

keene KLAB20D electronics Bluetooth

Overview

The Keene KLAB20DB is a compact, powerful stereo amplifier built onto a standard size UK double gang wall plate. It provides 20W (RMS per channel) of amplification eliminating the need to make space for a conventional amplifier. It draws it's own power from an externally located mains adaptor and can be controlled by push buttons integrated into the front panel membrane and also by infra red remote. It can be switched between four audio sources; an integrated FM radio, rear line inputs, bluetooth and a front panel 3.5mm jack input. The amplifier uses class D digital circuitry for maximum efficiency and generates very little heat. The amplifier only requires 25mm depth and so may be either flush or surface mounted.



Installation & Connection

Installation should only be carried out by a qualified installer or electrician, as a certain amount of electrical knowledge is assumed.

Mounting

The 25mm depth will allow installation into standard UK 2-gang boxes, which may be galvanised metal for installation in solid walls, or plastic drylining (with lugs) or surface mount box or trunking system.

IMPORTANT - Please Read!!!

The front panel membrane has two tabs that can be flexed outward to allow access to the panel fixing screws. Once fastened in position and tested the backing paper can be peeled off and the tabs fixed down flush to conceal the screws. **ONLY** perform this operation once the installation has been tested and found to be satisfactory. Once stuck down these tabs cannot be removed without damage to the front panel.

Replacement front panels are available, (part number KLAB20DBFP)



Wiring

In order to make a reliable and safe connection without short circuits it is recommended that the speaker cables and line input signal cables are prepared and tinned prior to connection, with no more than ¼" or about 7mm of tinned wire extending out of the insulation.

Power

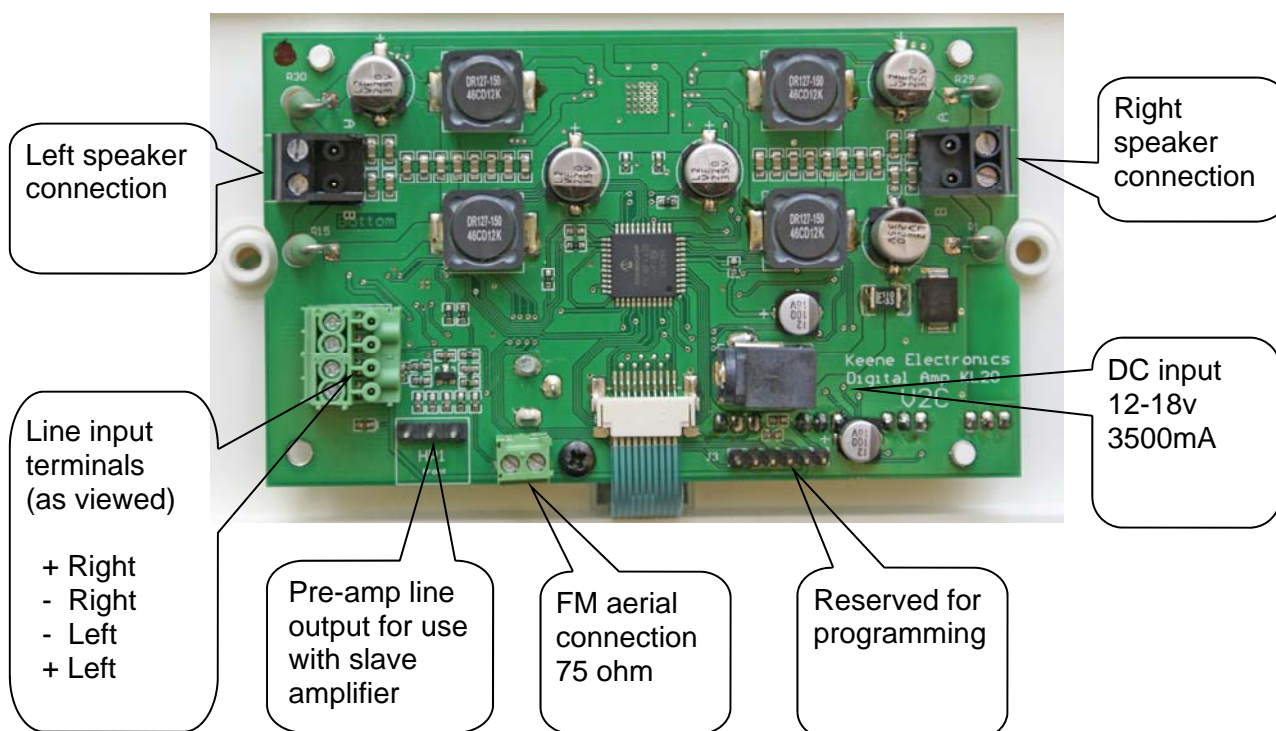
The amplifier requires a power supply of 12v to 18v DC centre positive and a minimum current of 3500mA. If you are not using the recommended psu please verify that the supply is correct BEFORE connection. If using the recommended supply we suggest that it is connected in accordance with current wiring regulations. The amplifier can also be powered from a 12v car battery but NOT directly from a car battery charger as this would damage the circuitry. Do not install near any heat sources such as radiators, stoves, or other apparatus that produce heat. **The mains connection should be via a fused and switched mains outlet such as order code SWL1.**

Environment

The KLAB20DB is not IP rated for use in a damp environments but if due care is given to positioning of the amplifier and supply then it can be used in zone 3 installations. Please use a qualified electrician operating to current regulations if you intend to use this unit in a bathroom.

Installation continued..

Connections for Power, Line Input and Loudspeaker Outputs are located on the rear PCB.



Note that the loudspeaker and line input screw terminal blocks can be pulled upwards and detached from the PCB to make connection and installation easier.

Loudspeakers

Connect the loudspeakers being careful to keep both left and right phase connections the same. For example if you've connected the left speaker positive to "A" and negative to "B" make sure that the right speaker positive also goes to "A" and negative to "B". Please note that the amplifier is fully bridged so there is NOT a common ground or return connection. The recommended minimum speaker impedance is 4 ohms on each channel. If driving 2 speakers or more on each channel use them in series if they are both 4 ohms or in parallel if they are both 8 ohms. Note the speaker corresponding to the left input is actually on the right hand terminals in the amp as viewed from the front.

Line input

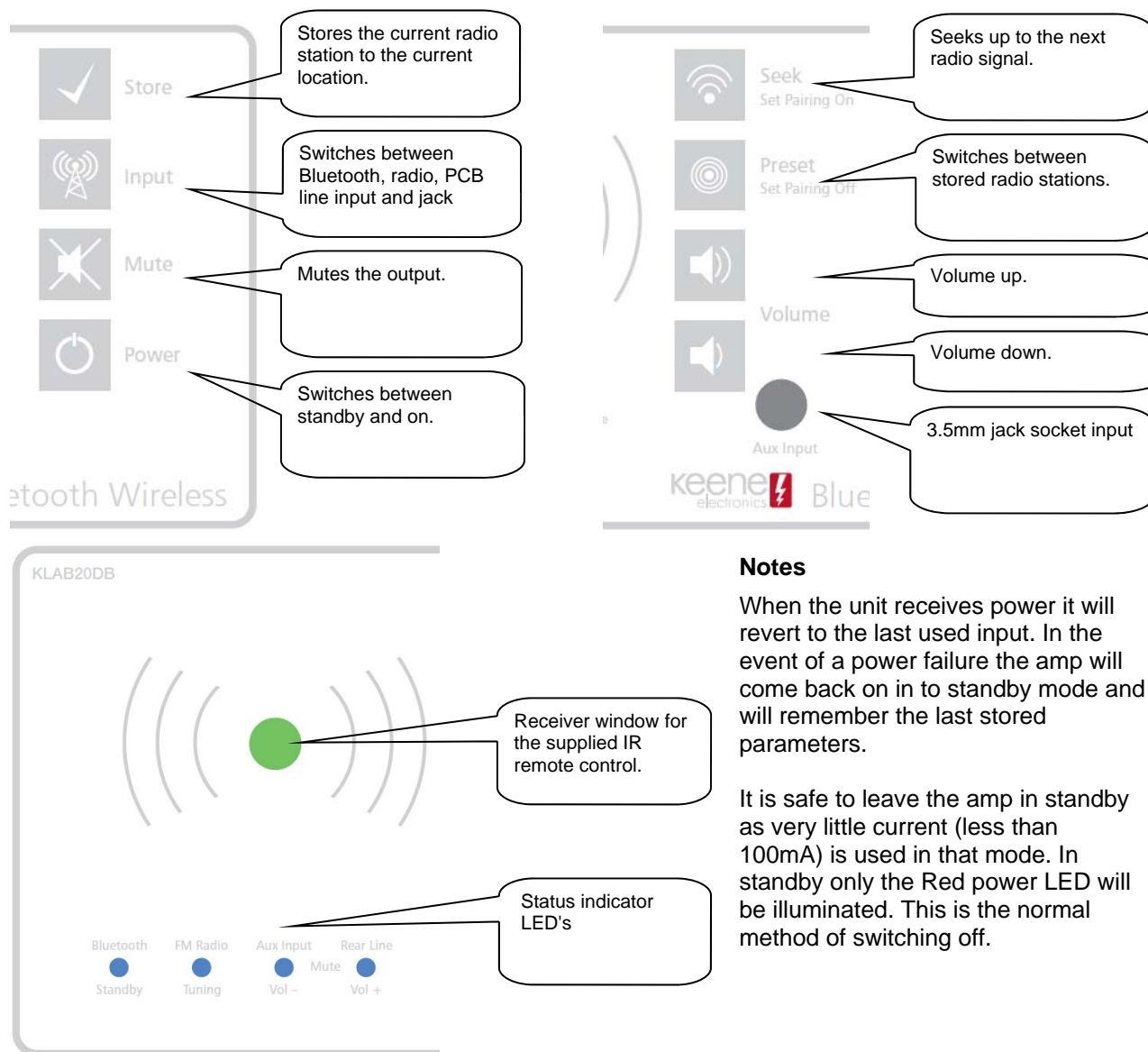
Connect the input signal cables using tinned screened cable. Connect the screens to the 2 centre connections and the 2 signal wires (centre cores) to the top and bottom connectors. Note all the connectors are of the superior rising clamp style so that they make a sound connection without biting through the copper of the cable.

Aerial

The FM radio requires a 75ohm aerial for operation. The bare wire ends of the supplied aerial cable should be connected to the terminals on the PCB and the other end arranged in a "T" shape as best as possible within wall or ceiling. If the cable needs to be extended then use similar sized 75ohm impedance cable. If you wish to connect to an external FM loop aerial then use coaxial aerial cable such as KBL 7. Polarity of the supplied aerial is not important, although if using coaxial cable then connect the screen (ground) to the right hand terminal closest to the PCB screw.

Double check all connections and, if all is well then fasten the panel into the mounting box. Switch on the power source and observe the LED's. If all is well the blue "Bluetooth" LED should be flashing slowly. Press the "power" button on the front panel once (or press power on the remote control) and the blue LED should change to red to indicate the unit is in standby. Power on again and cycle through the inputs. If there are no unexpected sounds then it's probably all connected correctly and it should be safe to proceed to the operation instructions. Do not fasten down the tabs until you are certain that everything is working as it should!

Operation. Front panel overview



Notes

When the unit receives power it will revert to the last used input. In the event of a power failure the amp will come back on in to standby mode and will remember the last stored parameters.

It is safe to leave the amp in standby as very little current (less than 100mA) is used in that mode. In standby only the Red power LED will be illuminated. This is the normal method of switching off.

Bluetooth mode

In Bluetooth mode a slow flashing blue LED indicates that no Bluetooth device is connected. F5 will turn pairing on and the blue LED will flash more quickly. F6 will turn pairing off (and the blue light will flash slow again). If a Bluetooth device is currently connected pressing F5 will also disconnect from that device.

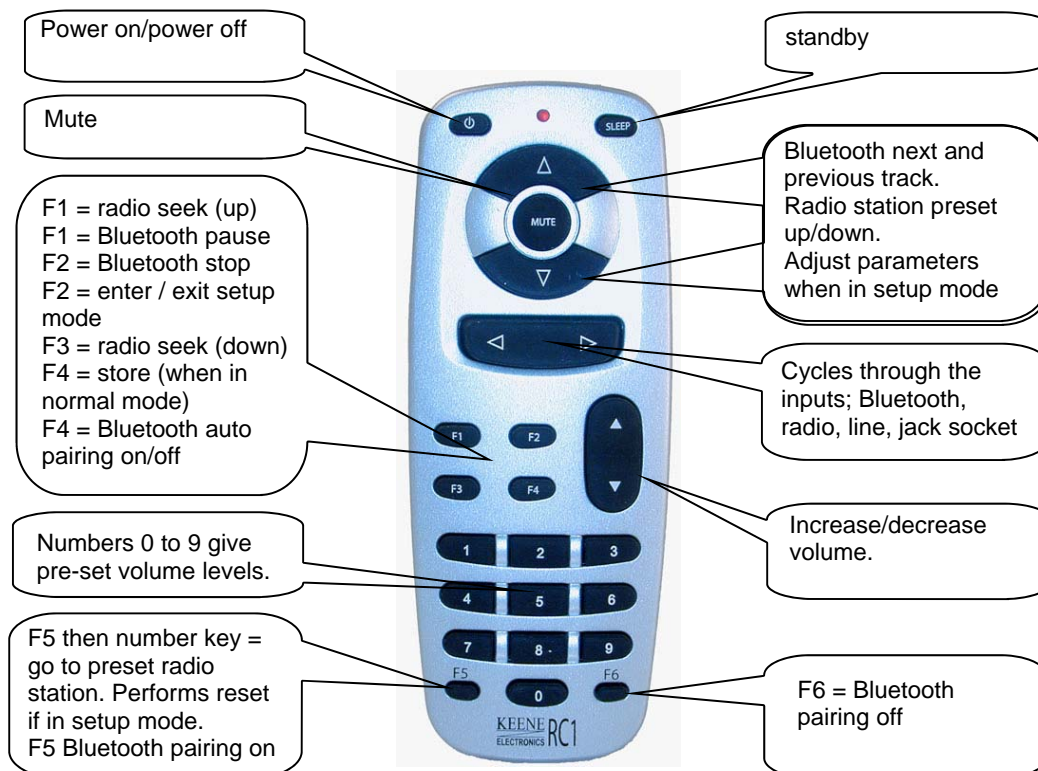
Pressing F4 will turn Bluetooth auto connect (to previously paired devices) on and off. The Bluetooth LED will flash red once for auto pairing on and twice for auto pairing off. If your device request a pairing code please enter **1234**

When a device is connected: F1 sends a play/pause command to the device. F2 sends stop command to the device. The large up and down buttons (above/below mute) send next and previous track command to device.

The default Bluetooth ID is **KeeneBlue**. If you have more than on Bluetooth amplifier you may wish to change the ID to make each amplifier unique. This is achieved by performing a factory reset as detailed later in this document.

Volume

There are 256 steps to the volume control from a minimum volume of 0 to a maximum volume setting of 255. These are accessed by pressing the volume up and volume down buttons. The 10 number keys from zero (minimum) to 9 (maximum) provide quick way of selecting a range of preset volumes within this range. Please note that the volume control system used does not go to absolute zero volume, the mute button is provided for when you require the unit to produce no sound.



Adjustment procedure for bass, treble, balance and loudness:

To enter setup mode press F2 and hold for 3 seconds.

Bass, treble, balance & loudness can now be adjusted. F4 cycles through these parameters and the radio preset up/down (above/below mute) will adjust the levels. To exit setup procedures press F2 again. To store the current settings to memory so they will be saved when the KLAB20DB is switched off and on again exit setup mode by pressing F2 and then press F4. Note - setup mode will be exited automatically (without storing) if no key is pressed within four seconds.

When in setup mode the LED's will illuminate as follows:

Adjust Bass	→	Bluetooth Standby	FM Radio Tuning	Aux Input Vol -	Mute Vol +	Real Line Vol +
Adjust Treble	→	Bluetooth Standby	FM Radio Tuning	Aux Input Vol -	Mute Vol +	Real Line Vol +
Adjust Balance	→	Bluetooth Standby	FM Radio Tuning	Aux Input Vol -	Mute Vol +	Real Line Vol +
Adjust Loudness	→	Bluetooth Standby	FM Radio Tuning	Aux Input Vol -	Mute Vol +	Real Line Vol +

When making adjustments in setup mode:

The "mute" key will reset the parameter being adjusted

The "F1" key will reset all four parameters

The "F5" key followed by a number will perform a factory reset including erasing any stored radio stations. Please see details on the next page.

Tuning and storing radio stations

To store a radio station first choose a memory location, for example to store to location four, press F5 then four. This makes number four the current active memory location. Now press seek (F1 up or F3 down) until the tuner settles on the station you like. Now press and hold F4 until the FM radio LED flashes green and the current station will then be stored to location four. Repeat for each location (0 through 9) storing as desired.

Factory Reset - Bluetooth ID - FM Radio presets

The factory reset procedure will restore all settings to factory default including any changes that have been made to stored radio stations, balance, treble, bass and loudness. The reset will also affect the Bluetooth ID and the preset FM radio stations.

The Factory reset procedure is as follows:

- 1) Enter setup mode by pressing "F2" for three seconds until all the LED's illuminate.
- 2) Press F5
- 3) Within two seconds press a number between 0 and 9
- 4) All four LED's will flash to confirm and the unit will restart.

Dependant upon the number chosen the Bluetooth ID will change as follows:

0 = Keeneblue (factory default)

1 = KeeneOne

2 = KeeneTwo

3 = KeeneThree

4 = KeeneFour

5 = KeeneFive

6 = KeeneSix

7 = KeeneSeven

8 = KeeneEight

9 = KeeneNine

Important - when you scan for Bluetooth devices the ID is usually stored along with its unique MAC address. When you change the ID from say KeeneOne to KeeneTwo it may well still appear in your device list as KeeneOne if this had been previously scanned and discovered. This may be the case even if you have not previously paired with it. To force the name to change you will need to pair to the device, then perform a "forget this device" or "unpair", then rescan and re-discover it under the latest device ID.

If, after performing a reset the device start up with a single flashing red LED then please disconnect the power supply, wait for five seconds and then reconnect.

The number chosen will also load the preset FM radio stations as follows:

FM default 0 - E Midlands

- [0] = Smooth Radio
- [1] = BBC radio1
- [2] = BBC radio2
- [3] = BBC radio3
- [4] = BBC radio4
- [5] = Classic FM
- [6] = Capital FM
- [7] = Radio Derby
- [8] = Radio Nottingham
- [9] = Trent FM

FM default 1 - London

- [0] = Smooth Radio 102.2
- [1] = BBC radio1 98.8
- [2] = BBC radio2 89.1
- [3] = BBC radio3 91.3
- [4] = BBC radio4 93.5
- [5] = Classic FM 100.9
- [6] = KISS FM 100.0
- [7] = Virgin 105.8
- [8] = Capitol 95.8
- [9] = Magic FM

FM default 2 - South

- [0] = London
- [1] = BBC radio1
- [2] = BBC radio2
- [3] = BBC radio3
- [4] = BBC radio4
- [5] = Classic
- [6] = Absolute
- [7] = Capitol

[8] = XFM

[9] = Magic

FM default 3 - Home Counties

- [0] = Berks
- [1] = BBC radio1
- [2] = BBC radio2
- [3] = BBC radio3
- [4] = BBC radio4
- [5] = Oxford
- [6] = Solent
- [7] = Classic
- [8] = Absolute
- [9] = ????

FM default 4 - South East

- [0] = Kent
- [1] = BBC radio1
- [2] = BBC radio2
- [3] = BBC radio3
- [4] = BBC radio4
- [5] = Surrey
- [6] = Sussex
- [7] = BRFM
- [8] = Classic
- [9] = Arrow FM

FM default 5 - North West

- [0] = Manchester
- [1] = BBC radio1
- [2] = BBC radio2
- [3] = BBC radio3
- [4] = BBC radio4

[5] = Lancs

[6] = MerseySide

[7] = Classic

[8] = Galaxy

[9] = Liverpool

FM default 6 - East

- [0] = Essex
- [1] = BBC radio1
- [2] = BBC radio2
- [3] = BBC radio3
- [4] = BBC radio4
- [5] = Cambs
- [6] = Norfolk
- [7] = Northampton
- [8] = Suffolk
- [9] = Classic

FM default 7 - Yorks

- [0] = Leeds
- [1] = BBC radio1
- [2] = BBC radio2
- [3] = BBC radio3
- [4] = BBC radio4
- [5] = Sheffield
- [6] = York
- [7] = York coast
- [8] = Air
- [9] = Sheffield live

FM default 8 - Wales

- [0] = BBC Wales
- [1] = BBC radio1

[2] = BBC radio2

[3] = BBC radio3

[4] = BBC radio4

[5] = Cymru

[6] = Champion FM

[7] = Marcher

[8] = Coast

[9] = classic

FM default 9 - N Ireland

- [0] = Ulster
- [1] = BBC radio1
- [2] = BBC radio2
- [3] = BBC radio3
- [4] = BBC radio4
- [5] = Foyle
- [6] = CityBeat
- [7] = cool
- [8] = Antrim
- [9] = DownFM

We apologise if your area or favourite stations are not covered. This was intended as a quick installation aid and it is very easy to tune and store your own preferences as required.

Specifications:

Power output (15v supply):	20W RMS per channel into 4ohms
Power output (12v supply):	15W RMS per channel into 4ohms
Total Harmonic Distortion + Noise:	0.15% (4ohm load, 1KHz, 8W power)
Bandwidth:	20Hz to 22KHz Passive limitation built in
Power Supply:	10V to 18V (absolute max 18V DC) minimum current 3.0A. Connection via a 2.1mm DC connector centre positive, auto mute on under voltage.
Fuse:	self resetting 3A built in – to clear remove power for at least 20 seconds, clear fault and reconnect
Amplifier topology:	full bridge mode all speaker connections are live (no common ground connection)
Recommended minimum speaker impedance:	4 ohms per channel
Absolute minimum speaker impedance:	3 ohms per channel
SNR:	98dB
Voltage gain:	33dB
Input required to produce full output:	approx 775mV

Part numbers you may find useful:

Architectural Wall/Ceiling mount loudspeakers

5 1/4" 25W [CMS5U]

8" 30W [CMS8U]

Switched Spur outlet

An MK style switched fused spur outlet, ideal for making a safe connection to the KLAB20D power supply.
[SWL1]

Power supply (input: 100-240v AC, Output: 15v DC 4.0A)

[KLABPSU]

Replacement front Fascia panel

[KLAB20DFP]

3.5mm stereo jack to 3.5mm stereo jack front panel input cable 1.2M

[KLDE6]

Loudspeaker cable 42 strand OFC

[KBL31]

Additional remote control

[KRC1]

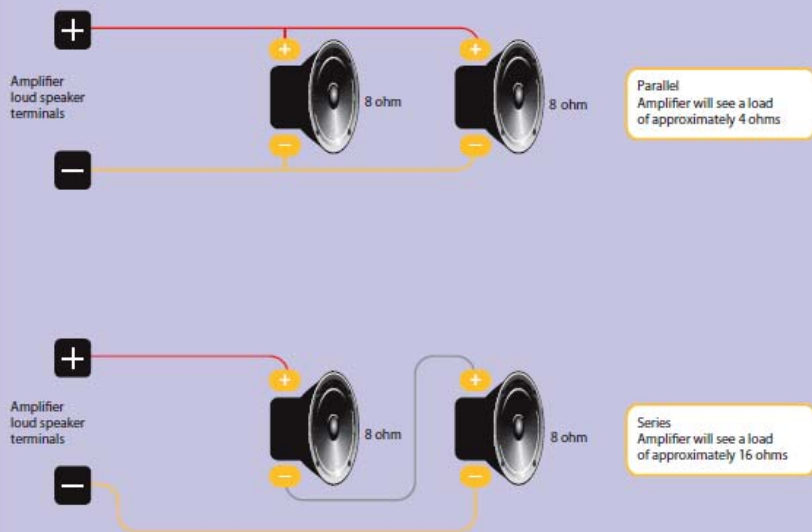
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Speakers in Parallel

Connecting two pairs of loudspeakers to one amplifier



If you want to drive two pairs of loudspeakers from the output of one amplifier you can either connect them to a switchbox or wire them directly. If you use a switchbox then you can have the flexibility of listening to either or both pairs as required. If you always want both pairs to be active then it is possible to wire them directly as long as you are careful with the connections. There are two ways to wire the loudspeakers; either in series or in parallel.

Wiring in series increases the impedance and will give a lower acoustical output. Wiring in Parallel has the opposite effect of lowering the impedance and increasing acoustical output. When deciding how best to connect have a look at the impedance of the loudspeakers you are using and also at the specifications for the amplifier. Most amplifiers will not work correctly with a load of below 4 ohms so if in doubt, always wire in series.

These examples use only two pairs of loudspeakers. It is possible to combine more than 2 Speakers per channel. If connected in Parallel, (and assuming each loudspeaker has the same impedance) then the net impedance of the load is equal to the impedance of the one loudspeaker divided by the total number of loudspeakers. Eg $3 \times 8 \text{ Ohm}$ loudspeakers in parallel would equate to $8/3$ (2.667) Ohms. If connected in series (and assuming each loudspeaker has the same impedance) then the net impedance of the load is equal to the impedance of the one loudspeaker multiplied by the total number of loudspeakers. Eg $3 \times 8 \text{ Ohm}$ loudspeakers in series would equate to 8×3 (24) Ohms.

Membranes.

When locating the membranes ensure that they are in the correct position as removing them and replacing them can damage the circuits, LED's adhesive and can collapse the domes.

Do NOT click the keypad domes unless the overlay is on a flat surface. This also can collapse the domes.

When handling membrane tails these are fragile and require care when locating into the electronic units. Hold the plastic connector housing to press in to correct position. This will reduce the possibility of creasing or folding the tails.

