the power supply board from the ATX power supply and separately start up the ATX power supply. Then measure the connectors connecting the ATX power supply and the power supply board to check whether the output voltage is normal (normal voltage is +12V±0.6V).If the output value is normal, then the failure comes from DC-DC power supply board itself.

The following (but not limited to the following) failures may be found:

a) The system cannot start up (failure comes from ATX power supply).

b) The system can start up, but then restart and power off.

c) The system can start up, but has no displays at all.

d) No ultrasound image.

e) Sensitivity of the ultrasound image is very low.

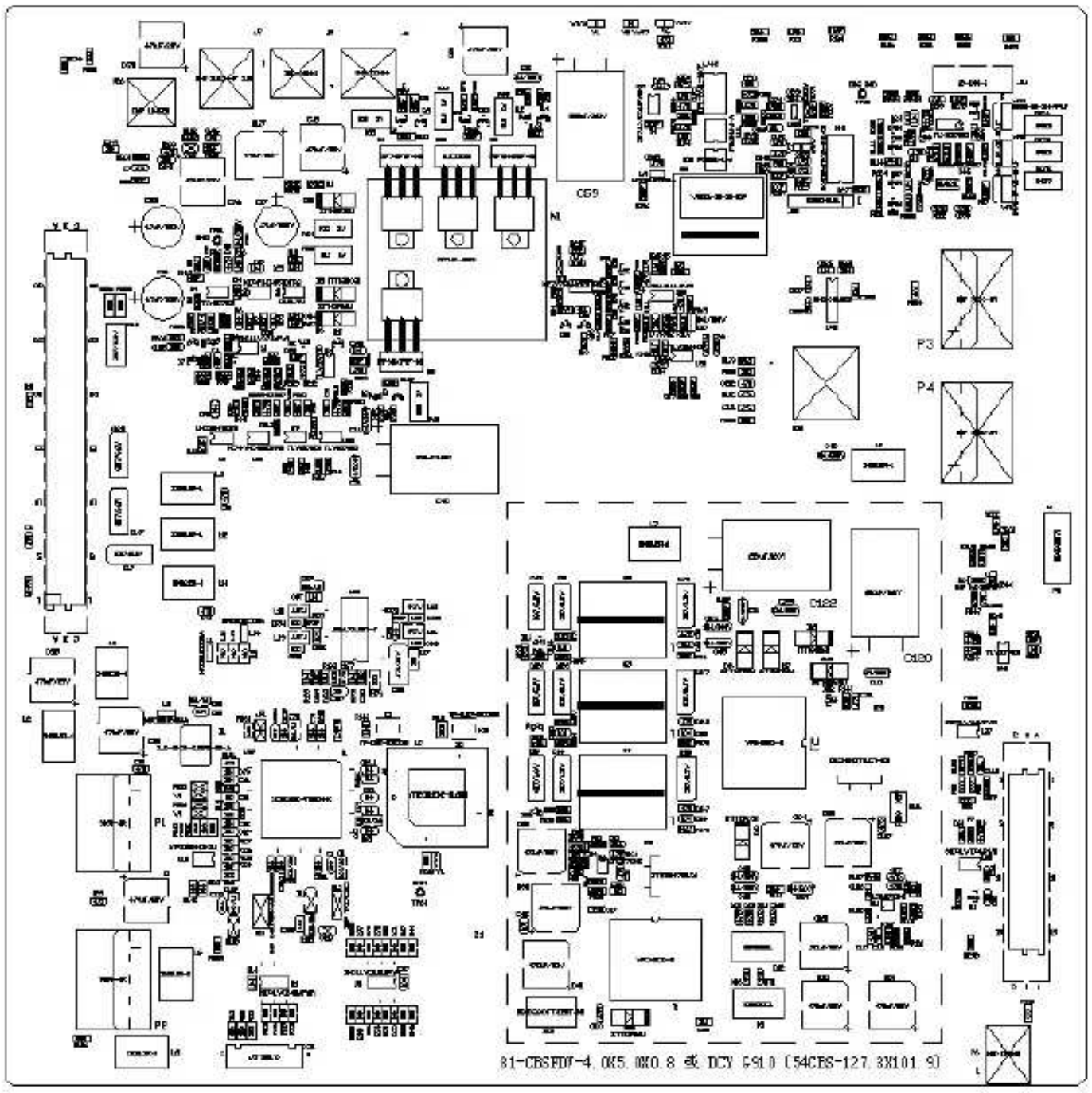


Fig. 2-4 Power Supply Board

2.2.5 Control Panel (KB Board)

The Control Panel (KB Board as shown in Fig. 2-5) serves as an end-user operation interface, providing operation objects such as keys, trackball, knobs, TGC sliders, touch screen and so on. When the user operates these objects, the control panel will detect these actions, convert them into agreed signals and send them to the computer module for corresponding processing.

If any failure occurs on this PCB, the following (but not limited to the following) failures may be found:

a) All the operations (including knobs) do not work.

b) Some of the keys do not work.

c) TGC controls do not work.

d) The trackball does not work.

e) The touch screen does not work.

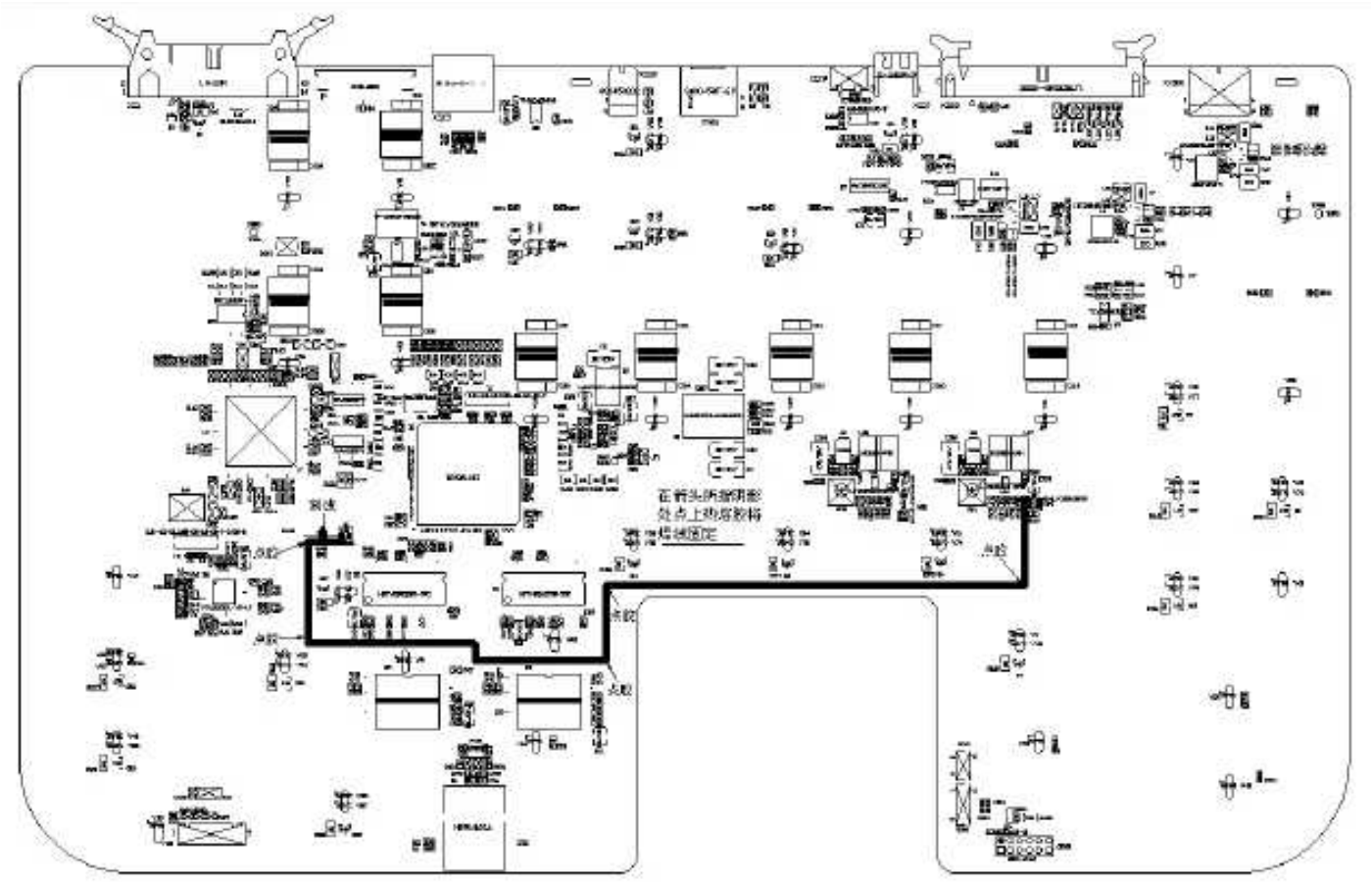


Fig. 2-5 KB Board

2.2.6 Computer Module

The Computer Module consists of Computer Main Board and Amplifier Board.

The main functions of Computer Main Board include reception, conversion and processing of control panel signals, data transmission, image display, measurement & calculation, storage, etc. The computer module is the running platform of the whole system, which is why such kind of ultrasound system is called “PC based ultrasound system”. The generality of computer module enables easy communication with peripheral devices like memory, monitor, printer, keyboard and mouse. All these devices can be connected to universal ports on a computer. With control of Windows operating system on these devices, various functions, such as image measurement & calculation, storage and

printing, can be achieved conveniently.

If any failure occurs on this PCB, firstly verify if the voltage of each group of ATX power supply is normal. If abnormal, check if the abnormality comes from power output or loading.

The following (but not limited to the following) failures may be found:

a) The system cannot start up.

b) The system can start up, but then restart itself and power off.

c) The system can start up, but has no display.

d) The system can start up, but cannot enter ultrasound interface (firstly check if it is a software problem).

e) No ultrasound image is displayed.

The main functions of Amplifier Board (Fig. 2-6) are to connect the Computer Main Board and Control Panel signals and to drive the speakers.

If any failure occurs on this PCB, the following (but not limited to the following) failures may be found.

a) The speaker does not sound.

b) The computer has no response to the operation on the control panel.

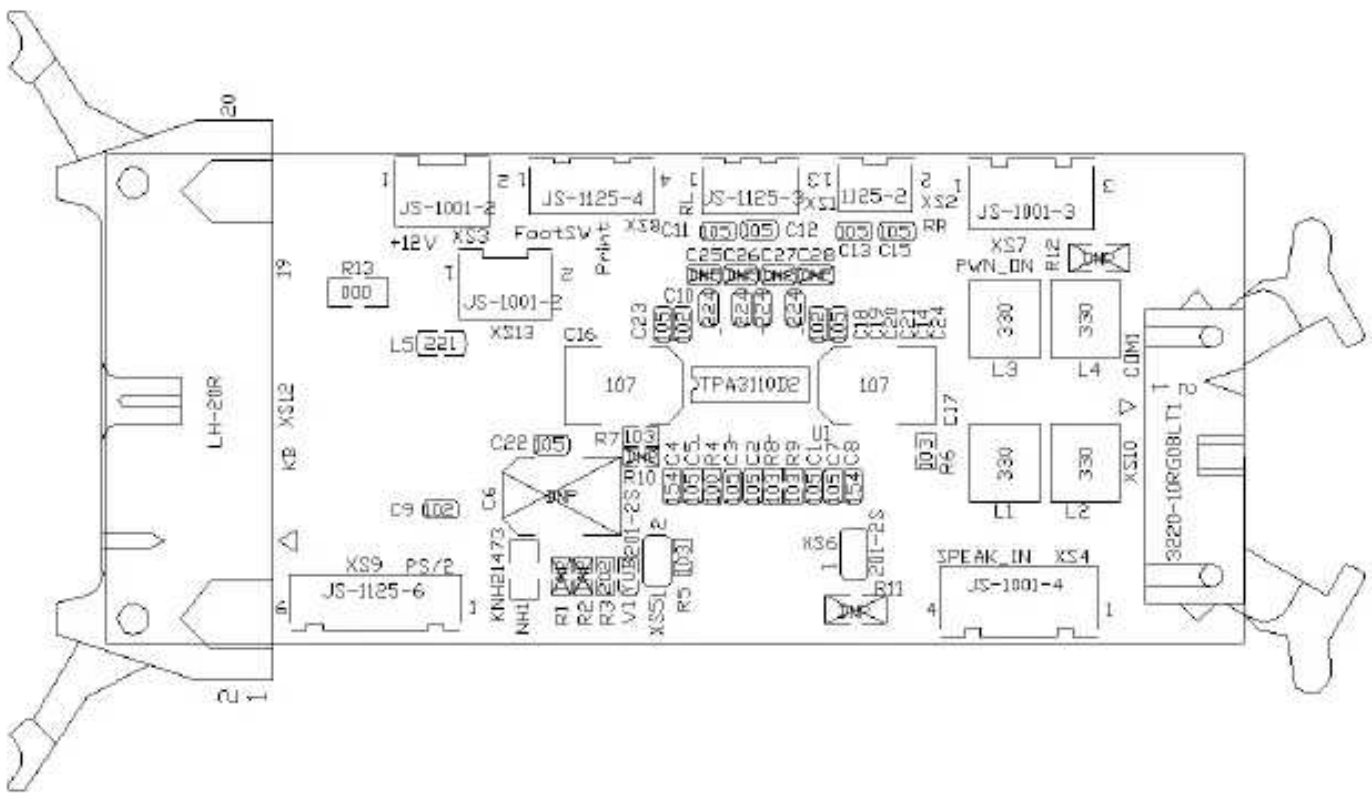


Fig. 2-6 Amplifier Board

2.2.7 LCD Display Module

The LCD Display Module consists of LCD monitor and Inverter Board. The main function of the LCD Display Module is to display video signals from the video card on the screen.

If any failure occurs on this PCB, the following (but not limited to the following) failures may be found:

a) The screen has no display.

b) The screen color is too bright or too dark.

c) The screen has color cast.

d) The screen shakes.

2.3 Common Failure and Possible Failed PCB

Due to complexity of the system, it is inevitable that this service manual may not cover all failures that might occur. Here is an introduction to some failure descriptions and the possible failed boards. Please follow the methods provided in this service manual to do

the troubleshooting. If it does not work, please contact SIUI service staff immediately for professional assistance. (Please record the failure description as detailed as possible for early trouble checkout.)

Table 2-1 Trouble List

No.	Failure Description	Failed PCB
1	The probe cannot be switched.	PBSW Board
2	The screen prompts no probe.	PBSW Board
3	The probe cannot be identified.	PBSW Board
4	One black or white strip in the ultrasound image.	PBSW Board
5	Multiple echo signals are displayed when using a screw driver to inspect.	PBSW Board
6	Many white strips in the ultrasound image.	Transmit-Receive Board, FEP Board
7	Many black strips in the ultrasound image.	Transmit-Receive Board, FEP Board
8	Black strip(s) in the echo signals when using the edge of a coin to scrape the probe.	FEP Board
9	No ultrasound image is displayed.	Transmit-Receive Board FEP Board Computer Main Board Power Supply Module
10	The ultrasound image is mal-positioned.	FEP Board
11	Only half of the ultrasound image is displayed.	FEP Board
12	The whole ultrasound image is too dark or too bright.	FEP Board

13	The system cannot start up.	Power Supply Module Computer Main Board
14	The system can start up, but then restart and power off.	Power Supply Module
15	The system can start up, but no display on the screen.	Power Supply Module FEP Board LCD Display Module
16	Sensitivity of the ultrasound image is very low.	Transmit-Receive Board Power Supply Module Computer Main Board
17	All the operations (including knobs) do not work.	KB Board Computer Main Board
18	Some of the keys do not work.	KB Board Computer Main Board
19	The trackball does not work.	KB Board Computer Main Board
20	The system can start up, but does not enter the ultrasound interface.	Computer Main Board
21	The screen is too bright or too dark.	Computer Main Board LCD Display Module
22	The screen has color cast.	Computer Main Board LCD Monitor
23	The screen shakes.	Computer Main Board LCD Monitor
24	No display on the touch screen	KB Board
25	Operation on the touch screen does not work	KB Board

After confirming which PCB has the failure, please return the PCB to SIUI for servicing.

Chapter 3

Disassembly Instruction

3.1 General

3.1.1 Brief Introduction

a) This instruction covers the disassembly method and steps for the system, including LCD monitor, rear cover board, power supply box, main unit case, probe box, front panel, DVD-RW and keyboard.

b) The expression and meaning of all the screws involved in this instruction are shown in the following examples:

Example 1: countersunk head screw, spec M3, metric length 6 mm, expressed as: countersunk head screw M3X6.

Example 2: screw assembly, spec M4, expressed as: screw assembly M4.

Example 3: Thread spec ST3.5, metric length 16 mm, expressed as ST3.5X16.

c) Here is the specification and application scope of the screwdrivers for disassembly.

1.2#×200 (for cross recessed screws and screw assemblies)

2.0#×80 (for cross recessed button-head screws)

3.0#×50 (for cross recessed button-head screws)

4.6×80 (for slotted screws and screw assemblies)

3.1.2 Precautions

a) Before disassembly, make sure that the power cable is unplugged, and all the probes are disconnected and laid aside properly.

b) When unplugging the cables from the system, please mark the corresponding plugs and sockets to facilitate plugging the plugs into the right sockets during reassembly.

c) During disassembly, the exterior plastic parts and the keyboard silicon-gel buttons

demounted shall be placed upon a bubble wrap bag or PE foam, and be kept away from the work area as far as possible to avoid any damage to the system appearance.

d) Avoid leaving any fingerprint or oil stain on the system LCD in disassembly. If leaving such item carelessly, clean it off with cloth.

3.2 LCD Monitor

Follow the steps below to remove the LCD monitor:

1) Open the line cap at the back of the LCD monitor, and disconnect the signal port and the power port on the LCD monitor.
2) Remove the LCD monitor following the schematic procedures on the disassembly label at the back cover of the LCD monitor.

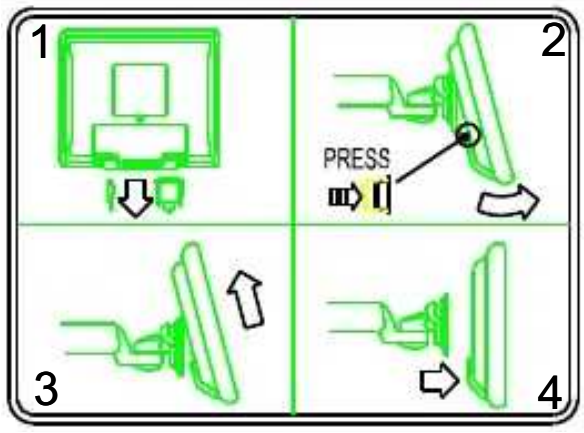


Fig. 3-1

3.3 Disassemble Rear Cover from Bodywork

Remove six M4 button head screws fixing the rear cover, and then slowly withdraw the rear cover backward.

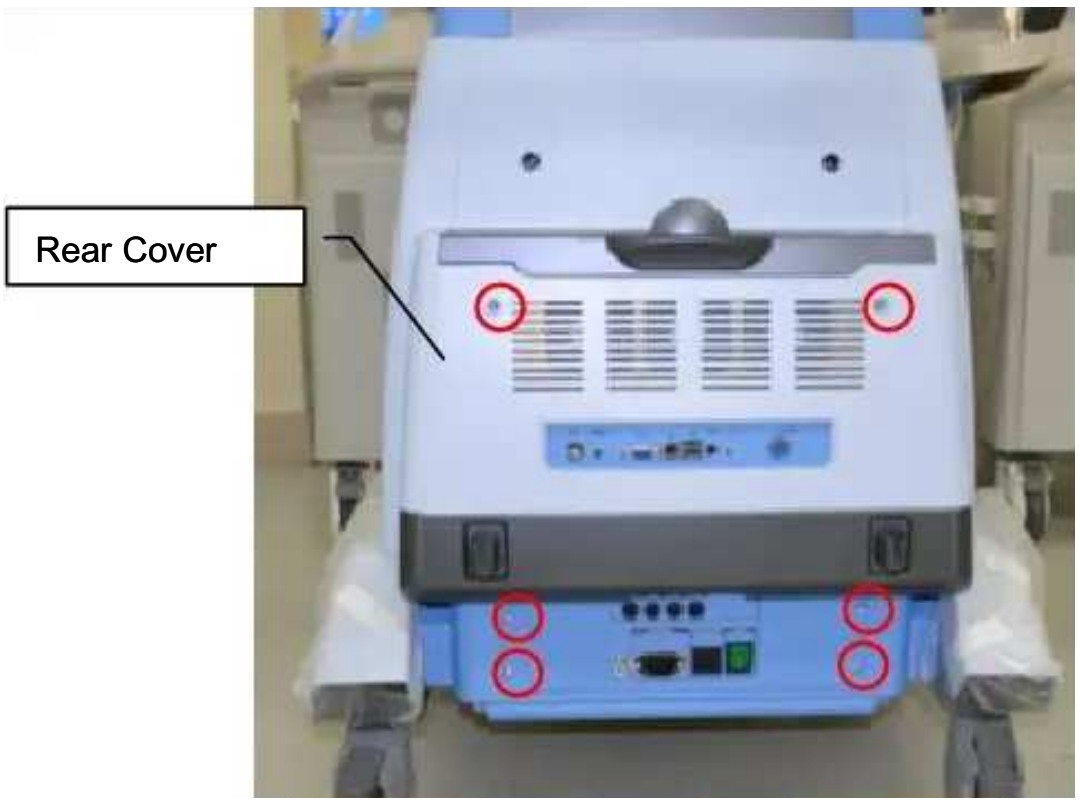


Fig. 3-2

3.4 Disassemble CS Case Cover from Bodywork

Remove four M4 button head screws on the CS case cover to remove the CS case cover.

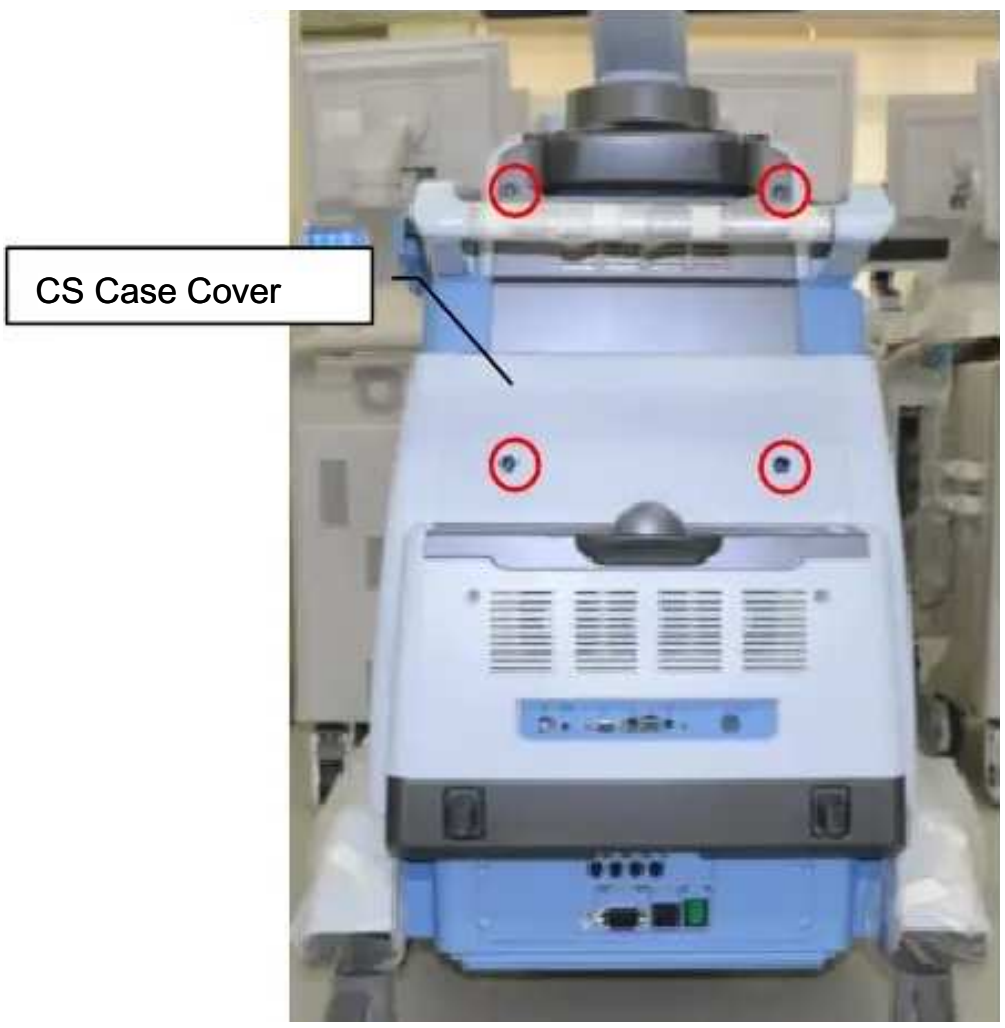


Fig. 3-3

3.5 Disassemble Printer Tray

After completing the operation in Section 3.3 (Disassemble Rear Cover from Bodywork), remove four M4X8 screw assemblies (see Fig. 3-5) fixing the printer tray to withdraw the printer tray.

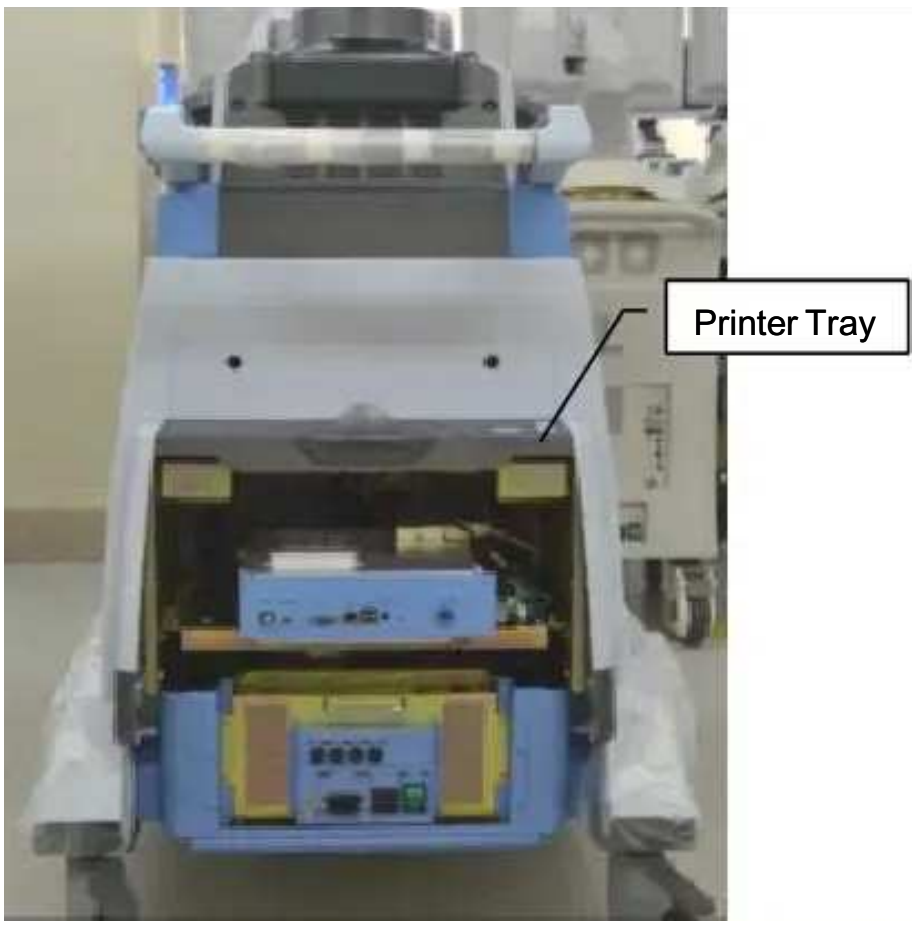


Fig. 3-4

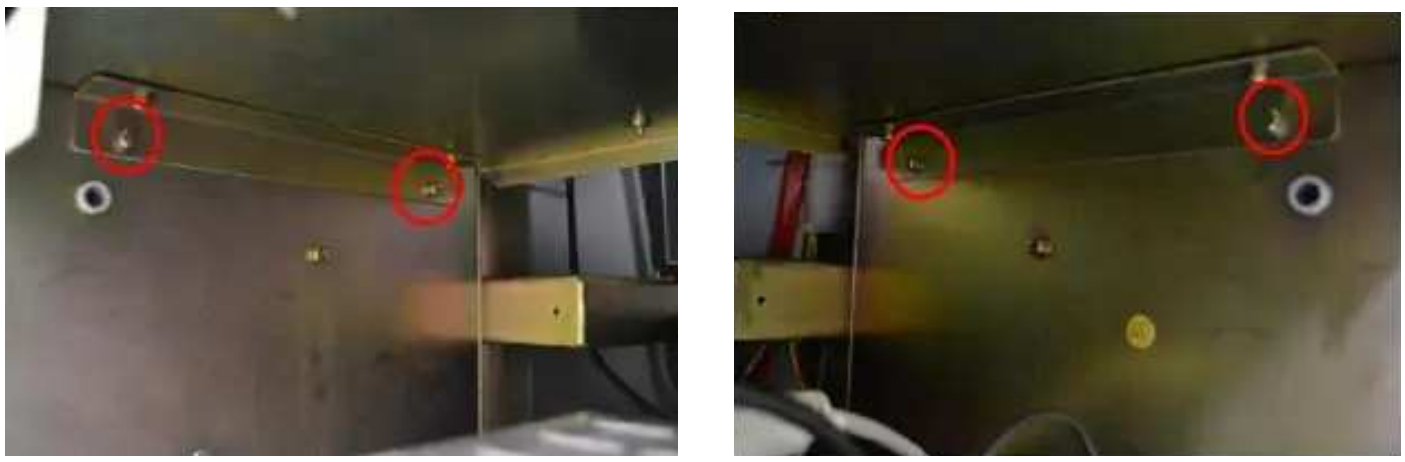


Fig. 3-5

3.6 DVD-RW Drive and HDD

3.6.1 Disassemble DVD-RW Drive from the Bodywork

After completing the operation in Section 3.4 (Disassemble CS Case Cover from Bodywork), the DVD-RW drive following the steps below:

a) Disconnect the wires connected with the DVD-RW drive.

b) Remove two M3X6 screw assemblies fixing the DVD-RW drive fixture to withdraw the fixture.

c) Remove four M3X6 screw assemblies respectively on both sides of the fixture, and withdraw the DVD-RW drive.

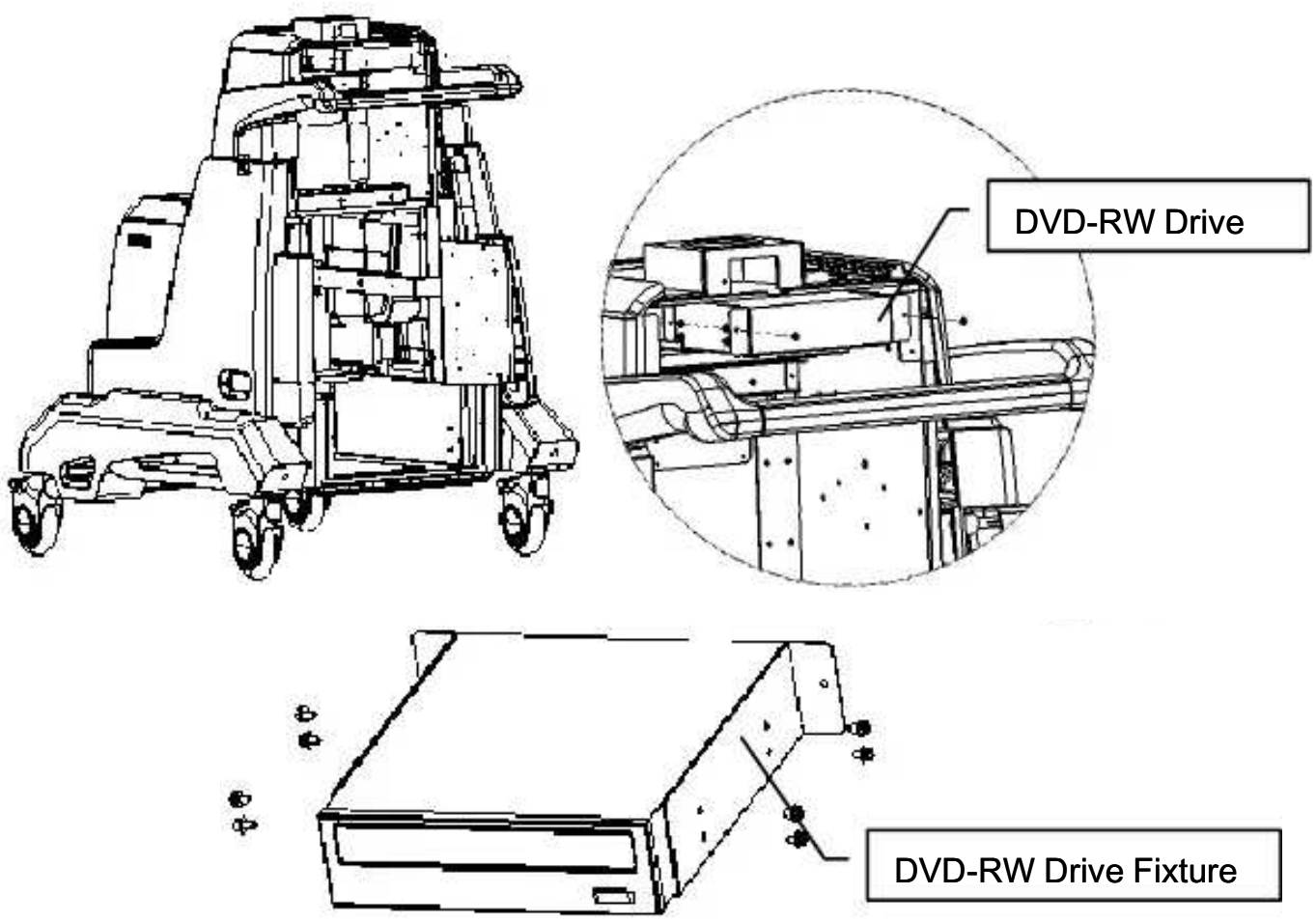


Fig. 3-6

3.6.2 Disassemble HDD from the Bodywork

After completing the operation in Section 3.4 (Disassemble CS Case Cover from Bodywork), the HDD (hard disk drive) shall be disassembled following the steps below:

a) Disconnect the wires connected with the HDD.

b) Remove two M3X8 screw assemblies fixing the HDD fixture to withdraw the fixture.

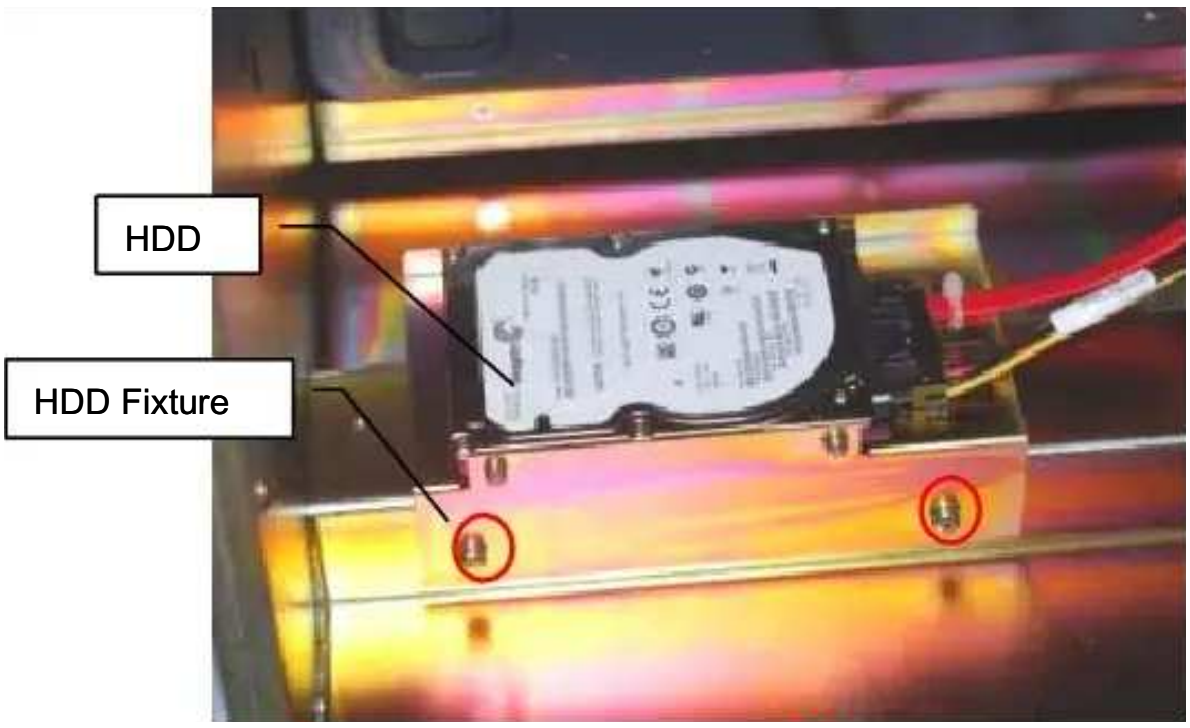


Fig. 3-7

c) Remove four M3X6 screw assemblies on both sides of the fixture, and withdraw the HDD.

Fig. 3-8

3.7 Power Supply Box

3.7.1 Disassemble Power Supply Box from the Main Unit

After completing the operation in Section 3.3 (Disassemble Rear Cover from Bodywork), the power supply box shall be removed from the main unit following the steps below:

a) Disconnect all the plugs connected with the power supply box.

b) Remove four M3X6 screw assemblies fixing the power supply box. Hold on the handle of the power supply box and pull it backward to withdraw the power supply box.

Fig. 3-9

c) Disassemble the fixing screws (four M3X6 screw assemblies at the top of the power supply box, and two M3X6 countersunk head screws on both sides respectively) fixing the power supply cover. Remove the power supply cover.

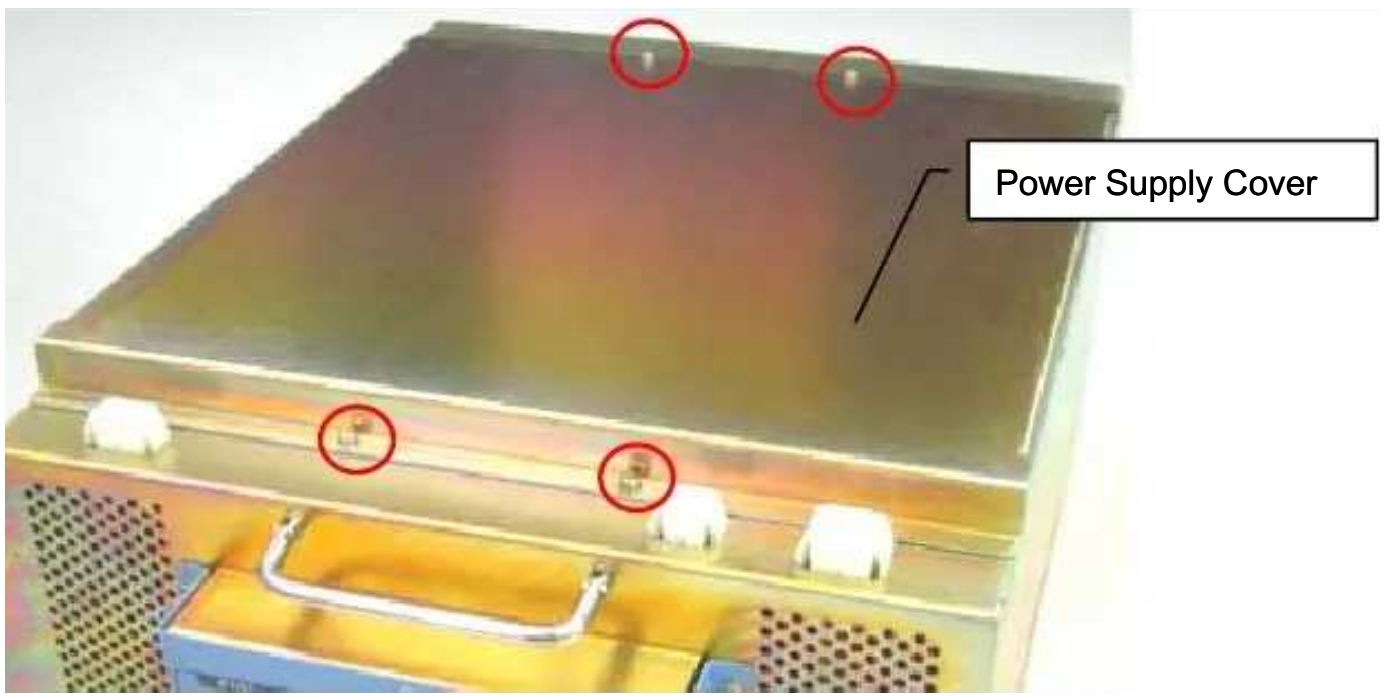


Fig. 3-10

3.7.2 Disassemble Filter Small Board

After completing the operation in Section 3.7.1 (Disassemble Power Supply Box from the Main Unit), the filter small board shall be removed following the steps below:

a) Disconnect all the wires connected with the AC filter small board.

b) Remove five M3X6 screw assemblies fixing the AC filter small board, and withdraw the AC filter small board.

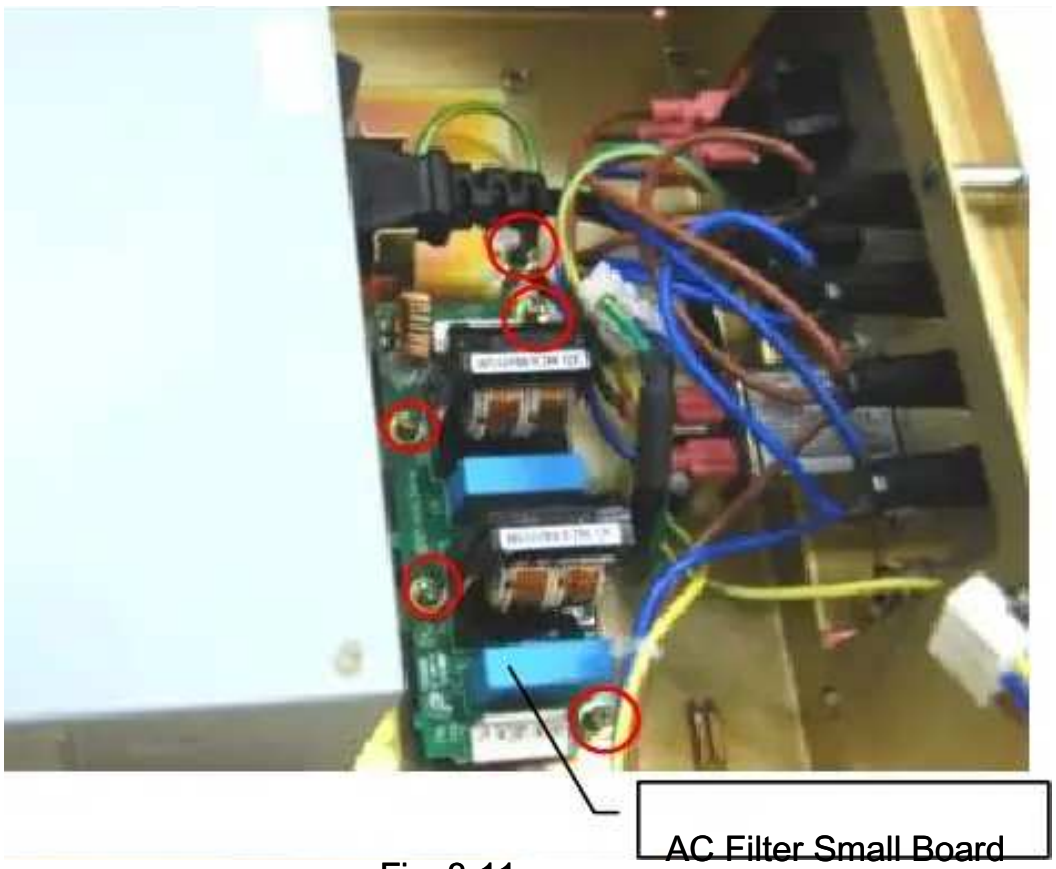


Fig. 3-11

3.7.3 Disassemble ATX Power Supply

After completing the operation in Section 3.7.2 (Disassemble Filter Small Board), the ATX power supply shall be removed following the steps below:

a) Remove four M3X8 screw assemblies fixing the ATX power supply.

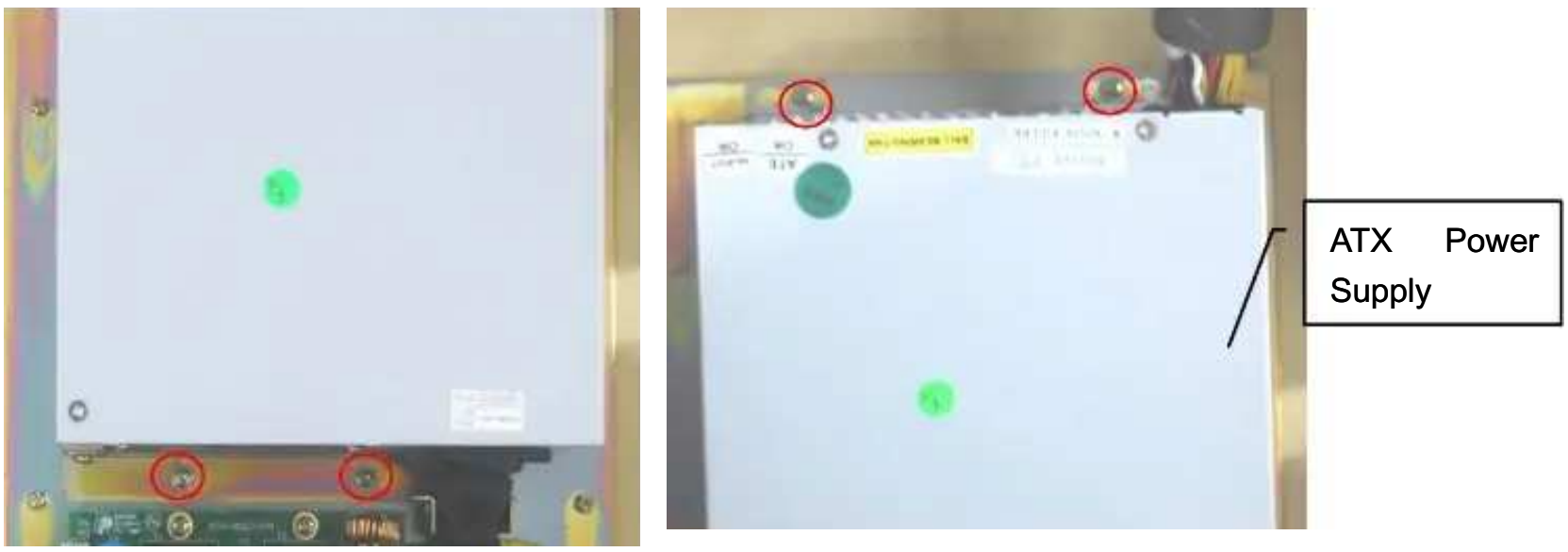


Fig. 3-12

b) Hold up the ATX power supply slightly. Remove two ANSI screws fixing the power supply installation fixture to withdraw the ATX power supply.

Fig. 3-13

3.8 PC Module

3.8.1 Disassemble PC Cover

After completing the operation in Section 3.3 (Disassemble Rear Cover from Bodywork), remove two M3X6 screw assemblies to take out the PC cover.

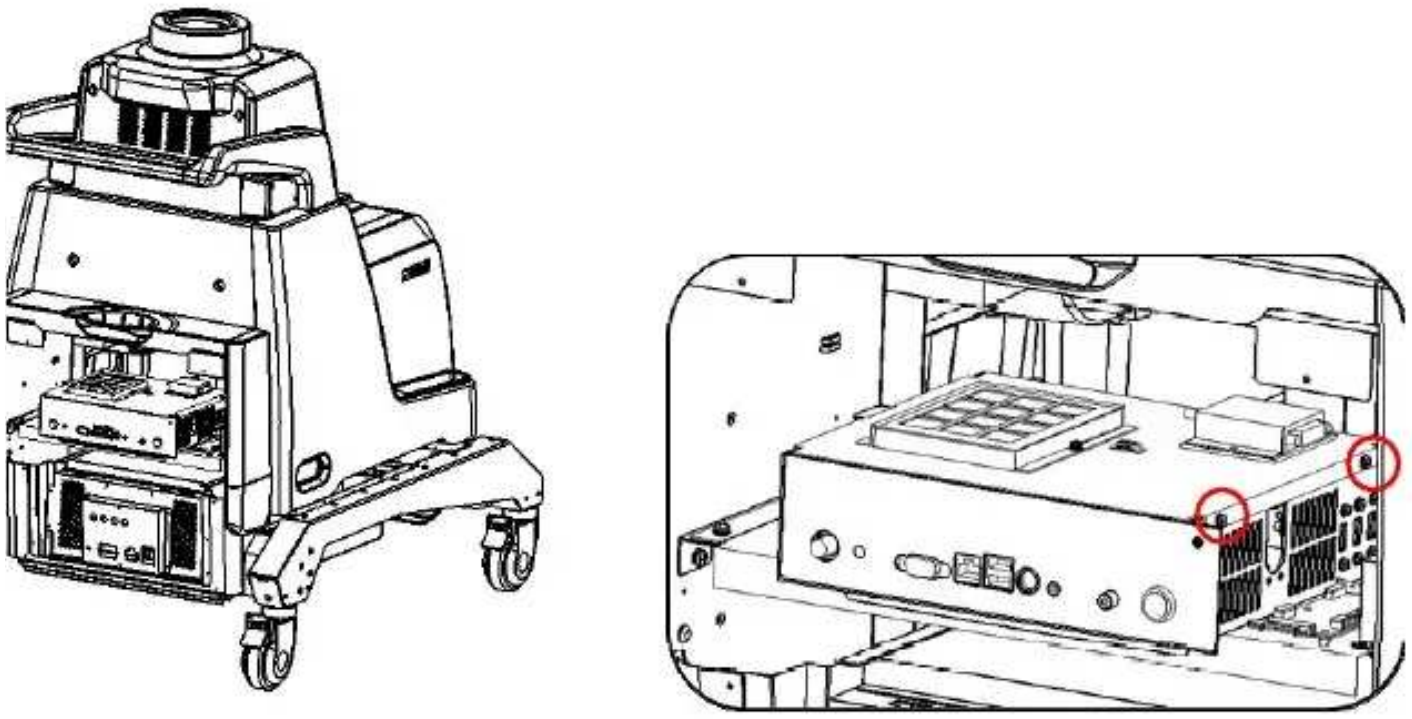


Fig. 3-14

3.8.2 Disassemble Dongle

After completing the operation in Section 3.8.1 (Disassemble PC Cover), the dongle shall be disassembled by following the steps below:

a) Remove two M3X6 screw assemblies fixing the bracket.

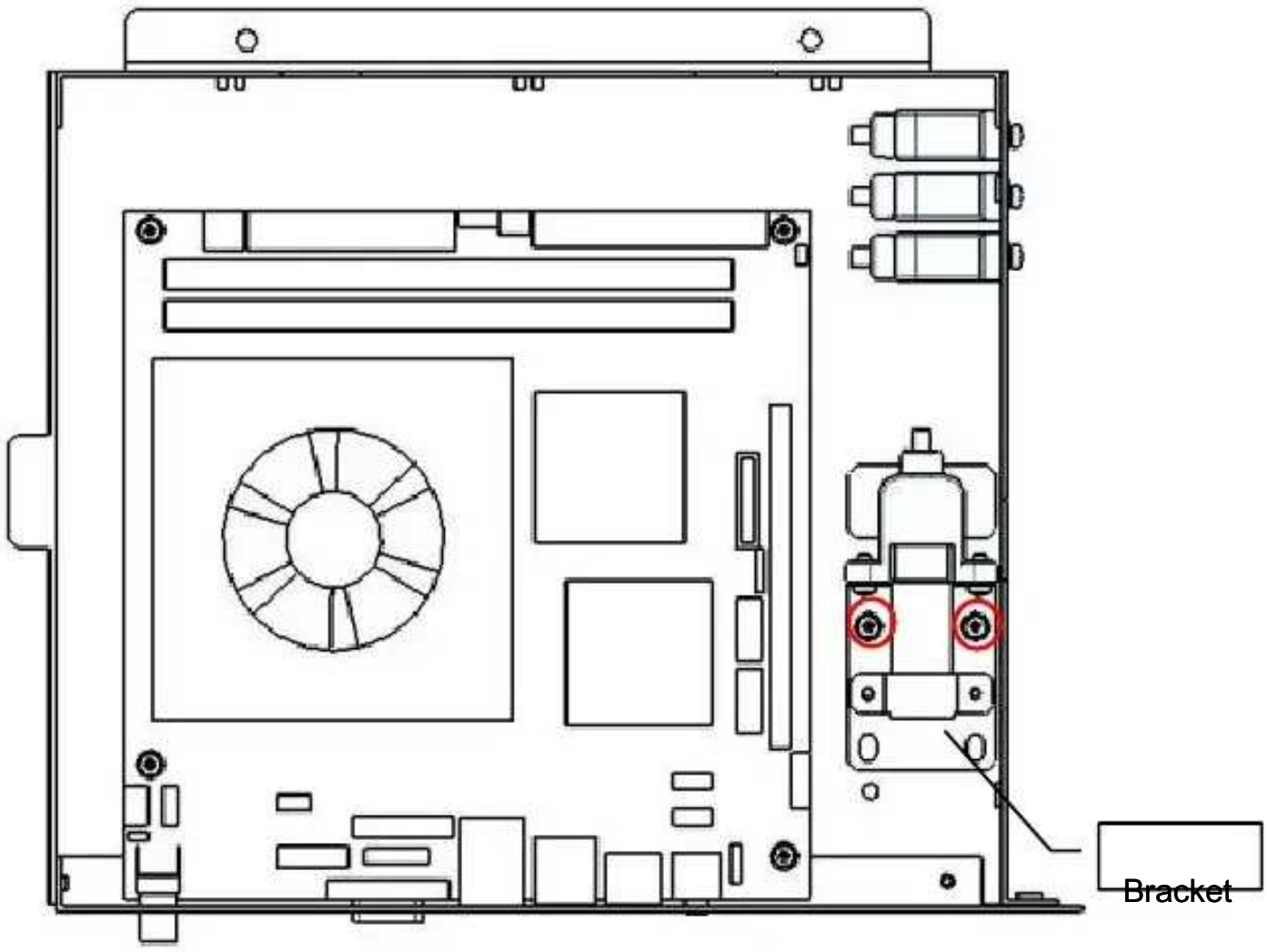


Fig.3-15

b) Remove two M3X6 screw assemblies fixing the card board (as shown in Fig. 3-17) to withdraw the dongle.

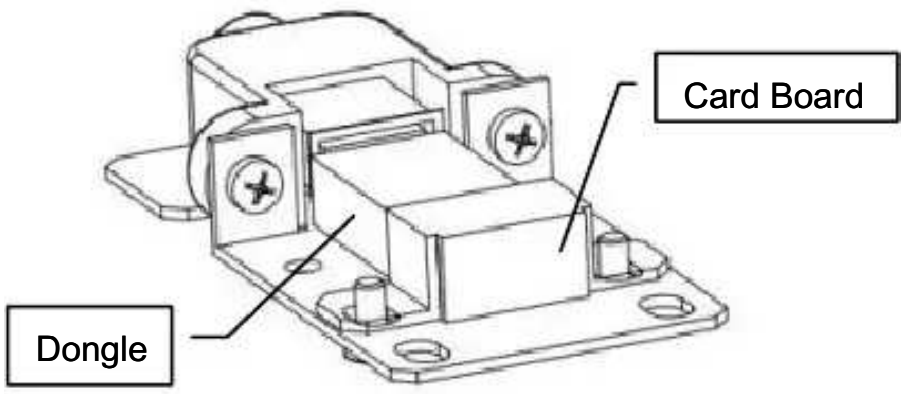


Fig. 3-16

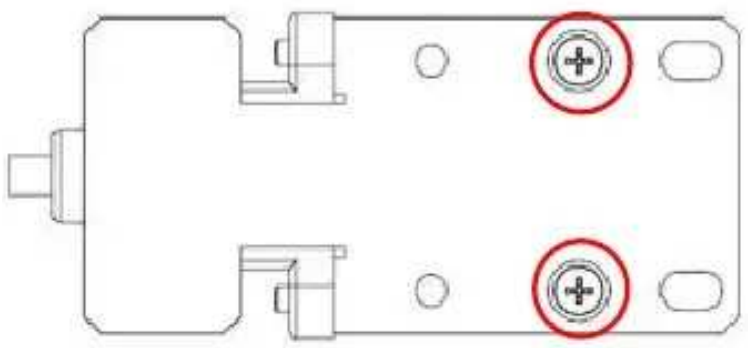


Fig. 3-17

c) Unplug the dongle from the USB port.

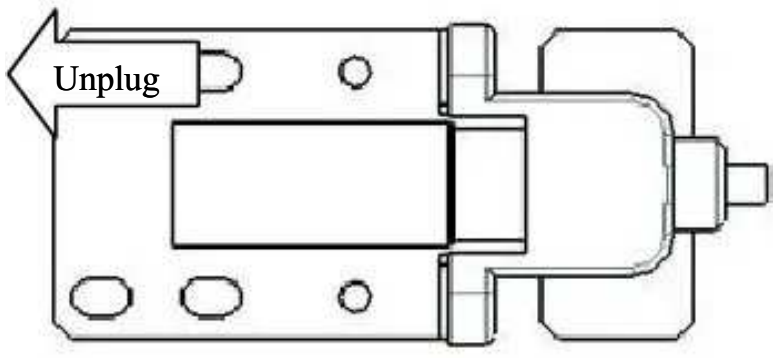


Fig. 3-18

3.8.3 Disassemble Industrial Control Board

Having finished the operation of 3.8.1 (Disassemble PC Cover), follow the operation steps below to disassemble the industrial control board.

a) Disconnect all the wires connected to the industrial control board

b) Remove four M3X6 screw assemblies fixing the industrial control board to withdraw the industrial control board.

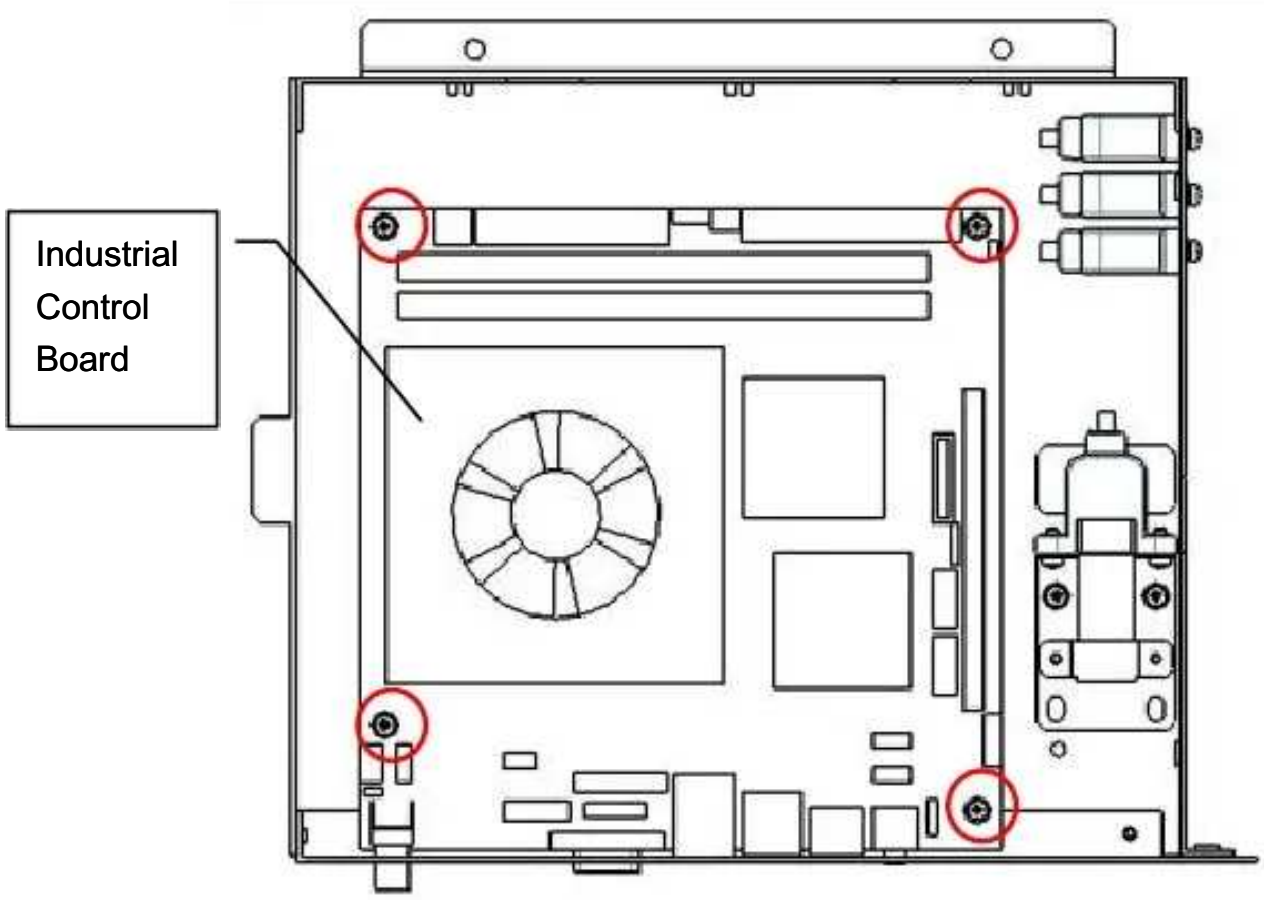


Fig. 3-19

3.9 Disassemble Amplifier Board

After completing the operation in Section 3.3 (Disassemble Rear Cover from Bodywork), the amplifier board shall be disassembled following the steps below:

a) Disconnect all the wires connected to the amplifier board.

b) Remove three M3X6 screw assemblies to take out the amplifier board.

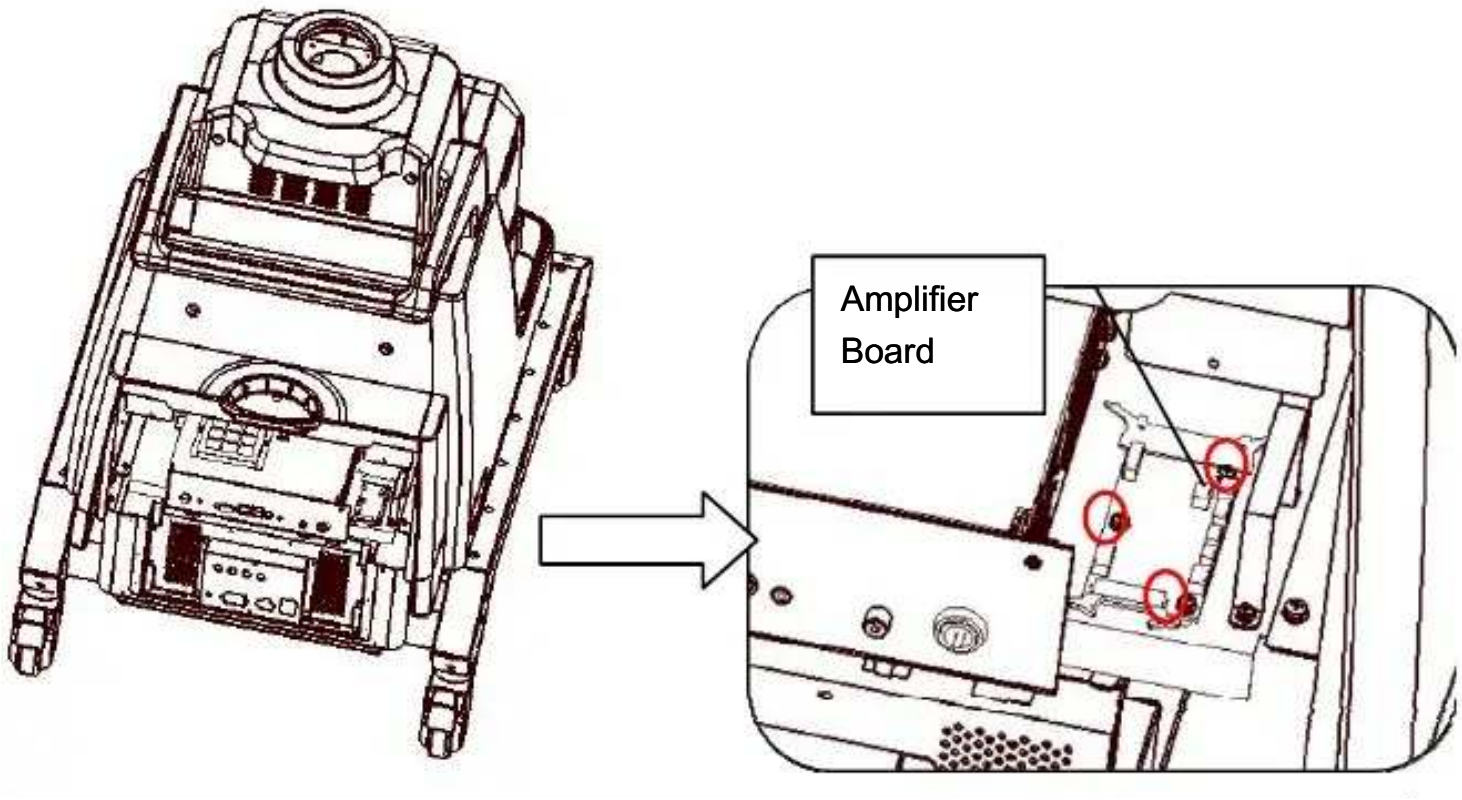


Fig. 3-20

3.10 Ultrasound Module

3.10.1 Disassemble Ultrasound Box

After completing the operation in Section 3.4 (Disassemble CS Case Cover from Bodywork) and 3.5 (Disassemble Printer Tray), the ultrasound box shall be removed following the steps below:

a) Remove all lever caps, pay attention to the direction for easy assembly.

Fig. 3-21

b) Disconnect all the wires connected to the ultrasound box.

c) Remove two M4X8 screw assemblies to take out the ultrasound box.

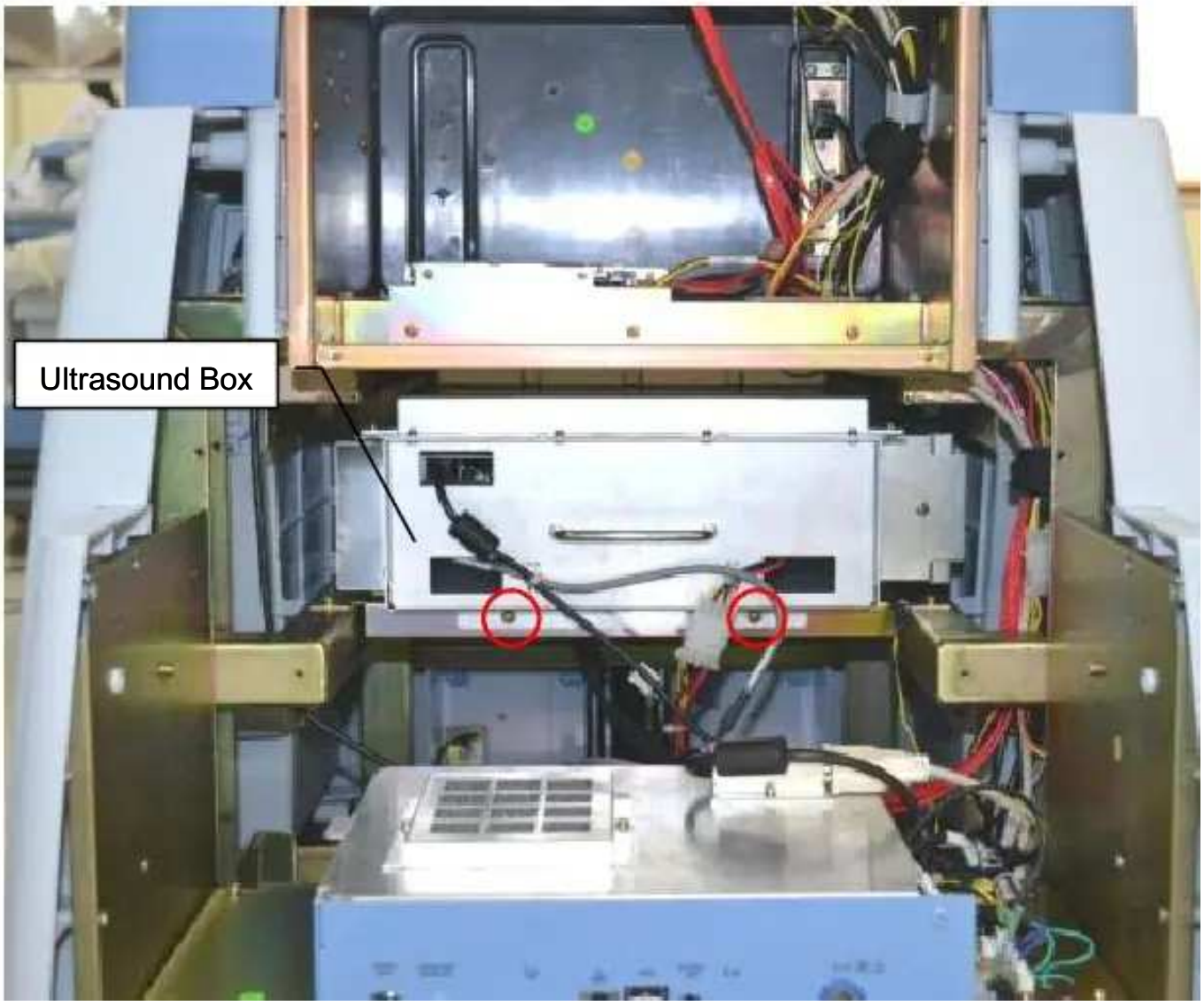


Fig. 3-22

3.10.2 Disassemble PBSW Board

After completing the operation in Section 3.10.1 (Disassemble Ultrasound Box), the PBSW board shall be removed following the steps below:

a) Remove four M3X6 screw assemblies to take out the probe box.

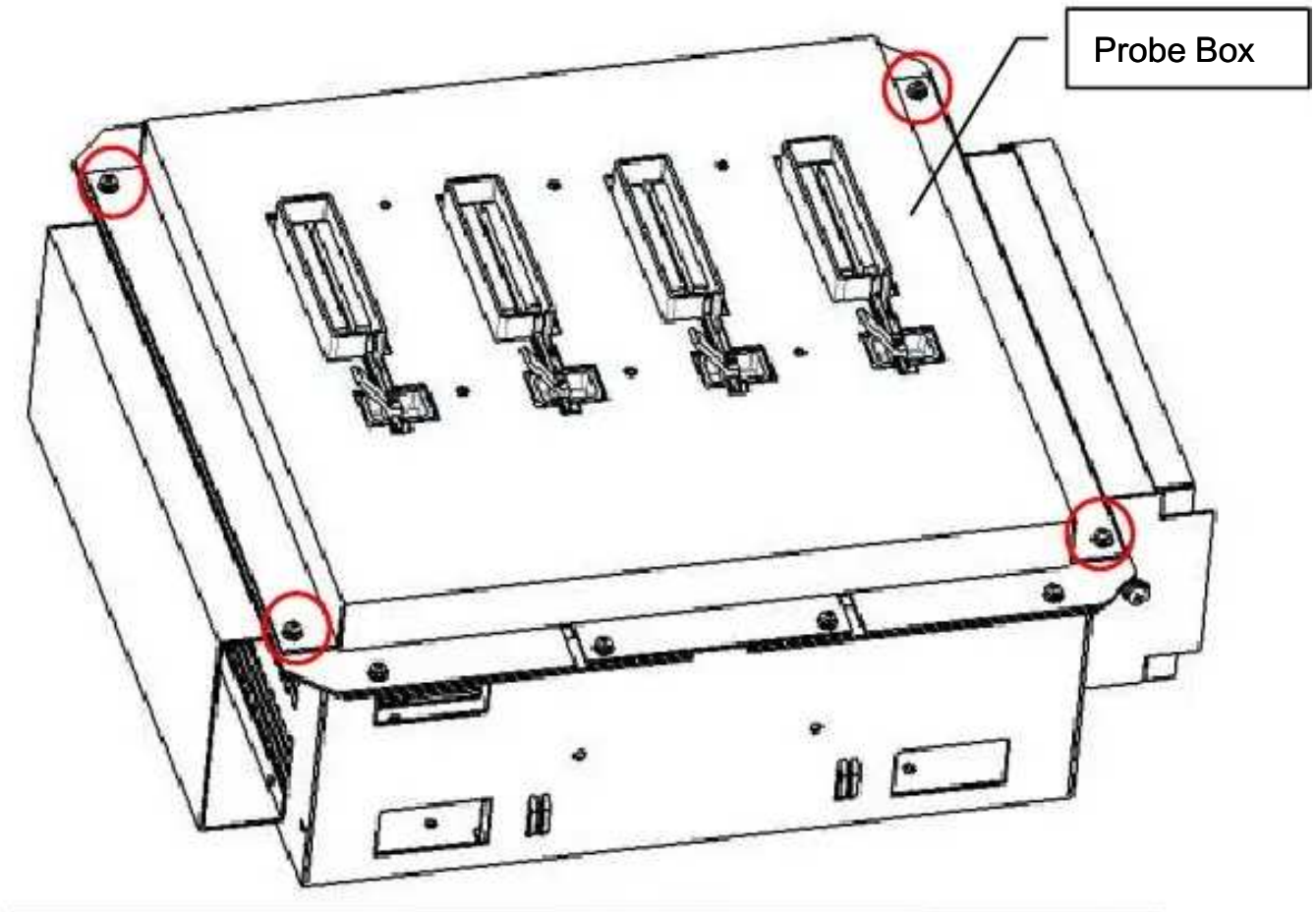


Fig. 3-23

b) Remove thirteen M3X6 screw assemblies, and apply force near the docking socket to take out the PBSW board.

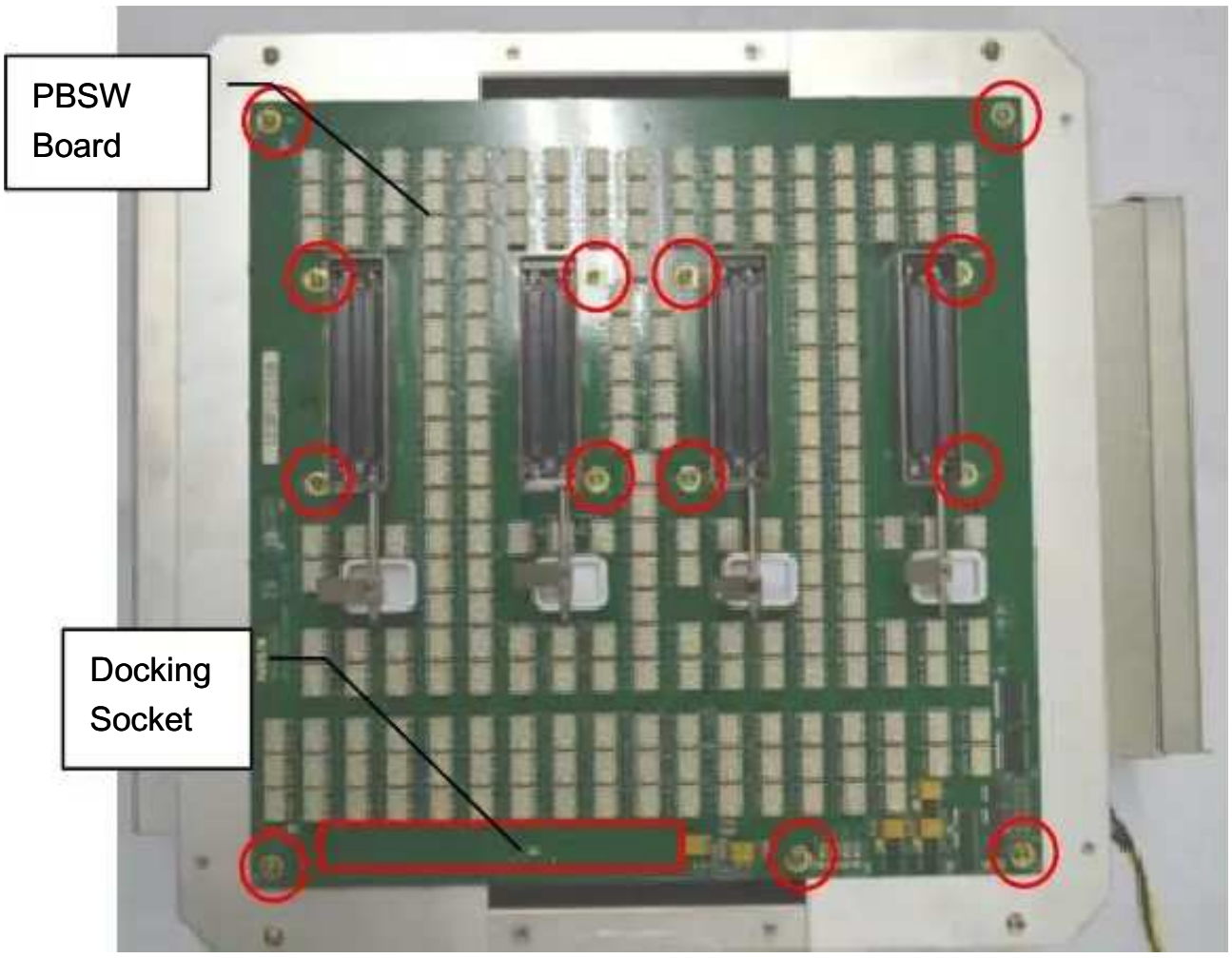


Fig. 3-24

3.10.3 Disassemble PCB Module

After completing the operation in Section 3.10.2 (Disassemble PBSW Board), the PCB module shall be removed following the steps below:

a) Remove four M3X6 screw assemblies to withdraw the bracket cover.

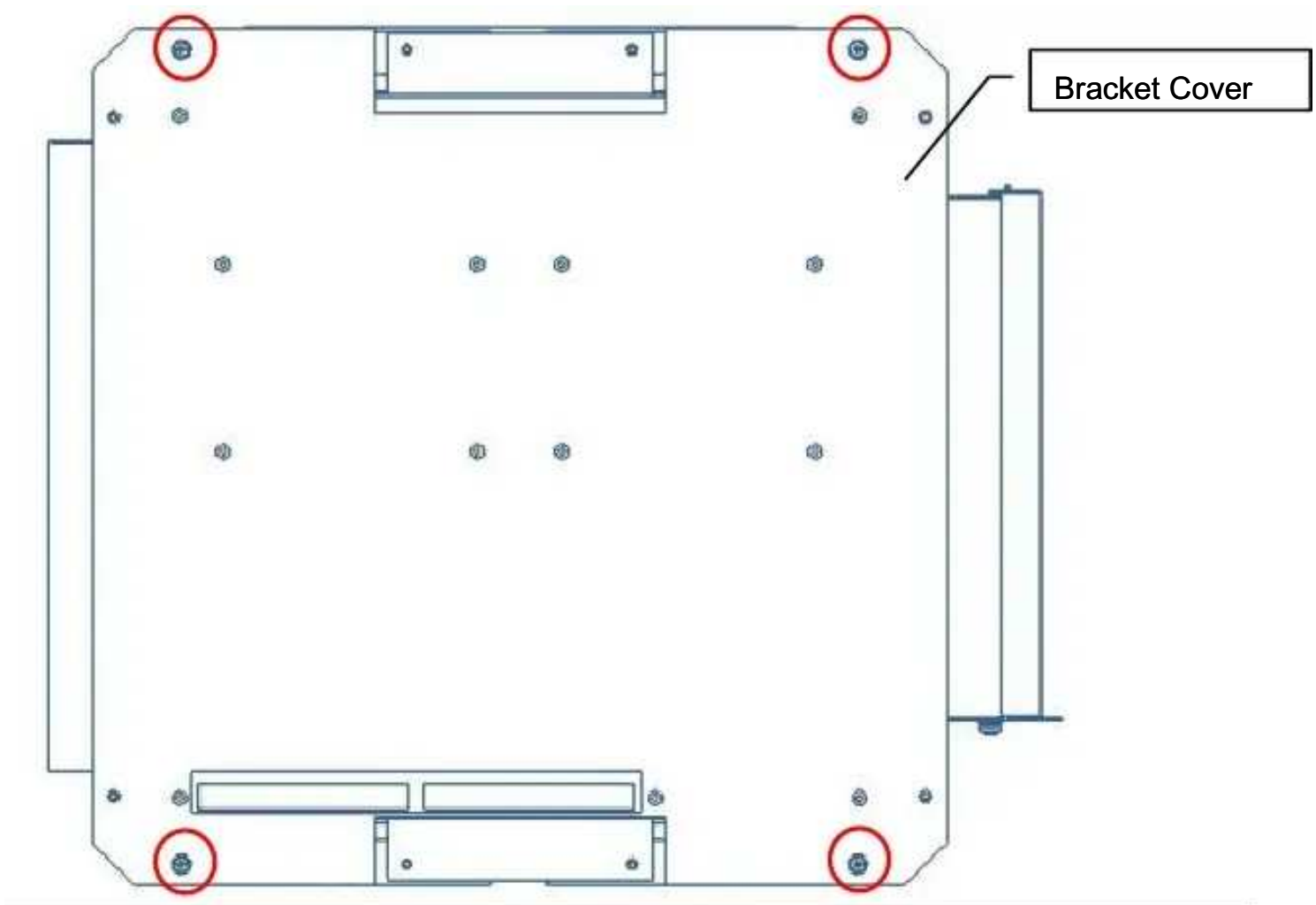


Fig. 3-25

b) Remove four M3X6 screw assemblies, and disconnect the wires connected to the PCB module to take out the PCB module.

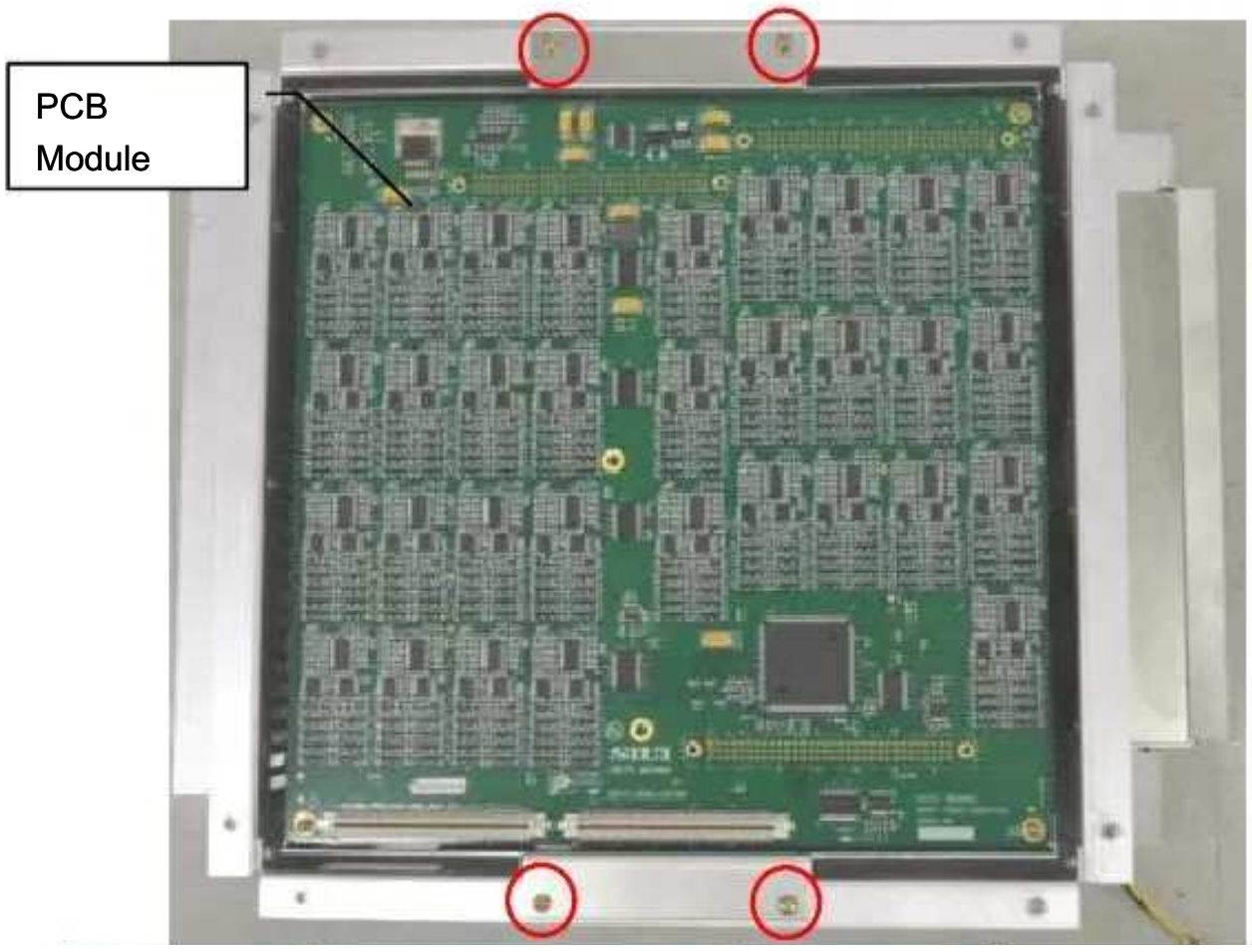


Fig. 3-26

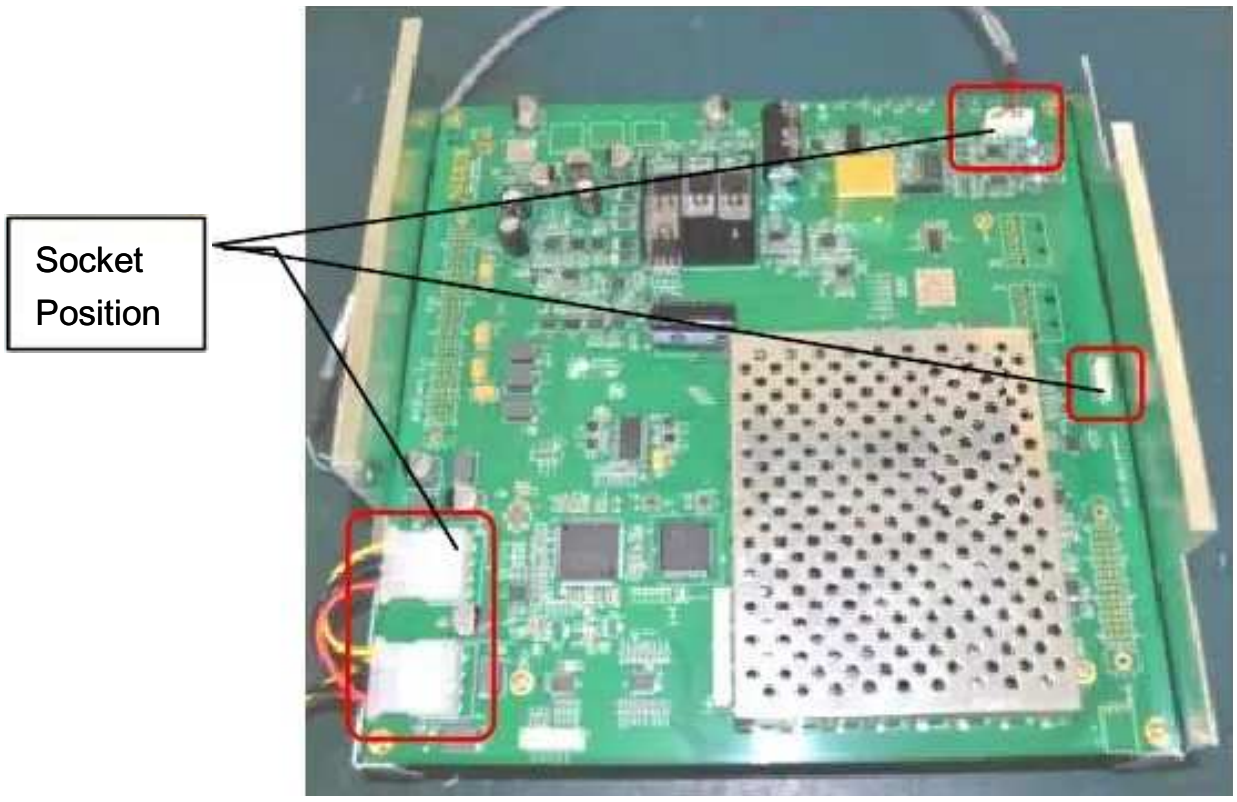


Fig. 3-27

3.10.4 Disassemble Power Supply Board

After completing the operation in Section 3.10.3 (Disassemble PCB module), the power supply board shall be removed following the steps below:

a) Remove four M3X6 screw assemblies, and apply a little force near the docking sockets to withdraw the power supply board.

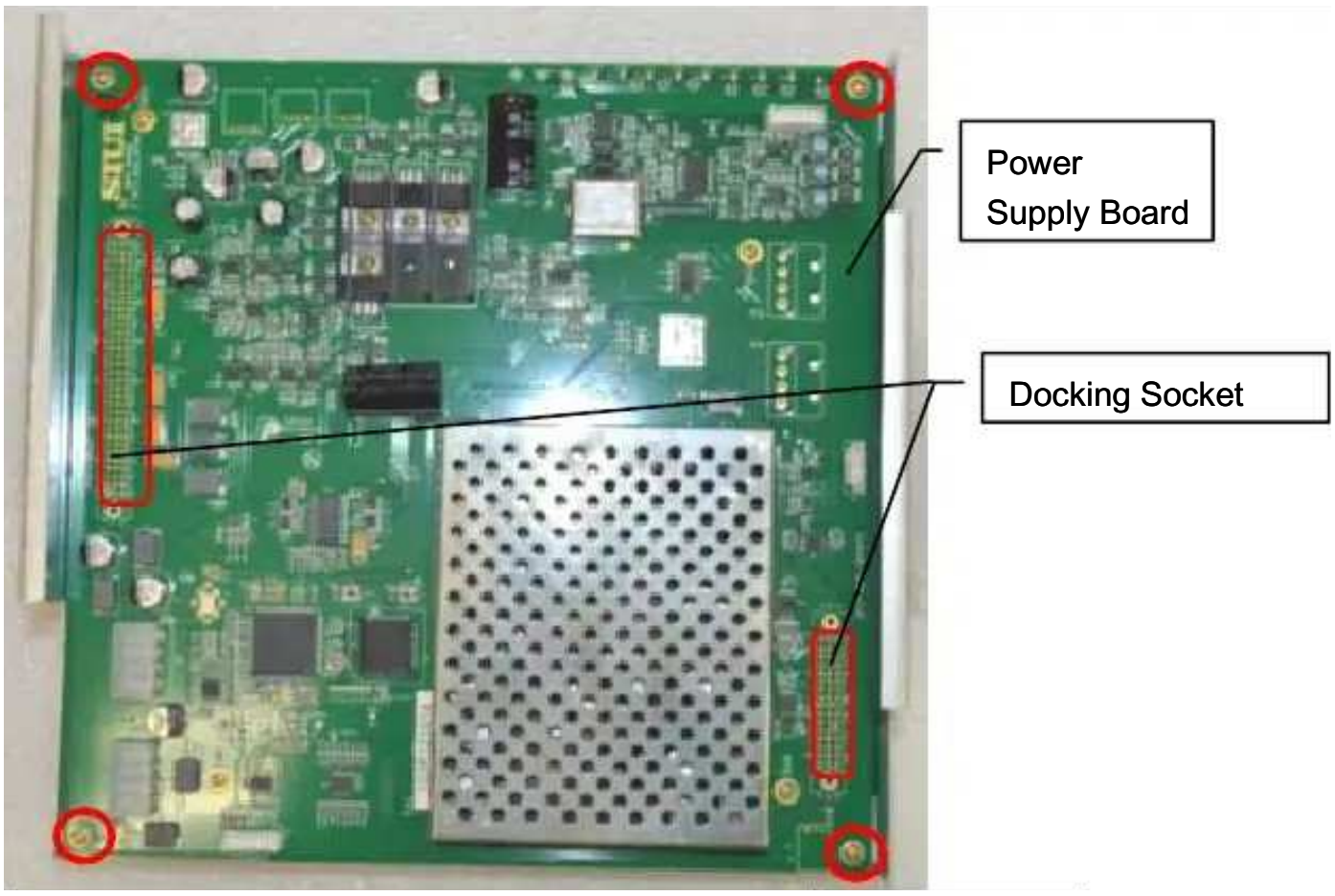


Fig. 3-28

b) Remove four M3X6 screw assemblies to separate the power supply shield board and the power supply board.

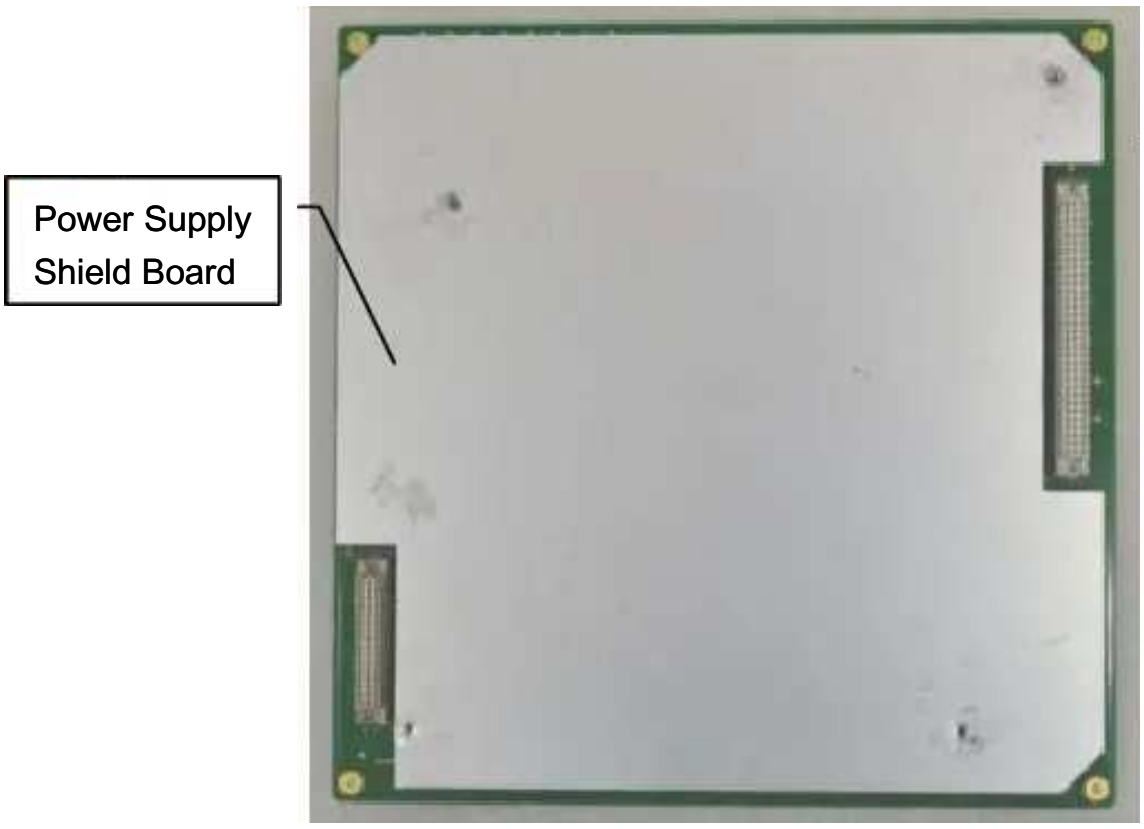


Fig. 3-29

3.10.5 Disassemble Transmit-Receive (TX-RV) Board

After completing the operation in Section 3.10.3 (Disassemble PCB Module), remove four M3X6 screw assemblies. Apply a little force near the docking sockets to take out the TX-RV board.

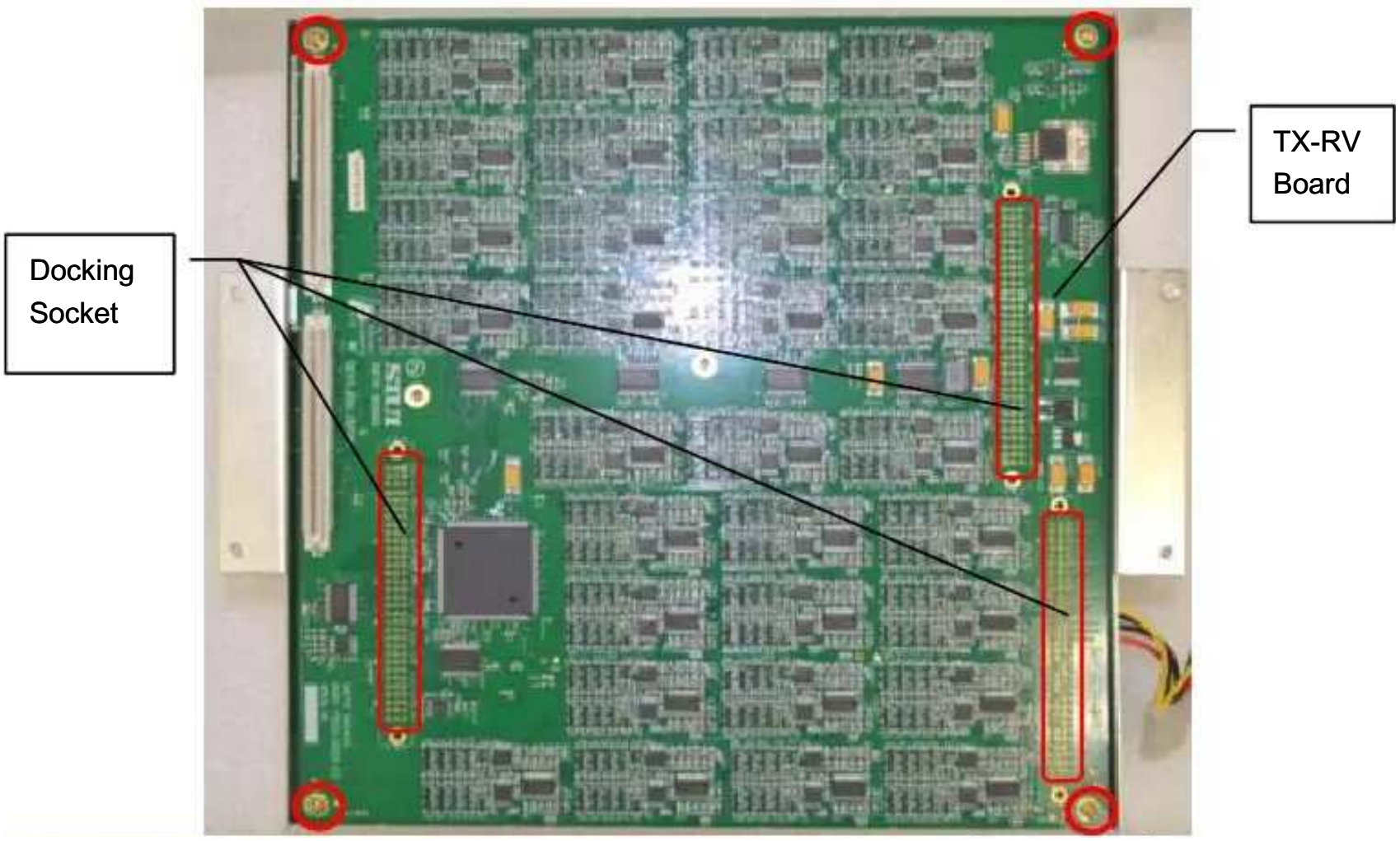


Fig. 3-30

3.10.6 Disassemble DBF Board

After completing the operation in Section 3.10.4 (Disassemble Power Supply Board) and 3.10.5 (Disassemble Transmit-Receive (TX-RV) Board), the DBF board shall be disassembled by following the steps below:

a) Remove four M3X6 countersunk head screws and then take out the PCB left bracket.

Fig. 3-31

b) Remove four M3X6 countersunk head screws and then take out the PCB right bracket.

Fig. 3-32

c) Remove four M3X6 screw assemblies, separate four PCB brackets and the DBF board.

【Note】: Keep the locating sleeves for the four screw assemblies of the PCB bracket properly after taking them down.

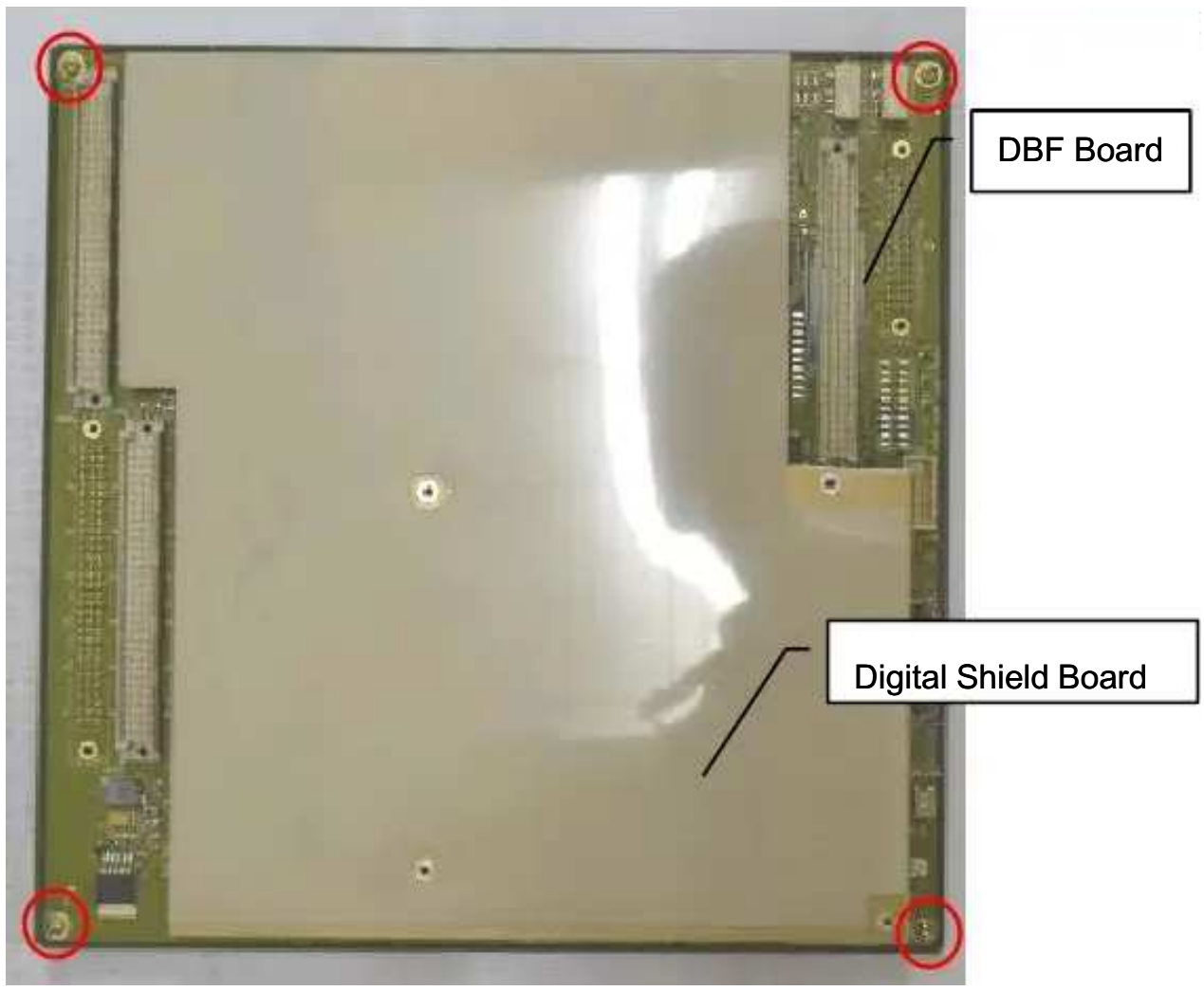


Fig. 3-33

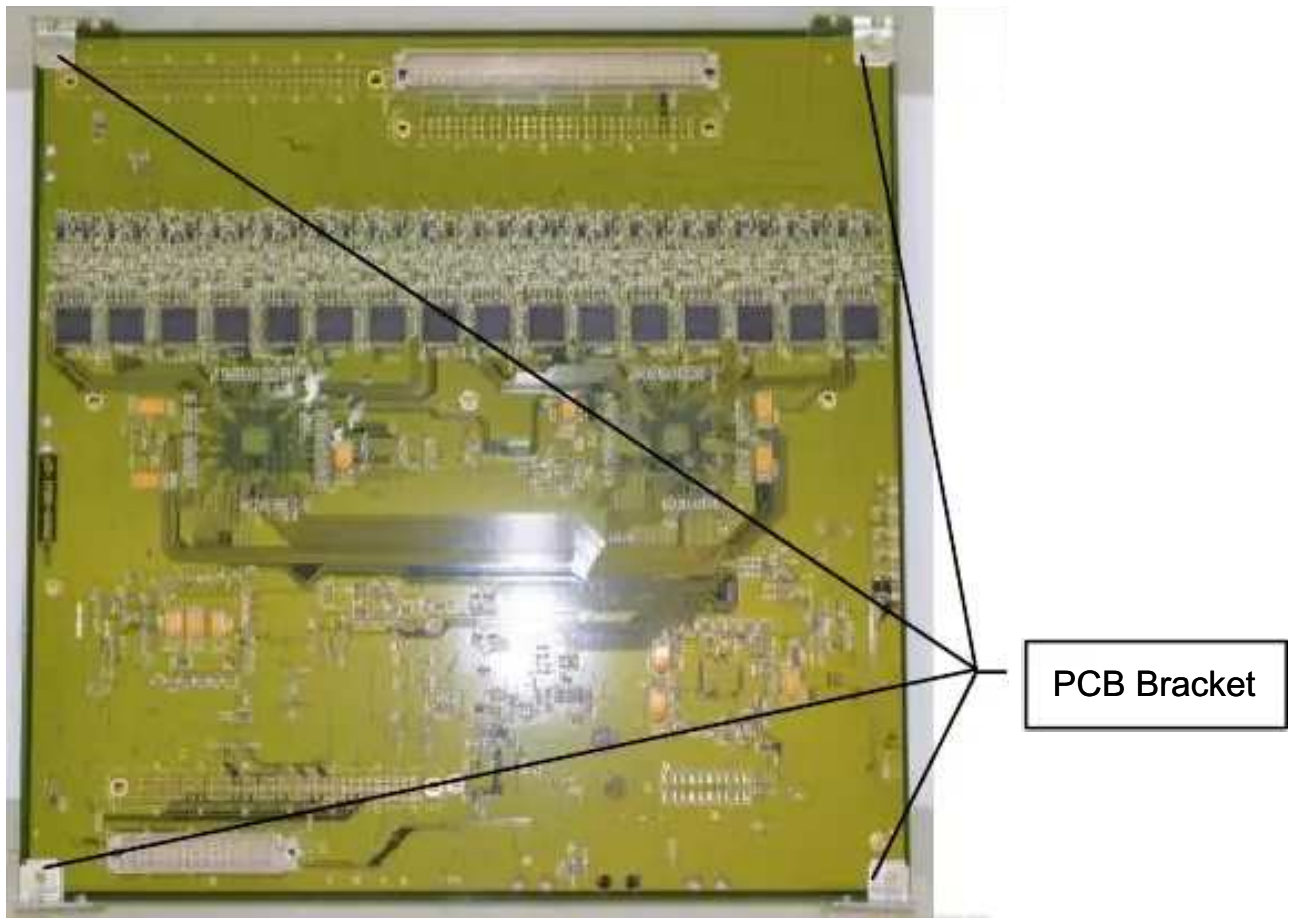


Fig. 3-34

d) Remove four M2.5X6 head screws to separate the DBF board and the digital shield board.

Fig. 3-35

3.11 Keyboard

3.11.1 Disassemble Touch Screen

3.11.1.1 Disassemble Touch Screen from the Control Panel

The touch screen shall be removed from the control panel following the steps below:

a) Remove three M3X10 screw assemblies fixing the touch screen at the back of the control panel.

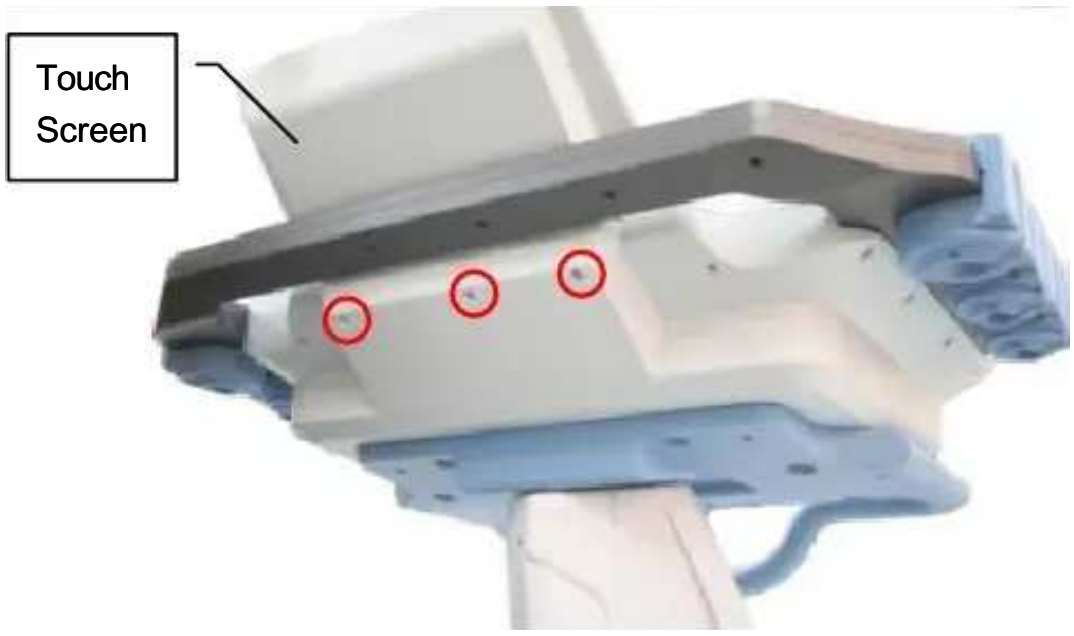


Fig. 3-36

b) Apply a bit force towards the back upper direction, and the touch screen (with its housing) can be extracted from the clip on the control panel. Do not apply too much force when pulling out the touch screen, so as to avoid damage to the connectors.

Fig. 3-37

c) Disconnect the wire plug at the back (below the touch screen). The fixing screws of the blue VGA plug can be unscrewed with a minus screwdriver. Take off the touch screen (with its housing). Disconnect the plugs.

【Note】:Do not apply too much force when using a minus screw driver to loosen or fix the VGA fixing screws, so as to avoid any damage to the head of the fixing screws.

Fig. 3-38

3.11.1.2 Disassemble Touch Screen

After completing the operation in Section 3.11.1.1 (Disassemble Touch Screen from the Control Panel), the touch screen shall be disassembled following the steps below:

a) Remove six ST2.9X6 self-tapping screws, and withdraw the rear housing of the touch screen.

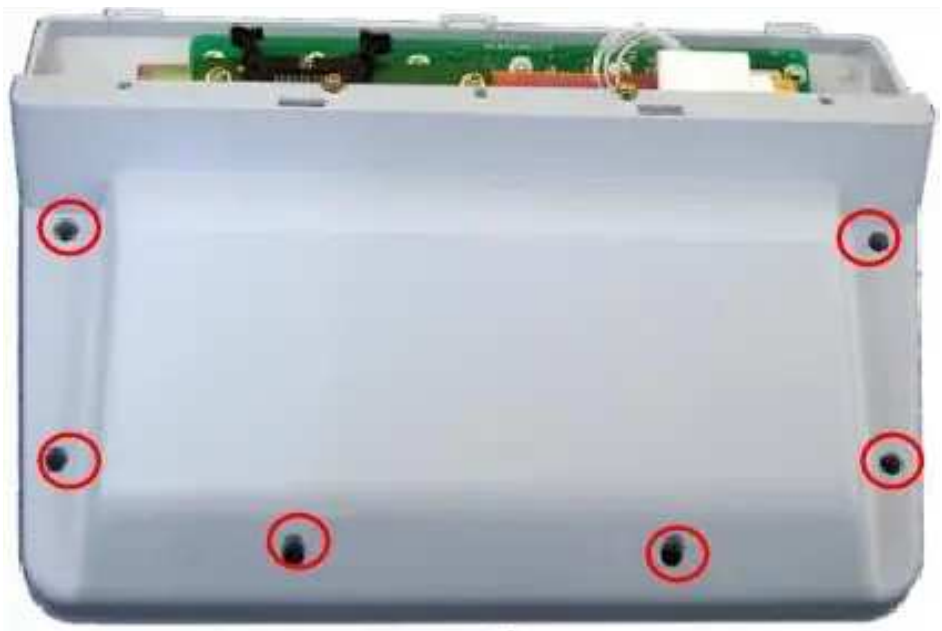


Fig. 3-39

b) Remove four M3X6 screw assemblies, and withdraw the touch screen.

【Note】:Do not touch the inner surface of the touch screen and the LCD display area with your hands. In case any fingerprint or dirt is carelessly left on it, clean with a cleaning tool immediately.

Fig. 3-40

3.11.1.3 Disassemble Parts of the Touch Screen

After completing the operation in Section 3.11.1.2 (Disassemble Touch Screen), the parts of the touch screen shall be disassembled following the steps below:

a) Disconnect the connecting wires on the drive board, remove four M3X6 screw assemblies on the drive board, and then withdraw the drive board.

b) Remove the shield cover of the inversion board. Disconnect the connecting wires on the inversion board, remove two fixing screws, and the inversion board can be removed.

c) Remove five adjust knobs on the tuning board. Remove six ST2.9X6 head self-tapping screws on the tuning board, and then withdraw the tuning board.

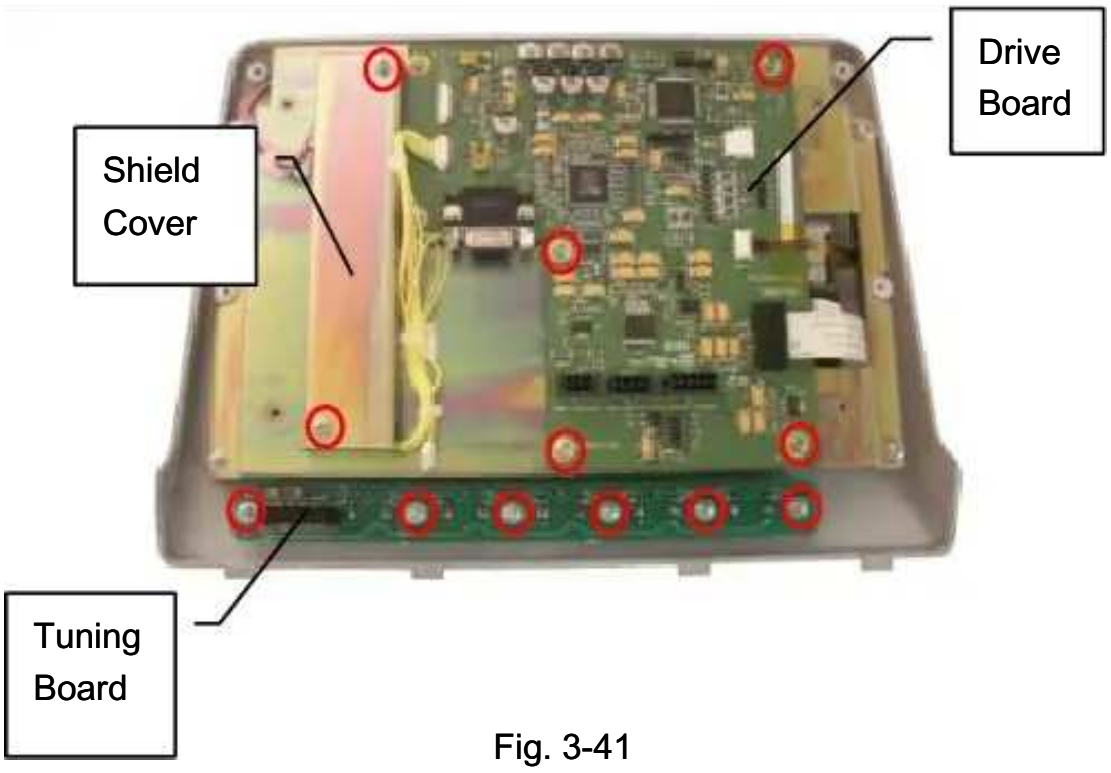


Fig. 3-41

3.11.2 Disassemble KB Board

3.11.2.1 Disassemble Control Panel from the Bodywork

a) Turn on the elevation switch of the keyboard, and apply a little force to lift up the keyboard handrail to elevate the keyboard to its highest position.

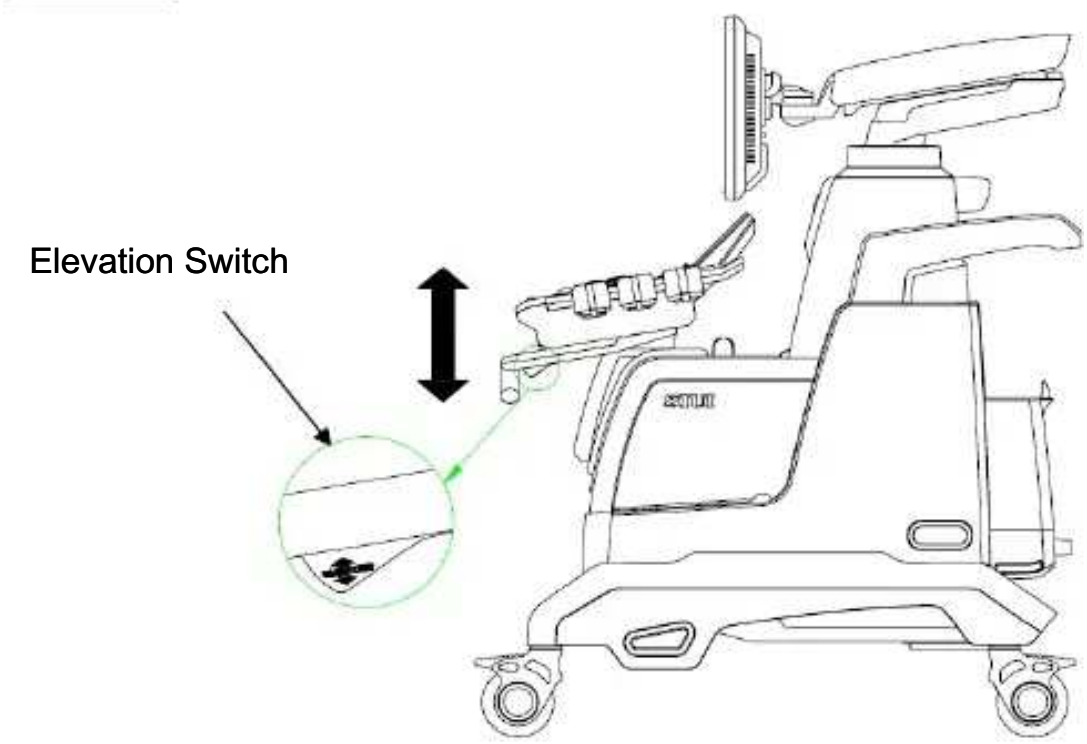


Fig. 3-42

b) Remove thirteen ST2.9X8 self-tapping screws, and then withdraw the control panel.

【Note】:A small head Phillips screwdriver is required for this step. If required in screw removal, the keyboard rotary switch shall be pulled forward while swiveling the keyboard to a certain angle at the same time.

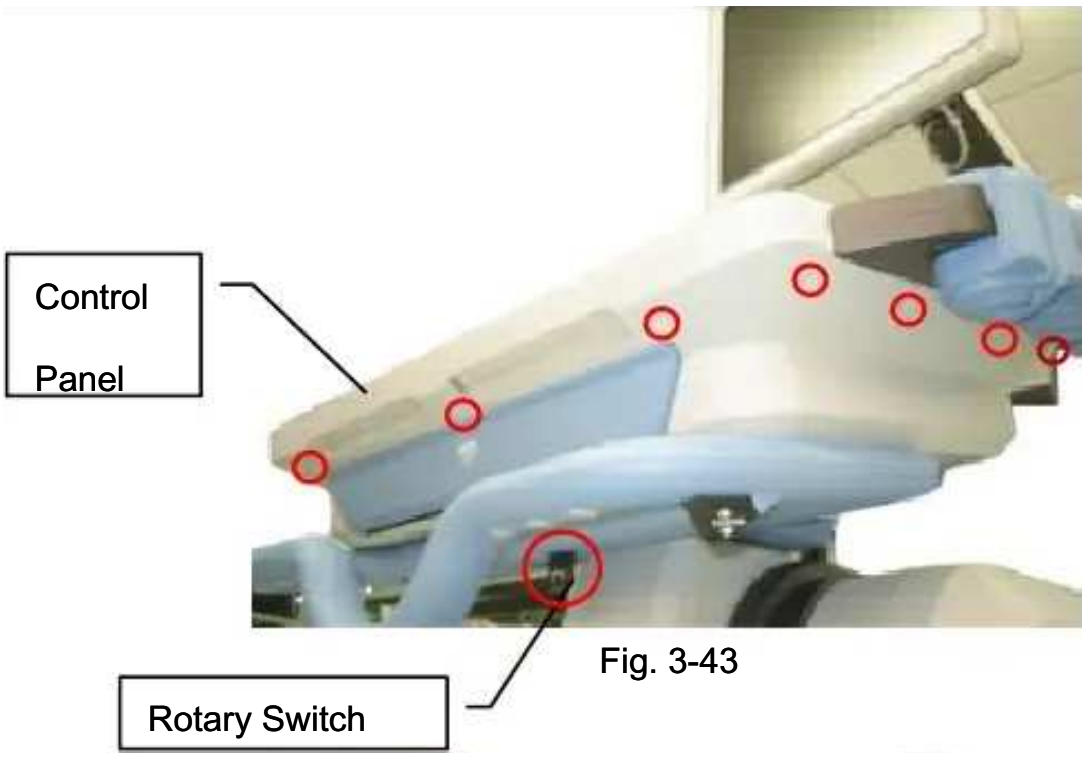


Fig. 3-43

Fig. 3-44

3.11.2.2 Disassemble KB Board from the Control Panel

After completing the operation in Section 3.11.2.1 (Disassemble Control Panel from the Bodywork), the KB board shall be disassembled following the steps below:

a) Disconnect all the wires connected to the control panel.

b) Lift up the keyboard panel and tilt it slightly forward to a certain degree, remove two keyboard wire-fixing screws, and then disconnect all the connecting wires on the control panel.

c) Remove four fixing screws, and then withdraw the keyboard reinforcing plate.

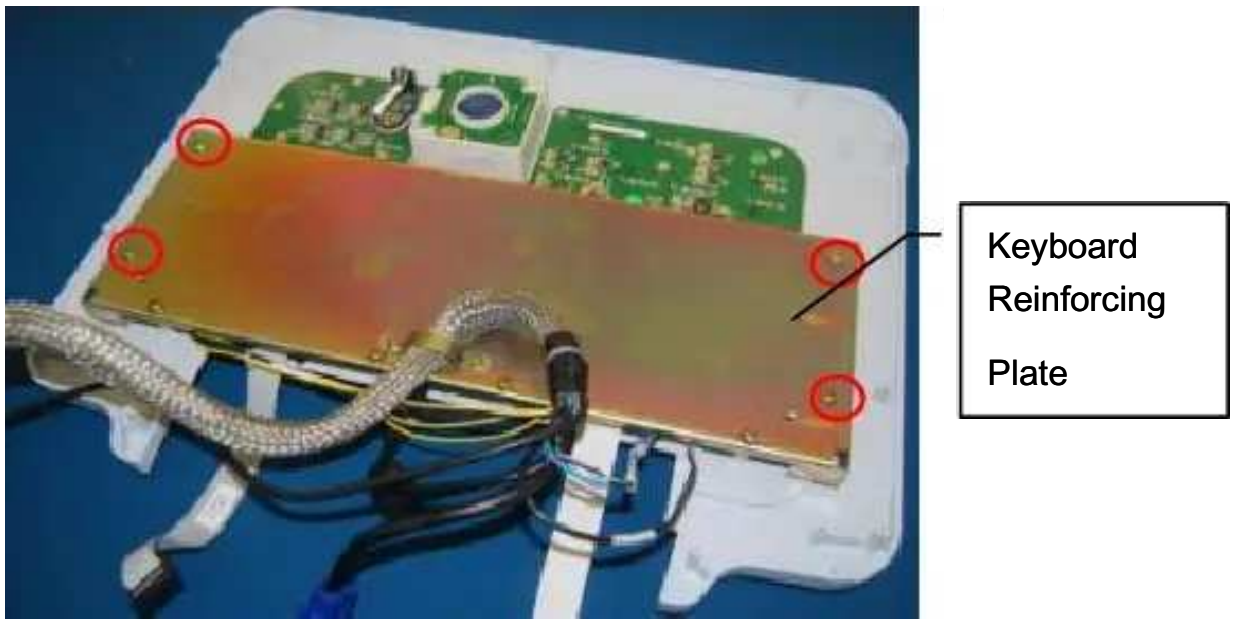


Fig. 3-45

d) Apply proper force upwards and pull out the big knobs, small knobs and TGC sliders from the KB board.

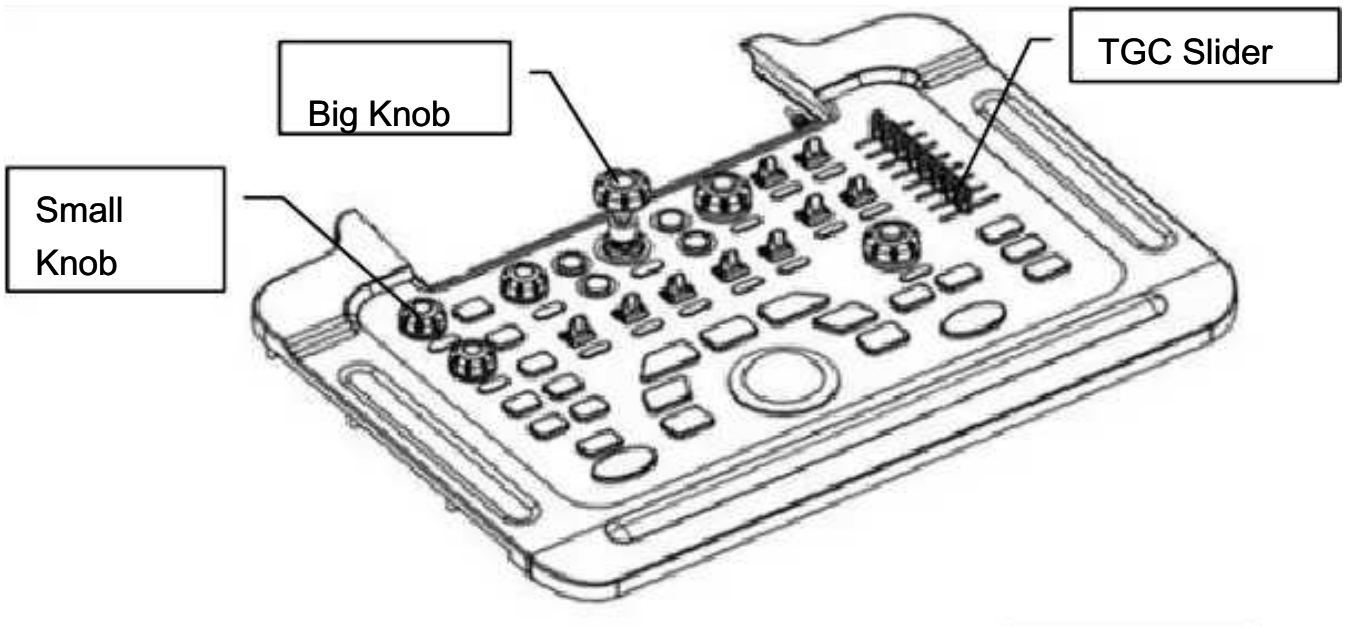


Fig. 3-46

e) Remove the ST2.9X6 self-tapping screws on the KB board, and remove the KB board.

f) Pull out the toggle swiches on the KB board.

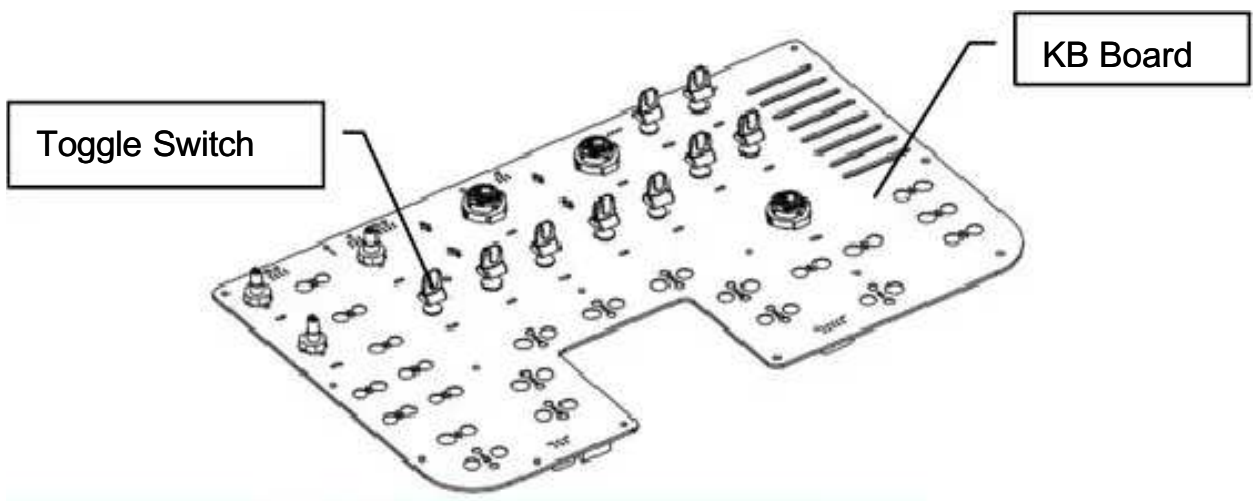


Fig. 3-47

3.11.3 Disassemble Small Keyboard

a) Pull out the small keyboard to the outermost.

b) Open the buckles on the two guide rails below the small keyboard and detach the small keyboard from the guide rails.

c) Disconnect the connecting wires of the small keyboard.

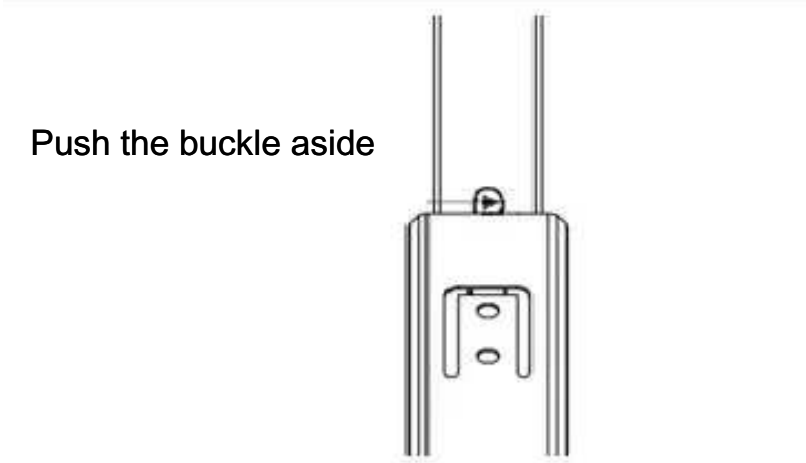


Fig. 3-48

Chapter 4

Software Maintenance

4.1 Software Update

4.1.1 Prepare tools and Files

Before software update, you need to prepare the software installation package, a blank USB disk and the debugging password.

4.1.1.1 Software installation package

The software installation package is provided by SIUI. You need to provide the DBF number to SIUI before acquiring the software installation package.

How to look up the DBF number:

1) Press Menu in the probe/ exam type select screen. A dialog as shown in Fig. 4-1 will pop up.

Fig. 4-1

2) Move the trackball to select System information. Press Set to pop up a dialog as shown in Fig. 4-2.

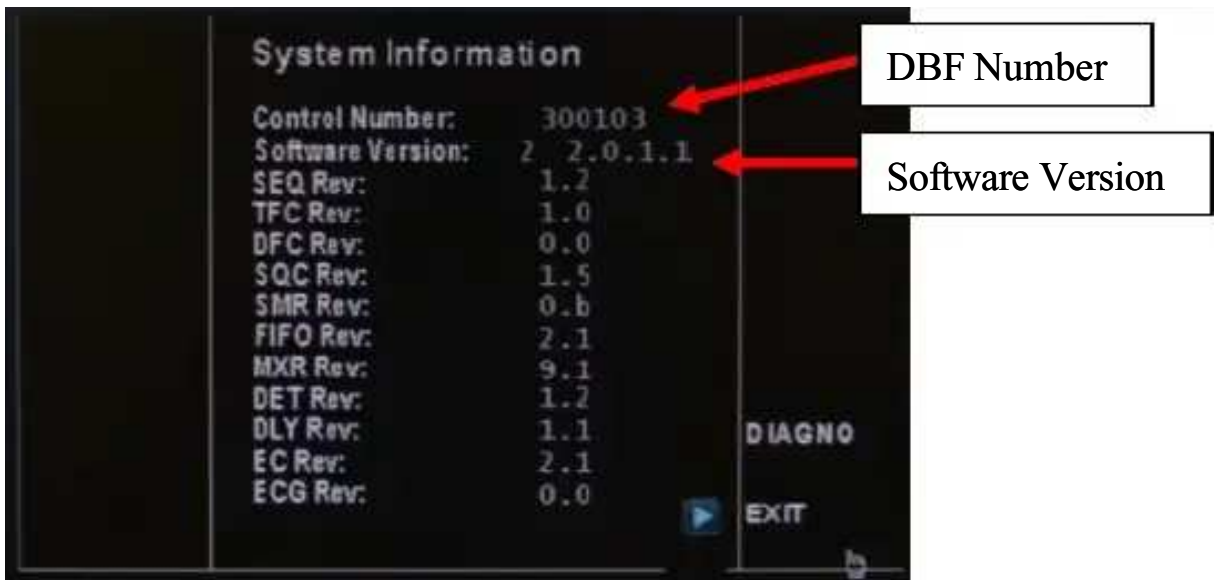


Fig. 4-2

According to the DBF number, the software installation package is created, which includes two files, i.e. “adata +_software version +.tgz” and “asecure+DBF number + software version +.tgz”.

For example, if the DBF number is 300001 and the software version is 2.0.1.1, the names of adata and asecure files are:

adata_2.0.1.1.tgz (called “adata file” below)

asecure300001_2.0.1.1.tgz (called “asecure file” below)

One adata file can be shared by multiple systems, while one asecure file is for one system only. After receiving the software installation package, please check:

1) if the version numbers of the adata file and the asecure file are the same.
2) if the DBF numbers of the asecure file and the system are the same.

4.1.1.2 Debugging Password

The debugging password is updated regularly. Please refer to SIUI for the new password before using it each time.

4.1.2 Software Update Steps

4.1.2.1 Copy files

Copy the adata file and the asecure file to a blank USB disk.

4.1.2.2 Update Software

In the probe/ exam type select screen, plug the USB disk to the system. Press Shift (for the system with a PC keyboard, only the right Shift key is valid in this case), E and Menu keys on the keyboard in turn. A dialog pops up for you to input the password, as

shown in Fig. 4-3.

Fig. 4-3

Input the password, and press Enter to bring up another dialog, as shown in Fig. 4-4.

Fig. 4-4

Move the trackball over the blue box to select GO button (default selection), press Set, and the software will read the software update package from the USB disk. After finishing the reading, the prompt in Fig. 4-5 will show up.

Fig. 4-5

Follow the prompt to press Exam and exit the dialog. Turn off the system and remove the USB disk. Restart the system, and it will go to the update screen and update the software automatically, as shown in Fig. 4-6.

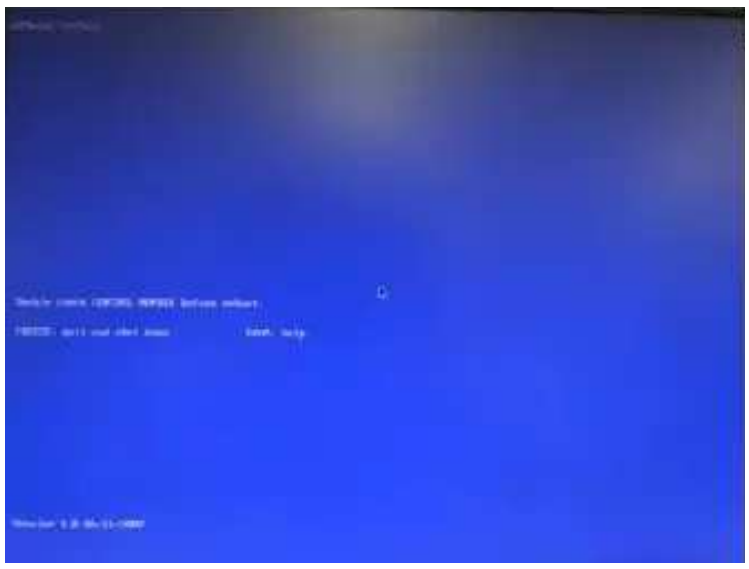


Fig. 4-6

When the update is finished, the system will reboot automatically and go the probe/ exam type select screen (which takes 3 to 4 minutes). Now the system will function properly.

4.2 Activation Function

4.2.1 Prepare tools and Files

To use the activation function, you need to prepare the functional configuration file, a blank USB disk and the debugging password.

4.2.1.1 Functional configuration file

The functional configuration file is equivalent to a Licence file, which is provided by SIUI. Before acquiring the functional configuration file, you need to provide the DBF number to SIUI, and inform SIUI which function(s) to be activated. Only one aconfig file is required for the functional configuration file. Here is the file naming rule:

"aconfig+DBF number"

For example, if the DBF number is 300001, then the aconfig file name is:

aconfig300001 (called "aconfig file" below)

One aconfig is for one system only. After receiving the aconfig file, please check if the DBF numbers of the aconfig file and the system are the same.

【Tip】: On how to look up the DBF number, see 4.1.1.1.

4.2.1.2 Debugging Password

The debugging password is updated regularly. Please refer to SIUI for the new password before using it each time.

4.2.2 Operation Steps of Activation Function

4.2.2.1 Copy files

Copy the aconfig file to a blank USB disk.

4.2.2.2 Activation Function

In the probe/ exam type select screen, plug the USB disk to the system. Press Shift (for the system with a PC keyboard, only the right Shift key is valid in this case), E and Menu keys on the keyboard in turn. A dialog pops up for you to input the password, as shown in Fig. 4-7.

Fig. 4-7

Input the password, and press Enter to bring up another dialog, as shown in Fig. 4-8.

Fig. 4-8

Move the trackball over the blue box to select GO button (default selection), press Set, and the software will read the aconfig file information from the USB disk to activate the system. After the successful activation, the prompt in Fig. 4-9 will show up.

Fig. 4-9

Press Exam to exit the successful activation prompt screen. Turn off the system and remove the USB disk. Restart the system, and the functional activation operation is finished. Now the system will function properly.

4.3 Information Collection

For better and more prompt solution for the potential failures, when failures occur, please help us to collect information and send it to us.

Information required includes:

a) Mark down the time when the failure occurred. It would be better to mark down the failure time as accurate as minute, and see if the clock in the system stops.

b) If there is any sound like “di, di” from the probe, record the situation in details;

c) Press Freeze and switch probe to check if there is any improvement or any new status, and record the situation in details;

d) Unplug the probe, observe the system; re-plug the probe and observe the system again. Record the system status in details, and see if the failure is improved or fixed.

4.4 Contact Information

SIUI Service Link

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Fax: 86-754-88251499