Powerball–2

Full Tube Guitar Amplifier

Operator´s Manual

Please, first read this manual carefully!


Tube
Amp
Technology

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CAUTION! Please read and heed the following:

You'll find an ancillary pamphlet accompanying this owner's manual entitled Instructions for the Prevention of Fire, Electrical Shock and Injury. Be sure to read it before you plug in and power up the amp!

Note: Technical specifications are subject to change without notice.

Congratulations, ENGL Amp user to your new Powerball-2 amplifier!
The second generation of the approved and extremely popular, 4-channel, all-tube powered amp head appears in an absolutely ingenious revised model; the successor is loaded with some additional, very meaningful features for guitarists: in addition to an optical facelift the new amp model is equipped with four gain control knobs making individual sensitivity adjustment and precise saturation tuning in the preamp section a piece of cake!
Designed to satisfy the exacting demands of discerning players, it delivers all the tonal hues and colors you need to paint the most vivid musical pictures imaginable. Housed inside this newly designed enclosure is a powerhouse 100-watt amp boasting 6L6GC tubes. It delivers the sonic goods you need to dial in everything from contemporary ultra-high gain lead tone to crystal-clear clean and punchy crunch sounds. An astonishing amount of gain reserves, remarkable tonal versatility, and bone-rattling bottom end have crowned the Powerball king of the heap among modern-day guitar amps.
Courtesy of its ability to crank out tight, focused low end, glossy top end and jaw-dropping sound pressure levels, this amp provides the contemporary guitarist with richly detailed tone and the kind of cut-thru-the-din assertiveness that sets standards for amps of this class. And in keeping with the ENGL tradition of engineering excellence, it sports a host of hip features: a second master volume (*Master A/B*), electronic power amp monitoring (P.T.M.), a switchable and adjustable FX Loop, and a Depth Punch knob that shapes the power amp's response by beefing up the low end.
But that's not the last word on this ENGL head's innovative features: you also get two different mid sound voicings, via the middle-boosted feature. We created these voicings to extend the range of lead sounds you have at your disposal by tweaking mid-range response to suit different playing styles and applications.
There are few more handy features to rave about: This amp sports our Serial Amp Control Port, or S.A.C. Port for short.
Plug an ENGL Z-9 Custom Foot Controller into to it and get hip to some very convenient remote control options. This footboard lets you activate the four channels directly in combination with Master A/B switching simply by tapping its four footswitches. And that affords you instant access to four sound variations at two different volume levels each. Moreover you can access further prominent features like *Middle-boosted* and *FX Loop off/on*; the build in Noise Gate affecting both Lead channels is switchable via footswitch in the new amp version too.
In addition, the amp comes with three stereo jacks designed to accept dual footswitches like the ENGL Z-4 or a MIDI switching system (e.g. ENGL Z-11) for selecting the channels and other crucial Amp features.
Old world craftsmanship and highest quality components are part of what makes ENGL amps so special, and the Powerball is no exception. On that note, please read and heed the guidelines on handling all-tube amps. The ENGL team is convinced that this amp will delight and inspire you. **The Powerball amp will rock your world!**

Your ENGL Powerball-2 Amp puts at your disposal:

1. a logical control feature array, utmost **ease of use** and **remarkably intuitive handling**;
2. **Top-shelf sound-shaping options** and **remarkable versatility** with four channels and different midrange voicings. Channel 3 and 4 feature the separate mid control "Mid-boosted" for a precise sound tuning of lead sounds.
3. **A broad tonal palette**: s**urgically precise sound-sculpting functions** are at your fingertips, and a tap of your foot on the conveniently compact footboard. This gives you very **powerful remote control options**.
4. **Four first-rate fundamental sounds in glorious all-tube tone:** Channel 1, *Clean* takes you from clean to a touch of mean. Channel 2, *Crunch* adds some grit to the mill for **sweet crunch tones** with a healthy helping of preamp overdrive. Channel 3, *Lead (3)* takes you very deep into the saturation zone with **plenty of headroom** to spare. Channel 4, *Lead (4)* offers an immense range of **gain potential for creamy, singing lead tone** or **massive powerchords**.
5. Even more **tone-tweaking power** courtesy of diverse sound shaping features: *Bright* and *Bottom* for *Clean* and *Crunch* and a separate ***Bottom*** sound feature for each Lead channel.
6. An **ultra-advanced, tone-generating machine** that will give you years of **playing pleasure** and **value to boot**.

Features and Functionality at a Glance

-> **Four channels**: *Clean*, *Crunch*, *Lead (3)* and *Lead (4)*, each channel with separate Gain and Volume knobs.

-> **Two voicing sections specially tuned for each channel**: One three-band EQ for Clean and Crunch modes and one three-band EQ plus the "Middle-boosted" control pot for *Lead (3)* and *Lead (4)*.
Two controls *Treble-Clean* and *Treble-Crunch:* a very special feature that lets you tweak the high-end response in both Clean and Crunch modes individually.

-> **Four sound switching options in the preamp section:** *Bright* and *Bottom* assigned to *Clean* and *Crunch*; one *Bottom* button assigned to *Lead (3)* and another *Bottom* button assigned to *Lead (4)*.

-> **Switchable and adjustable *FX Loop***. You can control the *FX Loop* remotely via a footswitch and use this circuit as a hardware bypass for connected FX.

-> **EQ-system in the poweramp circuit:** *Presence* and *Depth Punch*.

-> **Two power amp Master knobs**. You can footswitch these knobs to activate two different power amp volume settings on the fly without twisting a knob.

-> **The optional Z-9 Custom Footswitch**. It lets you select channels directly and control two additional (sound-shaping) features of your choice. Three ¼" stereo jack plugs accept three dual footswitches that let you control remotely the four channels,*Middle-boosted*, *Master A/B*, *FX Loop*, and *Noise Gate*.

-> **A Noise Gate for the two Lead Channels.** Activate it at the amp or via footswitch to suppress excessive noise at very high gain settings.

Among the hallmarks of this fine amp are painstaking workmanship and finishing as well as rigorously tested and carefully selected quality components. You'll find guidelines on care and maintenance of tube amps on page 18 and 19. Under the heading Tips from the designer, you'll come across practical tips on the aforementioned features throughout the manual. All critical information concerning the operation of this amp is preceded by "NOTE", "CAUTION", "Read and heed" or some other eye-catching comment. We're calling your attention to these remarks for reasons of safety or other compelling motives, so please give them due consideration.
Everyone at ENGL is confident that the **Powerball-2 tube amp's extraordinary versatility** and **outstanding features** are sure to delight you: **Simply plug in, play and be inspired by the tone of your great ENGL Amp!**

A few words of wisdom from the designer:

Though this amplifier is relatively easy to handle and you're probably raring to give it a go, I recommend that you read the owner's manual thoroughly before you power it up. It is equipped with several safety features that require further explanation to prevent malfunctions.

Contents:

1. ENGL Powerball-2 Tube Amp Head type E645-2;
2. mains cord;
3. this manual;
4. a leaflet presenting diverse sound setting samples;
5. a pamphlet entitled *Instructions for the Prevention of Fire, Electrical Shock and Injury*.

Front Panel Features

At the back of the manual, you'll find fold-out diagrams of the front and rear panels. As you're reading the descriptions of the amp's features, you'll gain a better understanding of the topic of discussion if you unfold and refer to them as we go!

1 Input

¼" unbalanced input jack. Plug your guitar in here using a shielded cord.

A tip from the designer:

Depending on the type of cord and its shielding, you may occasionally encounter interference from sources such as radio stations or powerful magnetic fields. When this occurs, try connecting your guitar to the amp using different cords. What's more, to minimize signal degradation due to high-frequency loss, use the shortest cords feasible (as a rule, the shorter the cord, the less susceptible it is to high-frequency attenuation).

2 Clean Gain-1

Gain control for the Channel 1, *Clean*. This knob determines input sensitivity when the Clean channel is active.

A tip from the designer:
In Clean mode, single-coil pickups may begin saturating the preamp when the knob is set to approximately the two o'clock position. Pickups with very high output levels (humbuckers or active pickups) will evoke mild overdrive at even lower settings. If you want squeaky clean tone (a pure guitar tone without preamp distortion, that is), simply back off the Gain control knob accordingly.

3 Crunch Gain-2
Gain control for the Channel 2, *Crunch*. This knob determines input sensitivity when the Crunch channel is active; use it to dial in the desired amount of preamp distortion.
A tip from the designer:
The amount of distortion depends on your guitar's pickups. If your guitar sports single-coils and you want to add some grit to your tone and bite to your riffs, set the knob somewhere between 10 and 2 o'clock. For higher output pickups such as humbucking or active jobs, dial in settings between 9 and 1 o'clock. For an even bigger, beefier crunch tone, try Crunch Gain settings well beyond the 2 o'clock position.
CAUTION: Extremely high gain and volume levels can produce powerful feedback. Avoid feedback squeals; they can lead to hearing loss and damage speakers! At higher volumes, back off the Gain and Treble levels in order to prevent unchecked feedback!

4 Bright
This feature boosts the upper end of the high frequency range for Channel 1 and Channel 2 (or Clean and Crunch modes, if you prefer). Its intensity decreases as gain settings increase.
A tip from the designer:
For a crisp or glassy tone, activate the Bright boost. It brightens the sound of humbucking or muddy pickups. *Bright* affects both channels *Clean* and *Crunch*. Use it to tweak the amp's tone to taste, activating it to boost top-end frequencies or deactivating it to dampen high end response.

5 Bottom
Alters the EQ by boosting the low end range; the Bottom feature affects Channel 1 and Channel 2 (*Clean* & *Crunch*).
A tip from the designer:
If you want to ladle an extra helping of bottom-end oomph on crunch sounds, I recommend that you activate the Lo End Punch button. At very high Gain knob settings (> 3 o'clock) and with high output pickups, your best bet is to deactivate this button for a more focused, crisper tone.

6 Bass
This is the preamp voicing section's passive low-frequency EQ for Channel 1 and Channel 2 (Clean and Crunch modes).

7 Middle
This is the preamp voicing section's passive midrange frequency EQ for Channel 1 and Channel 2 (Clean and Crunch modes).

8 Treble-Clean
This is the preamp voicing section's passive high-frequency EQ for Channel 1 (Clean mode).

9 Treble-Crunch
This is the preamp voicing section's passive high-frequency EQ for Channel 2 (Crunch mode).
A tip from the designer:
To help you get acquainted with the amp's fundamental sounds, I recommend that you set all tone controls to the center or 12 o'clock position. For higher-gain Crunch sounds, your best bet is to turn the respective Treble knob (9) well down to prevent the pickups and speakers from interacting at hi levels and generating feedback (the recommended setting is somewhere in the 10 to 1 o'clock range).
Bear in mind that you also have the Bright (4) button and the Presence (16) control knob at your disposal for shaping the high frequency range.
The Clean and Crunch channels are equipped with dedicated Treble knobs (8 & 9). This means that you can tweak the top end of each of the two channels separately to suit your taste and the given sonic scenario. You will find that grittier tones generally sound better with a touch less treble because preamp saturation makes higher frequencies figure more prominently in the signal.

10 Clean Volume-1
Determines the level of Channel 1 (Clean mode). Twist this knob to adjust Channel 1's volume and dial in the desired balance of levels with Channel 2, 3 and 4. Because this volume control is located pre effects loop, it also determines the effects send level for Channel 1. The green LED to the right of the knob lights up to indicate Channel 1 is on.

11 Crunch Volume-2
Determines the level of Channel 2 (Crunch mode). Twist this knob to adjust Channel 2's volume and dial in the desired balance of levels with Channel 1, 3 and 4. Because this volume control is located pre effects loop, it also determines the effects send level for Channel 2. The yellow LED to the right of the knob lights up to indicate Channel 2 is on.

12 Power Tube Monitor V1
This LED lights up when the current flowing through the V1 power amp tube was too high and the power tube monitor system has switched that tube off.
To learn more about this crucial protection feature, read the paragraph that follows section 15. See the tube layout chart on page 22 to locate V1's position on the amp chassis.

13 Power Tube Monitor V2
This LED lights up when the current flowing through the V2 power amp tube was too high and the power tube monitor system has switched that tube off.
To learn more about this crucial protection feature, read the paragraph that follows section 15. See the tube layout chart on page 22 to locate V2's position on the amp chassis.

14 Power Tube Monitor V3
This LED lights up when the current flowing through the V3 power amp tube was too high and the power tube monitor system has switched that tube off.
To learn more about this crucial protection feature,read the paragraph that follows section 15. See the tube layout chart on page 22 to locate V3's position on the amp chassis.

15 Power Tube Monitor V4
This LED lights up when the current flowing through the V4 power amp tube was too high and the power tube monitor system has switched that tube off.
The next paragraph provides details on this crucial protection feature. See the tube layout chart on page 22 to locate V4's position on the amp chassis.

An important note on the Power Tube Monitor (P.T.M.) system:
The electronic power amp monitoring system constantly gauges the current flowing through each power amp tube. If it rises to too high a level the system shuts down the given tube.
This can occur when the amp is operated incorrectly (for example, if the impedance is wrong due to an incorrect speaker load; see page 18 for permissible loads), at extreme power spikes, or when a tube is defective.
Reset this electronic monitoring system by switching the standby switch off and on again. When you press the standby switch to turn the amp on again, the system again measures the current sent to the tube. If it is still too high, the power amp must be checked by a service technician, and the tube may have to be replaced if it is defective.
IMPORTANT, PLEASE NOTE: do not flip the Stand By switch off and on in short time intervals if a P.T.M. LED (12, 13, 14, 15) indicates a tube failure. Let a few minutes pass by before you engage the poweramp again after you have switched it off!

16 Presence
This power amp voicing knob's setting determines the amount of high-end frequencies and affects all four channels.

17 Depth Punch
This power amp voicing knob's setting determines the amount of lo-end frequencies and affects all four channels.

18 Lead Gain-3
Gain control for the Channel 3, *Lead (3)*. This Control knob determines input sensitivity when Channel 3 is active. Use it to dial in the desired amount of preamp saturation level.
A tip from the designer:
The two Lead channels offers distinctive tonal characteristics; thus they are suited for different playing styles and techniques. The leaflet “Sound setting samples" illustrates several application examples.
CAUTION: Extremely high gain and volume levels in Lead mode can produce powerful feedback. Avoid feedback squeals; they can lead to hearing loss and damage

speakers! At higher volumes, back off the Gain, Treble and Presence levels in order to prevent unchecked feedback!

19 Lead Gain-4
Gain control for the Channel 4, *Lead (4)*. This Control knob determines input sensitivity when Channel 3 is active. Use it to dial in the desired amount of preamp saturation level.
A tip from the designer:
The two Lead channels offers distinctive tonal characteristics; thus they are suited for different playing styles and techniques. The leaflet "Sound setting samples" illustrates several application examples.
CAUTION: Extremely high gain and volume levels in Lead mode can produce powerful feedback. Avoid feedback squeals; they can lead to hearing loss and damage speakers! At higher volumes, back off the Gain, Treble and Presence levels in order to prevent unchecked feedback!

20 Lead (3) Bottom
Alters the EQ by boosting the low end range; this Bottom feature affects the bass response of the Leadsound in Channel 3.

21 Lead (4) Bottom
Alters the EQ by boosting the low end range; this Bottom feature affects the bass response of the Leadsound in Channel 4.
A tip from the designer:
If you really want to beef up the low end of your lead tone to dial in the type of sound often employed in contemporary styles, press the Bottom button. Note that you can activate this feature separately for each of the two Lead channels. At high Volume levels your best bet is to deactivate this sound feature for a more focused, crisper tone.

22 Bass
This is the preamp voicing section's passive low-frequency EQ for Channel 3, *Lead (3)* and Channel 4, *Lead (4)*.

23 Middle
This is the preamp voicing section's passive midrange EQ for Channel 3, *Lead (3)* and Channel 4, *Lead (4)*. This Mid control can be used in alternating operation with *Middle-boosted* (24). This Control knob determines the portion of mid frequencies when *Middle-boosted* (button, 28) is not activated.

24 Middle-boosted (control knob)
This is the preamp voicing section's passive boosted midrange EQ for Channel 3, *Lead (3)* and Channel 4, *Lead (4)*. Use this special Mid control in alternating operation with *Middle* (23). This Control knob determines the portion of mid frequencies when *Middle-boosted* (button, 28) is activated.
A tip from the designer:
Try the *Middle* (23) and *Middle-boosted* (24) voicings out for different applications.

Middle gives you a more expansive sound that is excellent for grinding out heavy-duty riffs or mid-scooped Lead sounds, while *Middle-boosted* brings up the low mids, making it a great choice for very warm and creamy leads.
This tone control switching option is remotely controllable via footswitch, so you can adapt the two fundamental Lead sounds on the fly, say to better support rhythm guitar work, singing leads, and slashing power chords.

25 Treble
This is the preamp voicing section's passive high-frequency EQ for Channel 3, *Lead (3)* and Channel 4, *Lead (4)*.
A tip from the designer:
To help you get acquainted with the amp's fundamental sounds, I recommend that you set all tone controls to about the center or 12 o'clock position. For higher-gain, high-volume lead sounds, your best bet is to turn the Treble and the Presence knob down to prevent the pickups and speakers from generating feedback (a setting in the 9-to-1 o'clock range is recommended).
Though this passive voicing section's controls range is narrower than that of a comparable active system, its EQ curve is tweaked specifically for its designated purpose and will give you satisfying results. What's more, in combination with the Presence and the Depth Punch control feature in the poweramp stage, you have heaps of voicing options for tailoring basic sounds to taste.

26 Lead Volume-3
Determines the level of Channel 3, *Lead (3)*. Twist this knob to adjust Channel 3's volume and dial in the desired balance of levels with Channel 1, 2 and 4. Because this volume control is located pre effects loop, it also determines the effects send level for Channel 3.
The red LED to the right of the knob lights up to indicate Channel 3, *Lead (3)* is on.

27 Lead Volume-4
Determines the level of Channel 4, *Lead (4)*. Twist this knob to adjust Channel 4's volume and dial in the desired balance of levels with Channel 1, 2 and 3. Because this volume control is located pre effects loop, it also determines the effects send level for Channel 4.
The red LED to the right of the knob lights up to indicate Channel 4, *Lead (4)* is on.

28 Middle-boosted (button)
Switches back and forth between the *Middle* (23) and *Middle-boosted* (24) control knobs (Mid EQ Lead channels) and boosts the midrange in Clean and Crunch mode. The LED above the button lights up to indicate *Middle-boosted* is activated.
It may also be switched using a Z-9 Custom Footswitch (S.A.C. F1-6 and F2-6, page 26) connected to the S.A.C. Port (37) or a footswitch connected to jack (39).
For more details see the chapter 37 and 39 on page 14 and 15!
A tip from the designer:
The two mid controls, *Middle* (23) and *Middle-boosted* (24), targets and shapes specific midrange bands crucial in voicing a guitar's sound. This tone-switching option

is remotely controllable via footswitch, so you can adapt the two fundamental Lead sounds of Channel 3 and Channel 4 on the fly, say to better support rhythm guitar work, singing leads, and slashing power chords. With a handy MIDI switcher such as the ENGL Z-11, you can assign channel switching, *Master A/B*, the sound option *Middle-boosted*, *FX Loop off/on* and *Noise Gate off/on* to different MIDI presets and control these switching and sound-shaping functions remotely in any configuration using a MIDI footboard.

29 Channel Up / Down
This channel switching button selects between the upper arranged channels and the channels arranged in the control row below and, depending on the Channel 1/2 3/4 (30) button setting, activates Clean, Crunch, Lead (3), or Lead (4) mode.
The LEDs next to the respective volume control knobs (10, 11, 26, 27) light up to indicate the active channel; the green LED for *Clean*, the yellow LED for *Crunch*, one red LED for *Lead (3*) and another red LED for *Lead (4)*.
Channels may also be switched via the ENGL Z-9 Custom Footswitch connected to the S.A.C. Port (37) or via a footswitch connected to jack (40). For even greater convenience, you could also use the optional ENGL Z-9 Custom Footswitch to select directly *Clean*, *Crunch*, *Lead (3)* or *Lead (4)* simply by tapping the Z-9's four channel-switching buttons. For more details see the chapter 37 and 40 on page 14 and 15!

30 Channel 1 / 2 3 / 4
This channel switching button selects between Channel 1, *Clean* and Channel 2, *Crunch* or it selects between Channel 3, *Lead (3)* and Channel 4, *Lead (4)* and, depending on the Channel Up/Down (29) button setting, activates Clean, Crunch, Lead (3), or Lead (4) mode.
The LEDs next to the respective volume control knobs (10, 11, 26, 27) light up to indicate the active channel; the green LED for *Clean*, the yellow LED for *Crunch*, one red LED for *Lead (3*) and another red LED for *Lead (4)*.
Channels may also be switched via the ENGL Z-9 Custom Footswitch connected to the S.A.C. Port (37) or via a footswitch connected to jack (40). And for even greater convenience, you could also use the optional ENGL Z-9 Custom Footswitch to select directly *Clean*, *Crunch*, *Lead (3)* or *Lead (4)* simply by tapping the Z-9's four channel-switching buttons. For more details see the chapter 37 and 40 on page 14 and 15!

31 Master A
Master A volume knob. Located post effect loop, it controls power amp output. The red LED to the right of the knob lights up to indicate Master A is enabled and determining the master level.
You can switch between *Master A* and *Master B* using a Z-9 Custom Footswitch (S.A.C. F1-1, page26) connected to the S.A.C. Port (37) or a footswitch connected to jack (39).
For more details see the chapter 37 and 39 on page 14 and 15!

32 Master B
Master B volume knob. Located post effect loop, it controls power amp output. The green LED to the right of the knob lights up to indicate Master B is enabled and determining the master level.

You can switch between *Master A* and *Master B* using a Z-9 Custom Footswitch (S.A.C. F1-1, page26) connected to the S.A.C. Port (37) or a footswitch connected to jack (39).
For more details see the chapter 37 and 39 on page 14 and 15!

A tip from the designer:

If you want to experience real remote control convenience, try an ENGL Z-9 foot controller. You can dial in different levels for *Master A* and *Master B*, assign these settings to any channel and access them directly via the four channel switches on the ENGL Z-9 foot controller. This gives you a range of alternatives that you can apply to different playing styles and musical genres to great dramatic effect. What's more, you can use Clean & Crunch mode for rhythm or cleaner lead lines and Channel 3's or Channel 4's overdriven preamp stage for power chords and soloing, and go from soft to loud at the touch of a button. Beyond that, you can also broaden the volume and tonal ranges by working your guitars' volume knob. If your arsenal includes MIDI gear - for instance, the Z-11 ENGL MIDI Switcher in combination with the Z-9 Custom Footswitch - you may use the amp's Master A/B circuit to swiftly and conveniently set the power amp's volume to two different levels, and then access these volume presets in combination with preamp voicing features such as *Middle-boosted*. The mind boggles...

33 Stand By

Power amp standby switch: Use this switch to silence (0 position) the amp when you take longer break. The amp's tubes stay nice and toasty, and the amp is ready to roll immediately when you ramp it back up to full power.

A tip from the designer:

I suggest you get into the habit of using standby during short breaks. In this mode, current is not piped through the power tubes, so they don't get as hot (due to the lack of anode dissipation) and are spared considerable wear. The amp is ready to run when you flip the Standby switch because the tubes are already warm and don't require time to heat up. For breaks of 30 minutes and longer, I recommend that you switch the amp off in order to conserve energy.

34 Power

Mains power on/off.

Please note: ensure that the Stand By switch (33) is set to *Stand By* (0 position) before you switch the amp on. Let the tubes heat up for about 30 seconds before you activate the power amp. This procedure spares the tubes.

CAUTION: After an extended period of operation and higher ambient temperatures the amps's chassis can become very hot, therefore avoid touching the rear panel surface !

Rear Panel Features

At the back of the manual you'll find a folded page offering diagrams of the front and rear panels. Please unfold and refer to it as you read through the descriptions of features and functions!

35 Mains Connector (AC Power Inlet; IEC - C14 connector)

Plug the mains cord in here. For European models, use a standard non-heating equipment connector cable.

CAUTION: Make sure you use an intact mains line cord with a grounded plug! Before you power the amp up, ensure the voltage value printed alongside **the mains socket is the same as the current of the local power supply or wall outlet.**

Please also heed the guidelines set forth in the separately included pamphlet, *Instructions for the Prevention of Fire, Electrical Shock and Injury*.

36 Mains Fuse Box:

The rear chamber contains the mains fuse and in the front chamber, a spare fuse.

CAUTION: ALWAYS make sure replacement fuses are of the same type and have the same ratings as the original fuse! Please refer to the fuse ratings table.

37 Footswitch: Serial Amp Control Port (S.A.C.)

This serial data input accepts the optional ENGL Z-9 Custom Footswitch, which lets you control various amp functions remotely. Connect the Z-9 Footswitch to the amp using a cord equipped with stereo 6.3 mm (¼") jack plugs. This MIDI-enabled footboard is a custom tool designed to switch every amp feature designated as footswitchable in this manual. To learn if a given feature may be controlled remotely, refer to its description herein. You'll find a configuration table showing the Powerball-2's functions on page 26.

Heads up: Plugging a jack plug into the S.A.C. Port disables the Channel switching functions controlled by the buttons (29, 30) arrayed on the amp's front panel. What's more, it also disables the footswitch jacks' (40) remote-control capability. In other words, when a Z-9 board is plugged in, it has priority over the amp's Channel switching controls as well as Channel switching via a footswitch connected to jack (40).

CAUTION: Connect only the ENGL Z-9 Footswitch to this 6.3 mm (¼") stereo jack! Connecting any other switching device may damage it and/or the amp's circuitry!

Insert and remove the Z-9's cable to and from the S.A.C. Port only when the amp is switched off!

Please note: Never link two S.A.C. Ports of Engl amps via an Y-adaptor to a Z-9 Custom Footswitch; this can cause ground hummming noise and damage the internal circuits!

A tip from the designer:

Try out the ENGL Z-9 Custom Footswitch – chances are you'll love the remote-control convenience. Based on a rather clever switching concept, it affords direct access to the four preamp modes (preamp channels) *Clean*, *Crunch*, *Lead (3)*, and *Lead (4)*. Alongside selecting channels, you can opt to control any other two switchable amp functions such as *Middle-boosted* and *Master A/B* or *FX Loop* and *Noise Gate*, and so forth.

Another tremendous benefit of this microcontroller-driven footboard is that it

connects to the amp via an easily obtained, standard stereo cord. But that's not the last of the Z-9's advantages: At some point, you may decide to ramp up or connect to a MIDI system. This won't render the Z-9 obsolete because it also serves as a simple MIDI footboard with a MIDI OUT (5-pin DIN connector) that selects 10 MIDI patches (or presets, if you prefer). Again, I want to emphasize that you should never connect another footboard to this jack: The Z-9 controls the amp via a proprietary ENGL serial data protocol, and the Serial Amp Control Port was developed exclusively for ENGL amps. No other footboard will work and in fact is likely to damage the footboard or the amp's circuitry!

38 Footswitch: FX Loop, Noise Gate
Use this jack to connect a conventional footswitch with two switching functions, for example, the ENGL Z-4 (2 x off/on - Single Pole Single Throw or SPST for short). This type of footswitch lets you access *FX Loop* on/off and *Noise Gate* on/off. One of the two switches enables or bypasses *FX Loop*, while the other switches the Noise Gate on and off (Lead mode only).
Note also: A footswitch may be equipped with LEDs indicating the given switching status. Each of the two switches is provided with approx. 10 milliamperes current, which suffices to power a standard LED. The jack's mono terminal controls *FX Loop* on/off, while the stereo terminal controls *Noise Gate* on/off (for pin assignments, see page23).

39 Footswitch: Master A/B, Middle-boosted
Use this jack to connect a conventional footswitch with two switching functions, for example, the ENGL Z-4 (2 x off/on - Single Pole Single Throw or SPST for short). This type of footswitch lets you access *Master A/B* and *Middle-boosted*. One of the two switches activates Master A or B, while the other selects the control *Middle* (23) or *Middle-boosted* (24) in the Lead channels; it alters the mid range frequency response during Clean and Crunch modes. Plugging a footswitch into this jack disables onboard *Middle-boosted* (28) switching.
Note also: A footswitch may be equipped with LEDs indicating the given switching status. Each of the two switches is provided with approx. 10 milliamperes current, which suffices to power a standard LED. The jack's mono terminal selects Master A/B, while the stereo terminal controls the Mid Boost feature (for pin assignments, see page23).

40 Footswitch: Channel Up/Down, 1/2 - 3/4
Use this jack to connect a conventional footswitch with two switching functions, for example, the ENGL Z-4 (2 x off/on - Single Pole Single Throw or SPST for short). This type of footswitch lets you access the four channels. One of the two switches selects between the upper arranged channels and the channels arranged in the control row below, while the other switch selects between *Clean* and *Crunch* or it selects between *Lead (3)* and *Lead (4)*. Plugging a footswitch into this jack disables onboard channel (29, 30) switching.
Note also: A footswitch may be equipped with LEDs indicating the given switching status. Each of the two switches is provided with approx. 10 milliamperes current, which suffices to power a standard LED. The jack's mono terminal selects channel

Up/Down switching, while the stereo terminal controls Clean/Crunch and Lead (3)/ Lead (4) feature (for pin assignments, see page 23).

41 NOISE GATE THRESHOLD LEVEL

This control knob activates an onboard Noise Gate serving to suppress excess noise in the two Lead channels *Lead* (3) and *Lead (4*) when you twist it to the right, near or just beyond the 9 o'clock position.

In addition the Noise Gate can be controlled remotely (on/off) via a footswitch connected to jack 38 (for details refer to chapter 38) or via the ENGL Custom Footswitch Z-9 (refer to chapter 37 for details). The precondition for a Noise Gate remote control via footwisch is a setting at the Threshold knob beyond the 9 o'clock position (primary activation).

Use this knob to set a threshold value (that is, the noise level) at which the Noise Gate activates to suppress the signal within the 9 to 5 o'clock range. The further you twist the knob to the right, the higher the signal level at which the Noise Gate kicks in. If you set the knob to the 5 o'clock position, the Noise Gate reacts to extremely high noise levels, meaning that there's not much of a margin between the guitar signal and background noise.

A tip from the designer:

Noise is a definite no-no in many situations. For example, studio etiquette demands that you keep a lid on extraneous noise during short breaks. It's in the nature of high-gain rigs to generate undesirable peripheral noise in overdriven (high gain) channels. This is attributable to the physical properties of an amp's constituent components, in particular its active components. That's right; those cherished tubes are the culprits. The Noise Gate is a tool that lets you silence this noise during breaks by way of signal mute circuit. Note that electric guitars pick up interference signals, and these are amplified tremendously at high gain levels in Lead mode. The most common source of noise is 50 Hz or 60 Hz (hertz/cycle) mains hum, particularly when the guitar is positioned near transformers and power units. Because in worst-case scenarios this humming can attain extremely high levels, the Noise Gate can hardly distinguish between the musical signal and noise. This makes it hard to find the right Threshold setting. It is entirely possible for this humming and other noise to rise to a level that deactivates the Noise Gate and therefore becomes audible. My advice is to stay as far away from transformers and power units as space allows.

IMPORTANT note; please read and heed: The *Noise Gate* may open up inadvertently when the *Noise Gate* is activated, a high-gain Lead channel is selected, and the volume exceeds the Threshold knob setting. At very high volume and gain settings, this may generate instant feedback, particularly if your guitar is facing the speakers. Rather than musical and controlled, this is the shrill, unpleasant and potentially harmful variety of feedback squealing that sends your audience and fellow musicians packing. Though the amp is not more susceptible to feedback when the *Noise Gate* is activated, the fact that it suppresses extraneous noise means you can't hear those telltale signs that feedback is swelling and consequently can't take measures to suppress it. For this reason, make an extra effort to be careful when the *Noise Gate* is activated: Before you approach the amp and speaker cabinet with your guitar in hand, turn the guitar's volume knob to the far left position (to 0 so that no signal is audible) to prevent the pickups and speakers from interacting!

42 FX Loop Send
Connect the FX Loop output to a signal processor's input/return jack using the shortest possible shielded cord equipped with 1/4" plugs. The FX Loop can be controlled remotely (: on/off) via a footswitch connected to jack 38 (for details refer to chapter 38) or via the ENGL Custom Footswitch Z-9 (refer to chapter 37 for details). In the signal path, the FX Loop is located post preamp and pre the two power amp Master knobs.

43 FX Loop Return
Connect the FX Loop input to a signal processor's output/send jack using the shortest possible shielded cord equipped with 1/4" plugs. The FX Loop can be controlled remotely (: on/off) via a footswitch connected to jack 38 (for details refer to chapter 38) or via the ENGL Custom Footswitch Z-9 (refer to chapter 37 for details). In the signal path, FX Loop is located post preamp and pre the two power amp Master knobs.

44 FX Loop Balance
FX mix control for the *FX Loop*. When the knob is set to *Dry*, the amp signal is routed through with no processed signal (0% wet balance) added to the mix. Twist the knob clockwise to blend in the processed signal (parallel/passive, wet balance 1-99%, depending on knob position). When the knob arrives at the Effect position, only the wet signal (that is, the processed signal generated by the connected effect device) is patched to the power amp (serial, 100% wet).
NOTE: Set this knob to *Dry* when this loop is not in use! Settings between the 9 and 3 o'clock position reduce the signal level.

45, 46 Poweramp Output, 4 Ohms Parallel
4 ohms speaker output jacks, internal connected parallel. For diverse cabinet options see the chapter *Cabinet options* on page 18 !

47, 48 Poweramp Output, 8 Ohms Parallel
8 ohms speaker output jacks, internal connected parallel. For diverse cabinet options see the chapter *Cabinet options* on page 18 !

49 Poweramp Output, 16 Ohms
16 ohms speaker output jack. For diverse cabinet options see the chapter *Cabinet options* on page 18 !
IMPORTANT NOTE, please read and heed: Never operate the power amp without a sufficient load, otherwise you may damage or destroy it! Always check the connected cabinets' impedance to confirm it matches the amp's output impedance! For example, if you are connecting a cabinet to one of the two 8-ohms output, make sure the speaker system is indeed rated for 8 ohms. You'll find the various speaker and cabinet options listed in the nest section. I cannot stress enough the importance of proper impedance matching when connecting one or more cabinets to your amp. Impedance mismatching can damage the power amp!

Cabinet options

1. One 4-ohm cabinet connected to a 4-ohm jack;
   Summary: 4 Z, -> connected to 4-ohm output.
2. Two 8-ohm cabinets connected to the 4-ohm jacks;
   Summary: 8 Z + 8 Z, -> connected to 4-ohm + 4-ohm output.
3. One 8-ohm cabinet connected to an 8-ohm jack;
   Summary: 8 Z, -> connected to 8-ohm output.
4. Two 16-ohm cabinets connected to the 8-ohm jacks;
   Summary: 16 Z + 16 Z -> connected to 8-ohm + 8-ohm output.
5. One 16-ohm cabinet connected to the 16-ohm jack;
   Summary: 16 Z -> connected to 16-ohm output.
6. An 8-ohm cabinet connected to one of the 4-ohm jacks in combination with a 16-ohm cabinet connected to one of the 8-ohm jacks
   Summary: 8 Z + 16 Z -> connected to 4-ohm + 8-ohm output.

Handling and Care:

* Keep the amp safe from hard knocks and shocks. Tubes are fragile and tend to suffer when exposed to mechanical stress!
* Let the amp cool down before you transport it. Ten minutes or so will spare the tubes.
* Tubes take some 20 seconds to warm up after you switch the power on, and about two to three minutes before they are able to pump out full power. Make a habit of giving your amp plenty of time to get toasty and flipping the Standby switch for short breaks.
* In order to spare the power tubes and prolong their lifetime, we recommend to set the Stand By switch to *Stand By* (0 position, that is) before you switch the amp on. After a period of 30 seconds you may activate the poweramp by flipping the Stand By switch.
* Avoid storing the amp in damp or dusty rooms to spare jacks, switches and potentiometers. If you don't use the amp all the time, I recommend that you drape a covering over it to prevent the intrusion of dust. Even better, keep it in a transport cover or flight case.
* Never use caustic or scouring detergents to clean the amp's housing, front or rear panels. Use a soft, damp cloth or sponge with diluted soapsuds or a standard brand of mild dishwashing liquid instead. Never use solvents they can corrode the amp's vinyl skin and dissolve the front and rear panel labels. Keep liquids well away from the amp, particularly the interior of the housing.
* Make sure air can circulate at the rear and top of the amp to allow for adequate cooling, which increases component life.
* Never operate the amp without an adequate load (a speaker, cabinet or suitable terminating resistor).

* High ambient temperatures place an additional strain on diverse components; so if at all possible, avoid operating the amp at temperatures far higher than 30°C for longer periods. Running the amp at mains voltages exceeding the nominal mains input voltage over longer periods can also shorten component life.
* Replace tubes with selected tubes that satisfy ENGL selection criteria to forestall microphonic properties, undesirable noise and unbalanced power amp signals. Because power tubes' idle current (bias) must checked and possibly adjusted when replacing tubes, this is a job best left to experienced and authorized specialists.

Troubleshooting

*** Some features that may be controlled remotely using a Z-9 or Z-4 footswitch fail to respond when you change settings:**

-> Powerful static charges, strong radio signals, or mains voltage spikes can affect microcontroller-driven systems, setting them to an undefined status commonly called a hung chip. In this event, your only choice is to reset the system. Simply switch the amp off and on again.

-> If a reset doesn't solve the problem, there is a defect in the control system, probably on the logic board holding the microcontroller or merely a faulty contact on one of the four stereo footswitch jacks (37, 38, 39, 40). In this case, consult an authorized service center or a professional specialist.

*** The amp fails to respond when you try to control switching functions remotely via the Z-9 footboard.**

-> Is the Z-9 footboard connected to the S.A.C. Port (37)?

-> Is the cord you are using stereo, intact, and wired properly?
(Refer to page 23 for pin assignments.)

*** The amp fails to respond when you try to control switching functions remotely using a footboard such as the Z-4 or a MIDI switcher such as the ENGL Z-11.**

-> Are the footboards or switching loops connected to the corresponding footswitch jacks (38, 39, 40)?

-> Are the cords you are using stereo, intact, and wired properly?
(Refer to page 23 for pin assignments.)

-> If you are using footswitches other than an ENGL Z-4 or Z-11, are the switches or relays inside the boards or switching loop systems off / on Single Pole Single Throw (SPST) switches? In other words, do these switches continuously connect to GND when you wish to activate the given function? If you're unsure about the answers to these questions, consult an authorized service center or a professional specialist.

*** The amp is not providing an output signal / no sound is emanating from the speaker.**

-> Is at least one speaker connected to the speaker outputs 4 ohms, 8 ohms or 16 ohms (45, 46, 47, 48, 49) ?
-> Is the power amp activated (Standby switch to ON) ?
-> Are all cords (guitar, effect, and speaker) connected properly and are they functional ?
-> Unplug connected effectors and see if the preamp works fine without these peripheral devices.
-> Is the Noise Gate activated in one of the Lead channels and the Threshold (41) knob set to a high value? Deactivate the Noise Gate (41) for a quick check.
-> Are the active Master knob and the Gain and Volume knobs set to a value greater than 0 ? If any of these knobs is set to 0, no signal is routed to the amp's outputs.
-> You may be looking at a faulty tube or another defect. In this case, be sure to take the preamp to an authorized, professional service center.

*** The speaker is emitting humming noises:**

-> Is there a connection (for example, via a shielded circuit) between the amp and another device that is grounded via a power plug of its own? Two or more circuits sharing a common electrical ground line can cause audible hum. If low-frequency noise is emanating from your rig, be sure to consult a specialist.
-> The amp and mains grounds are not connected properly or are altogether disconnected. Have an experienced specialist check this.
-> Cords connected to the input or effect loops may not be shielded properly. Replace them to check if this is indeed the case.
-> The amp or speaker cords may be picking up interference from powerful magnetic fields (for example, of nearby power transformers or electrical motors). Reposition the amp and connector cables.
-> The amp or speaker cords may be picking up radio signals, for example, from activated mobile telephones or powerful local transmitting stations nearby. Switch off mobile phones while troubleshooting noise problems.

*** The electronic power amp protection circuit has tripped:**

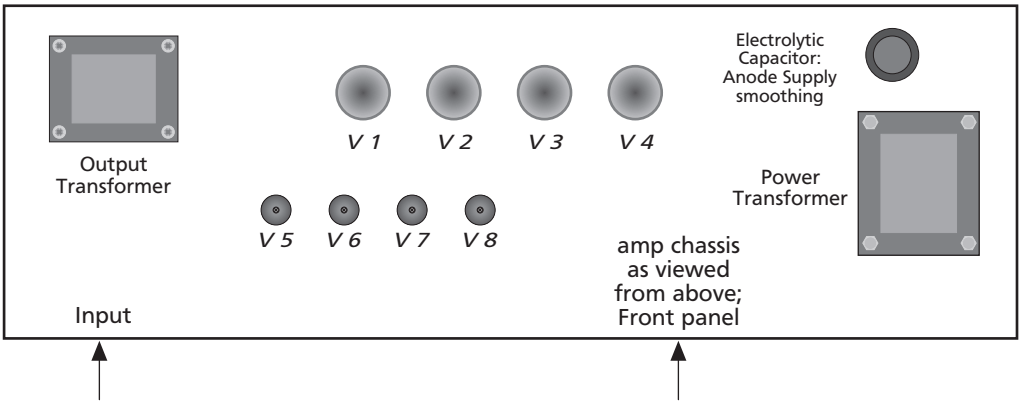
-> The given power tube is defective and must be replaced if the electronic circuit breaker continues to trip after several attempts to reset the Tube Monitoring System by flipping the Standby switch off and back on again.
-> The amp has been overloaded, perhaps by excessive volume levels, mains over-voltage, or the wrong output impedance (the impedance setting does not match the connected speaker's impedance).

IMPORTANT, PLEASE NOTE: do not flip the Stand By switch off and on in short time intervals if a P.T.M. LED (12, 13, 14, 15) indicates a tube failure. Let a few minutes pass by before you engage the poweramp again after you have switched it off!

Technical Data

Output power:	approx. 100 watts; adjusted accordingly to 4, 8 and 16 ohms;
Input sensitivity levels	
Input:	range: –40 dB to -10 dB (Clean), max. 0 dB
Effect Return:	range: -20 dB to -10 dB, max. 0 dB
Output levels	
SEND, level range:	-20 dB to -10 dB, max. 0 dB
Power consumption:	approx. 310 watts (380 VA) max.;
Fuses:	
at 220/230/240 mains voltage	external: 2 ATL, internal: 3.15 ATL (T: slo-blo);
at 100/115/120 mains voltage	external: 4 ATL, internal: 6.3 ATL (T: slo-blo);
Important:	**Replace these with fuses of the same type and rating only!**
Tubes:	
V1, V2, V3, V4:	6L6GC, matched sets;
V5:	ECC83 F.Q., input tube;
V6, V7:	ECC83 selected;
V8:	ECC83 standard;
Consult Tube Map to view tube array	Replace tubes with selected sets only!
Logic control system:	
Processor, software:	AT89C2051 µC with internal 2K Flash Memory for software source code; Upgradeable with external Programmer;
System interface:	
Serial Amp Control (S.A.C.)	Proprietary ENGL asynchronous data protocol.
Dimensions:	approx. 71 x 27 x 27 cm (l x h x d); approx. 27.9" x 10.6" x 10.6" (l x h x d);
Weight:	approx. 21 kg approx. 46,3 lbs

Tube Map:



the tubes and their function:
V 5 - ECC83 (12AX7): input stage, 2. gain stage; grade: FQ selected
V 6 - ECC83 (12AX7): Lead driver stage, 4. stage; grade: selected
V 7 - ECC83 (12AX7): FX buffer stage, poweramp driver stage; grade: selected
V 8 - ECC83(12AX7): phase splitter; grade: standard
V 1 - V 4: 6L6GC: power tubes, poweramp, matches sets

Tube replacement report:

1. Replaced on: _ _ _ _ _ _ _ 20 _ _ _ Replaced by: _ _ _ _ _ _ _ _ _ _ _ _ _ _

Replaced tubes: _

Reason: _

2. Replaced on: _ _ _ _ _ _ _ 20 _ _ _ Replaced by: _ _ _ _ _ _ _ _ _ _ _ _ _ _

Replaced tubes: _

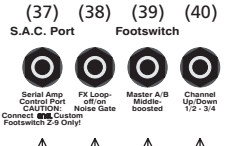
Reason: _

3. Replaced on: _ _ _ _ _ _ _ 20 _ _ _ Replaced by: _ _ _ _ _ _ _ _ _ _ _ _ _ _

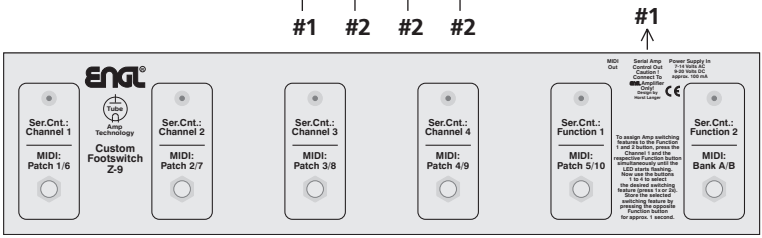
Replaced tubes: _

Reason: _

Your Options for controlling the ENGL Powerball-2 amp remotely:

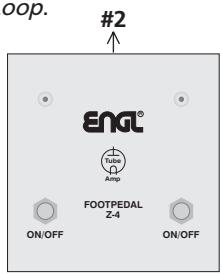


Footswitch connectors (4 x stereo jack sockets) located at the rear panel of the amp.



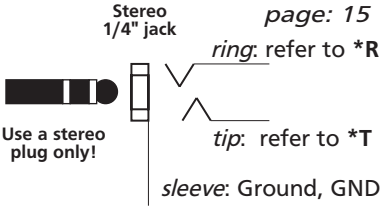
#1 ENGL Z-9 Custom Footswitch: This specialized footboard connects to the amp via a 6.3 mm (¼ ") stereo cord plugged into the Serial Amp Port - S.A.C. (37). The Z-9 affords you direct access to the amp's four Channels Clean, Crunch, Lead (3), Lead (4) simply by tapping the four channel switching buttons, and lets you control two special functions, for example, *Middle-boosted* and *FX Loop*.

#2 A two-way footswitch such as the ENGL Z-4: Connect dual footswitches to the amp by plugging stereo 6.3 mm (¼ ") cords into jack nos. 38, 39, and 40.
-> *Channel Up/Down* and *Channel 1/2 - 3/4* (1 x Z-4);
-> *Master A/B* and *Middle-boosted* (1 x Z-4);
-> *FX Loop* and *Noise Gate* (1 x Z-4);
As an alternative to dual footswitches, you can connect a MIDI switcher (the ENGL Z-11 will do nicely) to these three jacks to control the six switching functions.

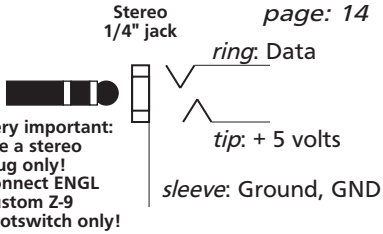


Wiring of Principal Connectors

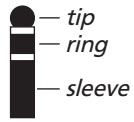
Dual Footswitch (38, 39, 40)



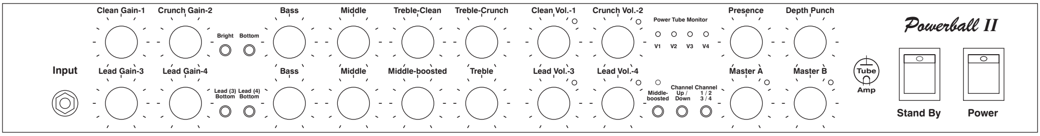
Serial Amp Control Port (37)



Here you'll find at a glance the technical details of the P.B.-2's various remote switching capabilities:
A switch connected to this terminal ***R** controls
Noise Gate; off <-> on via jack 38;
Middle-boosted; passive <-> active via jack 39;
Channel 1/2 - 3/4; Channel 1 or 3 <-> Channel 2 or 4 via jack 40.
A switch connected to this terminal ***T** controls
FX Loop; off (bypassed) <-> on (enabled) via jack 38;
Master A/B; Master A <-> Master B via jack 39;
Channel Up/Down; "Up" <-> "Down" via jack 40.

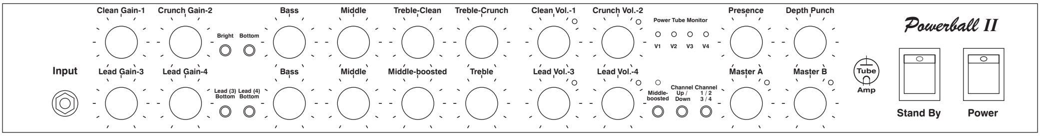


ENGL® Powerball-2: Noting Settings



Sound title: ______________________

comment: ____



Sound title: ______________________

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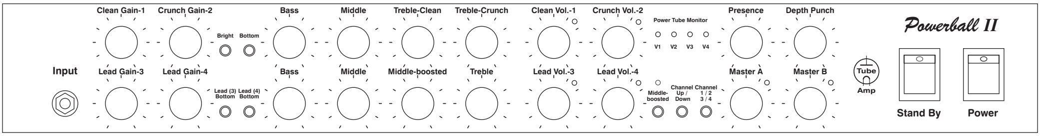

Sound title: ______________________

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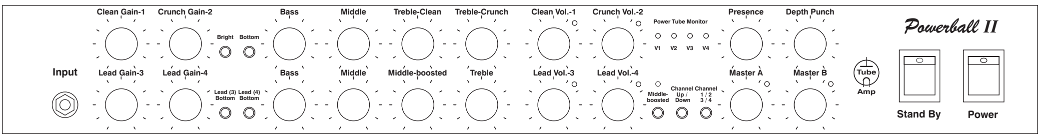

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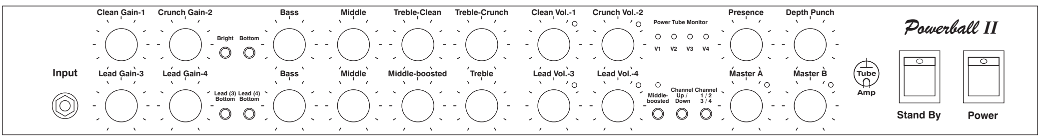
comment: ____



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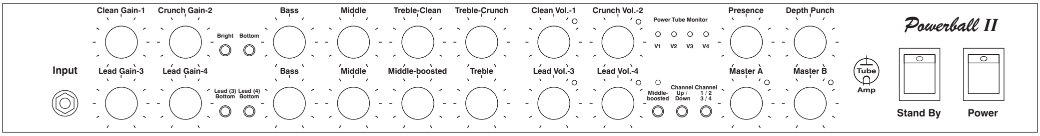
comment: ____

ENGL® Powerball-2: Noting Settings



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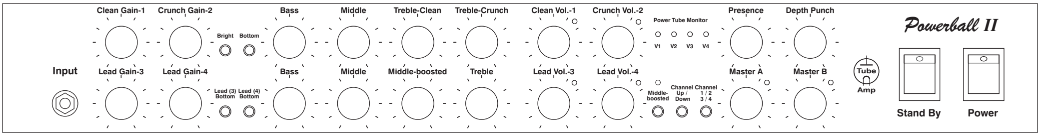

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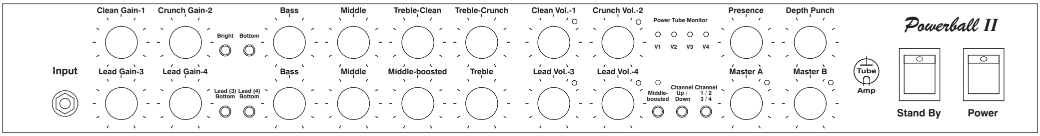

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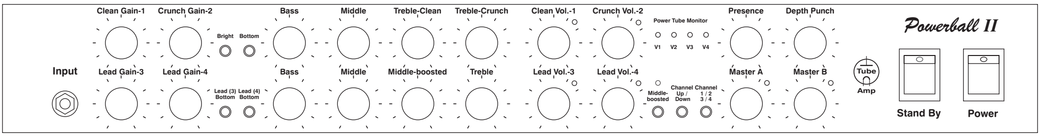

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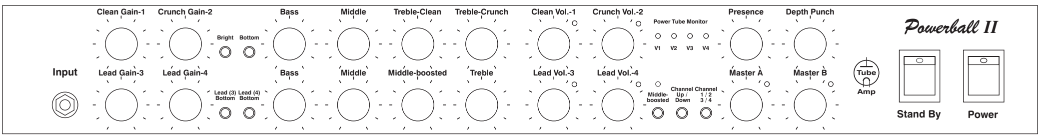


Sound title: _

comment: _

Configuration table for assigning the Powerball-2's sound-shaping and special functions to the Z-9 Custom Footswitch's *Functions 1* and *2* :

Button	Functions P.B.-2 amp	Setup	Indication	S.A.C.
Function 1	*Master A/B*	1: *Channel 1*	LED 1 lights	*F1-1*
Function 1	no	1: *Channel 2*	LED 2 lights	*F1-2*
Function 1	*FX Loop off / on*	1: *Channel 3*	LED 3 lights	*F1-3*
Function 1	*Noise Gate off / on*	1: *Channel 4*	LED 4 lights	*F1-4*
Function 1	no	1: *Channel 1*	LED 1 flashes	*F1-5*
Function 1	*Middle-boosted*	1: *Channel 2*	LED 2 flashes	*F1-6*
Function 1	no	1: *Channel 3*	LED 3 flashes	*F1-7*
Function 1	no	1: *Channel 4*	LED 4 flashes	*F1-8*
Function 2	no	2: *Channel 1*	LED 1 lights	*F2-1*
Function 2	no	2: *Channel 2*	LED 2 lights	*F2-2*
Function 2	no	2: *Channel* 3	LED 3 lights	*F2-3*
Function 2	*Noise Gate off / on*	2: *Channel 4*	LED 4 lights	*F2-4*
Function 2	no	2: *Channel 1*	LED 1 flashes	*F2-5*
Function 2	*Middle-boosted*	2: *Channel 2*	LED 2 flashes	*F2-6*
Function 2	*FX Loop off / on*	2: *Channel 3*	LED 3 flashes	*F2-7*
Function 2	no	2: *Channel 4*	LED 4 flashes	*F2-8*

Comments:

Column 1 lists the Function button on the Z-9. Column 2 lists the sound-shaping and special functions that can be assigned to it.

Column 2 lists sound-shaping and special functions on the ENGL P.B.-2 Amp that can be controlled remotely via the Z-9 Custom Footswitch.

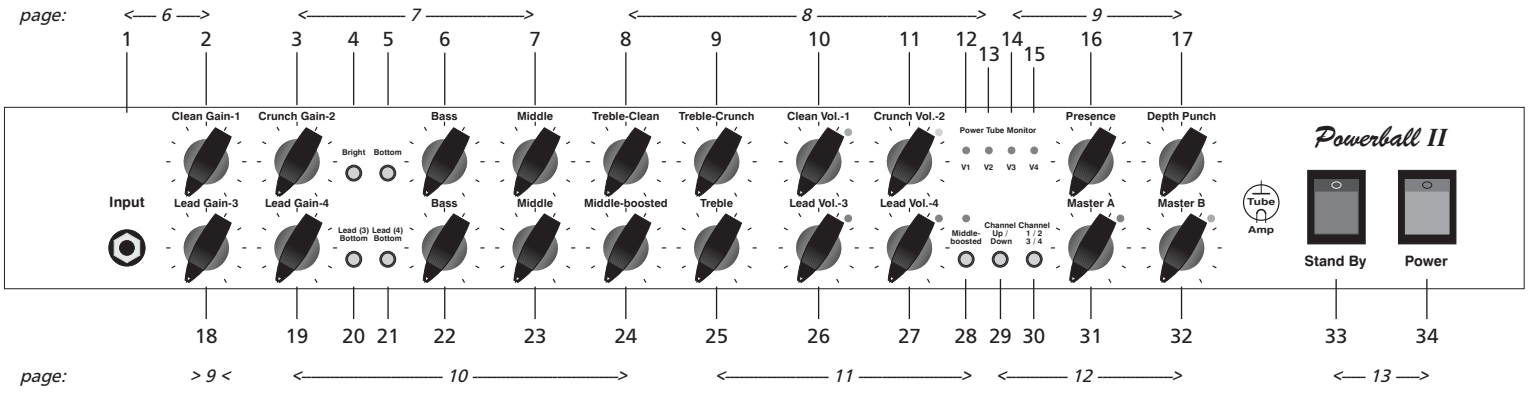
Column 3 lists the configuration or setting required to remote-control sound-shaping or special functions on the P.B.-2 Amp.
The first digit indicates the *Function Setup* routine, that is,
1: for *Function 1* Setup and 2: for *Function 2 Setup*.
Channel 1 to *Channel 4* denotes the button used to enter the setting.

Column 4 indicates the currently or newly selected configuration. For example, if LED 3 flashes when the Z-9's *Function 2* Setup routine is activated, then the Powerball's *FX Loop* switching feature is currently assigned to *Function 2*; the corresponding S.A.C. command is *F2-7*.

Column 5 lists the shorthand designations for specific configurations that appear throughout the Z-9 Operator's Manual. For detailed information, please refer to the Z-9 Custom Footswitch Operator's Manual.

Please note: The ENGL Z-9 Custom Footswitch is an optional accessory. The afore mentioned Function buttons, LEDs and setup routines pertain to the Z-9.


Tube
Amp
Technology


page:
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Clean Gain-1
Crunch Gain-2
Bright
Bottom
Bass
Middle
Treble-Clean
Treble-Crunch
Clean Vol.-1
Crunch Vol.-2
Power Tube Monitor
V1 V2 V3 V4
Presence
Depth Punch
Powerball II
Input
Lead Gain-3
Lead Gain-4
Lead (3) Bottom
Lead (4) Bottom
Bass
Middle
Middle-boosted
Treble
Lead Vol.-3
Lead Vol.-4
Middle-boosted
Channel Up / Down
Channel 1 / 2 3 / 4
Master A
Master B
Tube Amp
Stand By
Power
18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34
page:
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11
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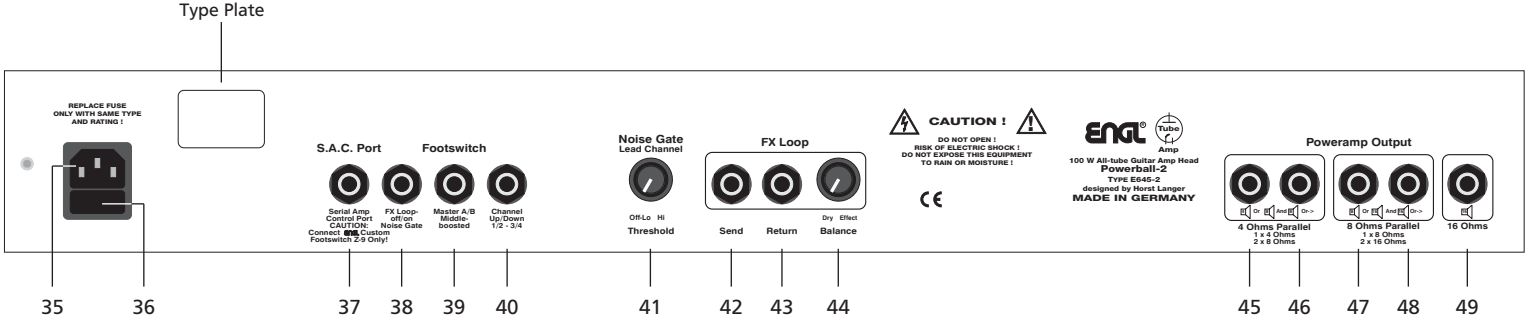
13


Type Plate
REPLACE FUSE ONLY WITH SAME TYPE AND RATING !
S.A.C. Port
Footswitch
Serial Amp Control Port CAUTION: Connect Custom Footswitch 2-9 Only!
FX Loop-off/on Noise Gate
Master A/B Middle-boosted
Channel Up/Down 1/2 - 3/4
Noise Gate
Lead Channel
Off-Lo Hi
Threshold
FX Loop
Send
Return
Dry Effect
Balance
CAUTION !
DO NOT OPEN !
RISK OF ELECTRIC SHOCK !
DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE !
ENGL Tube Amp
100 W All-tube Guitar Amp Head
Powerball-2
TYPE E645-2
designed by Horst Langer
MADE IN GERMANY
Poweramp Output
4 Ohms Parallel
1 x 4 Ohms
2 x 8 Ohms
8 Ohms Parallel
1 x 8 Ohms
2 x 16 Ohms
16 Ohms
35 36 37 38 39 40 41 42 43 44 45 46 47 48 49
page:
14
15
> 16 <
17

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Germany
Internet: http://www.engl-amps.com

Amp photo by Stefan Wibbeke
Text, design, graphics and layout by
Horst Langer, ENGL Amp Designer