

CQ -20B



SERVICE MANUAL ISSUE 1

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ALLEN & HEATH

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Notices

Legal Notice

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Servicing precautions – General Notes

- Service Personnel:** Service work should be carried out by technically qualified personnel only. Mains power is dangerous and can kill. Do not attempt to work on a linear or switched mode power supply if you are not suitably qualified to do so. Do not attempt to repair surface mount circuit assemblies unless you are suitably qualified and have the necessary facilities to do so. Replacement circuit assemblies can be ordered.
- Service Facilities:** Ensure a suitably sized worksurface is available. Ensure this is clear of dirt, debris and obstructions which may damage the equipment surfaces. Ensure adequate lighting. Use the correct tools for the job and ensure that they are in good working order. Ensure all workshop safety requirements are adhered to.
- Safety Information:** Failure to follow the appropriate service and safety procedures may result in personal injury. You must read and adhere to the Safety instructions available in the box with the finished goods or available to service centres via your Asset Library login.
- Service information:** Check that you have all the information you need before starting the service job. Refer to the Allen & Heath website for user facing information at such as firmware guides (including block diagrams), weights and dimensions and Technical Spec Data Sheets at www.allen-heath.com. For any other information contact Allen & Heath Product Support at support.allen-heath.com.
- Saving Data:** In order to preserve the customer data, you should save any console data onto two separate USB devices if applicable.
- Mains Power:** Connect the equipment to mains power only of the type described in the user guide and marked on the rear panel. The power source must provide a good ground connection. Ensure you always use an isolation transformer when working on any mains power supply unit.
- Mains Cord and Fuse:** Use the correct power cord as supplied with the equipment. Do not remove or tamper with the ground connection in the power cord. Heed the important mains plug wiring instructions in the Safety Instructions sheet. Always replace the equipment mains fuse with the correct type and rating as marked on the equipment panel.



- Static Discharge:** Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated before commencing servicing.
- Opening the unit:** Switch off and remove the mains power cord before opening the equipment. Ensure all power supply covers and safety shields are in place before applying power with the unit open for diagnostic fault finding.
- Fault finding:** In warranty faults should be corrected by board swapping. If attempting an out of warranty repair at a component level, replace suspected faulty components only with those specified by Allen & Heath. The use of lower grade alternatives may degrade the performance or risk damage to the equipment.
- Closing the unit:** Before finishing, check the quality and accuracy of the service work carried out. Remove any dirt or debris as this may cause equipment failure in the future. Ensure all assemblies, harnesses and connectors are correctly aligned, plugged in and cable tied. Ensure that jumper settings and control configurations are correctly set according to the requirements of the customer.
- Testing the unit:** Before operating the equipment, read and adhere to the Safety Instructions for the unit. Test that the service work has been successfully carried out.
- Shipping the unit:** Use adequate packing such as the original packaging or purpose designed flight case if you need to ship the unit. To avoid injury to yourself or damage to the equipment take care when lifting, moving or carrying the equipment.
- Important:** Information provided is believed to be accurate but research is ongoing and improvements or changes can be made to the unit without notice. If you have any questions, please contact Product Support at support.allen-heath.com.
- Battery Handling:** **Batteries can explode with improper handling. Follow the following precautions if a battery is fitted to this product.**
- Battery replacement should be performed by qualified service personnel.
 - Always replace with batteries of the same type.
 - When installing on the PCB by soldering, solder using the connection terminals provided on the battery cells.
 - Never solder directly onto the cells. Perform soldering as quickly as possible.
 - Never reverse the battery polarity when installing.
 - Do not short the batteries.
 - Do not attempt to recharge batteries.
 - Do not disassemble the batteries.
 - Never heat batteries or throw them into fire.



Parts Identification

Parts List

Chassis

Part Number	Description	Qty
AA11993	FRONT PNL CQ20B	1
AA11994	BASE PNL CQ20B	1
AA12335-L	HANDLE ALU. CQ20B BLACK LEFT	1
AA12335-R	HANDLE ALU. CQ20B BLACK RIGHT	1
AA11936-L	SIDE TRIM CQ20B LEFT	1
AA11936-R	SIDE TRIM CQ20B RIGHT	1
AK6915	FEET FAST 21DIA.X8MM	4
AL12258	ANTENNA WIFI EXT.RUBBER+ELBOW	1
AJ12363	ANTENNA CLIP	1
AA11934	SHIELD CQ20B PSU	1
AA13204	INSUL. POLYFILM	1
004-1240	AM12139 FANA 60X60X10 12CM	1
AA12165	FAN GRILLE 60MM WIRE MATT	1
AA12588	CLIP RJ45 EARTH	1

Screws

Part Number	Description	Qty
AB7765	SCREW M4X8 PAN TORX POLYM (For Side Trims)	10
AB8592	SCREW M3X5 TRUNC CSK TORX BK (For COMMS board/Panel)	3
AB11989	PILLAR M3X11 HEX BRASS	8
AB0188	NUT M4 NYLOCK (For FAN)	4
AB7422	SCREW 2.7X9 AB TORX BK UH (For XLR sockets)	26
AB9037	SCREW M3X5 TRUNC CSK TORX (For panels)	22
AB12365	SCREW M4X8 CSK POZI BK (For handles)	4
AB0072	SCREW M3X6 PAN TORX BK PATCH (For CPU board)	11
AB0102	NUT M3 NYLOCK (For COMMS inside board)	12
AB12170	SCREW M4X20 PAN TORX BLK (For FAN)	4
AB12171	WASHER M4 SHAKEPROOF(For AB0102 & AB12170)	5
AB2921	SCREW M4X8 BTN-HEAD	1
AB5564	SCREW M3X12 PAN TORX BK	2

Cables

Part Number	Description	Qty
AH12711	CABLE WIFI COAX.200MM-FOR AL12258	1
004-1490-07H	WFMA EARTH WIRE 7CM HKD (Yellow wired from Main Inlet)	1
004-1338	IDC WFM CQ20B PWR TRANS (Ribbon cable from PSU to Connector)	1
004-1337	WFMA CQ20B PWR (From PSU to CPU)	1



PCB

Part Number	PCB	Description	Qty
004-1244-1X	AG12018	PCBA CQ20B CPU-RF UNLKD	1
004-1244-2X	AG12018	PCBA CQ20B CPU-RF US/CAN	1
004-1242	AG12008	PCBA CQ20B COMMS	1
004-1460	AG12779	PCBA CQ20B CONNECTOR TYPE 2	1
004-1243	AG12015	PCBA CQ20B PSU	1

Due to RF Regulations, CQ20B CPU for **USA** and **CANADA** must be ordered under part # **004-1244-2X**
For anywhere else, part # **004-1244-1X**

Other

Part Number	Description	Qty
AA12671-1	DUST COVER PLUG USB A	1
AA12671-2	DUST COVER PLUG USB B	1
AA12671-3	DUST COVER PLUG RJ45	1
AA12671-4	DUST COVER PLUG SD	1
CQ20B-CASE	CQ20B Soft case	1
CA20B-RK19	CQ20B 19" Rack Mount Kit	1
AA12065	Rack Ear CQ20B 19" Left	1
AA12066	Rack Ear CQ20B 19" Right	1

Parts Identification



AA11993 FRONT
PNL CQ20B



AA11994 BASE
PNL CQ20B



AA12335-L HANDLE
ALU. CQ20B BLACK
LEFT



AA12335-R HANDLE
ALU. CQ20B BLACK
RIGHT



AA11936-L SIDE
TRIM CQ20B
LEFT



AA11936-R
SIDE TRIM
CQ20B RIGHT



AK6915 FEET FAST
21DIA.X8MM



AL12258 ANTENNA WIFI
EX



AH12711 CABLE WIFI
COAX.200MM



AB7765 SCREW
M4X8 PAN TORX
POLYM x 10



AB8592
SCREW M3X5
TRUNC CSK
TORX BK



NUTS x 8
1Nm +/- 0.1Nm



AB11989
PILLAR M3X11
HEX BRASS x



AB0188 NUT
M4 NYLOCK



AB7422 SCREW
2.7X9 AB TORX
BK UH



AB9037 SCREW
M3X5 TRUNC
CSK TORX



AB12365 SCREW
M4X8 CSK POZI
BK



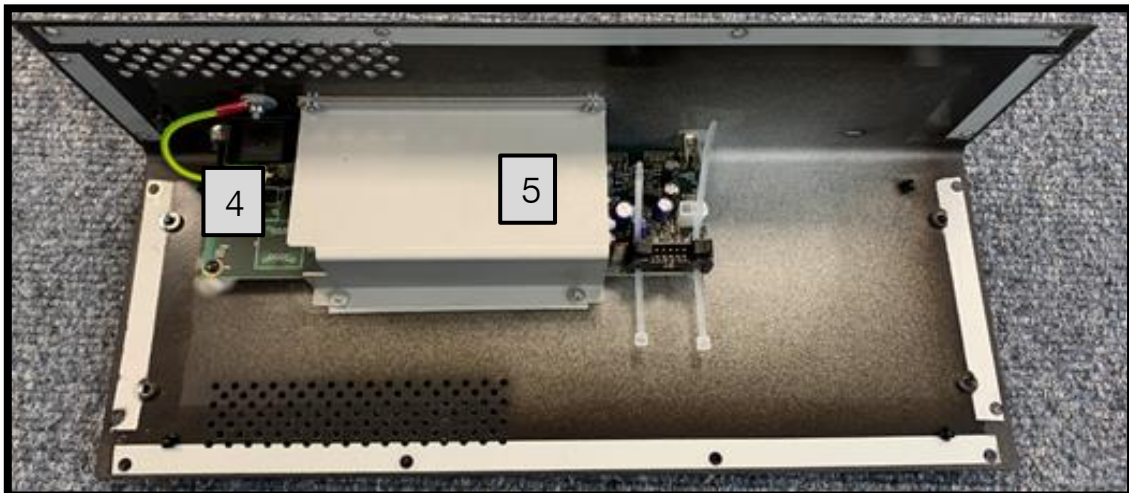
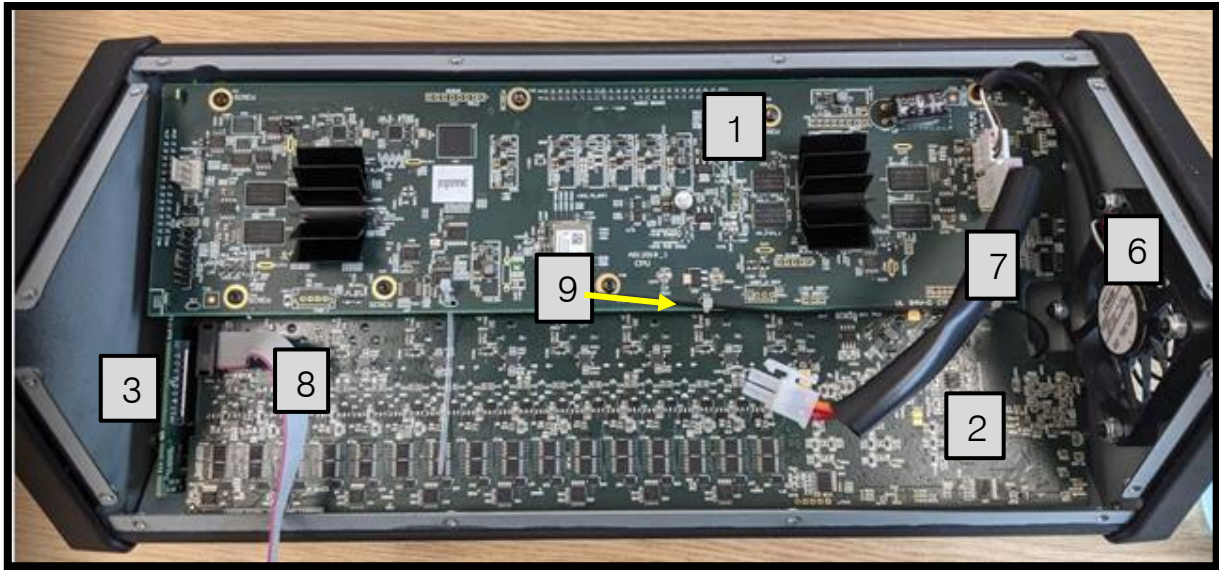
AB0072
SCREW M3X6
PAN TORX BK
PATCH



AB0102 NUT M3
NYLOCK



Circuit Board Layout

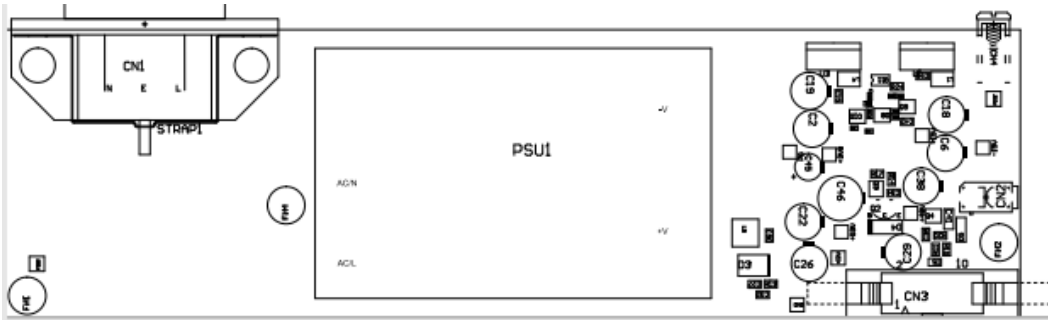


- 1.- CPU Board – AG12018 – 004-1244-1X (ROW) 004-1244-2X (US & Canada)
- 2.- Audio Connectors Type 2 board - AG12586 - 004-1460
- 3.- COMMs board - AG12008 - 004-1242
- 4.- Power Supply 12v - AG12015 - 004-1243
- 5.- Power Supply Shield - AA11934
- 6.- FAN - AM12139 - 004-1240
- 7.- WFMA CQ20B PWR - 004-1337
- 8.- IDC WFM CQ20B PWR TRANS - 004-1338
- 9.- Wi-Fi Coax cable - AH12711

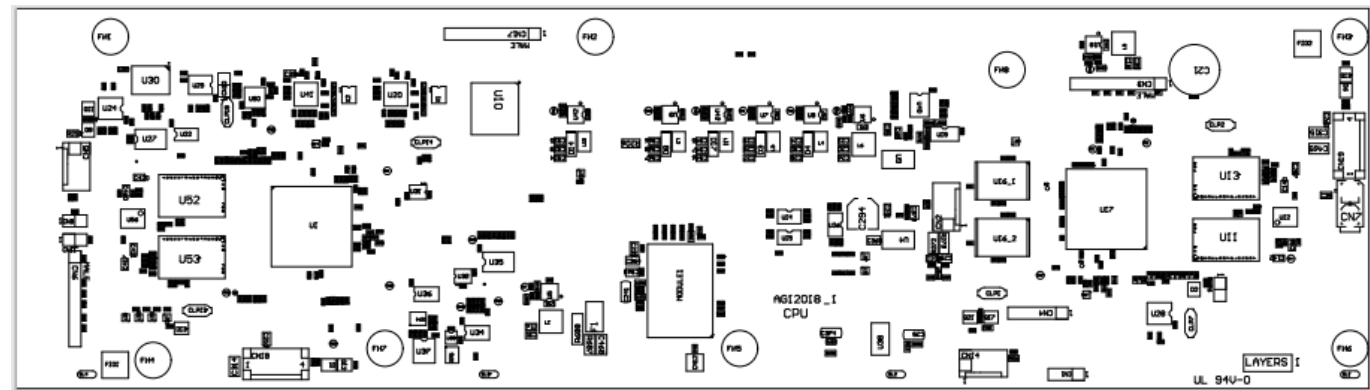
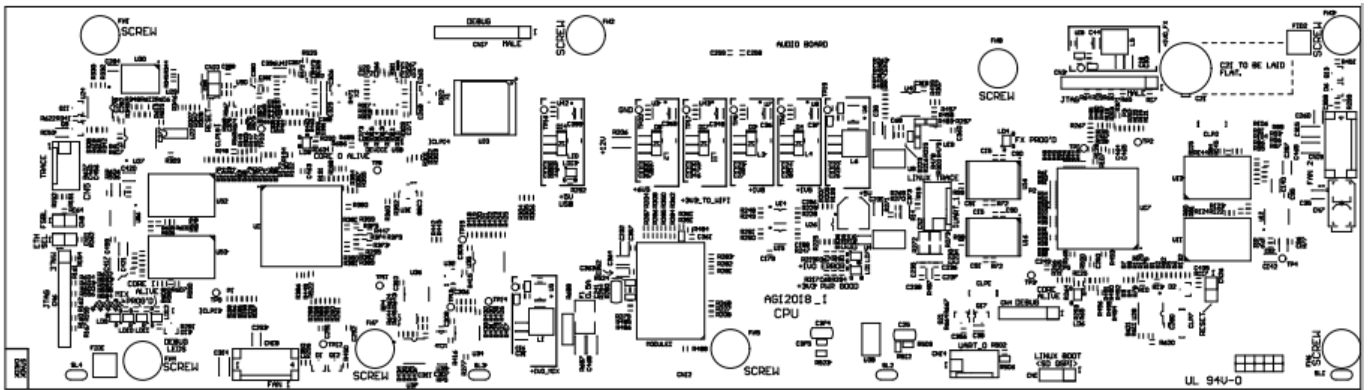


Circuit Board Identification

PCB	AG12015
Part Number	004-1243
Description	CQ20-B PSU board



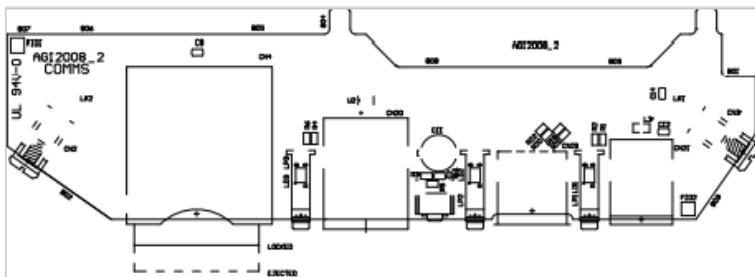
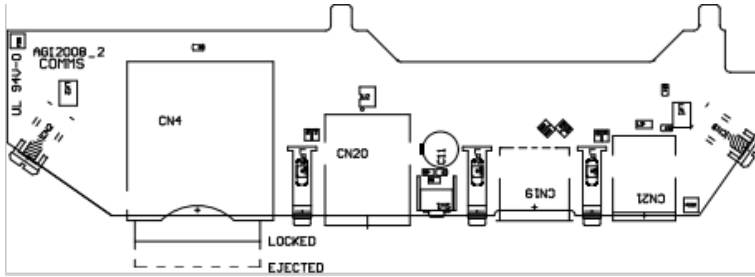
PCB	AG12018
Part Number	004-1244-1X / 004-1244-2X
Description	CQ20-B CPU board



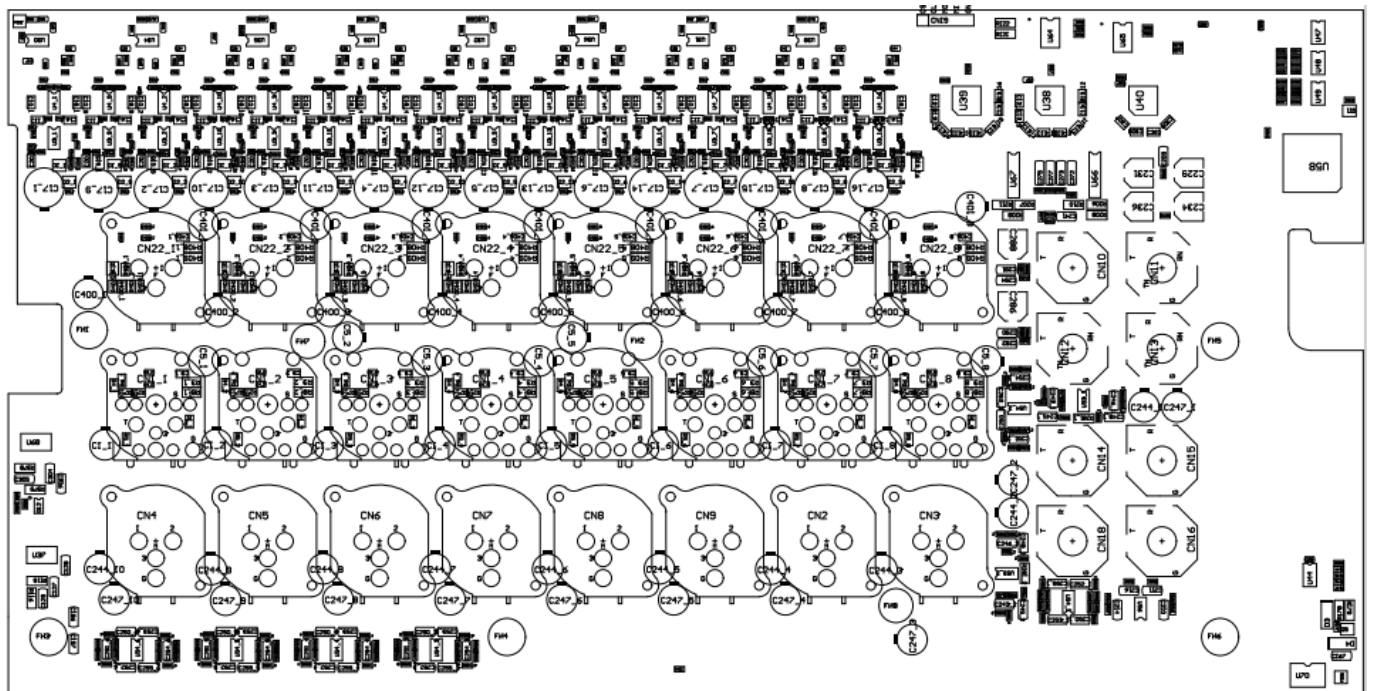
Parts Identification



PCB	AG12008
Part Number	004-1242
Description	CQ20-B COMMs board



PCB	AG12779
Part Number	004-1460
Description	CQ20-B Audio type 2 board





Servicing Information

Hot Melt Glue

Some connectors and wireforms/harnesses may be held in place with hot melt glue. You will need 99% Isopropyl Alcohol (propan-2-ol) to remove it. Follow these steps:

- Apply a small amount of 99% Isopropyl Alcohol to a swab and apply it to the edges of the glue
- Leave it for 20 seconds and then pick off the glue by hand or by using a tool that is of low risk to cause damage. Do not use excessive force. If the glue does not come off re-apply the Isopropyl Alcohol.
- Once the glue is removed from the connector release the wireform.
- Once the service/repair is complete re-apply the hot melt glue to secure the wireform in place.

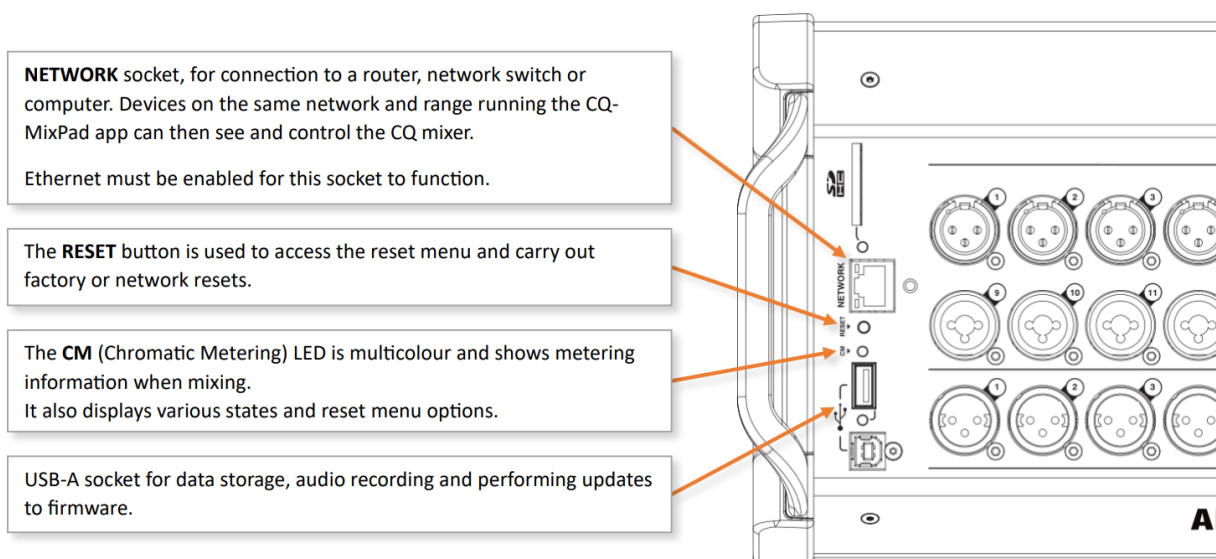
After replacing PCB parts Firmware Update must be done

After replacement of and PCBs inside the unit the firmware will need to be updated to ensure that the correct firmware is installed in all parts of the unit.

An updated unit will automatically update the firmware on connected I/O expanders when they are connected.

Backup show

In order to preserve customer data, the settings should be stored and copied to two separate storage devices before attempting any resets or servicing.





Resetting the Unit

- 1) Power on the unit and allow to boot.
- 2) If the network connection has already been set up and the system boots normally, the 'CM' LED will illuminate **GREEN**. If the 'CM' LED flashes **BLUE** or **YELLOW** then the CQ has already been reset and you do not need to perform a reset.
- 3) Use a small, pointed but not sharp object (e.g. a pencil) to press and hold the 'RESET' button, the 'CM' LED will illuminate **WHITE**, hold the button down for 2 seconds and release to access the *Reset Menu*.
- 4) Press the button momentarily (for less than 2 seconds) to cycle through 3 reset options:

- 'CM' LED lights **RED** = Factory reset
All mixer parameters are set to default values.
All data stored on the CQ (including scenes and libraries) is deleted.
Wi-Fi and Ethernet network settings are set to default values and method of connection must be selected.
- 'CM' LED lights **BLUE** = Wi-Fi settings reset
Wi-Fi network settings are set to default values and WiFi connection is active.
- 'CM' LED lights **YELLOW** = Ethernet settings reset
Ethernet network settings are set to default values and Ethernet connection is active.

Note: Only available Reset Options will appear in the *Reset Menu*. Should any colour not appear when cycling through the Reset Options this would indicate that these settings are in their default state.

- 5) With the 'CM' LED showing the colour matching the reset you want to perform, press and hold the 'RESET' button for 2 seconds to action the reset.

Note: To exit the reset menu, do not interact with the 'RESET' button for 10 seconds.

Forced Firmware Update

- 1) Use a computer to format a USB drive to a FAT32 file system.
- 2) Download and unzip the latest version of firmware.
- 3) Copy the firmware file, which will have a name like 'CQ18tUPG_1_0_1_r1234.bin', to the root of the USB drive. Do not place it in any folder.
- 4) Ensure there is only one version of firmware on the drive and if any old versions have been deleted from the drive, that the Trash or Recycle Bin has been emptied.
- 5) Disconnect the drive from the computer.
- 6) Use a small, pointed but not sharp object (e.g. a pencil) to hold the 'RESET' button for 2 seconds whilst powering up the CQ, the 'CM' LED will flash **GREEN** once and the SD activity LED may illuminate.
- 7) Connect the USB drive, the 'CM' LED will illuminate **GREEN**
- 8) Press the 'RESET' button once, the LED will briefly **WHITE** once
- 9) Press and hold the 'RESET' button until LED goes **PINK** then release the button.
- 10) Press and hold the 'RESET' button again until LED starts flashing **PINK** and the USB activity LED illuminates to show firmware is updating.
- 11) Once the update is complete, the unit will automatically restart. Note: To exit the reset menu, do not interact with the 'RESET' button for 10 seconds.



Updating Firmware

Note: Firmware is updated through CQ-MixPad App

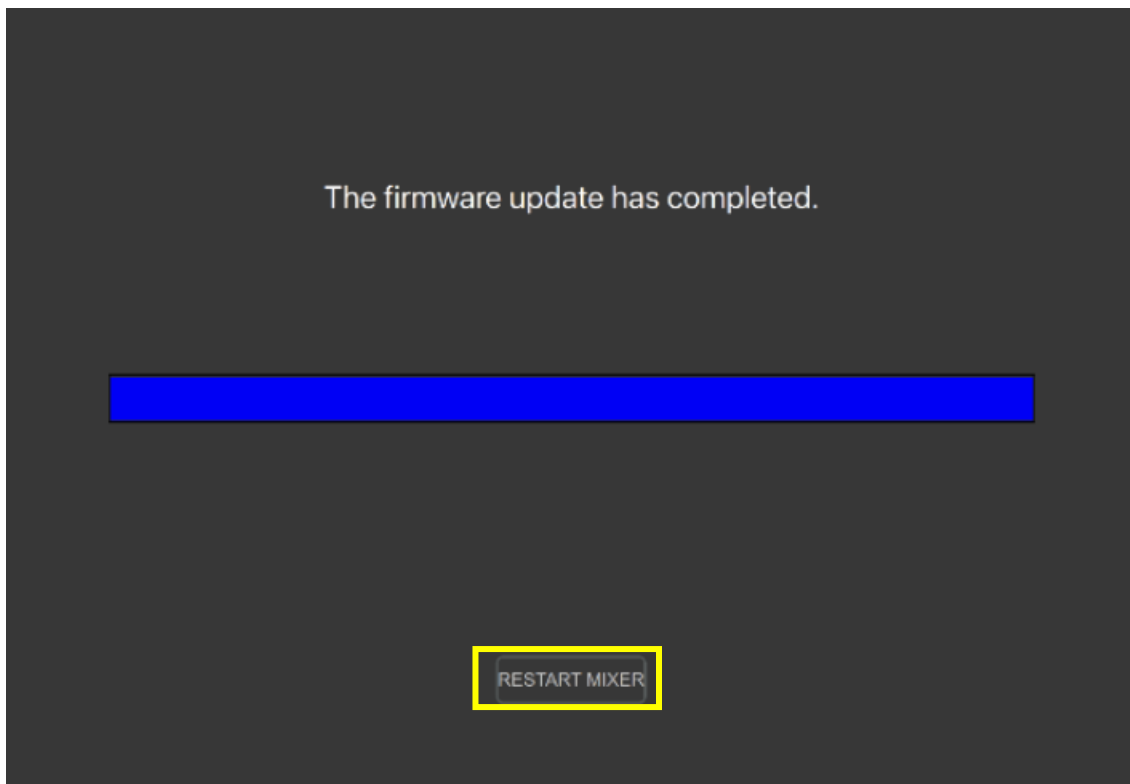
- 1) Run the CQ-MixPad app on a device connected to the CQ's built-in Wi-Fi network or on the same network as the CQ.
- 2) Select the CQ from the 'Choose Unit' list. If you cannot see the CQ, check network connections or use the 'Other' option if you know the IP address of the CQ but cannot see it listed by name.
- 3) If CQ-MixPad cannot connect to the unit because of mis-matching firmware, follow the on-screen instructions to update.



Press UPDATE



Use a small, pointed but not sharp object to press the 'RESET' button on the unit to continue.



Press the 'RESTART MIXER' button to complete the update.



Network Setup

Remote control of the CQ is via either the built-in Wi-Fi or the Ethernet connection. Only one of these can be enabled and used at a time.

1) If the network connection has already been set up and the system boots normally, the 'CM' LED will illuminate **GREEN**.

To begin a completely new setup, carry out a reset of the CQ-20B as described elsewhere in this document.

To only reset network settings, carry out the reset procedure separately for both Wireless and Ethernet.

2) If the 'CM' LED flashes **BLUE** or **YELLOW** then the CQ has been reset correctly. Use a small, pointed but not sharp object (e.g. a pencil) to press the 'RESET' button and switch between modes.

- 'CM' LED flashes **BLUE** = Wi-Fi network settings are set to default values and WiFi connection is active.
- 'CM' LED flashes **YELLOW** = Ethernet network settings are set to default values and Ethernet connection is active.

3) On first boot or after a reset, network defaults are as follows:

Wi-Fi

- The SSID is **Visible**.
- The SSID is [CQ20B_XXXX] where XXXX are the last 4 digits of the serial number.
- Security is set to 'OPEN', so no password is required to connect a device.
- Password is set to 'DefaultPassword' Note: This will be the password if Security is switched to 'WPA2' but the password has not been changed.
- Country is set to 'World-Wide' (depending on shipped firmware).
- Channel is set to 'AUTO'.

Ethernet

- IP Settings are 'Automatic'
- The unit will be assigned an IP address by a DHCP server (e.g. a connected router), devices on the same network and in the same network range running CQ-MixPad can then connect to the unit.
- If no address is provided, the CQ will automatically assign itself a local address. This allows for a direct connection to a computer using a network cable.

4) Run the CQ-MixPad app on a device connected to the CQ's built-in Wi-Fi network or on the same network as the CQ.

5) Complete setup of the network by navigating to 'CONFIG' > 'CONTROLS' > 'NETWORK'.

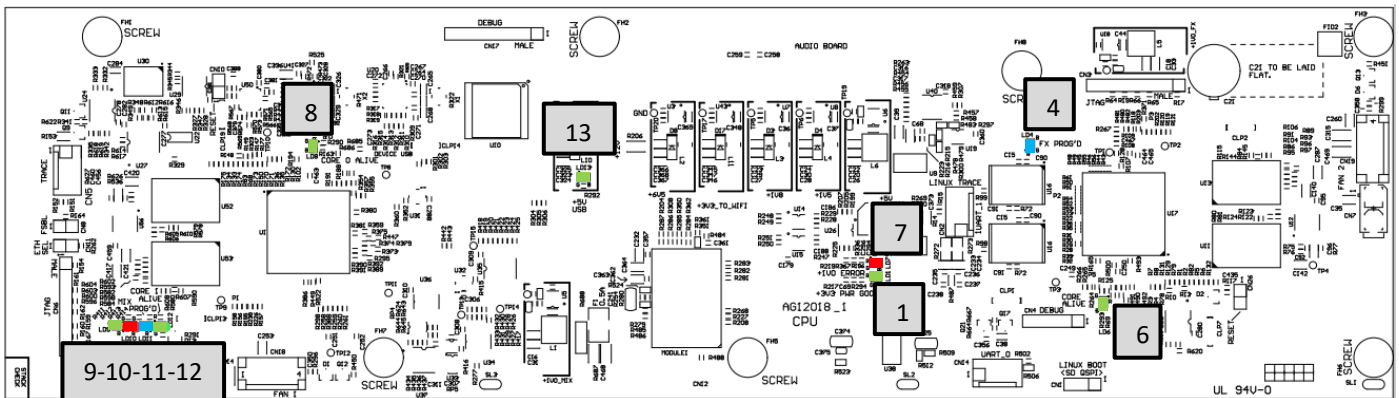


Diagnostics

A number of LED's are placed on the main CPU to help monitor activity on these board. This includes LEDs for power rails, USB, and FPGA/DSP programmed and active.

Due to the presence of these LEDs, there are less needs for power rail test points.

Also supplied are routing overviews for Power Distribution and Control/Audio routing. Use these to identify associated PCB's when a fault occurs.



LD1 = On solid - Power good +3v3

LD4 = Heartbeat pattern - FX PROG +3v3

LD6A = Slow Blink - FX Alive +3v3

LD6B = Slow Blink - FX Alive +3v3

LD7 = Error +1v

(This led will light up red only when an error occurs)

LD8B = Heartbeat pattern - Core 0 Alive +3v3

LD8A = Heartbeat pattern - Core 0 Alive +3v3

LD9 = (Off on normal operation) Debug

LD10 = (Off on normal operation) Debug

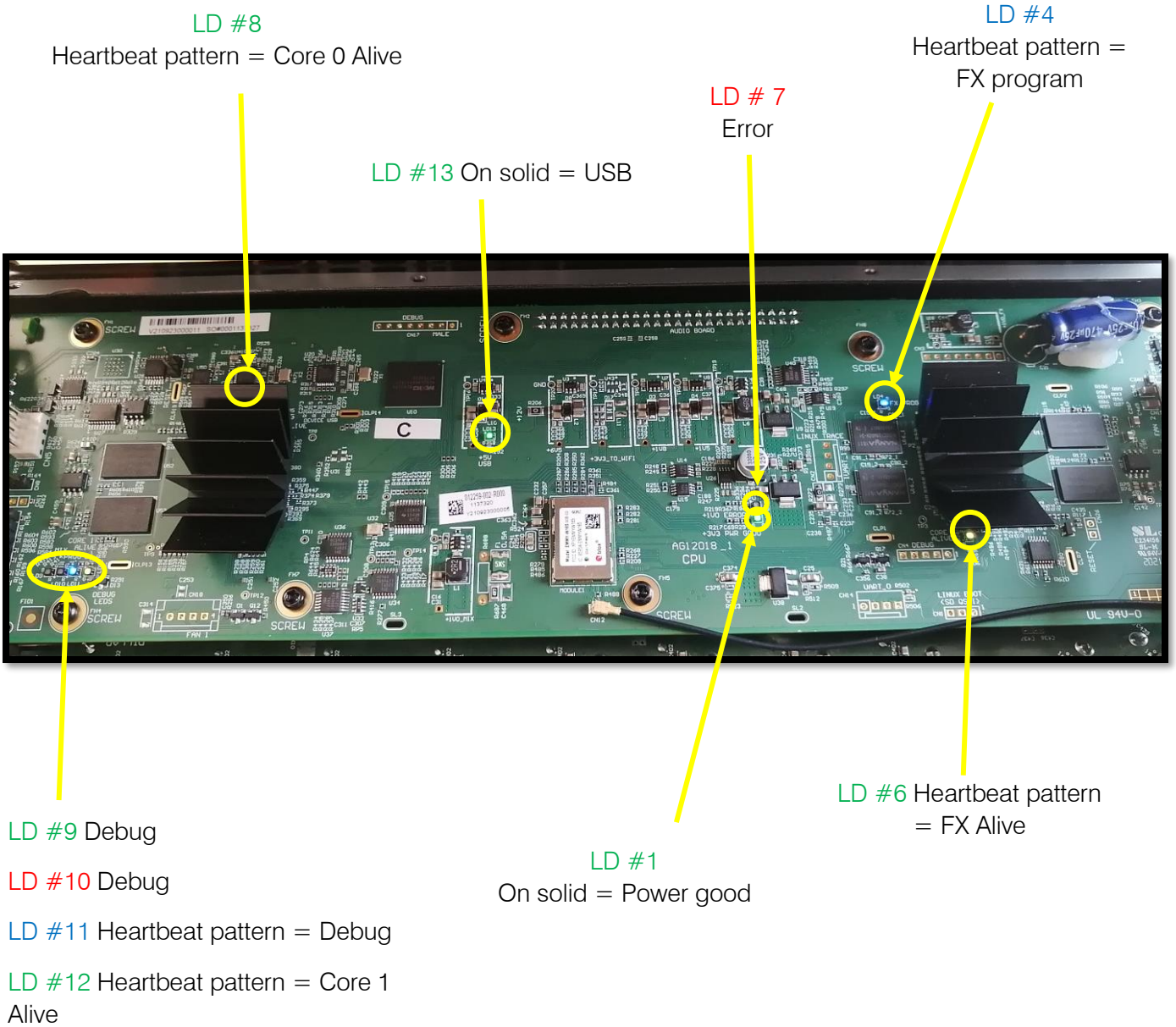
LD11 = Heartbeat pattern - Debug

LD12B = Heartbeat pattern - Core 1 Alive

LD12A = Heartbeat pattern - Core 1 Alive

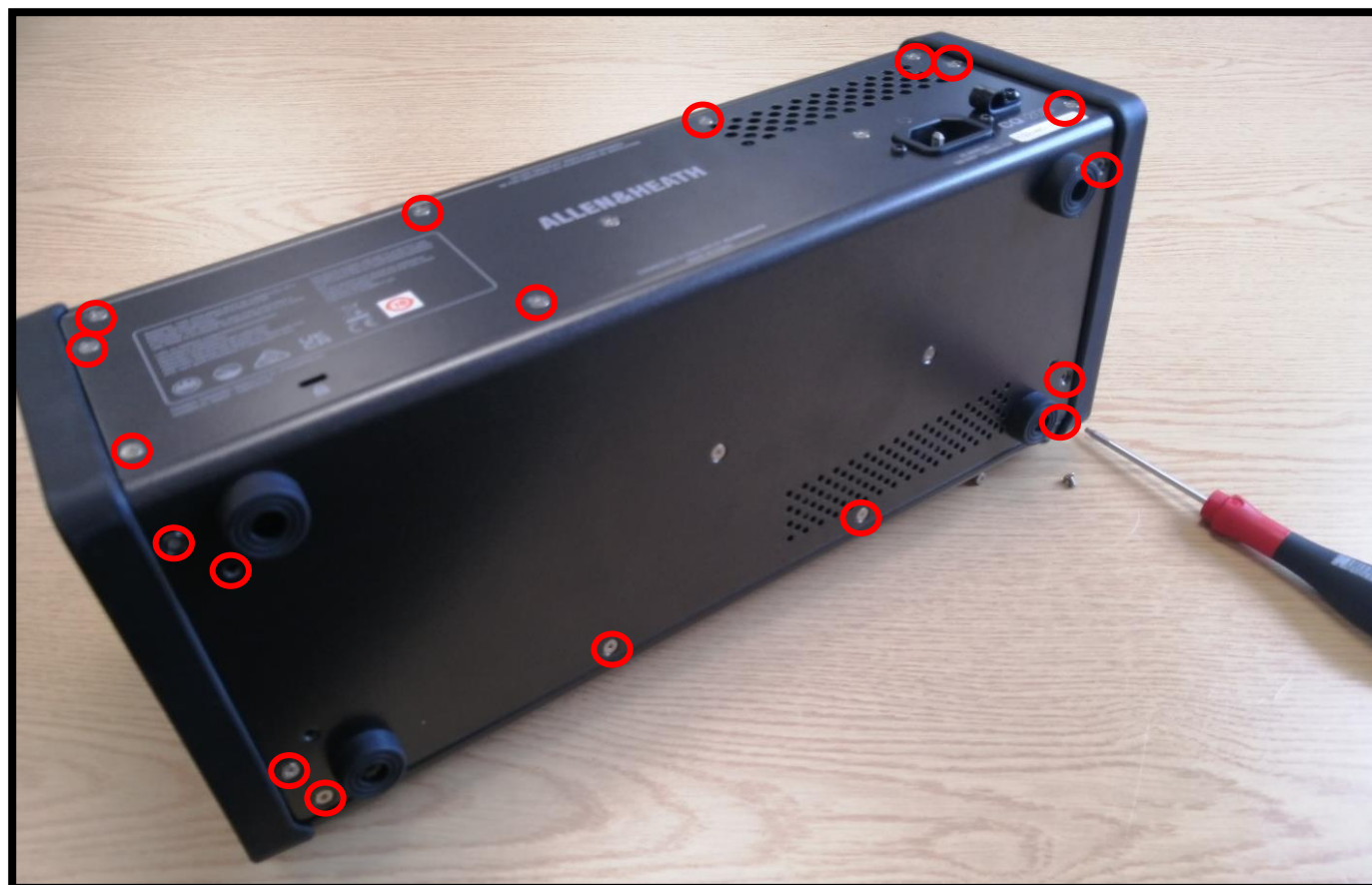
(These LEDs will turn red if there's a problem with the Core)

LD13 = On solid - USB +5v

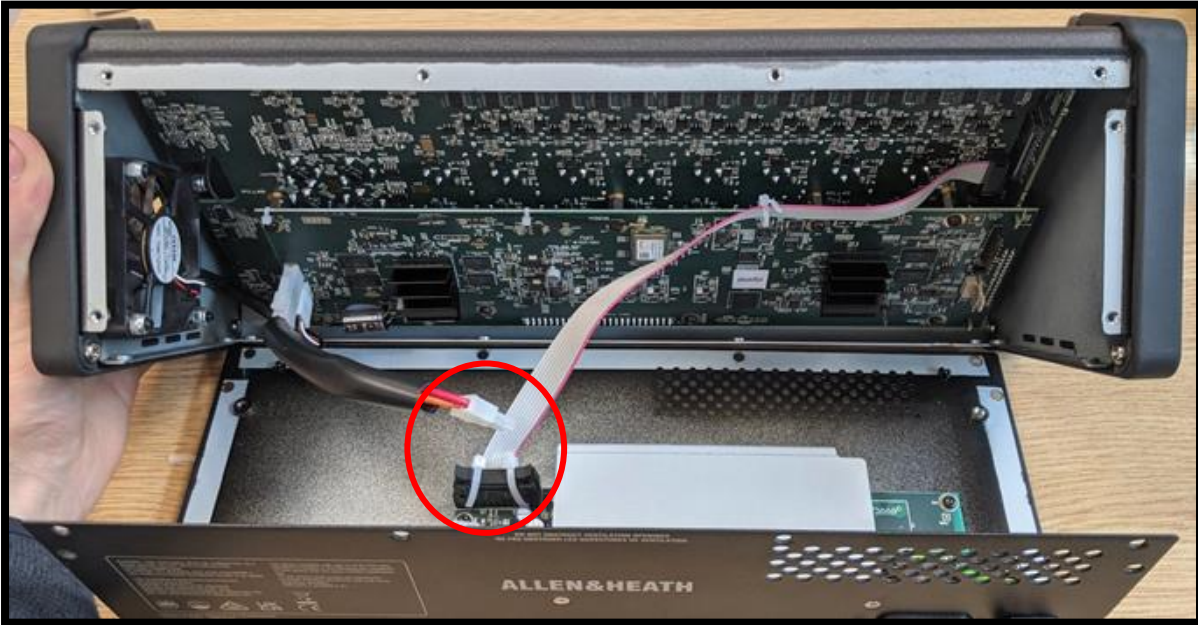




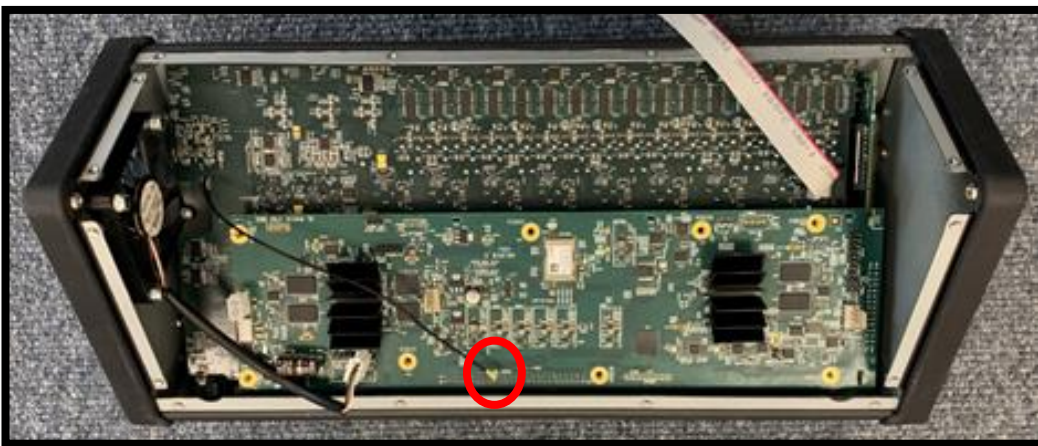
Disassembly Procedure



- Remove screws from base panel



- Disconnect CPU power cable from PSU
- Disconnect Audio Board ribbon cable from the PSU

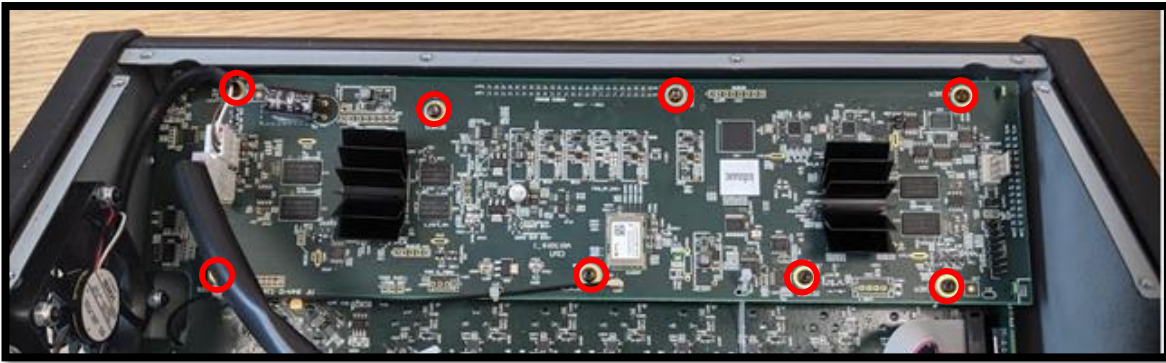


- Disconnect Fan from CPU
- Disconnect Wi-Fi Coax wire by gently pulling up the connector

Antenna connector is very delicate, remove and place back in carefully.



Removing CPU



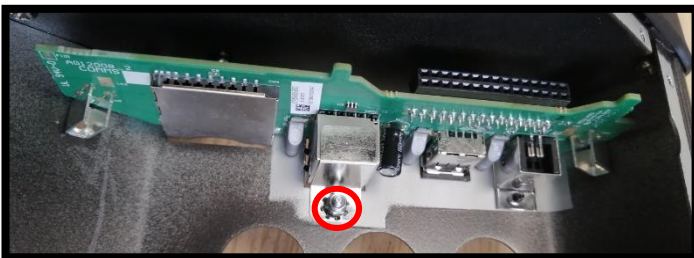
- Remove CPU board by gently pulling up from the back and left side of the board.

Removing Audio Connector Type 2 Board



- Remove Fan
- Remove all screws from XLR sockets and nuts from plug connectors at the front of the unit

Removing COMMs board



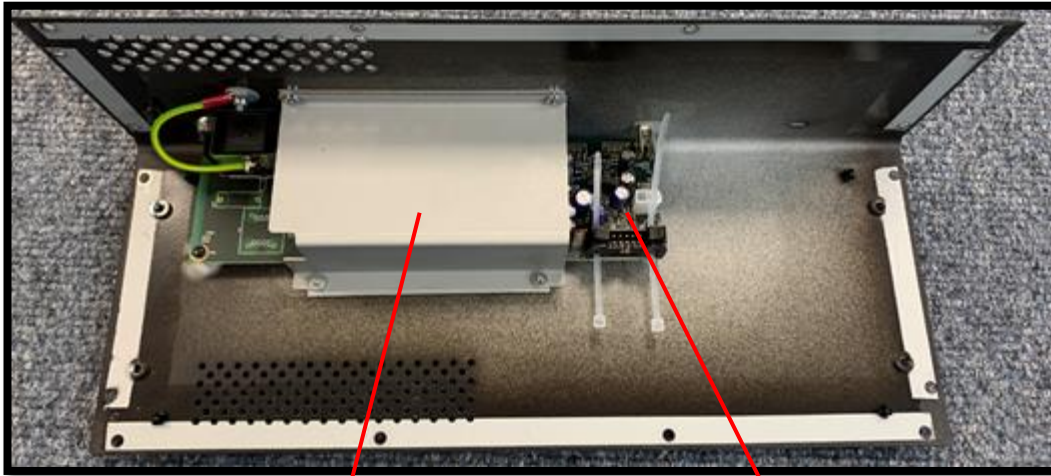
- Remove two black screws at the front of the unit and one nut inside the board

IMPORTANT: Make sure to place the wires in the same original position. The wrong placement could cause interference and noise.

If cable ties were removed during service, please replace.



Removing PSU



Part: AA13204 INSUL.POLYFILM
is safety critical, please ensure
this is properly fitted

- Remove shield
- Remove front screw
- Remove ground cable nut



Removing Antenna

Remove Nut and Washer to replace Coax WiFi cable (AH12711)

When installing new cable, fit and secure Nut and Washer **TORQUE SETTING: 1.0Nm +/- 0.10Nm**



To replace aerial antenna (AL12258), cover the metalwork to prevent from damaging and carefully untighten by using only your fingers or pliers.

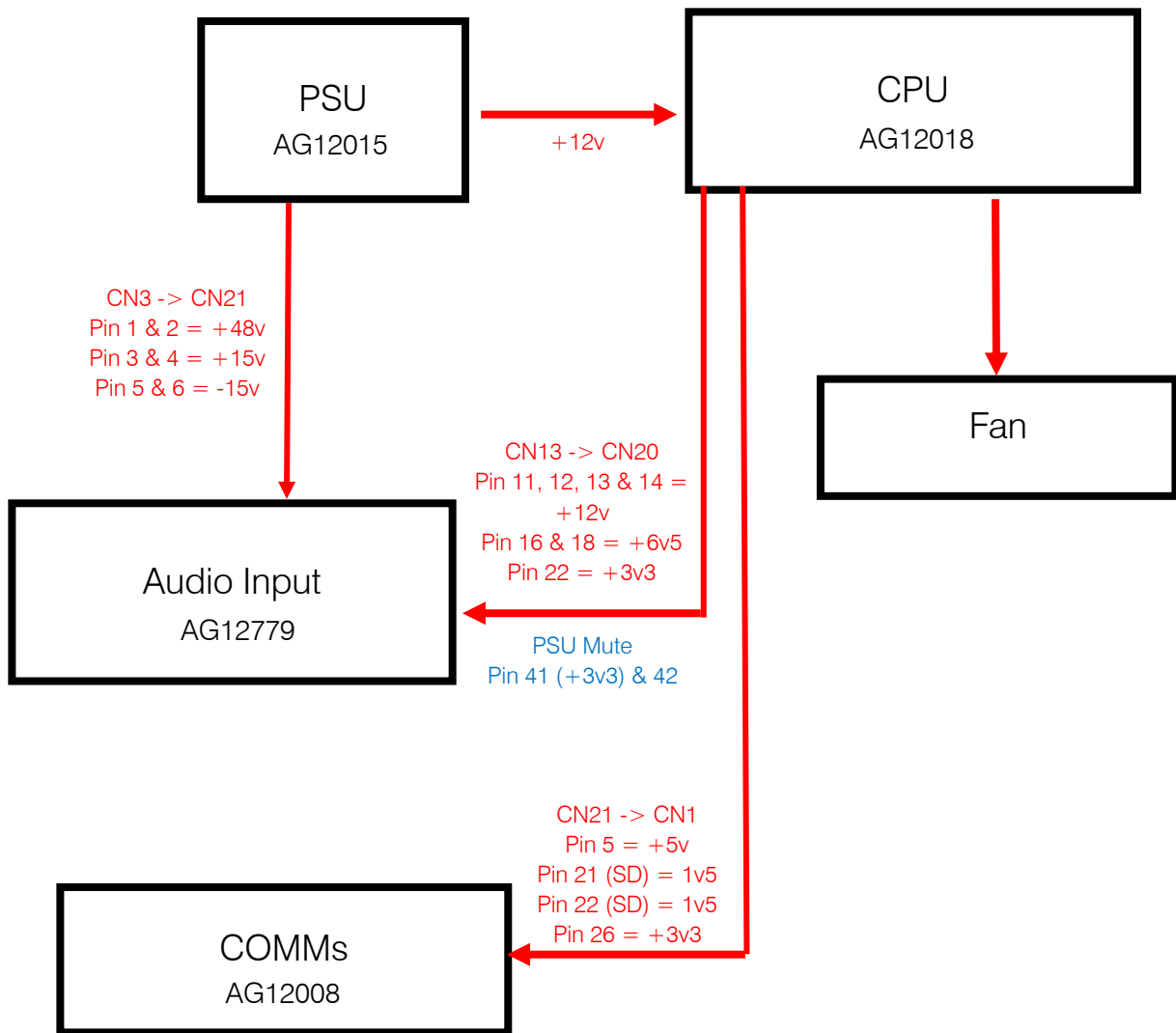
Please note:

We do not advise nor recommend the use of pliers when tightening back the aerial, as this can cause serious damage and malfunction. Proceed to do this operation by tightening the aerial only with your fingers.








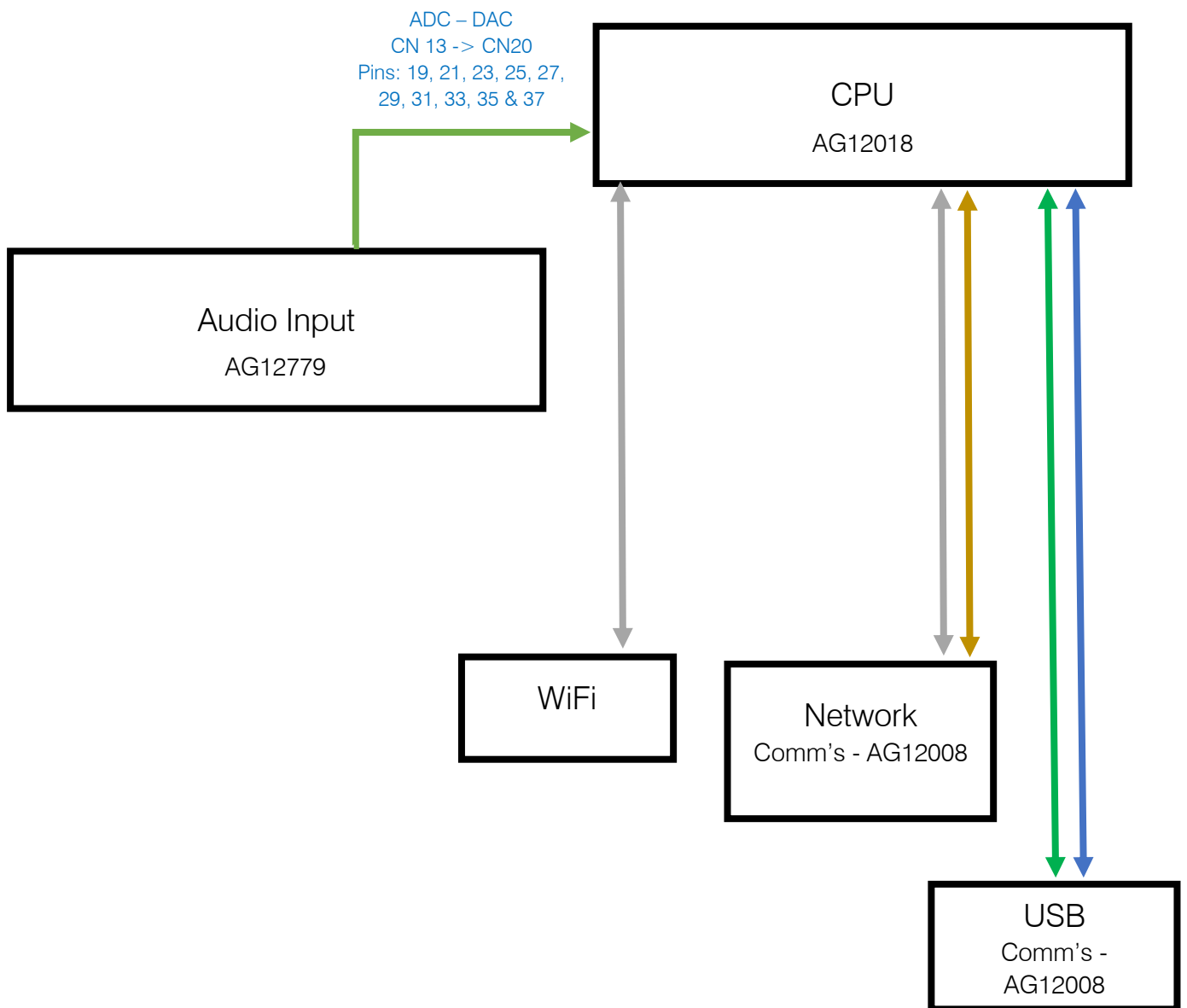
Power Distribution





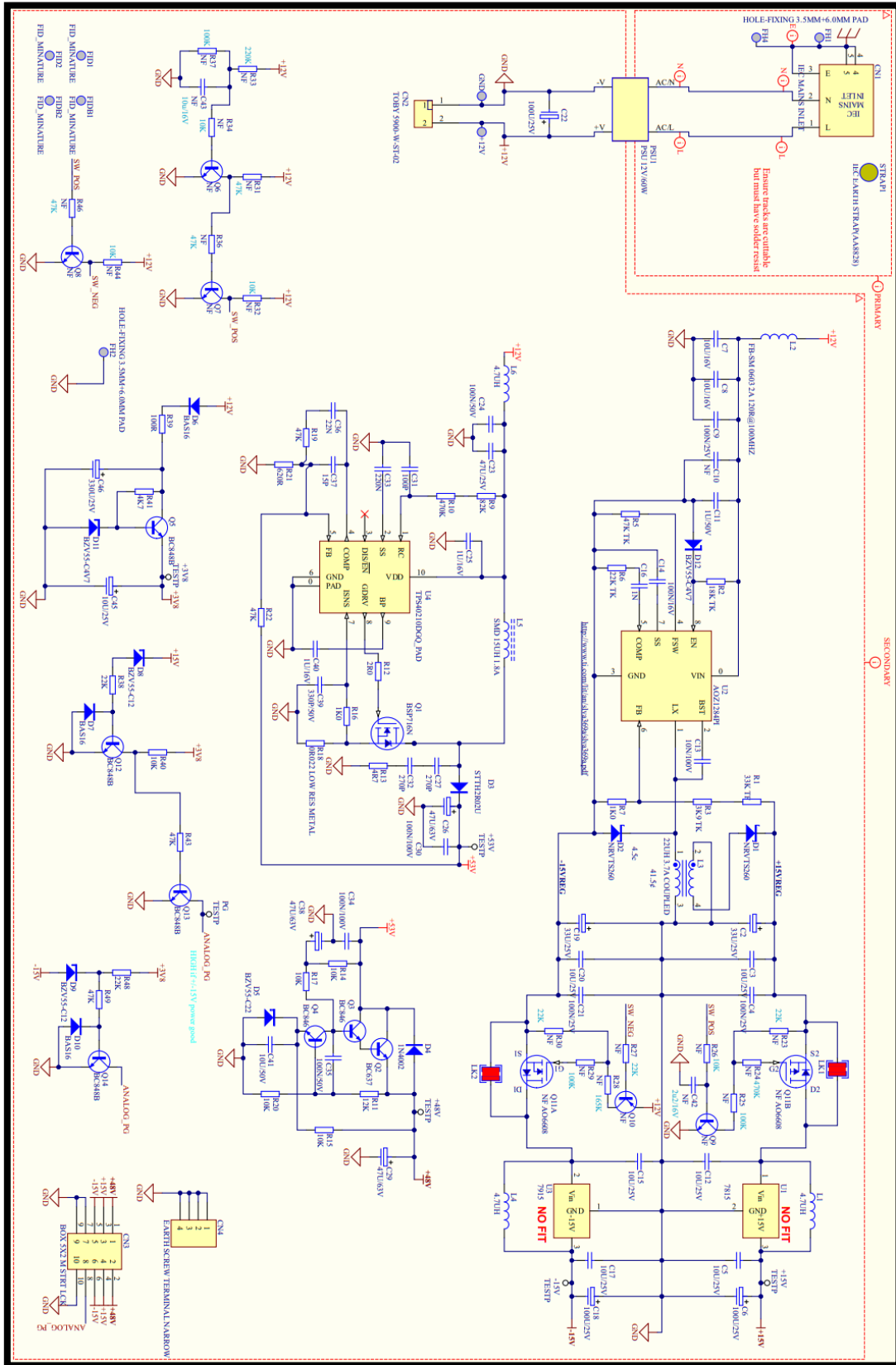
Routing Overview

-  = Audio
-  = Control
-  = USB
-  = Ethernet





PSU Circuit Diagram





Other Technical Information

Block Diagram

Specifications

Weights & Dimensions

All this information is available to end users and can be found at the following location:

[CQ-20B - Allen & Heath \(allen-heath.com\)](http://allen-heath.com)

For further information please contact Allen&Heath Product Support

[Product Support - Allen & Heath \(allen-heath.com\)](http://allen-heath.com)