ENGL

Tube Amp
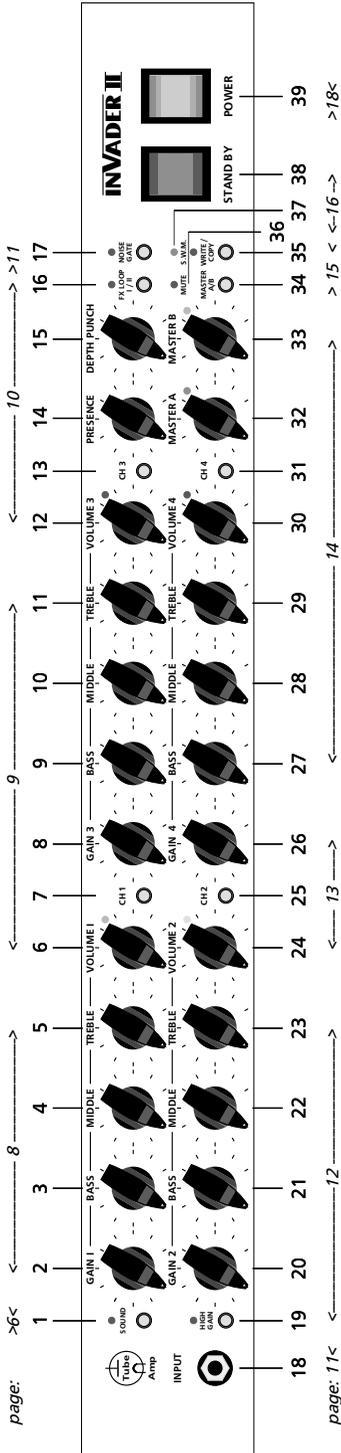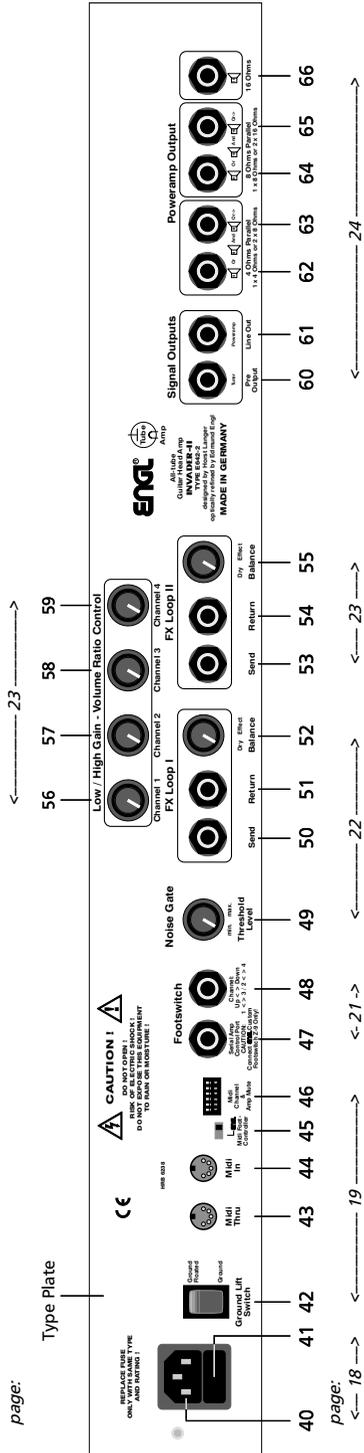
INVADER II

4 Channel Full Tube Guitar Amplifier with MIDI-Control

Operator´s Manual

Please, first read this manual carefully!

2

page:

INVADER II: Front Panel Layout

Tube Amp

SOUND

HIGH GAIN

INPUT

GAIN 1 BASS MIDDLE TREBLE VOLUME 1

GAIN 2 BASS MIDDLE TREBLE VOLUME 2

CH 1

CH 2

GAIN 3 BASS MIDDLE TREBLE VOLUME 3

GAIN 4 BASS MIDDLE TREBLE VOLUME 4

CH 3

CH 4

PRESENCE DEPTH PUNCH

MASTER A MASTER B

FX LOOP I / II NOISE GATE

MUTE S.W.M. MASTER A/B WRITE / COPY

STAND BY POWER

INVADER II

page: 11<

> 6 < 1
2 19
3 20
4 21
5 22
6 23
7 24
8 25
9 26
10 27
11 28
12 29
13 30
14 31
15 32
33
34
35
36
37 38 39
16 17
> 11
> 18 <
> 15 < < 16 ->
< 12 < 13 --> < 14 ->
< 8 > < 9 > < 10 ---->

INVADER II: Rear Panel Layout

Type Plate

CE

CAUTION !
DO NOT OPEN !
RISK OF ELECTRIC SHOCK !
DO NOT EXPOSE THIS EQUIPMENT
TO RAIN OR MOISTURE !

REPLACE FUSE
ONLY WITH SAME TYPE
AND RATING !

Ground Lift Switch
Ground Floated Ground

Midi Thru

Midi In

Multi Channel Controller
Multi Channel & Amp Mute

Footswitch
Serial-Amp Control Port (< 3 | 2 < 4)
Channel Up + Down (< 3 | 2 < 4)
(connect Custom Footswitch FS Only)

Noise Gate
Threshold Level min. ... max.

Low / High Gain - Volume Ratio Control
Channel 1 Channel 2 Channel 3 Channel 4

FX Loop I
Send Return Dry / Effect Balance

FX Loop II
Send Return Dry / Effect Balance

Signal Outputs
Pre Line Out
Output

Poweramp Output
4 Ohms Parallel 8 Ohms Parallel 16 Ohms
1 x 4 Ohms or 2 x 8 Ohms 1 x 8 Ohms or 2 x 16 Ohms

ENGL

All-tube
Guitar Head Amp
INVADER II
TYPE E642-2
designed by Front Langer
optionally refined by Edmund Engl
MADE IN GERMANY

Tube Amp

40
41 42
43
44
45 46
47 48
49
50 51 52
53 54 55
56 57 58 59
60 61
62 63 64 65 66

< 18 -->
< 19 -->
< 21 ->
< 22 -->
< 23 -->
< 24 -->
23

Table of Contents

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 on your choice of amp, **the mighty ENGL INVADER II**. With this **tube-powered head**, you now own a **high-performance guitar amp** that incorporates **several innovative new ideas** and **remarkably efficient features**.

This **top-notch guitar amp** marries the unrivalled tone of **all-tube technology** to the awesome sound-shaping might of control features powered by modern microchip circuitry. This elegant combination puts at your fingertips a **vast range of great fundamental tones** and a virtually inexhaustible reservoir of compelling variations, all of which may be **controlled remotely via MIDI**.

The INVADER II amp offers **four independent channels** - tweaked to **deliver different tonal spectrums** for various styles and playing techniques, for instance, Channel 4 for **fast & heavy riffs** and an power chords; Channel 3 for **punchy lead tone** with an **assertive midrange kick**. All four channels offer Low Gain / High Gain switching, as well as dedicated Gain and Volume knobs and a 3-band EQ for each channel that give you an even greater range of sound-sculpting options. The tonal palette ranges from **vintage clean** to **classic grind**, and from **creamy rock lead tone** with **thick, lush tube overdrive** to the **kind of aggressive hi-gain lead sound** it takes to cut through the din of **contemporary heavy styles**.

Then there's the nifty **Sound button**, a sort of **DIY tone-tuning tool** that **vastly extends** the amp's application range. This **unprecedented feature** lets you shape the amp's fundamental sound as you see fit and **fine-tune its voicing** using the **optional Sound Wizard module**.

This amp boasts a lot more hip and practical features:

A/B Master switching is a powerful option that has proven its merits in countless ENGL amps (it has featured in E920 power amps since the late '80s and in the legendary SAVAGE 120 head since '93!). Your **INVADER II head** also sports **two switchable effect loops** and a **programmable Amp Mute function**.

As an alternative to operating the amp remotely via a **MIDI foot controller** such as the ENGL Z-15, you can also plug in an ENGL Z-9 Custom Foot Controller and manipulate key functions directly. What's more, the amp comes with a stereo jack designed to take an **ENGL Z-4 dual footswitch** or a switching system for selecting the four channels.

And the **exterior's compelling visuals** certainly match the interior's impressive appointments. This amp's elegant and stylish look is sure to turn heads wherever you play.

This gives you:

1. a logical control feature array, utmost **ease of use** and **remarkably intuitive handling**;

2. **excellent voicing options** and the **great flexibility** provided by so many sound shaping and other special functions. You can also tweak the amp's fundamental sound to taste using the **ENGL Sound Wizard module**, and your voicings can be assigned to 128 MIDI presets.

3. fundamental **clean**, **crunch**, and **lead sounds** in **excellent tube-driven quality**: **Two gain stages** in every channel **double** the count of **instantly accessible sounds**. You can select channels and adjust Gain Low/High and the Sound

function's setting via MIDI, affording you **quick access** to a **broad tonal palette**. What's more, the **Sound function's voicing** is **automatically adjusted** to match the amp's various operating modes, which **extends the scope** of its **tonal spectrum tremendously**.

4. **Separate Gain** and **Volume** knobs in each of the four channels and a **3-band EQ** for **channels 1, 2, 3 and 4** let you dial in distinct tones with surgical precision.

5. **ENGL INVADER II** - an **ultra-advanced tone-generating machine** that's versatile enough to cover a wide range of applications.
It can even be **extended** with **Sound Wizard technology**, all of which will give you **years of playing pleasure** and **value to boot**.

Features and Functionality at a Glance
-> **Four basic channels**: Channel 1, Channel 2, Channel 3 and Channel 4 with separate Gain and Volume knobs.
-> **Two Gain variants** (and **three** with the optional Sound Wizard) for each of the basic channels: The High Gain function affords you instant access to **two gain settings** with **different voicings** for **every channel**.
-> **Four voicing sections**: one EQ for each Channel featuring Bass, Middle and Treble.
-> The versatile **Sound voicing button** for Channel 1, 2, 3 and 4: It is **tuned** to **match** the given channels' **tonal characteristics**.
-> **Two effect loops:** FX Loop I and FX Loop II are variable, switchable effect loops. Each effect loop may be activated for each channel.
-> The power amp's **A** and **B Master** knobs are **accessible via MIDI**. MIDI controller #7 or #28 accesses Amp Mute, and in addition Amp Mute is **MIDI-programmable**. These choices come in handy if you wish to use the **Pre Output** signal to **tune your guitar**.
-> MIDI In and Thru ports serve to integrate the amp into a MIDI system.
-> **128 MIDI presets**, accessible via 16 MIDI channels.
-> The **INVADER II amp offers three different remote interface ports:** The Serial Amp Control Port accepts the Custom Z-9 Footswitch (optional); use it as a conventional switcher to select channels and two more functions directly. Then there's the MIDI In, which accepts the Z-9 for use as a simple MIDI footcontroller or any other MIDI footcontroller. Finally, the amp is equipped with a stereo jack that takes a dual footswitch, allowing you to switch the four channels remotely.
-> **Programmable Noise Gate** for suppressing noise in Channel 2, Channel 3 and Channel 4.

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 28. 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 **INVADER II 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 new ENGL amp!** And the **Sound Wizard module** is the **perfect add-on** if you want to get even **more creative** when **sculpting your tone**.
A few words of wisdom from the designer:
Though this amp head 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 INVADER II Tube Amp Head;
2. mains cord;
3. this manual;
4. a pamphlet entitled Instructions for the Prevention of Fire, Electrical Shock and Injury.
The Sound Wizard module referred to in this manual is not included.

Front Panel Features

On page 2 and 39 of the manual, you'll find diagrams of the front and rear panels.

1 Sound
The Sound function takes on a certain type of voicing that is determined by the selected channel and the given gain stage setting. This function's setting - Sound off/on - affects the amp's overall sound. You can assign many typical voicings individually to the two Sound off and Sound on settings when using the ENGL Sound Wizard module (optional). The LED above the button lights up to indicate the Sound function is enabled (Sound on). It may also be switched via MIDI program change or the ENGL Custom Z-9 footswitch.
The following list shows how the Sound function works when enabled (Sound on) in various modes and the ENGL Sound Wizard module is not installed (or the SWM is set to Sound Wizard off):
CHANNEL 1 & Low Gain: Twang (that's switch #4 on the SWM)
CHANNEL 1 & High Gain: Low Midrange (that's switch #3 on the SWM)
CHANNEL 2 & Low Gain: Bright (that's switch #5 on the SWM)
CHANNEL 2 & High Gain: Low Midrange (that's switch #3 on the SWM)
CHANNEL 3 & Low Gain: Low End (that's switch #2 on the SWM)
CHANNEL 3 & High Gain: Low Midrange & High Midrange (that's switch #3 combined with switch #4 on the SWM)

CHANNEL 4 & Low Gain: Low End (that's switch #2 on the SWM)

CHANNEL 4 & High Gain: Low Midrange & High Midrange (that's switch #3 combined with switch #4 on the SWM).

A tip from the designer:

The Sound function gives you so much creative leeway in voicing the amp that it merits a closer look: In the preceding section, you learned that you can activate a certain voicing such as Twang for Channel 1 in Low Gain mode or Bright for Channel 2 in Low Gain mode. Note that 'Low Gain mode' simply means that High Gain is not activated. Your choice of voicing will of course depend on the selected mode, which in turn is determined by the currently active channel and the given gain stage setting.

The Sound button's voicings are automatically adjusted to match the amp's operating modes as determined by the given channel and gain stage. This is very beneficial to your tone. Here's why: Each tonal flavor has certain frequency ranges that can be tweaked to fine-tune that type of tone. As you can imagine, these frequency ranges vary from sound to sound, say from a pristine clean tone to a heavily overdriven lead sound. A voicing such as Bright would hardly enhance a distorted tone, so it's not much use in shaping lead sounds. However, tweaking the low end and various midrange frequencies can certainly change the flavor of crunchy rhythm sounds or singing lead tones. But I don't want to bore you by trying to describe all the Sound voicings' specifics. Besides, tone is very subjective, so here's my recommendation: Plug in your guitar and try out all 16 variations by combining the channel's fundamental sound in Low Gain and High Gain modes and switch the Sound function off and on. An audition will tell you a lot more than words ever could.

Nonetheless, I do want to devote a few more words to an optional feature that extends the tonal capabilities of the Sound function on the INVADER II amp. It caters to demanding players who want to sculpt their sound with the surgical precision of a scalpel rather than beat it into shape with a mallet. Closet hot-rodders and amp modders will find plenty to love in this tool.

Seeking to give creative guitarists practically unlimited freedom to shape their tone, I started tinkering with the idea of a sound-tuning tool for everyone. Eventually, we came up with the Sound Wizard module. This optional add-on enables any guitarist to fine-tune all the fundamental sounds of the INVADER II amp without having to take a soldering iron to its circuitry. Best of all, these modifications can be done without any knowledge of electronics. Restoring the INVADER II to its original voicing is as simple as flipping a single switch. The unique Sound Wizard module is truly extraordinary because it does what so many guitarists have been wanting to do for such a long time - it lets them fine-tune the sound of their amps to suit their taste.

The Sound Wizard module sits in the amp's rear panel, so all you have to do is replace the panel. There's no need to remove the amplifier chassis.

A single connector plugs the Sound Wizard module into the amp's circuitry. The ENGL Sound Wizard module provides 96 rockers on 16 DIP switches for fine-tuning your sound. 16 LEDs next to the DIP switches tell you which configuration of rockers is currently active for a given amp mode (Channel, Gain & Sound settings). A slide switch enables and disables the Sound Wizard module. The module's status is indicated by a separate LED on the module as well as by the SWM LED on the amp's front panel. You can encode a total of 64 different settings on the Sound Wizard module for each amp mode. The variations on Channel, Gain & Sound settings give you a total of 16 modes.

All this means you have a whole bunch of configurations for fine-tuning your amp. In addition to offering specific voicings such as Bright, Twang and Mid Boost, the Sound Wizard also lets you modify the gain stages in certain modes and activate a special parameter called Attenuator for each amp setting to balance out different volume levels. You will find a detailed description of the Sound Wizard's tuning capabilities in the manual that comes with the module.

2 Gain 1

Gain control for Channel 1's preamp section. This knob determines the preamp's input sensitivity when Channel 1 is selected and, by extension, the preamp signal's saturation level.

A tip from the designer:
The amount of distortion depends on your guitar's pickups and the High Gain (19) setting. In Channel 1, single-coil pickups may begin saturating the preamp when the knob is set to about 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, simply back off the Gain knob accordingly.

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 12 and 3 o'clock. For higher output pickups such as humbucking or active jobs, dial in settings between 10 and 1 o'clock and activate High Gain.

3 Bass

This is the preamp voicing section's passive low-frequency EQ for Channel 1.

4 Middle

This is the preamp voicing section's passive midrange frequency EQ for Channel 1.

5 Treble

This is the preamp voicing section's passive high-frequency EQ for Channel 1.

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 or slightly higher than the center or 12 o'clock position. For higher-gain preamp sounds, your best bet is to turn the Treble knob down to prevent the pickups and speakers from generating feedback (a setting in the 10-to-2 o'clock range is recommended). 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. Each channel is equipped with a dedicated EQ so you can tweak its sound separately to suit your taste and the given sonic scenario. Bear in mind that you also have the Sound (1) button, as well as the power amp Presence (14) and Depth Punch (15) knobs, at your disposal for shaping the frequency range. You can program various MIDI presets with the Sound option remotely and have plenty of tonal variations at your fingertips.

6 Volume 1

Volume control for Channel 1's preamp section. Use this knob to adjust the volume of Channel 1's preamp and dial in the desired balance with the other three channels' levels. Because this knob is located pre effects loop, it also determines the send levels for both FX loops when Channel 1 is selected. The green LED to the right of the knob lights up to indicate Channel 1 is on. Use the knob (56) on the amp's rear panel to balance out the relative volumes of High Gain and Low Gain modes.

7 CH 1

Push this button to activate preamp Channel 1 at the amp. The green LED to the right of the Channel 1 Volume knob (6) lights up to indicate Channel 1 is active. Channel 1 may also be activated via MIDI program change, the ENGL Custom Z-9 Footswitch, or a dual footswitch.

8 Gain 3

Gain control for Channel 3's preamp section. This knob determines the preamp's input sensitivity when Channel 3 is selected and, by extension, the preamp signal's saturation level.

A tip from the designer:
Like Channel 4, Channel 3's gain structures range from vigorous to extreme, making it a great choice of channel for fat, creamy lead sound with plenty of sustain. The High Gain (19) and Sound (1) functions let you tune Channel 3's fundamental tone to suit different playing techniques. This channel has plenty of headroom, so I recommend setting the Gain knob to somewhere between 8 and 1 o'clock. This will let you dial in impressive sounds with preamp saturation figuring prominently in the tone. The High Gain function comes in especially handy in conjunction with Gain settings below 12 o'clock because you can use it to shape and access two distinctly different tones.

CAUTION: Extremely high gain and volume levels in Channel 3 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!

9 Bass

This is the preamp voicing section's passive low-frequency EQ for Channel 3.

10 Middle

This is the preamp voicing section's passive midrange frequency EQ for Channel 3.

11 Treble

This is the preamp voicing section's passive high-frequency EQ for Channel 3.

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 sounds in Channel 3 your best bet is to turn the Treble knob down to prevent the pickups and speakers from generating feedback (a setting in the 10-to-2 o'clock range is recommended).

Each channel is equipped with a dedicated EQ so you can tweak its sound separately to suit your taste and the given sonic scenario. Bear in mind that you also have the Sound (1) button, as well as the two power amp Presence (14) and Depth Punch (15) knobs, at your disposal for shaping the frequency range. 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.

12 Volume 3
Volume control for Channel 3's preamp section. Use this knob to adjust the volume of Channel 3's preamp and dial in the desired balance with the other three channels' levels. Because this knob is located pre effects loop, it also determines the send levels for both FX loops when Channel 3 is selected. The red LED to the right of the knob lights up to indicate Channel 3 is on. Use the knob (58) on the amp's rear panel to balance out the relative volumes of High Gain and Low Gain modes.

13 CH 3
Press this button to activate preamp Channel 3 at the amp. The red LED to the right of the Channel 3 Volume knob (12) lights up to indicate Channel 3 is active. Channel 3 may also be activated via MIDI program change, the ENGL Custom Z-9 Footswitch, or a dual footswitch.

14 Presence
Power amp Presence knob. This knob determines the power amp's high frequency response and affects all channels.

15 Depth Punch
This control shapes the lo frequency response in the power amp stage and affects all channels.

16 FX LOOP I/II
This button switches to and fro between FX Loop I and FX Loop II. The red LED above the button lights up to indicate FX Loop II is on. You can also select loops via MIDI program change or the ENGL Custom Z-9 Footswitch.
A tip from the designer:
Both effect loops can be configured in series (that is, 100% processed signal when Balance is set to wet) or in parallel (1% to 99% mix of preamp and effect signal when Balance is set somewhere between dry and wet), or be bypassed altogether (0 % wet balance when Balance is set to dry). You can connect an effect device to each of the effect loops and switch from one effect device to the other using the FX Loop I/II function, or employ just one of the two effect loops (for example, FX II Loop) and use FX Loop I/II to activate the effect. In the latter case, FX Loop I serves as a bypass (set its Balance knob to the dry position). Note that in the signal path, Master A and Master B controls are post FX Loop Return and pre the power amp.

17 Noise Gate

Press this button to activate an onboard Noise Gate and suppress excess noise in channel 2, 3 or 4. Control the Noise Gate using the Level Threshold (49) knob on the back of the amp. The LED above the button lights up to indicate the Noise Gate is activated. This feature can also be switched via MIDI program change or the ENGL Custom Z-9 Footswitch.

IMPORTANT note; please read and heed: The Noise Gate may open up inadvertently when the Noise Gate is activated, a high-gain 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!

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 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 High Gain mode. The most common source of noise is 50 or 60 hertz 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.

18 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).

19 High Gain

Pressing this button boosts the gain and amount of distortion in all four channels, CH1, CH2, CH3 and CH4. The LED above this button lights up to indicate High Gain is active. This feature can also be switched via MIDI program change or the Custom Z-9 footswitch. You can also use the optional Sound Wizard module to modify the two gain stages. See the description of the Sound Wizard for more on this.

A tip from the designer:

Obviously, the difference between Low and High Gain is that the latter gives you more preamp juice. But I also tuned frequency response to suit each channel's gain structure, which is a long-winded way of saying the four channels give you eight great sonic choices. Depending on the selected channel and Gain knob setting, the spectrum ranges from pristine clean (CH1 and CH2) to ultra saturated lead tone (CH3 and CH4), rich in overtones and gain reserves for screaming solos and crashing power chords. Whatever tones your style, genre and whims may demand, you'll find it between these two extremes. The options are too numerous to mention, so switch back and forth between Low and High Gain in each of the four channels and vary the Gain knob settings to get to know their tonal characteristics and make the most of these eight fundamental sounds. The optional Sound Wizard module lets you select another gain stage, Medium Gain, in addition to Low Gain and High Gain. See the description of the Sound Wizard for more on this.

20 Gain 2

Gain control for Channel 2's preamp section. This knob determines the preamp's input sensitivity when Channel 2 is selected and, by extension, the preamp signal's saturation level.

A tip from the designer:

Channel 2 offers moderate to middling gain structures for great alternative clean sounds with slightly higher gain levels and different flavors than those provided by Channel 1. Set it to High Gain if you wish to dial in classic rock riffs with anything from subtle to in-your-face preamp overdrive. Even in Low Gain mode, you can conjure a slightly dirtier sound at Gain settings around 12 to 2 o'clock, and lower with humbucking pickups. This is a nice option to have when you're going for a grittier tone. **CAUTION:** Extremely high gain and volume levels in Channel 2 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!

21 Bass

This is the preamp voicing section's passive low-frequency EQ for Channel 2.

22 Middle

This is the preamp voicing section's passive midrange EQ for Channel 2.

23 Treble

This is the preamp voicing section's passive high-frequency EQ for Channel 2.

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 knob down to prevent the pickups and speakers from generating feedback (a setting in the 10-to-1 o'clock range is recommended).

Each channel is equipped with a dedicated EQ so you can tweak its sound separately to suit your taste and the given sonic scenario. Bear in mind that you also have the Sound (1) button, as well as the two power amp Presence (14) and Depth Punch (15) knobs, at your disposal for shaping the frequency range.

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.

24 Volume 2
Volume control for Channel 2's preamp section. Use this knob to adjust the volume of Channel 2's preamp and dial in the desired balance with the other three channels' levels. Because this knob is located pre effects loop, it also determines the send levels for both FX loops when Channel 2 is selected. The yellow LED to the right of the knob lights up to indicate Channel 2 is on. Use the knob (57) on the amp's rear panel to balance out the relative volumes of High Gain and Low Gain modes.

25 CH 2
Press this button to activate the preamp's Channel 2 at the amp. The yellow LED to the right of the Channel 2 Volume knob (24) lights up to indicate Channel 2 is active. Channel 2 may also be activated via MIDI program change, the ENGL Custom Z-9 Footswitch, or a dual footswitch.

26 Gain 4
Gain control for Channel 4's preamp section. This knob determines the preamp's input sensitivity when Channel 4 is selected and, by extension, the preamp signal's saturation level.

A tip from the designer:
Depending on Gain knob, Gain option (19) and Sound option (1) settings, Channel 4's gain ranges from massive to borderline ridiculous, which translates to big power chords and mean leads. Note that Channel 4's midrange is scooped - that is, not as dominant as Channel 3's - lending Channel 4 a distinctive tone quite unlike the other. Channel 4 has plenty of headroom, so I recommend setting the Gain knob to somewhere between 8 and 1 o'clock. This will let you dial in impressive sounds with preamp saturation figuring prominently in the tone. The High Gain function comes in especially handy in conjunction with Gain settings below 12 o'clock because you can use it to shape and access two distinctly different tones.

CAUTION: Extremely high gain and volume levels in Channel 4 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!

27 Bass
This is the preamp voicing section's passive low-frequency EQ for Channel 4.

28 Middle
This is the preamp voicing section's passive midrange EQ for Channel 4.

29 Treble
This is the preamp voicing section's passive high-frequency EQ for Channel 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 the center or 12 o'clock position. For higher-gain, high-volume lead sounds, your best bet is to turn the Treble knob down to prevent the pickups and speakers from generating feedback (a setting in the 10-to -1 o'clock range is recommended).
Each channel is equipped with a dedicated EQ so you can tweak its sound separately to suit your taste and the given sonic scenario. Bear in mind that you also have the Sound (1) button, as well as the two power amp Presence (14) and Depth Punch (15) knobs, at your disposal for shaping the frequency range. 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.

30 Volume 4
Volume control for Channel 4's preamp section. Use this knob to adjust the volume of Channel 4's preamp and dial in the desired balance with the other three channels' levels. Because this knob is located pre effects loop, it also determines the send levels for both FX loops when Channel 4 is selected. The red LED to the right of the knob lights up to indicate Channel 4 is on. Use the knob (59) on the amp's rear panel to balance out the relative volumes of High Gain and Low Gain modes.

31 CH 4
Press this button to activate preamp Channel 4 at the amp. The red LED to the right of the Channel 4 Volume knob (30) lights up to indicate Channel 4 is active. Channel 4 may also be activated via MIDI program change, the ENGL Custom Z-9 Footswitch, or a dual footswitch.

32 Master A
Master A volume knob. Located post effect loops, 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 also set the master level to 0 (Amp Mute) via MIDI or the Z-9. To learn how to do this, see section 36 and section 46, page 20 in the Rear Panel Features chapter.

33 Master B
Master B volume knob. Located post effect loops, 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 also set the master level to 0 (Amp Mute) via

14

MIDI or the Z-9. To learn how to do this, see section 36 and section 46, page 20 in the Rear Panel Features chapter.

34 Master A/B

Switches back and forth between the Master A and Master B knobs. The LEDs next to the knobs light up to indicate which Master knob is active the red LED for Master A, the green LED for Master B. MASTER A/B can also be switched via MIDI program change or the ENGL Custom Z-9 Footswitch.

A tip from the designer:

Here's a nifty option: Use Master A and B to set two different power amp levels and access these as you wish in tandem with the preamp's eight channel and Gain combinations. You can easily program combinations of different Master A/B, Channel 1 to 4 and Low or High Gain (19) settings to different MIDI presets. Then you can conveniently access these configurations on stage using a MIDI footboard (for example, the ENGL Z-9, Z-12 or Z-15). This gives you many variations of the fundamental sounds for different playing techniques and musical situations. Channel 1 or Channel 2 is your first choice for clean and even grittier rhythm and lead work. Take advantage of the preamp saturation in Channels 3 and 4 for power chords and leads at diverse gain and volume levels. Try working your guitar's volume knob to extend your range of tones and musical expression. If a MIDI control unit and controller commands are available (for example, the ENGL MIDI Footcontroller Z-15) you can use the Amp Mute to silence the power amp quickly and conveniently for short breaks or to swap guitars.

35 Write/Copy

Press this button to store the modified setting of a programmable feature to a MIDI memory slot (generally called a preset). Here's how to distinguish between Write and Copy: with the former you're actually programming or writing a new MIDI preset, with the latter you're making an exact duplicate of an existing preset.

The system will select a Write operation whenever you edit a MIDI preset, that is, when you have modified a programmable feature. You'll know that this is the case because the Status LED flashes steadily when you edit one or several programmable features. If you press the button and did not edit a MIDI preset, the system will select Copy. This means that the given preset becomes the source, and its contents are dumped to another preset and stored there. When you press this button, the Status LED lights up continuously to indicate Copy is activated. The system quits Copy mode autonomously if you do not select a new MIDI preset within about 30 seconds.

The preset programming process -- the Write command, that is -- is not carried out as soon as you press the button. Pressing the button merely initiates the process. You must hold it down for about a second until the Status LED flashes three times in rapid succession. This mechanism is designed to prevent inadvertent programming. You can cancel the programming process at any time before the Status LED first illuminates by releasing the Write button. Again, the preset will only be programmed successfully if you press and hold the button until the Status LED flashes three times.

You'll have to go through a similar routine to copy a preset once you select a target preset: When the Status LED extinguishes, the copy operation is underway and can no longer be cancelled. The LED flashes three times to indicate the preset was copied

successfully. You can cancel the copy operation by releasing the key, but only for as long as the LED lights up continuously. See page 27 and 28 for more details.

IMPORTANT note; please read and heed:

MIDI preset 1 activates when the amp is powered up. If you want to edit and/or store other MIDI presets, you must connect a MIDI foot board or another MIDI send device to the MIDI In port (44) and use this outboard device to select the desired MIDI preset on the amp.

More good-to-know info:

Note that the Status LED also indicates the status of components unrelated to Write and Copy. The microcontroller runs a short system check after you switch the amp on. Should it find a defect in the memory chip (EEPROM), the LED will flash in a pattern of five short bursts.

Press the Write/Copy copy button to confirm that you got the message. Once you have done this, the system will be ready to run, although you may encounter problems when attempting to select or store MIDI preset.

Further indicator functions: Power Tube Monitor; description in section 38.

The Status LED serves a third display function. As described in section 38, it indicates that no speaker is connected to the power amp outputs.

36 Mute

This red LED lights up to show Amp Mute is engaged, that is, the power amp is silenced. Activate this mode via Standby (set it to 0), a previously programmed MIDI preset, a MIDI controller #7 (or #28) command (see chapter 46 to learn more) or by sending the appropriate Z-9 command to the Serial Amp Control Port (47). Deactivate Amp Mute by setting Standby (38) from 0 to Power Amp On or sending the appropriate MIDI command to the MIDI In port (44) or via the respective Z-9 command (setting F2-4) send to the Serial Amp Control Port (47).

A very IMPORTANT note; please read and heed: When programming MIDI presets, ensure Standby switch is set to On (that is, the power amp is active) if you want this preset to disable Amp Mute and enable the power amp so the speaker renders your sound. If the Standby switch is set to 0 during programming, the amp will be muted when you select this MIDI presets precisely because the Amp Mute function was enabled during programming. Therefore the power amp will not boost the signal and the sound will not be audible over the speaker.

Note: You cannot deactivate Amp Mute to activate the amp via appropriate programmed MIDI presets, MIDI controller commands or via the Z-9 when Standby is engaged to switch the power amp off. You must first flip the Standby switch.

37 SWM

This blue LED lights up when the ENGL type Z-16 Sound Wizard module has been installed in the amp's rear panel and enabled via the slide switch (1/SWM) on this optional add-on module.

38 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. Amp Mute activates as soon as you set the Standby switch to the 0 position and the Mute LED (36) shows this status by lighting up. You can easily program the Amp Mute function to MIDI presets to mute the amp using a simple MIDI footboard. To do this, set the Standby switch to 0 and start the programming process with the Write button (35).

IMPORTANT note; please read and heed: When programming MIDI presets, ensure Standby is set to On (that is, the power amp is active) if you want this preset to disable Amp Mute and enable the power amp so the speaker renders your sound. If the Standby switch is set to 0 during programming, the amp will be muted when you select this MIDI presets precisely because the Amp Mute function was enabled during programming. Therefore the power amp will not boost the signal and the sound will not be audible over the speaker.

If you want the power amp to be enabled in a MIDI preset, you must program it with Standby set to On**!**

Do not engage the Standby switch when copying with the Write/Copy (35) button, as this launches a write operation. The control system treats the Standby switch much like a function button. If you use it to edit the stored settings, the Status LED will flash.

To learn more about this, see section 35 Write/Copy and Programming sounds (Settings) to MIDI presents in individual steps in the appendix on page 27 and 28.

Note:

If the amp is in Standby mode, deactivating the Amp Mute function via the Amp Mute Z-9 command will not activate it. The same goes for sending MIDI controller #7 (or #28) commands and selecting MIDI presets programmed with Amp Mute deactivated. You must first flip the Standby switch.

More good-to-know info:

On the one hand, the amp's surveillance system monitors if speaker cords are plugged into Poweramp Outputs 4 Ohms (62, 63), 8 Ohms (64, 65), and 16 Ohms (66). If none of these ports is in use, flipping the Standby switch will not activate the power amp. This ensures the amp is not operated without a connected load. If the amp is powered up and the Standby switch is set to On, the Standby circuit is deactivated internally and the Status LED shows this by flashing rapidly.

In addition, an electronic surveillance system monitors the power tubes. The Status LED flashes to alert you to a defective power tube, blinking in different patterns to identify the given tube. Specifically, it lights up briefly at regular intervals - once for V1, twice for V2, thrice for V3, and four times for V4. Because the tube monitoring system only works when the power tubes are up and running, this indicator is not enabled until you activate the power amp (Standby switch set to On). Please read the following paragraph for further important Details.

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 24 and 25 for permissible loads), at extreme power spikes, or when a tube is defective.

Reset this electronic monitoring system by flipping the Standby switch off and on

again after a brief pause. 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.

HEADS UP: Do not flip the Standby switch off and on in short time intervals if the Status LED indicates a tube failure. Wait around 30 seconds before you engage the poweramp again after you have switched it off!

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 20 minutes and longer, I recommend that you switch the amp off in order to conserve energy.

There's another function called Amp Mute that is also controlled via the Standby switch. You can use it to conveniently silence the power amp when switching or tuning guitars via a MIDI preset. All you have to do is first program the target MIDI preset by setting the Standby switch to "0" (Power Amp off). Then the amp will always be muted when you select this preset. The Mute LED (36) indicates this function's current status.

39 Power

Mains power on/off.

Please note: ensure that the Stand By switch (38) 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 and the ventilation grille on the top!

Rear Panel Features

On page 2 and 39 of the manual, you'll find diagrams of the front and rear panels.

40 Mains Connector (AC Power Inlet, IEC - C14 connector)

Plug the mains cord in here.

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 port 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.

41 Mains Fuse Box:

The rear chamber contains the mains fuse and 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! To this end, please refer to the fuse ratings shown on the type panel.

42 Ground Lift Switch
This switch severs the circuit connecting the amp's internal ground to the wall receptacle's ground terminal. You can set the switch to Ground Floated when you have connected a signal processor or power amp and want to prevent the two devices' grounds from forming a ground loop that manifests in annoying humming.
Please note: A ground loop is an extraordinary condition. Under ordinary circumstances, ensure the button is set to Ground to earth the amp to the mains ground, thereby preventing ungrounded line noise!

43 MIDI Thru
This 5-pin DIN port patches incoming MIDI data from the MIDI In (44) to any other connected MIDI device.

44 MIDI In
This 5-pin DIN port accepts data sent by a MIDI sender (for example, the ENGL MIDI Z-12, Z-15, or Z-9 foot controllers) or from or routed through another MIDI device.
Switch no. 45 lets you activate the amp's power supply if you have an ENGL MIDI foot controller connected to this port.
CAUTION: Before you connect any other MIDI footswitch or effects device, always make sure that switch no.45 is set to the right to avoid damaging the device.

45 Power Supply For The ENGL MIDI Footcontroller
This selector activates a MIDI In port power supply for connected ENGL MIDI foot boards. Power is fed to the board via the MIDI circuit. When the switch is set to the left position, power is routed to the MIDI In port's pin 1 and pin 2 (refer to page 35 for pin assignments). If you choose to use another MIDI foot board, be sure to set the switch to the right to avoid damaging it. If the foot board you are using is designed to handle phantom power, consult its operating manual to learn how it is wired (that is, which pins carry its power supply) and what its voltage and current specifications are. If the voltage and current specifications and wiring match, you may set the switch to the left to power this foot board via the MIDI cable.
Please read and heed: Note that a MIDI foot board may not draw more than 200 milliamperes of current if you want to power it via this port. You must also check and verify if this MIDI foot board is able to handle 11 volts of alternating current (AC)! If you are in any doubt, be sure to consult a specialist, meaning an amp technician or electronics engineer who earns a living with a screwdriver!

46 MIDI Channel, MIDI Controller, Amp Mute
Use this DIP switch to assign the MIDI channel by which the amp's MIDI system will receive program change commands and specific MIDI controller commands assigned to certain amp functions.
Your choices are the standard 16 MIDI channels numbered from 00 to 15, as well as OMNI mode, whereby all MIDI data is received regardless of the MIDI send channel.

The following table shows the specific channel and OMNI settings of the small switches labeled 1, 2, 3, 4 and 5 on the larger piano-type DIP switch.

MIDI-channel:	1:	2:	3:	4:	5:	6:
OMNI	OFF	XX	XX	XX	XX	XX
CH 1	ON	OFF	OFF	OFF	OFF	XX
CH 2	ON	OFF	OFF	OFF	ON	XX
CH 3	ON	OFF	OFF	ON	OFF	XX
CH 4	ON	OFF	OFF	ON	ON	XX
CH 5	ON	OFF	ON	OFF	OFF	XX
CH 6	ON	OFF	ON	OFF	ON	XX
CH 7	ON	OFF	ON	ON	OFF	XX
CH 8	ON	OFF	ON	ON	ON	XX
CH 9	ON	ON	OFF	OFF	OFF	XX
CH 10	ON	ON	OFF	OFF	ON	XX
CH 11	ON	ON	OFF	ON	OFF	XX
CH 12	ON	ON	OFF	ON	ON	XX
CH 13	ON	ON	ON	OFF	OFF	XX
CH 14	ON	ON	ON	OFF	ON	XX
CH 15	ON	ON	ON	ON	OFF	XX
CH 16	ON	ON	ON	ON	ON	XX

MIDI controller access permission set with the small switch labeled '6' on the larger piano DIP switch:
Setting the small switch labeled '6' to ON enables the MIDI controller access capability for certain Amp functions.
Setting the small switch labeled '6' to OFF disables the MIDI controller access capability for certain Amp functions.

A tip from the designer:
As the table indicates, the small switch labeled '1' switches between Poly and OMNI mode. Bear this in mind for practical applications, because this is a fast way to go from a preset Poly channel to OMNI mode and vice versa.

MIDI Controller, Amp Mute
The small switch labeled '6' on the larger piano DIP switch determines if the amp accepts MIDI commands so that MIDI controllers #7 or #28 can be used to mute it. These controllers send an Amp Mute command when assigned a value of 5 or greater. A value of 0 to 4 deactivates the Amp Mute command, thereby unmuting the amp and reactivating at its current MASTER volume setting.
Note:
You cannot deactivate Amp Mute to activate the amp via an appropriate MIDI controller #7 or #28 command when Standby is engaged to switch the power amp off. You must first flip the Standby switch.

You can control the programmable functions Sound (1), FX Loop I/II (16), Noise Gate (17), High Gain (19) and Master A/B (34) as well as Amp Mute directly using controller

MIDI commands (HEX: Bn). To enable MIDI control, you must set small switch labeled '6' on the larger piano DIP switch (46) to ON. See page 20 for details on how to do this. The following table lists amp functions and their assigned MIDI controller numbers.

Fuctions INVADER:	MIDI Controller:	Cntrl value 0 - 4:	Cntrl value 5 - 127:
Master A/B	controller #14	off	on
High Gain	controller #22	off	on
Noise Gate	controller #24	off	on
Amp Mute	controller #7, #28	off	on
Sound	controller #29	off	on
FX Loop I/II	controller #30	off	on

Cntrl value: Controller value, 0 to 4: Function off or 5 to 127: Function on

47 Footswitch: Serial Amp Control Port

This serial data input accepts the Custom ENGL Z-9 Footswitch (optional), which lets you control various amp functions remotely. Connect the Z-9 Footswitch to the amp port using a cord equipped with stereo ¼" jack plugs. This MIDI-enabled foot board is a custom design that switches every amp feature designated as footswitchable in this manual. To learn if a given feature may be controlled remotely, refer to its description herein. The MIDI In port (44) is disabled when the Z-9 Footswitch is connected. A configuration table for assigning the ENGL INVADER's sound-shaping and special functions to the Z-9 Custom Footswitch's buttons is printed on page 38.

CAUTION: Connect only the ENGL Z-9 Footswitch to this (1/4") 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!

A tip from the designer:

The Custom Z-9 Footswitch was designed with the non-MIDI guitarist in mind. It's sure to delight if you don't or won't use MIDI systems. Based on a rather nifty switching concept, it provides direct access to the four channels. It also lets you control any other two switchable amp functions, for example, Master A/B, FX Loop I/II, High Gain, etc. Another tremendous benefit of this microcontroller-driven foot board 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 foot board 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 foot board 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 foot board will work and in fact is likely to damage the foot board or amp's circuitry!

48 Footswitch: Channel Up < > Down, 1< >3 / 2< >4

Use this jack to connect a conventional footswitch with two switching functions (for example, the ENGL Z-4) that let you access the four channels Channel 1, Channel 2, Channel 3 und Channel 4. Read Up and Down to mean switching among channels

arrayed at the top and bottom of the amp's front panel. One button switches between the top and bottom channels (Channel 1 and Channel 2 or Channel 3 and Channel 4), while the other activates Channel 1 or Channel 3 and Channel 2 or Channel 4. The onboard channel switching facility, is disabled when you plug a footswitch into this jack. The MIDI In port (44) and the Z-9 Port (47) are both disabled when a plug is connected to this jack.

Note also: A footswitch may be equipped with LEDs indicating the given switching status. Each of the two switches is provided with 15 milliamperes current, which suffices to power a standard LED. The stereo jack plug's mono contact (tip) controls up and down channel selection (CH1 < > CH2 and CH3 < > CH4), while the other contact (ring) controls CH1 < > CH3 and CH2 < > CH4 channel selection. For details on wiring, see Pin Assignments on page 35.

49 Threshold Level
Use this knob to set a threshold value (that is, the noise level) at which the Noise Gate activates to suppress the signal. The further you twist the knob to the right, the higher the signal level at which the Noise Gate kicks in. The Noise Gate can be activated and deactivated as required for Channel 2, Channel 3 and Channel 4 by pushing the front panel button (17).

A tip from the designer:
The Low and High Gain options generate different levels of noise, and I tuned the ENGL INVADER's Noise Gate accordingly. However, there is some minor matching variance between the two. High Gain stands to benefit most from the Noise Gate, so I suggest that you tweak its two knobs for this mode. See page 26 for more information.

50 FX Loop I Send
Connect this FX Loop I output to a signal processor's input/return jack using the shortest possible shielded cord equipped with 1/4" plugs. Activate and deactivate it via the FX Loop I/II (16) button, which switches between these two loops. In the signal path, FX Loop I is located post preamp and pre the two power amp Master knobs.

51 FX Loop I Return
Connect this FX Loop I input to a signal processor's output/send jack using the shortest possible shielded cord equipped with 1/4" plugs. Activate and deactivate it via the FX Loop I/II (16) button, which switches between these two loops. In the signal path, FX Loop I is located post preamp and pre the two power amp Master knobs.

52 Balance
FX mix control for FX Loop I. 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!

53 FX Loop II Send

Connect this FX Loop II output to a signal processor's input/return jack using the shortest possible shielded cord equipped with 1/4" plugs. Activate and deactivate it via the FX Loop I/II (16) button, which switches between these two loops. In the signal path, FX Loop II is located post preamp and pre the two power amp Master knobs.

54 FX Loop II Return

Connect this FX Loop II input to a signal processor's output/send jack using the shortest possible shielded cord equipped with 1/4" plugs. Activate and deactivate it via the FX Loop I/II (16) button, which switches between these two loops. In the signal path, FX Loop II is located post preamp and pre the two power amp Master knobs.

55 Balance

FX mix control for FX Loop II. 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!

56 Low / High Gain - Volume Ratio Control: Channel 1

This knob adjusts the balance of volume levels between Channel 1 in Low Gain mode and Channel 1 in High Gain mode. Its setting affects Channel 1 in High Gain mode only. The volume level of Channel 1 in Low Gain mode is determined by the Channel 1 Volume knob (6) setting. Use knob 56 to dial in the relative volume to Channel 1 in High Gain mode.

57 Low / High Gain - Volume Ratio Control: Channel 2

This knob adjusts the balance of volume levels between Channel 2 in Low Gain mode and Channel 2 in High Gain mode. Its setting affects Channel 2 in High Gain mode only. The volume level of Channel 2 in Low Gain mode is determined by the Channel 2 Volume knob (24) setting. Use knob 57 to dial in the relative volume to Channel 2 in High Gain mode.

58 Low / High Gain - Volume Ratio Control: Channel 3

This knob adjusts the balance of volume levels between Channel 3 in Low Gain mode and Channel 3 in High Gain mode. Its setting affects Channel 3 in High Gain mode only. The volume level of Channel 3 in Low Gain mode is determined by the Channel 3 Volume knob (12) setting. Use knob 58 to dial in the relative volume to Channel 3 in High Gain mode.

59 Low / High Gain - Volume Ratio Control: Channel 4

This knob adjusts the balance of volume levels between Channel 4 in Low Gain mode and Channel 4 in High Gain mode. Its setting affects Channel 4 in High Gain mode only. The volume level of Channel 4 in Low Gain mode is determined by the Channel 4

Volume knob (30) setting. Use knob 59 to dial in the relative volume to Channel 4 in High Gain mode.

60 Pre Out
This is the INVADER's preamp auxiliary out. It delivers a signal with almost the same level and frequency response as the signal patched into the amp's input. A low-impedance circuit, Pre Out is great for applications like addressing a guitar tuner. The Pre Out signal is patched out to jack 60 even when Amp Mute is engaged. It can also serve as an effect device send, whereby the amp's preamp (EQ and gain stages) is bypassed.

61 Line Out
This jack taps into the power amp circuit to retrieve its signal. The frequency response of the Line Out's and the Power Amp Output's signals are identical (Line Out is not frequency-compensated). Use it to do things like drive another linear power amp or frequency compensation filter, say to simulate a 4/12 cabinet and feed this signal to a recording system or PA.

62, 63 Poweramp Output, 4 Ohms Parallel
4 ohms speaker output jacks, internal connected parallel. For diverse cabinet options see the chapter Cabinet options on page 24 and 25 !

64, 65 Poweramp Output, 8 Ohms Parallel
8 ohms speaker output jacks, internal connected parallel. For diverse cabinet options see the chapter Cabinet options on page 24 and 25 !

66 Poweramp Output, 16 Ohms
16 ohms speaker output jack. For diverse cabinet options see the chapter Cabinet options on page 24 and 25 !
IMPORTANT NOTE, please read and heed: Never operate the power amp without a sufficient load, otherwise you may damage or destroy it!
An electronic surveillance system constantly monitors if a plug is inserted into the speaker outputs 4 ohms (62, 63), 8 ohms (64, 65) and 16 ohms (66). If a plug is not inserted into one of these 5 jacks, the power amp is disabled and the Status LED flashes in a distinctive pattern to alert you to this. However, the system cannot check if a speaker is actually connected to the other end of the cord. That's your job.
Always check and verify that the amp's output impedance matches the connected cabinets' impedance!

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.

A few words from the designer on your ENGL INVADER II Amp's sounds and settings as well as some practical tips:

On the Subject of Sounds and Settings

A lot painstaking attention to detail and a great deal of time went into tuning this novel amp head. You'll find that the four channels' gain ranges overlap a bit. There's definitely some similarity at the crossover points. Channel 1 and Channel 2 share some common ground, as do Channel 3 and Channel 4. This is intentional, and serves some very sensible sound-sculpting purposes. Higher Gain settings in the 12-to-3 o'clock range push Channel 1 into moderate overdrive, depending on how hot your pickups are. Activating High Gain propels this channel into the dirt zone that much earlier. This means you can use this channel for ultra clean chord work or for grittier riffs and leads, with the amount of dirt hinging upon how hard you attack the strings. If you add the guitar's volume knob to the sonic equation, you get a vast spectrum of subtle tonal variations in just this one channel. The same goes for Channel 2: Its spectrum ranges from clean with the Gain knob set to around 1 o'clock or lower, again depending on the pickup, to a touch of vintage-style grit with Gain when set no higher than about 3 o'clock. At higher Gain settings and with High Gain activated, hotter pickups such as humbuckers will even serve up enough oomph for punchy leads. Channel 1 and Channel 2 are voiced differently, with Channel 2 eliciting a slightly different frequency response.

The four channels' tone controls also respond differently, so I suggest you perform an initial sound-check by setting the knobs between 10 and 2 o'clock and auditioning the results. This amp employs passive EQ. Note that its range is narrower than a comparable active EQ. I opted for passive tone controls simply because they sound sweeter in combination with tubes.

Note that High Gain mode affects all preamp channels. This lets you conjure two sounds with markedly different gain structures and voicings for each channel.

This successor model is not just INVADER "I" reloaded. All four channels' sound structures have been modified somewhat, so let's take a closer look at the four channels' gain ranges:

Channel 1 in Low Gain mode is relatively sedate and great for conjuring sweet, squeaky-clean tones. It won't start to break up until you dial in relatively high gain levels, which will just roughen up the edges of the preamp signal. This channel sounds very warm with midrange frequencies figuring prominently.

Channel 1 in High Gain mode elicits moderate preamp clipping to conjure dynamic, slightly distorted sounds.

Channel 2 in Low Gain mode is a bit hotter than Channel 1. It starts clipping at lower levels and reaches the overdrive zone that much faster. It's also voiced differently so you can get a slightly different flavor of clean tone than that of Channel 1.

Channel 2 in High Gain mode is perfect for dialing in typical vintage tone. At Gain knob settings beyond 1 o'clock, you'll get that classic midrange-laden overdrive. Cranking the knob further takes you deeper and deeper into heavy distortion territory, especially in combination with higher power amp volume levels.

Channel 3 in Low Gain mode gives you far more gain than Channels 1 and 2, and still a good bit more than Channel 2 in High Gain mode. Preamp saturation kicks in at Gain knob settings as low as around 8 o'clock.

Channel 3 in High Gain mode notches the gain up another level from Channel 3 in Low Gain mode. It's perfect for blistering leads with oodles of sustain.

Channel 4 in Low Gain mode serves up a much bigger helping of gain than Channels 1 and 2, and still a good bit more than Channel 2 in High Gain mode. Its response is closer to that of Channel 3 in Low Gain mode. It starts clipping at Gain knob settings as low as around 8 o'clock.

Channel 4 in High Gain mode amps up the gain again so it's another step up from Channel 4 in Low Gain mode. This works wonderfully for lead lines that sustain for days.

The optional type Z-16 Sound Wizard module lets you configure yet another gain stage in each channel if you happen to need a little more sonic firepower.

Beyond that, I voiced Channels 3 and 4 differently. Channel 4's midrange is scooped, and its hair-trigger response to your string attack is fast and true. Channel 3, in contrast, packs a mightier midrange punch, but is slightly less responsive to your touch. Channel 3 demands more precise playing technique, while Channel 4 is easier to handle.

All these options harbor vast and musically meaningful sonic potential. I'm confident that the Sound and High Gain controls will let you conjure all the sounds you have in mind and that you'll discover a world of tones while you're tweaking.

Because it is chock-full of tone-tweaking tools, this truly remarkable amp is sure to surprise you time and again as you discover new tonal territory. However, don't be intimidated by its sophistication. At ENGL, ease of use is paramount. We design all our amps so that players can dial in great sounds from the start - without hours spent researching the manual and struggling with settings. Despite being so easy to use, the ENGL INVADER II amp puts a mind-boggling array of sound-shaping resources into the hands of the innovative, creative guitarist. And I am convinced that guitarists with more traditional leanings are equally well-served with this amp's smorgasbord of tasty tube tone!

A few comments on the Noise Gate:

The advantage of a Noise Gate that is installed in and matched to the amp is that it lets you fine-tune its threshold with extreme precision, thereby separating the useful, musical signal from useless background noise. Indeed, this Noise Gate was designed to address the signal the most beneficial spot in the signal chain - the preamp - to make it

more effective. First and foremost, it is designed to suppress ambient noise such as hissing and humming during breaks when the Preamp is in High Gain mode. For this reason, I tuned its threshold (that's the level at which the gate triggers) range to suit this amp mode, and then adjusted it for Low Gain (High Gain deactivated) configurations. To get acquainted with how the Noise Gate works, I suggest you start by setting the Threshold knob to the far left (Noise Gate opens at low signal levels) and slowly twist it clockwise to gradually raise the gate's trigger threshold. When the knob arrives at the far right position, the Noise Gate will not trigger until the signal reaches a very high level. This means that the preamp must amplify the guitar signal considerably to open up (or deactivate) the Noise Gate. In practice, your best bet for suppressing loud noise when running channels 2, 3, and 4 at high Gain levels is to set the Threshold knob higher than 12 o'clock. If you're doing the low-gain thing in Low Gain mode, dial in a lower Threshold setting (below 12 o'clock) to prevent the gate from throttling notes (that is, the musically useful sounds) as they decay, particularly if you like to work the guitar's volume knob.

On the subject of effect loops:
An interesting configuration option is to run the INVADER's internal preamp with or without an effects device. In this variant, FX Loop I serves as a nifty, MIDI-controlled hardware bypass. Another possibility is to connect two effect devices one each to FX Loop I and FX Loop II - and assign them freely to the preamp channels.

Electronic safety systems:
We endowed the amp with MIDI functionality and programmable settings, which mandate a microprocessor. This afforded me the opportunity to put that processor to even better use and employ it to power a couple of reassuring protection systems. One is Power Tube Monitoring, which checks every power tube individually; the other is a speaker output surveillance system designed to prevent the potentially destructive operation of the power amp without a load. For reasons of operating safely, tube amps require a load such as a speaker cabinet connected to the output. Be aware, though, that as sophisticated as these features may be, they can't relieve you of all responsibility. For example, the system can't detect if a cabinet is connected to the other end of the cord. Please make a habit of checking this before powering the amp up. As a rule, always exercise due caution when operating this baby.

Programming sounds (settings, actually) to MIDI presets:
For reasons of convenience and handling ease, we made programming sounds to MIDI presets a piece of cake. Because this amp offers many programmable switching functions, Copy is indeed a handy tool. It lets you copy the settings of one MIDI preset to another. You'll come to appreciate its utility when you begin programming your own presets. Dumping a stored setup from one MIDI preset to another, and editing and storing changes in the target preset, is so must faster and more convenient than programming from scratch every time. MIDI preset 1 is called up automatically when you switch the amp on. This ensures that when you power up, the settings for programmable sound-shaping functions are immediately enabled in the configuration stored in the most recent programming session - without having to first connect a MIDI foot board.

The programming process in steps:
1. Select the desired MIDI program (also called a preset or patch) using a MIDI foot board connected to the amp's MIDI In (44).
2. Select the desired preamp channel (CH1, CH2, CH3 or CH4) and set all programmable features as required, configuring Sound (off or on), High Gain (Low Gain or High Gain), Master A/B (Master volume control A or B), Amp Mute via Stand By and so forth as you please. All programmable functions are designated as such in their descriptions herein. Hint: settings on the SWM control panel are not programmable.
3. The Status LED flashes to indicate you have edited one or several settings.
4. Press and hold the Write/Copy button (35) for about one second until the Status LED extinguishes, and then flashes three times in rapid succession. The selected preamp channel and the current settings of all programmable functions are now stored in the selected MIDI patch.

Copying:
1. Select the desired MIDI preset using a MIDI foot board connected to the amp's MIDI In (44) port. This is the preset that you want to copy, which is why in geek-speak it is called the "source."
2. Press the Copy/Write button briefly. It is essential that during this routine you do not change the settings of programmable functions in the selected source preset. That Status LED lights up continuously to indicate that Copy is activated.
3. Select the target preset via the MIDI foot board; you have approx. 30 seconds to do this. (The amp automatically quits Copy mode 30 seconds after it is activated.)
4. Press and hold the Write/Copy button (35) until the Status LED extinguishes, and then flashes three times in rapid succession. The current settings of all programmable functions and the current preamp channel stored in the source MIDI patch (that's the preset you selected first when you activated Copy) have now been dumped to the newly selected target preset.

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 10 minutes or so will do to 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 of 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) 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 front 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 (86°F) 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.

Glossary

MIDI Preset:
In this manual, MIDI programs are called presets and patches.
Though the MIDI standard defines program numbers 000 to 127, almost all MIDI devices and foot boards indicate and control these programs using a 1-to-128 numbering scheme.
MIDI Channel:
MIDI specifications define 16 channels for sending and receiving MIDI data. The small switches labeled 1, 2, 3, 4 and 5 on the larger piano-type DIP switch 46 on the back of the amp determine the MIDI data receiving channel.
MIDI channels: 1 to 16, or OMNI (meaning that all 16 channels receive MIDI data).
MIDI Controllers:
The MIDI specification calls for 128 controllers numbered 000 to 127. The amp's built-in MIDI system can process select MIDI controller data to switch certain functions off and on as described on page 20 and 21.
If you wish to take advantage of this option, you will need a suitable MIDI foot board such as the ENGL Z-15 that is able to send MIDI controller data with the specific controller numbers assigned to the amp's functions (see the table on page 21). You will

have to set small switch labeled '6' on the larger piano DIP switch 46 on the back of the amp to ON to gain access to the amp's functions via MIDI controllers.

Power Tube Monitor:
An electronic surveillance system that monitors each power tube's current and shuts the given tube down when it detects a value that is too high.

The Status LED above the Write/Copy (35) button indicates the following conditions:

1. Memory error (possibly a defect in the EEPROM); Indication: LED flashes in five short bursts; What to do: Press the Write/Copy button (this resets the LED, but does not solve the problem).

2. No speaker connected; Indication: The LED flashes in a distinctive pattern, illuminating briefly at regular intervals; What to do: Connect a speaker.

3. A programmable function's (or functions') setting(s) has (have) been edited; Indication: LED flashes regularly; What to do: If desired, restore this MIDI preset's original configuration (e.g. by selecting it again); the Status LED also extinguishes once the new setting has been stored.

4. Copy process was activated by pressing the Write/Copy button; Indication: LED lights up continuously; What to do: If desired, cancel the Copy operation by changing the setting of a programmable feature; the Status LED also extinguishes once the preset has been copied.

5. Power Tube Monitor: A problem or overload in power tube V1; Indication: LED flashes in 1 short burst, followed by a longer pause, etc.; What to do: Activate and deactivate Standby after a brief pause; further information on page 17 and page 18 (Stand By).

6. Power Tube Monitor: A problem or overload in power tube V2; Indication: LED flashes in 2 short bursts; What to do: Activate and deactivate Standby after a brief pause; further information on page 17 and page 18 (Stand By).

7. Power Tube Monitor: A problem or overload in power tube V3; Indication: LED flashes in 3 short bursts; What to do: Activate and deactivate Standby after a brief pause; further information on page 17 and page 18 (Stand By)..

8. Power Tube Monitor: A problem or overload in power tube V4; Indication: LED flashes in 4 short bursts; What to do: Activate and deactivate Standby after a brief pause; further information on page 17 and page 18 (Stand By).

Troubleshooting

Programmable features 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 that is, the chip is still hung there is a defect in the control system (presumably on the logic board holding the microcontroller). In this case, consult an authorized service center or a professional specialist.

The amp fails to respond when you try to switch presets via MIDI foot board.
-> Is the MIDI foot board connected to the MIDI In port (44)?
-> Is the MIDI cord you are using intact and wired properly? (Refer to page 35 for pin assignments.)
-> Is the amp set to the MIDI channel over which the MIDI foot board is sending program change commands? You can set the DIP switch (46) to OMNI reception to check if the preamp is actually receiving data.
-> Is another foot board (the ENGL Z-9 or a two-way footswitch) connected and therefore blocking MIDI reception?

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 (62, 63), 8 Ohms (64, 65) or 16 Ohms (66)?
-> Is the power amp activated (Standby switch to ON)? Standby / power amp off => The Mute LED (36) on the front panel indicates the Amp Mute status.
-> 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 channels CH2, CH3 or CH4 and the Threshold (49) knob set to a high value? Deactivate the Noise Gate (17) 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.
-> Did you select a MIDI preset programmed with Amp Mute enabled? The front panel Mute LED (36) lights up to indicate Amp Mute is active.
-> Did you send via MIDI foot board a MIDI controller #7 (or #28) command with a value more than or equal to 5? This activates Amp Mute, thereby silencing the amp. The front panel Mute LED (36) lights up to indicate Amp Mute is active.

-> 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 loud humming noises:
-> Is the Ground Lift switch (42) set to Ground? If you are operating the
   amp without other grounded gear (power amp, effect devices) connected,
   this switch must be set to the Ground position; otherwise, it's goodbye silence,
   hello humming! In this case, the amp will hum even without a guitar connected.
-> 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.
-> Note that feeding the amp's signal via the Out (60) or Line Out (61) jacks to a
   tuner or ancillary power amp may create a ground loop. Set the Ground Lift (41)
   switch to the Ground Floated position.

**Issues or problems when switching channels or the Sound (1) and High Gain (19)
functions:**
-> If the Sound Wizard module is installed and enabled on the amp,
   first disable the Sound Wizard and then try switching that function again.
-> If that doesn't fix the problem, try detaching the Sound Wizard module from
   the amplifier by unplugging the connection between the two. To do this,
   first disconnect the amp from the mains power, let it cool down if it was
   powered up, and remove the rear panel by unfastening the screws and turning
   the left release lever on the box header to the left and the right lever to the
   right to release the IDC connector.
   Replace the rear panel and then try switching that function again.
-> If this fails to rectify the problem, definitely take the amp to an authorized
   service center staffed with professionals who earn their living handling
   screwdrivers and soldering irons.

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 after a brief pause.
-> 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).

Technical Data

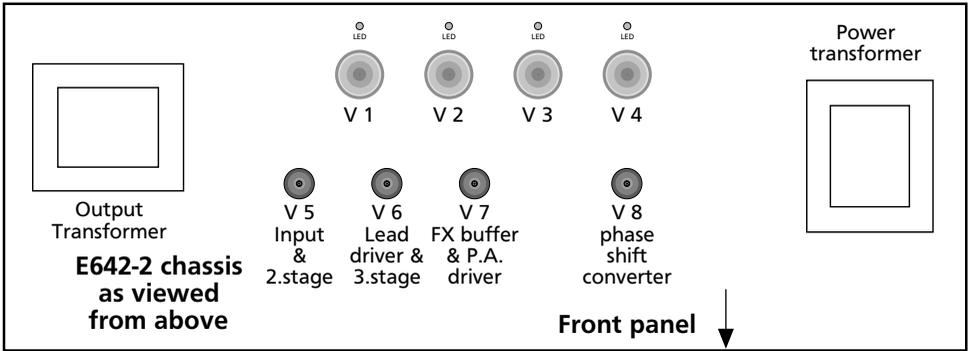|	
Output power:	approx. 100 watts; adjusted accordingly to 4, 8 and 16 ohms;
Input sensitivity	
Input:	from -20 dB, nominal, max. 0 dB
Effect Return:	from -20 dB nominal, max. 0 dB
Output level	
SEND, level range:	from -20 dB to approx. 0 dB max.
Pre Out:	-17 dB bis ca. + 3 dB max.;
Line Out:	approx. 0 dB at nominal power output;
Power consumption:	approx. 400 watts max.;
Fuses:	
Mains fuse:	
at 220/230/240 mains voltage	2 ATL (2 amps slo-blo)
at 100/115/120 mains voltage	4 ATL (4 amps slo-blo)
Important:	**Replace these with fuses of the same type and rating only!**
Tubes:	
V1, V2, V3, V4:	EL34, matched sets;
V5:	ECC83 F.Q., input tube;
V6, V7:	ECC83 selected;
V8:	ECC83 standard;
Consult Tube Map	Replace tubes with selected sets only!
to view tube array	
Logic control system:	AT89C52 µC with internal 8K Flash Memory for
Processor, software:	software source code; Upgradeable with external Programmer;
Memory:	EEPROM 93C66 for data retention;
System interfaces:	
MIDI:	Asynchronous data protocol according to the MIDI standard; MIDI program changes 0 - 127; MIDI channels 1 - 16 MIDI controller #7, #14, #22, #24, #28, #29, #30 value 0 - 4 Function deactivated, value >/= 5 Funktion activatedt;
Serial Amp Control:	Proprietary ENGL asynchronous data protocol.
Dimensions:	approx. 71 x 28 x 29 cm (l x h x d); approx. 27.95 x 11 x 11.4 in;
Weight:	approx. 22,5 kg, 49.6 lb;

Tube Map, INVADER II amplifier:

	○ LED	○ LED	○ LED	○ LED
Output Transformer	V 1	V 2	V 3	V 4
	V 5	V 6	V 7	V 8

Output
Transformer

**E642-2 chassis
as viewed
from above**

V 5
Input
&
2.stage

V 6
Lead
driver &
3.stage

V 7
FX buffer
& P.A.
driver

V 8
phase
shift
converter

Power
transformer

Front panel ↓

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: _

Wiring of Principal Connectors

MIDI In (44), DIN connector

Pin 3 - N.C.

Pin 1 - power supply approx.11 volts AC *

Pin 5 - MIDI-data wire

Pin 4 - MIDI-data wire

Pin 2 - power supply approx.11 volts AC *
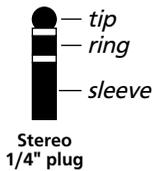
page: 19
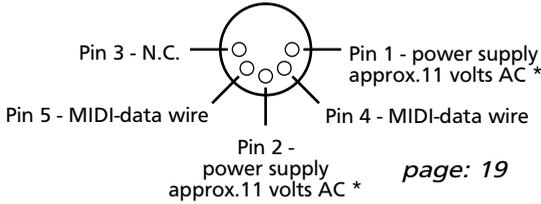
*: AC voltage is routed to pin 1 and 2 only when the slide switch 45 is set to ENGL MIDI Footcontroller.

Serial Amp Control Port (47)

Stereo 1/4" jack

ring: Data

Very important: use a stereo plug only! Connect ENGL Custom Z-9 Footswitch only!

tip: + 5 volts

sleeve: Ground, GND

page: 21

Dual Footswitch (48)

Stereo 1/4" jack

ring: CH 1< >3 / 2< >4

Use a stereo plug only!

tip: Up/Down

sleeve: Ground, GND

page: 21

— *tip*
— *ring*
— *sleeve*

Stereo 1/4" plug
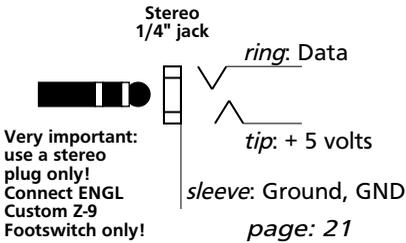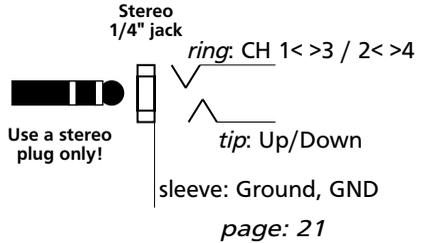
Options for controlling the ENGL INVADER II amp remotely:
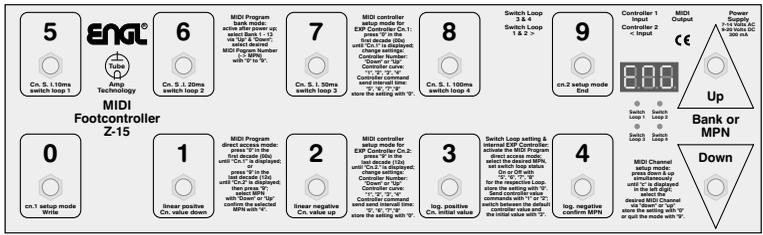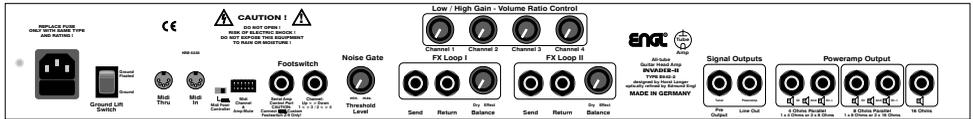
**1. MIDI foot board (for example, the ENGL Z-12 or ENGL Z-15 pictured above):** Connect the foot board to the amp using a standard 5-pin DIN cable. All 5 terminals of both connectors must be wired in a 1:1 configuration: MIDI data transmission requires two wires, and the ENGL MIDI foot board uses two more wires for purposes of power supply. This combination affords access to all of the amp's 128 MIDI presets.
The Z-15 foot board also lets you control *Amp Mute* via MIDI controller #7, see page 20.
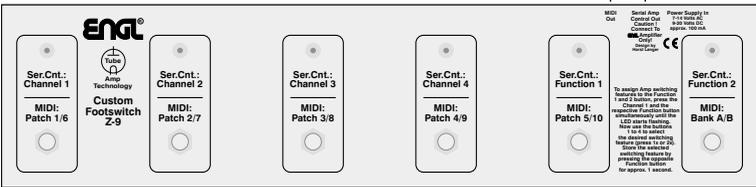
2. ENGL Custom Z-9 Footswitch: This special foot board connects to the amp via a ¼″ stereo cord plugged into the Serial Amp Port (47) or via a 5-pin DIN cord plugged into the MIDI In port (44). The former option affords switching access to channels and two special functions (for example, *High Gain* or *FX Loop I/II*), the configuration table is shown on page 38. In the latter setup, the Z-9 serves as a MIDI foot board that accesses the first 10 MIDI presets.

3. Two-way footswitch (e.g. ENGL Z-4): Connect two-way footswitches to the amp by plugging a stereo ¼ " cord into jack no. 48.
Functions: Channel switching Up/Down (CH1 < > CH2, CH3 < > CH4) and CH1 < > CH3, CH2 < > CH4; see page 21 chapter 48 for more details.
This does not afford direct access to each of the four channels.
As an alternative to a two-way footswitch, you can connect a MIDI switcher (the ENGL Z11-S.A.C. will do nicely) to this jack (48) to control the two switching functions.
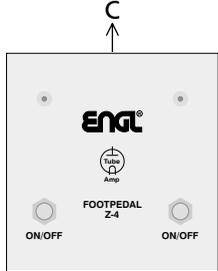
Noting Settings:
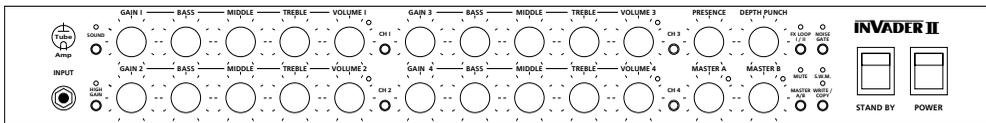
Sound title: _ Preset: _ _ _ _ _ _ _ _
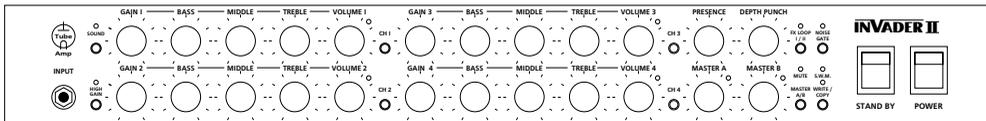
comment: _

Sound title: _ Preset: _ _ _ _ _ _ _ _
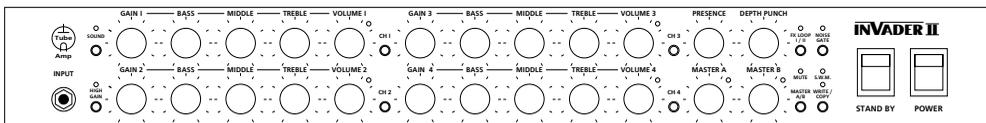
comment: _

Sound title: _ Preset: _ _ _ _ _ _ _ _
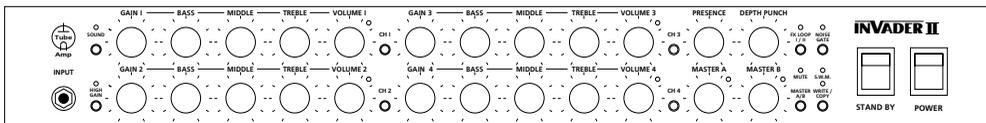
comment: _

Sound title: _ Preset: _ _ _ _ _ _ _ _
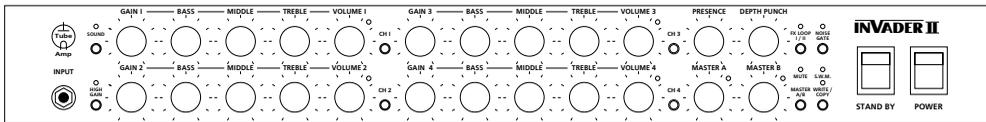
comment: _

Sound title: _ Preset: _ _ _ _ _ _ _ _

comment: _

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

Button	Functions INVADER 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	no	1: Channel 3	LED 3 lights	F1-3
Function 1	no	1: Channel 4	LED 4 lights	F1-4
Function 1	no	1: Channel 1	LED 1 flashes	F1-5
Function 1	High Gain	1: Channel 2	LED 2 flashes	F1-6
Function 1	no	1: Channel 3	LED 3 flashes	F1-7
Function 1	Noise Gate	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	Amp Mute	2: Channel 4	LED 4 lights	F2-4
Function 2	no	2: Channel 1	LED 1 flashes	F2-5
Function 2	Sound	2: Channel 2	LED 2 flashes	F2-6
Function 2	FX Loop I/II	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 INVADER II 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 ENGL INVADER II 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 Z-9 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 INVADER's FX Loop I/II switching feature is currently assigned to
  Function 2; the corresponding S.A.C. command is F2-7. The Function 2 button
  of the Z-9 will remote control FX Loop I/II on the amp.
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.

INVADER II: Front Panel Layout

page:

>6<

INVADER II

Tube Amp

INPUT

SOUND

HIGH GAIN

GAIN 1 BASS MIDDLE TREBLE VOLUME 1 GAIN 3 BASS MIDDLE TREBLE VOLUME 3

GAIN 2 BASS MIDDLE TREBLE VOLUME 2 GAIN 4 BASS MIDDLE TREBLE VOLUME 4

CH1 CH2 CH 3 CH 4

PRESENCE DEPTH PUNCH

MASTER A MASTER B

FX LOOP 1/II NOISE GATE

MUTE MASTER A/B S.W.M. WRITE /COPY

STAND BY POWER

18 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 38 39

19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

page: 11<   <— 12 —>   <— 13 —>   <— 14 —>   > 15 <   <—16 —>   >18<   > >11

INVADER II: Rear Panel Layout

page:

Type Plate

REPLACE FUSE ONLY WITH SAME TYPE AND RATING !

CE

CAUTION !
DO NOT OPEN !
RISK OF ELECTRIC SHOCK !
DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE !

Ground Lift Switch

Ground Floated Ground

Midi Thru Midi In

Footswitch

Noise Gate

Threshold Level

Low / High Gain - Volume Ratio Control

Channel 1 Channel 2 Channel 3 Channel 4

FX Loop I FX Loop II

Send Return Dry Effect Balance Send Return Dry Effect Balance

Signal Outputs

Pre Output Line Out

Poweramp Output

4 Ohms Parallel 8 Ohms Parallel 16 Ohms

ENGL

All-tube Guitar Head Amp
INVADER II
TYPE E640-2
designed by Front Langer optionally refined by Edmund Engl
MADE IN GERMANY

Tube Amp

40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66

<— 18 —>   <— 19 —>   <- 21 ->   <— 22 —>   <— 23 —>   <——— 23 ———>   <——— 24 ———>

39

ENGL ®

Tube Amp Technology

ENGL Gerätebau GmbH
Germany
Internet: www.engl-amps.com

Text, design, graphics and layout by
Horst Langer, ENGL Amp Designer
Photography INVADER II Amp: Stefan Wibbeke