RM244V and CS4

4 Output 100V Mixer-Amp and Call Station

Item ref: 953.244UK, 953.146UK

User Manual

Version 2.1

⚠ Caution: Please read this manual carefully before operating
Damage caused by misuse is not covered by the warranty

SAFETY SYMBOL AND MESSAGE CONVENTIONS

CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	AVIS RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR

This symbol indicates that dangerous voltage constituting a risk of electric shock is present within this unit

This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this unit.

SAFETY NOTICE

1. Prior to use, read through this manual
2. Keep the manual in good condition
3. Pay attention to safety warnings
4. Observe all operating requirements
5. Do not use the device near water or wet areas
6. For cleaning, only use a lint-free, dry cloth
7. Install according to the specifications
8. Place away from heat sources or heating appliances
9. Use mains lead provided and avoid damage to cable or connectors
10. Unplug power from mains during stormy weather or if unused for long periods
11. In case of malfunction, water ingress or other damage, consult qualified service personnel
12. Do not place in damp areas or near liquids or moisture. Do not spill liquids on the housing
13. Please pay attention to warning symbols during transit and placement
14. Terminals marked with the ⚡ symbol are HAZARDOUS LIVE and should only be connected by qualified personnel
15. Ensure that the apparatus is connected to a mains socket with a protective EARTH connection
16. Ensure correct operation of the mains switch

Introduction

Thank you for choosing the Adastra RM244V rackmount 100V amplifier as part of your public address system. This is a 4 output mixer-amp with built-in media player + Bluetooth® and individual level and mute control for each output. Up to 2 CS4 call stations can be used with the RM244V to create a flexible 4-zone paging system. Please read this manual fully and follow the instructions to achieve the best results with your new purchase and to avoid damage through misuse.

Warning

To prevent the risk of fire or electric shock, do not expose any components to rain or moisture. If liquids are spilled on the casing, stop using immediately, allow unit to dry out and have checked by qualified personnel before further use. Avoid impact, extreme pressure or heavy vibration to the case No user serviceable parts inside – Do not open the case – refer all servicing to qualified service personnel.

Safety

- Check for correct mains voltage and condition of IEC lead before connecting to power outlet
- Use double insulated speaker wire with adequate current rating for 100V speaker connections
- Do not exceed the rated 100V output of the amplifier
- Do not allow any foreign objects to enter the case or through the ventilation grilles

Placement

- Keep out of direct sunlight and away from heat sources
- Keep away from damp or dusty environments
- For rack-mounting, ensure adequate support for the weight of the amplifier
- Ensure adequate air-flow and do not cover cooling vents on the amplifier housing
- Ensure adequate access to controls and connections

Cleaning

- Use a soft cloth with a neutral detergent to clean the casing as required
- Use a vacuum cleaner to clear ventilation grilles of any dust or debris build-ups
- Do not use strong solvents for cleaning the unit

Front panel
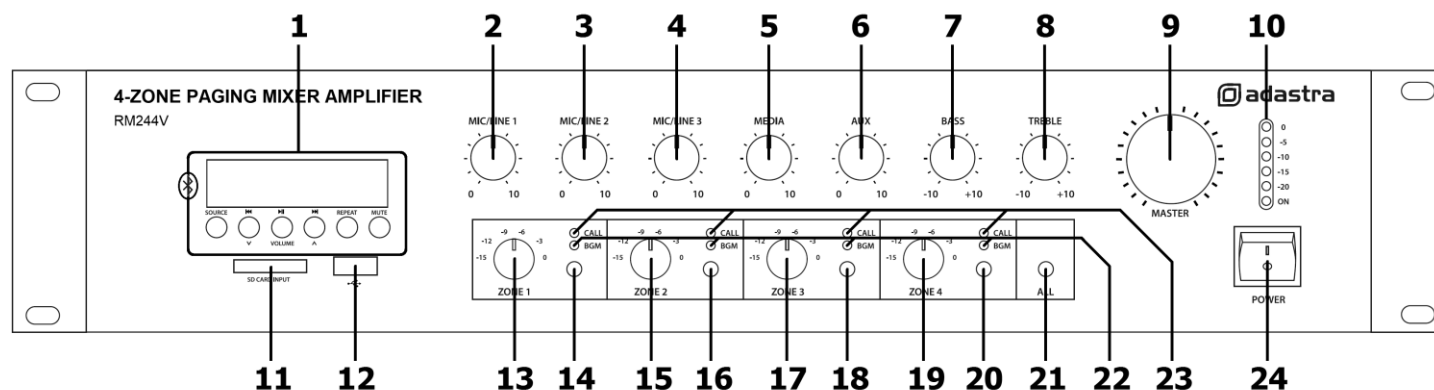
1. Media player section USB/SD/FM/BT
2. MIC/LINE 1 volume control
3. MIC/LINE 2 volume control
4. MIC/LINE 3 volume control
5. MEDIA player volume control
6. AUX line in volume control
7. BASS EQ control
8. TREBLE EQ control
9. MASTER volume control
10. VU meter LEDs
11. SD card slot
12. USB media port
13. ZONE 1 volume attenuator
14. ZONE 1 call select
15. ZONE 2 volume attenuator
16. ZONE 2 call select
17. ZONE 3 volume attenuator
18. ZONE 3 call select
19. ZONE 4 volume attenuator
20. ZONE 4 call select
21. ALL outputs page select
22. BGM background music (media) indicator
23. CALL paging indicator
24. POWER switch

Rear panel
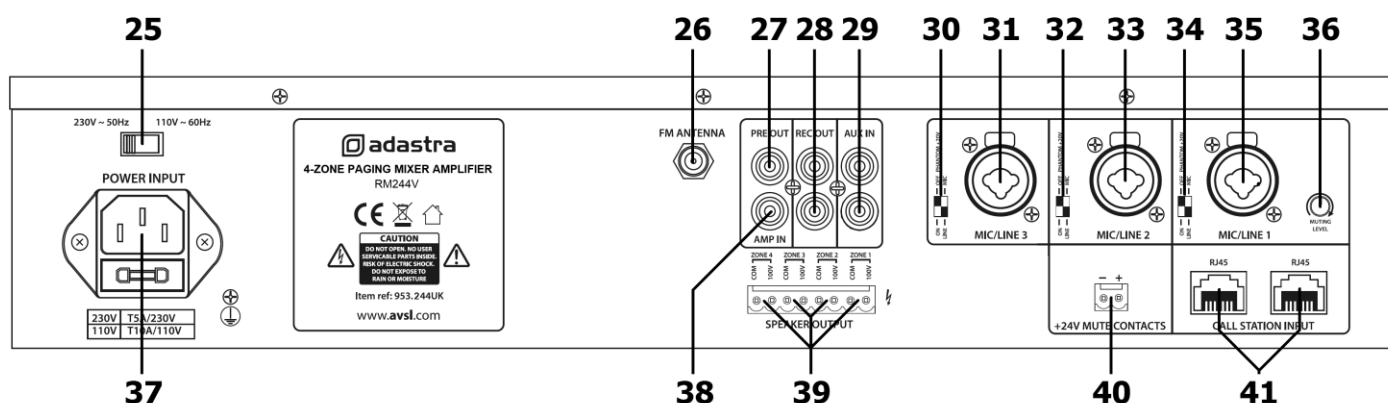
25. Voltage select
26. FM ANTENNA 'F' connector
27. PRE OUT (loop send) RCA
28. REC OUT recording output 2 x RCA
29. AUX IN line input 2 x RCA
30. Channel 3 MIC/LINE + PHANTOM switches
31. Channel 3 input XLR/jack
32. Channel 2 MIC/LINE + PHANTOM switches
33. Channel 2 input XLR/jack
34. Channel 1 MIC/LINE + PHANTOM switches
35. Channel 1 input XLR/jack
36. Channel 1 priority MUTING LEVEL
37. Mains power inlet IEC and fuse holder
38. AMP IN (loop return) RCA
39. SPEAKER OUTPUT modular screw terminals
40. 24V MUTE modular screw terminals
41. CS4 CALL STATION connectors 2 x RJ45

Connection and setup

Connect the rear IEC inlet (37) to the mains supply using the IEC power lead provided (or an equivalent approved type). Ensure that the voltage is correct as indicated on the voltage selector (25) and that the mains outlet is switched on.

The RM244V has 3 mic/line inputs which can accept XLR or 6.3mm balanced/unbalanced connection. There is also an Aux line input via 2 x RCA on the rear panel and up to two CS4 call stations may be connected via RJ45 on the rear panel.

DIP switches

Mic/Line inputs each have 2 DIP switches (30, 32, 34) which should be set for the input type.

The left DIP switch selects whether +20V phantom power is supplied to the XLR input for condenser microphones or paging microphones with built-in chimes. This should be switched to the down position if phantom power is required.

The right DIP switch selects the input level for XLR or 6.3mm jack. This should be switch to the up position for microphones or the down position for line level inputs to match the input level correctly and avoid overloading the channel.

Be sure to make these DIP switch settings when the amplifier is switched off and prior to connecting inputs to the RM244V. Making any changes when the amplifier is powered up may cause loud bangs through the system which can damage the speakers.

Mic/Line 1 input also has a priority function, which can reduce the output of the other channels (Mic/Line 2 & 3, Aux and Media) when MIC 1 signal is detected and returns them to normal when MIC 1 signal is silent.

The amount by which this "override" mutes the other channels is set by adjusting the MUTING LEVEL control (36). Turning this control clockwise increases the muting effect on the other channels and turning anti-clockwise reduces the muting effect.

The priority function for Mic/Line 1 does not affect any CS4 call stations connected to the RM244V.

With the power switched off, connect microphones or mono line inputs to Mic/Line inputs 1, 2 and 3 using good quality XLR or 6.3mm jack leads.

Connect any other line level audio inputs to the AUX IN (29) connectors on the rear panel using a good quality RCA lead. Since the amplifier has a mono output, stereo signals will be summed together.

Further mixer-amplifiers, slave amplifiers or recording devices can be connected to the rear REC OUT (recording output) sockets, again using a good quality RCA lead. This output carries the full mix of all channels (including the internal media player) but is not affected by the MASTER volume control.

The RM244V also has RCA connectors for PRE OUT and AMP IN, which can be used as Send and Return in a series loop for connecting audio processors or as Mix output and Slave input separately.

Speaker outputs

The RM244V has 4 separate outputs for connecting 100V line speakers. These are arranged on a single modular connector for convenience. Each output has 2 screw terminal connections.

For each zone output, connect the "100V" output terminal to the positive (+) connection of the speaker and "COM" output to the negative (-) connection of the speaker. Connect further speakers in parallel to the first speaker with all positive terminals and connected together and all negative terminals connected together as shown below.
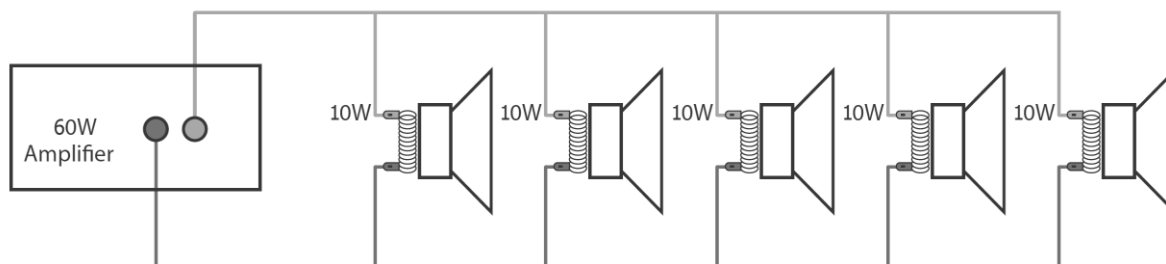
Repeat this process for all 4 zone outputs as required. Usually, each zone represents a specific room or area and connecting these separately will allow individual control and paging for each zone.

A 100V line speaker system can comprise of many speakers connected together. The determining factor for how many speakers can be used on a single amplifier is the power rating. For most purposes, it is advised to connect as many speakers as needed with a combined wattage of no more than 90% of the amplifier's output power rating.

In the case of the RM244V, the maximum power output is 240W, shared across all 4 zones. This means that a recommended maximum 216W combination of speakers can be connected to a single zone or shared across all 4 zones (so long as the total does not exceed 216W)

Emergency 24V contacts

For fire alarm panels with 24V trigger out, connect to the trigger to the 24V contacts on the RM244V. When the fire alarm is activated, 24V trigger on these terminals will mute all except CS4 call stations. (The 24V contacts can be connected with either polarity +/- or -/+ to operate)

Connecting a CS4 call station

The CS4 call station is a bespoke optional addition to the RM244V system and up to 2 of these can be connected to a single amplifier by RJ45 with CAT5 network cable. This is not a standard LAN connection and should only be connected directly to the RM244V.

The CS4 call station comprises a base unit and paging microphone. Connect the microphone to the XLR input on top of the base unit.

Connect the RJ45 connector on the rear panel of the CS4 to one of the RJ45 inputs on the rear of the RM244V. The CAT5 cable carries power to the CS4 and control and audio signals to the RM244V.

If the CAT5 cable run is further than 100m, it will be necessary to connect 24Vdc power to the DC jack of the CS4 for operation up to 1000m cable length.

Operation

When all connections to the RM244V are made, turn all rotary controls down and switch on the power (24) and a power "ON" LED will illuminate. Turn BASS and TREBLE EQ controls (7, 8) to the 12 o'clock position (pointing straight up) and turn the MASTER control (9) up part way for testing. Press the ALL button (21) to engage all speaker outputs (the green BGM LEDs should be lit)

Ensure a signal is being fed to one of the Mic/Line 1, 2, 3 inputs or Aux and gradually increase the volume control for that channel until the output is heard through the speakers. Turn up the MASTER to the maximum required volume level and reduce the channel volume control if necessary. Repeat this process for any other microphones or line inputs connected to the RM244V.

Note: If a line input is not connected to the RM244V, the initial test can be made using the built-in media player from USB/SD, FM tuner or Bluetooth. See section below for instructions.

The output of the amplifier is represented on the VU meter LEDs (10) and care should be taken that the Red "0" LED is only lit momentarily during use. Anything longer than a short flash of this LED may be indicating distortion or clipping of the output signal and the MASTER should be turned down.

If a microphone is connected to MIC 1 input, make sure it is switched on and if it requires phantom power, make sure this feature is enabled. Gradually increase the MIC 1 control (2) whilst speaking into the microphone until the required volume level is reached. The microphone should not be able to "hear" the speakers, which can cause feedback (squealing or howling noise).
Repeat this process for microphones connected via the MIC/LINE 2 and MIC/LINE 3 inputs.

In addition to channel and MASTER volume controls, there are BASS and TREBLE EQ controls to adjust the tone of the overall output. At the 12 o'clock position, these controls are applying no effect to the signal (no boost or cut).

Moving the BASS control clockwise boosts the low frequencies in the audio, whilst moving it anticlockwise will cut these low frequencies.
Likewise, moving the TREBLE control clockwise boosts the high frequencies in the audio, whilst moving it anticlockwise will cut these high frequencies.

Adjust these EQ controls to suit the type of audio signal or compensate for the room acoustics.

Zone Outputs

The RM244V has 100V speaker output connections for 4 separate zones, which are governed by 4 rotary switches on the front panel (13, 15, 17, 19). Although the RM244V has a single amplifier, its output is shared across 4 volume attenuators, which are adjusted by these rotary switches, giving an independent level control for each zone (the sound source for all 4 zones will always be the same).

Furthermore, each zone output is controlled by a select button (14, 16, 18, 20), which selects a zone to BGM (background music) or CALL (mute unless paged from CS4) with LED indicators to show its status. If no CS4 call stations are connected, these act as mute buttons for each zone.
The ALL button (21) operates as a select button for all zones simultaneously.

Turn down the volume controls when powering down the RM244V to avoid damage to the speakers.

Media player

The RM244V is fitted with a built-in media player, which allows playback of music or audio messages stored as standard compressed audio files on either USB pen drive or SD card.
The media player also has an FM radio tuner function and Bluetooth receiver as described below.
The output level of the media player is controlled by the MEDIA control (5) on the front panel.

Controls

SOURCE   USB / SD / FM tuner / Bluetooth input source selector

⏮   Previous track or FM channel / volume down

▶ ‖   Play or pause current track / auto tune FM stations

⏭   Next track or FM channel / volume up

REPEAT   Repeat mode – off, single track or all

MUTE   Mute media player output

USB/SD

Push a USB pen drive into the USB port (12) and/or SD card into the SD card input (11) and the audio files will start to play automatically. Turn up the MEDIA control gradually to hear the output from the speakers and increase to the required level.

If play does not start automatically, press the SOURCE button and Play/Pause button (▶ ‖) to check if the player is set to play from the required memory device. If playback still does not start, try pressing the Previous track and Next track buttons (⏮, ⏭). Otherwise, check that the audio files are standard compressed type.

Normal playback will read through all tracks on the storage device. Pressing the REPEAT button (7) will step through the repeat modes.

RT1   = repeat current track

RND   = random play

RTA   = repeat all tracks

Pressing the Previous track button (⏮) briefly steps backwards through tracks on the memory device. Press and hold this button to decrease the playback volume.

Pressing the Next track button (⏭) briefly steps forwards through tracks on the memory device. Press and hold this button to increase the playback volume.

To pause the current track, press the Play/Pause button (▶ ‖) and press again to resume playback.

The LCD display will show the track number when a track is selected and then the elapsed time when it is playing.

FM Tuner

The FM tuner function operates in the same way as a standard FM radio and benefits from the connection of an FM antenna to the rear panel 'F' type connector (26).

If no channels are tuned in, press the Play/Pause button (▶ ‖) to begin auto tuning, which scans available stations and stores them as channels within the FM tuner.

Pressing Play/Pause again will abort the auto-tuning.

To step through pre-set stations, press the Previous or Next (◄◄, ►►) buttons.

Holding the Previous track or Next track buttons will adjust the output volume of the player.

Bluetooth

The Bluetooth function allows connection of a smart phone or tablet to the media player section for playback of stored files or streamed digital audio.
In order to enable this function, it will be necessary to pair the sending device to the receiver as follows.

1. Open the Bluetooth settings menu on the smart phone or tablet (or other sending device)
2. Scan for Bluetooth devices and look for "adastra 0000" in the list of available devices (ensure that the RM amp is powered on and within reception range)
3. Select "adastra 0000" and the sending device should confirm that it is connected as an audio device. (note that "0000" may be a different number if it has been edited – see below)
4. Play audio from the sending device, ensuring that volume controls are not turned down/muted
5. Turn up the LN5/USB volume control on the amplifier to the required level.

The Previous, Next and Play/pause buttons will operate in Bluetooth as remote playback controls.
Holding the Previous track or Next track buttons (2, 5) will adjust the output volume of the player.

The Bluetooth name can be customized to enable identification of individual nearby amplifiers.
To customize the Bluetooth number press and hold the Play/Pause button until adastra 0000 is displayed with one of the characters flashing.

Press Previous or Next buttons to edit the number and Play/Pause to select another character.
Hold Play/Pause to store the ID and exit.

Note: Android devices have the facility to re-name devices within the Bluetooth settings menu.
If a the Bluetooth ID has been re-named on the Android device, editing the Bluetooth ID on the media player will not affect the name displayed on that Android device.

Track navigation can be controlled from the paired device or from the front panel of the RM244V.

Previous, Next and Play/pause buttons (◄◄, ►►, ▶ ‖) will operate in Bluetooth as remote playback controls.

Holding down the Previous or Next buttons will also adjust the volume of the player.

CS4 Call Station
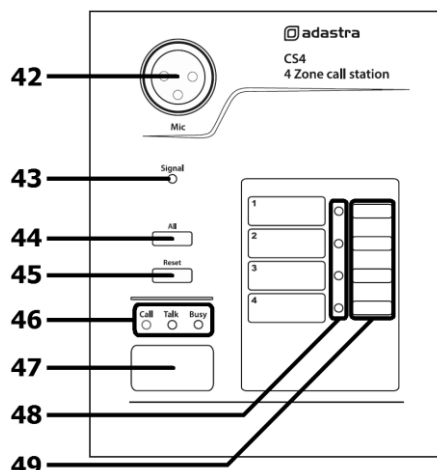
42. XLR paging microphone connection
43. Call station signal indicator
44. Select ALL zones for paging
45. Reset zones to BGM (background music)
46. Call status indicators
47. Page button
48. Zone selection indicators
49. Zone select buttons
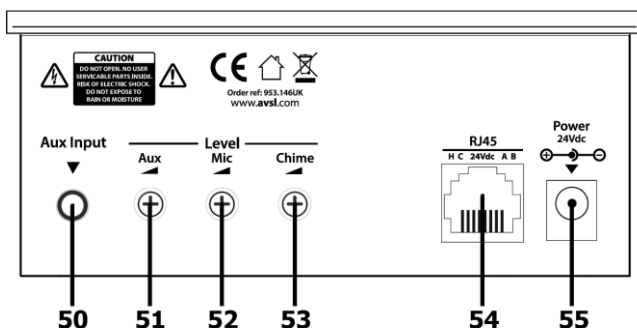
50. Aux line input 3.5mm stereo jack
51. Aux level control
52. Paging mic level control
53. Chime level control
54. RJ45 connector (to RM244V)
55. 24Vdc power input (>100m cable run)

CS4 Operation

Select which zones are to be paged using the Zone Select buttons (49) or All Zones button (44)
Zone Select indicators (48) will light for the zones that are "armed".
Pressing the Reset button (45) removes all zone selections.

When one or more zones are armed, pressing the Page button (47) will mute the media player (background music) to all zones and activate the chime (if a chime setting is selected – see below) The CS4 microphone will be activated and any speech/audio will cause the Signal LED (43) to light. Announcements into the CS4 microphone will be heard in the selected zones only.

Pressing the Page button again will deactivate the microphone and all zones will be reset back to BGM after a few seconds.

Chime function

Chime		
Mode	Trigger ON	Trigger OFF
000	NC	NC
100	Ascending 4 (slow)	Descending 4 (slow)
010	Ascending 4	Descending 4
110	Ascending 4	NC
001	Ascending 4 (slow)	NC
101	Dong	NC
011	Dingdong	NC
111	Ascending 3	NC

The CS4 has a programmable chime function, which is set by DIP switches on the side of the base unit. The chart printed next to the DIP switches shows the chime setting variations.

The Chime level and Microphone level are adjusted via miniature rotary controls (52,53) on the rear of the CS4 base unit. Next to these is a level control (51) for a local Aux input, which allows connection of a stereo line input (e.g. smart phone or laptop) to a 3.5mm jack on the left side (50).

Specifications: CS4

Power supply	24Vdc, 500mA from RJ45 or optional adaptor
Max. connection length	100m (CAT5 cable) or 1km with optional 24Vdc adaptor
Capsule	Back electret condenser
Polar pattern	Cardioid
Controls	Aux/Mic/Chime levels, chime DIP switches, zone/page buttons
Connectors	RJ45 to amplifier, 24Vdc power jack, 3.5mm aux in
Frequency response: -3dB	150Hz - 22kHz
Input level	Mic: -46dBV, Aux: -10dBV
Input impedance	Mic: 600 Ohms, Aux: 50k Ohms
Output level	10dBV
Output impedance: balanced	600 Ohms
S/N ratio	-60dB (all channels selected)
Interface	RS-485 control
Zone assign	4 zones or all selectable
Dimensions	460 x 140 x 115mm
Weight	670g

Specifications: RM244V

Power supply	110/230Vac, 50/60Hz (IEC)
Output power rms	240W (shared across 4 zones @ 100V)
Inputs	3 x mic/line (jack/XLR), 1 x aux (RCA)
Input sensitivity: mic	-47dBV
Input impedance: mic	5k Ohms
Input sensitivity: line	-10dBV
Input impedance: line	1k Ohms
Paging station inputs	2 x RJ45 (for optional RM-4B paging stations)
Line output (REC)	RCA
Sends: returns	Pre out, Amp in (RCA)
Channel controls	Ch1, Ch2, Ch3, Media and Aux volume
Output controls	Master volume, 4 x zone volumes & mutes
Equalizer: bass	100Hz ±10dB
Equalizer: treble	10kHz ±10dB
Phantom power	+20V (switchable inputs 1-3)
Audio source	USB/SD player, FM tuner and Bluetooth receiver
Bluetooth version	2.0
Fire alarm contacts	24V screw terminals
THD +N	<2% @ 1kHz (rated power)
Protection	Short circuit, overload, overheat
Speaker outputs	4 x 100V (modular terminal block)
Dimensions	430 x 315 x 89mm
Weight	10.4kg

Troubleshooting

No power LED on control panel	Ensure IEC lead is in good condition and connected properly
	Ensure POWER switch is on and check mains inlet fuse
Power LED is on but no other LEDs and no output	Check input signals and condition of input connection leads
	Check Master, Mic/Line, Aux or Media level controls are turned up
Power light and output LEDs lighting but no output	Check speaker output terminals are connected correctly
	Check speakers are working (test on another amp if available)
USB/SD player will not play audio from media	Press PLAY on transport controls
	Check memory device is connected properly (remove and re-insert)
	Check file types – standard compressed digital audio files required
	Check memory device works on a PC or Mac for standard playback
Bluetooth cannot connect	Ensure that Bluetooth is enabled on sending device
	Ensure that the sending device is within Bluetooth range (5-10m)
	Check that "adastra" is the connected device
	If there are more than one "adastra" devices, check each in turn
	If one of many "adastra" devices, rename it on the sending device
No audio from Bluetooth device	Ensure that volume controls are not turned down on sending device
	Check volume and Play/Pause buttons in case Bluetooth is muted
Output is very loud or distorted	Check level of input signal is not too high
	Reduce Mic/Line, Aux, Media and/or Master level
	Check Mic/Line DIP switch setting is not set to Mic for a line input
Output is working but at very low level	Check input audio source level is not too low
	Increase MIC, LINE IN, USB/SD and/or Master level
	Check output level setting on Bluetooth connected device
	Check for quiet recording of media files on USB
	Check Mic/Line DIP switch setting is not set to Line for a mic input
	Check Mic/Line 1 muting level is not suppressing audio playback
No output from CS4 call station	Ensure paging mic is connected correctly and mic level is turned up
	For Aux input, check that input is playing and Aux level is turned up
	If cable run is longer than 100m, connect a 24Vdc power supply
	Check that required zones are selected and level is not turned down
	Check that priority of another CS4 is not set to override
No microphone output	Check 20V phantom power is enabled if using a condenser microphone
	For CS4 microphone, if cable run is >100m, add a 24Vdc power supply
Feedback from microphone	Face microphone away from speakers and monitors
	Turn down Mic/Line and/or Master level
Amplifier overheating	Ensure cooling vents are clear from debris and dust
	Check that 4Ω or 8Ω speakers are not connected to 100V terminals
	Ensure total 100V speaker wattage is lower than amplifier rating

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