

SUPER STANDARD
&
MINI-MARSHMALLOW
Operating Manual

This manual applies to the London Power models:
“SUPER STANDARD Vacuum-Tube Preamplifier”
“MINI-MARSHMALLOW Vacuum-Tube Preamplifier”
musical instrument preamplifier models manufactured from 2016 onward

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Section-1: WARNING

RISK OF SHOCK

Electronic amplifiers are powered from the AC mains distribution. High AC voltages and AC currents are present in the chassis and constitute a risk of shock to the user. Lethal power levels are available from the mains. Keep hands clear of mains wiring.

HIGH VOLTAGE

Vacuum tube electronic circuits operate at high voltages. High DC voltages are derived from high AC voltages and both represent a significant shock hazard. Injury and death may result from contact with these voltages. Keep hands clear of secondary wiring and high-voltage circuitry.

RISK OF SHOCK FROM UNPOWERED EQUIPMENT

Capacitors can store electric charge for very long time periods. Electronic equipment that is unplugged from the mains and has not been powered for days can still hold enough charge to cause injury or death. Carefully discharge capacitors using recommended techniques (not shorting) prior to working on the unit. **London Power's products incorporate automatic discharge circuits so that internal voltages will be reduced to near-zero within minutes of power-'off'**

FIRE RISK

Electronic equipment creates heat during operation. Proper air circulation and/or fan cooling will remove this heat from the unit. Do not obstruct ventilation or otherwise impede heat removal. Do not defeat protection circuitry or any devices such as fuses, current limiters, temperature monitors, fan servo circuits, or power reduction circuits.

HOT SURFACES

Electronic devices and chassis containing them can become hot to the touch. Avoid contact of skin with these surfaces as severe injury can result. Tube envelopes can be 250°C at their hottest point. Soldering iron temperatures approach 450°C.

SOLDER FUME & MATERIALS HAZARD

Solder used to secure electronic devices contains tin and lead. Solder for electronics use also includes a resin core to clean the connection while soldering. The resin and solder create fumes that may be hazardous to health if inhaled. Exhale gently while soldering. A low-speed fan to extract the fumes is recommended. Ventilation to outside air is preferred. When wet, surface residue on electronic components may be hazardous to health. Wash hands with cold water and soap after working with electronic components.

WARNING (cont'd)

OPERATOR RESPONSIBILITY

The equipment operator must exercise due care in heeding safety advice presented in this manual. The operator must assure a proper environment to use the equipment in and a stable surface to support the equipment. Never leave equipment unattended if powered.

ERRORS AND OMISSIONS

Every effort has been made on the part of the author and the publisher to assure that the text and drawings are correct. Neither the publisher nor author shall be responsible for errors or omissions in the text, or for loss of income, injury, upset or death or any misuse or misinterpretation of the content of this text on the part of the reader.

LOUD SOUND DAMAGES HEARING

Exposure to loud sounds over extended periods of time will damage your hearing. The louder the sound, the shorter the time required to cause temporary or permanent hearing loss. Ringing in ears, numbness or pain, and feeling “deaf” are all signs that the sound was too loud for the time exposed to it. Health regulating bodies, such as OSHA, prescribe specific times for given sound pressure levels (SPL) in decibels, to provide a safety protocol for workers subjected to noisy environments. London Power finds these recommendations to be inadequate and recommends much shorter exposure times. Hearing protection should be selected and worn correctly. However, for a musical environment, the need for hearing protection is a cue that SPL is too high and other remedies should be explored first to reduce the loudness level. The use of hearing protectors impairs intelligibility of music and is counter-productive to the creation of an enjoyable Human-Scale music experience, therefore SPL should be kept below 80dB. Power Scaling assists in this goal by allowing a “loud sound” to be attained at low-SPL.

Aural compression is invoked at all SPLs and to a greater extent as loudness increases. This is our internal physiological protection mechanism and it impairs accurate sensation of the sound. Even with hearing protection in place, aural compression will interfere with our judgement of tone and is a strong motivator to use lower SPLs. Our judgement of sound is much more accurate at low-SPL than at high-SPL, contrary to common prejudice.

REFER SERVICE TO QUALIFIED PERSONNEL

This equipment should be serviced only by qualified personnel with technical expertise in dealing with high-voltage tube circuitry and solid-state circuitry. To assist in serviceability, the Super Standard / Mini-Marshmallow is built in a U-frame. This allows removal of the top and bottom covers, providing access to main-board components on one side and solder points on the other.

WARNING (con't)

WARRANTY & LIMITED LIABILITY

The manufacturer warrants this equipment for Five Years from the date of shipment against defects of workmanship and electronic component failure, excluding tubes, and reverb delay lines, and excluding failure caused by abuse or misuse of the product. London Power will not be liable for damage to other equipment or property caused by negligent use of this product, by misinterpretation of this manual, or by component failure, or by use of the equipment in inappropriate environs (rain, damp, on unstable surfaces), by faulty wiring of signal or power paths, by ground faults causing damage to this or other equipment. For warranty repair, London Power will pay for parts and return shipping. Shipping to us is the responsibility of the owner. Assure that the unit is packed correctly. Damage during shipping is not covered by warranty.

FUSES

All fuses are internal and are slow-blow types. These are 5x20mm S506-series available world-wide. Fuses should be replaced with the same type and value.

| | |
|---------|-------------------------------------|
| Mains | 63mA x2 |
| Plate | 63mA |
| Heaters | 3A x2 |
| LV | 400mA (dual-mains-range units only) |

Fuses can blow because the air inside the preamplifier is too hot, due to poor ventilation. If a fuse blows it is best to determine the cause of the failure. Replacement with a similar fuse resulting in a second fuse failure suggests further investigation is required - that something may be damaged in the preamplifier. Most often a tube replacement is required. Otherwise, refer servicing to a qualified tech.

Section-2: WIRING CONVENTIONS

The types of interconnections used between audio equipment and between that equipment and the mains is all very standard. The connection and cable requirements used by London Power products are described below.

Mains: The AC mains is connected through a male IEC chassis connector using a detachable power cord. The power cord is a 3-wire type carrying **Line**, **Neutral** and **Safety Ground** between the wall receptacle and the equipment. The wall-end of this cable has a male connector plug appropriate for the local region, and the equipment end is a female IEC connector. Replace the AC mains cable if it becomes worn, cut or pinched, or if the moulded connector ends are cracked.

DO NOT INTERFERE WITH OR DISABLE THE SAFETY GROUND !!

Speakers: Power amplifiers drive loudspeakers via heavy-wire interconnections using a 2-wire cable. This can be “lamp” or “zip” cord, or a pair of wires inside a sheathing. Loudspeaker current is high and the wire must be of sufficiently thick gauge to conduct this current without heating up. For amplifiers up to 100W, 18-gauge wire is sufficient but thicker wire (#16 or even #14) should be used if the distance between the power amplifier and the speaker is over 15m (46').

Speaker outputs on London Power equipment <100W use 1/4"-TS female connectors. The tip (T) carries the signal and the sleeve (S) is ground. Both ends of the cable should be wired identically, using male plug ends.

D.I.: “Direct-injection” outputs are typically male XLR jacks. This allows a 3-wire cable to the receiving equipment and the connection is most often “balanced”, meaning that the signal itself does not use a ground connection between the equipment; rather, the signal “floats” so that ground levels become irrelevant.

At the sending end, London Power uses a male 3-pin XLR connector fed from either a transformer providing galvanic isolation, or a balanced drive circuit producing symmetrical signals. The receiving end uses a female 3-pin XLR and either a transformer or a differential amplifier.

The sending end of the D.I. cable is a female 3-pin XLR and the receiving end is a male 3-pin XLR, wired as follows: pin-1 is the equipment ground; pin-2 is the “hot” in-phase signal; pin-3 is the “cold” out-of-phase signal. The shield is tied to pin-1.

A less costly interconnection requiring less panel space on both pieces of equipment uses 1/4"-TRS connectors and a 3-wire cable. The tip (T) is “hot”, ring (R) is “cold”, and sleeve (S) is shield and chassis ground. Connector sex same as for XLRs above.

NOTE !!! When connecting any output of this unit to a mixer, assure that phantom power is OFF.

WIRING CONVENTIONS (cont'd)

Impedance-matched: Balanced connections do not require balanced signals to function; rather, the more important parameter is to maintain balanced impedances of the two lines. This is easily attained and is less costly with respect to circuitry. The connector and cable types are the same as for the D.I. connections above.

Ground-compensated: Ground-compensated (GC) connections allow unbalanced signals to be passed between equipment without ground level difference impairment. The sending end requires a 3-wire male connector, either 1/4"-TRS or XLR. The receiving equipment can have an unbalanced 2-wire connector, such as female 1/4"-TS or female RCA phono input. The GC connection can be up to 15dB quieter than an electronically-balanced one.

A 3-wire cable must be used for the ground compensation to be effective. At the sending end, the cable is wired the same as for the XLR or 1/4"-TRS above. At the receiving end, the "hot" goes to the tip (T) of the 1/4"-TS or of the RCA phono plug, while "cold" and the shield tie to the sleeve (S) of the connector.

GC outputs can be connected through a full 3-wire cable/connectors into a balanced XLR or 1/4"-TRS input and provide an impedance-matched source signal.

Unbalanced: Unbalanced connections are also called "single-ended" or "2-wire". Generally, one wire is signal and the other is ground, as for the speaker connections above. Note that some speaker connections might be floating, as when bridge-driven. The unbalanced output is either a female 1/4"-TS jack or female RCA phono. The receiving end is identical. Guitar cables are typically 2-wire with just a single inner conductor and a shield with male 1/4"-TS plugs for both ends. Hifi connections have historically been similar cable but with male RCA phono plugs for both ends. Phono plugs and mini-plugs (1/8"-TS and 1/8"-TRS) are common in semi-pro and home studios.

SIGNAL LEVELS: Note that the connector type used for any given input or output DOES NOT denote the nominal signal level, despite common usage of certain connector types for certain nominal signal levels. Neither does the application absolutely define the signal levels.

Instrument: -20dB = 77.5mVrms = 100mVpk

Semi-pro: -10dB = 210mVrms = 300mVpk

Line: 0dB = 775mVrms = 1V pk

"1-volt" Line: +4dB = 1.1Vrms = 1.6Vpk

Section-3: RACK MOUNTING

This equipment may be rack mounted or used as a table-top device. Rubber feet are provided which bolt onto the bottom cover for table-top or shelf use. Note that the washer under the bolt-head has its round-side towards the rubber. Tighten the bolt just to the point where the rubber foot does not turn freely. **DO NOT** over-tighten.

For rack mounting, some units have a storage area on the rear panel for the rubber feet. If the unit does not have a storage position, such as on the 1U devices, place the rubber feet and their hardware in a ziplock bag and store in a safe place.

The rack-mount brackets bolt to the sides of the unit and are interchangeable from left to right. Start all four bolts before tightening any of them. The bolts should screw in freely without binding. Use appropriate bolts and washers to secure the unit to the rack rails.

Section-4: PRODUCT OVERVIEW

SUPER STANDARD and MINI-MARSHMALLOW are musical instrument preamplifiers, comprised of a tube-based tone generation section, solid-state interfacing for effects and multiple outputs, and a sophisticated switching system. Both preamplifiers are identical in their overall features and connectivity, and produce a low-gain clean sound and a higher-gain distortion sound. The different gain structures result in quite different tones, and in particular, much different saturation of distortion.

NOTE in 2017 both preamps underwent a significant design upgrade which added user-selectable gain and new voicing, dramatically extending the range of distortion even for the Low-Gain channels.

SUPER STANDARD is based on the widely used topology of the London Power Standard Preamp, as shown in *The Ultimate Tone* (1995) and used for many years prior. This arrangement produces a two-stage clean sound and a four-stage lead sound. The EQ is late in the chain allowing for high saturation levels of distortion and a very dynamic EQ.

MINI-MARSHMALLOW is also based on a widely used topology, again with a two-stage clean sound and four-stage lead path, but with early EQ. This changes the saturation level possible for the distortion and alters the EQ performance. The most famous form of this circuit was promoted by Howard Dumble, and we have used a few of his innovations here along with our own refinements to improve player ergonomics.

In both preamps, two small-signal dual-triodes create the clean and high-gain sounds. These are of the standard pin-out (9A), and can be any of 12AT7, 12AU7, 12AY7, 12AX7, 12BH7, 12BZ7, 12DF7, 12DM7, 12DT7, 12DW7, 5751, 5814, 5963, 5965, 6201, 6211, 6414, 6679, 6680, 6681, 6829, 6913, 7025, 7247, 7318, 7728, 7729, 7730, ECC-81, ECC-82, ECC-83, or any equivalents or variants. It is generally the case that types of the 12A_7 or ECC-8_ will be used, as these are what the circuit is optimised for. Others in the list above, particularly those with dissimilar sections, can provide interesting “in-between” gain levels compared to the identical-section types.

All tubes are external, accessible on the rear panel, and do not require a bias adjustment: just “plug-and-play”. To replace a tube, turn the power -OFF, gently extract the tube by rocking and pulling, then gently insert the new tube being sure to line up the gap in the pin circle on the tube and socket. When the tube is properly seated, turn power-ON. Each tube contains two triode gain sections, so swapping in different types changes two gain stages within the preamp. “Mu” is the maximum voltage gain of the tube, listed as follows:

| | |
|----------------|--------|
| 12AU7, ECC-81: | mu=20 |
| 12AY7: | mu=50 |
| 12AT7, ECC-82: | mu=70 |
| 12AX7, ECC83: | mu=100 |

Preamp tubes require about 100-hours of use to be “broken-in”. Their infant tone is brighter and harsher than their later tone, at which point, the tube is on its “tone plateau” and its performance does not change perceptibly over the rest of its life (50+ years).

PRODUCT OVERVIEW (cont'd)

The V-PRE-1 position influences both channels and creates the entire clean sound; a low- μ type will provide clean throughput at all gain settings. V-PRE-2 is dedicated to the distorted high-gain tone following V-PRE-1's contribution to boosting the signal. At the extreme of low- μ tube use, where both preamp positions are filled with 12AU7 or equivalent ($\mu=20$), a quite high control setting may be required to achieve moderate distortion. However, the low- μ tubes have a smoother, mellower sound than the high- μ types and can sound very much like older octal-based preamp tubes, where 12AX7 ($\mu=100$) can sound a bit harsh. For maximum distortion saturation, use high- μ tubes in both positions.

SUPER STANDARD has a Drive and Level control each for the Low-Gain and High-Gain sounds. The voicing and gain structure can be set to a wide variety using the voicing switches: (2016 models) three for the Low-Gain channel and six for the High-Gain channel; (2017+ models) six for Low-Gain and twelve for High-Gain. The clean sound can be cool, or warm, or “chimey”, but the Low-Gain channel can also be dialled up to quite heavy distortion levels when needed. The lead sound can be mildly over-driven, heavily over-driven, or wildly saturated to the most modern level - the latter referred to as “Zen-level” gain, as by Steve Vai, or the “Swede-style gain” as exemplified by Yngwie Malmsteen. Any tone from Chuck Berry to Black Sabbath is here. The late-EQ provides very good control over the ultimate tone, regardless of clean or saturated.

MINI-MARSHMALLOW has a Drive and Level control for each channel, but the High-Gain channel has two additional controls, Gain-1 and Gain-2. These provide intermediate control of the signal path, conferring great flexibility and a wide range of distortion textures not available in the progenitor circuits. In those original forms, it was necessary for the player to set up the Low-Gain sound first and then the High-gain sound; the extra controls on MINI-MARSHMALLOW eliminate this dependency. The early-EQ loses some of its effectiveness with higher distortion saturation, yet this is somewhat of a hallmark of this topology inasmuch as the goal was to have a sound like an over-driven Fender amplifier whose EQ would behave in precisely the same manner. The later release units have twice as many voicing switches per channel than the first release, four per channel instead of two, allowing a greater range of player control over tone and drive, plus a lot more gain for a wider range of musical application and experimentation.

London Power's design approach allows the player or studio engineer to access parameters within the preamplifier circuit which would normally be “pre-decided” by the amp designer, and thus give the operator freedom to voice the circuit as required at any given moment. Versatility is one of the design goals for all London Power products, made possible through access to heretofore unknown parameters combined with explicit encouragement to experiment with many tube types and combinations thereof. As a studio tool, SUPER STANDARD and MINI-MARSH-MALLOW can reveal new textures and tones for every session and for each new tonal requirement. For a single user, one tends to gravitate to an ultimate tone that is the signature of the player, at which point the preamp is voiced for that tone and the player uses only a few of the controls on a daily basis. It is easy at that point to feel that one has “outgrown” the preamplifier and desire to find one with just the controls being used daily. However, that endeavour may be fraught with frustration as the player now has to find a preamplifier voiced exactly as has been voiced by the player.

The Low-Gain and High-Gain sections have their own Level controls so the player can set the relative loudness. The Loud control lets the loudness of everything be raised or lowered without altering the channel balance.

PRODUCT OVERVIEW (cont'd)

Following the tube tone generator, is a highly transparent, low-noise solid-state section providing overall loudness control, an effects loop, dual main outputs with individual level controls, and a D.I. output (direct injection).

The effects loop has front-panel controls for easy adjustment, and can be used in *series* or *mixing* modes, and with pedals or processors. The Send control assures that the effect input is not over-driven, while the Return control assures that any excess output from the effect is not a problem. The rear-panel 20dB switch should be engaged when pedal-type devices are used and disengaged for line-level devices.

Series-mode effects require that the entire signal leave the preamplifier, go through the effect, and then return to the preamp. Effects of this type include phasers, tremolo, and devices that do not allow a 100% “effect” output (also called “wet”).

In mixing-mode, the “dry”, or unaffected, sound stays inside the preamp while a portion is tapped off to go through the effect. In this case, the effect is set to output only the effected sound, which is then brought back to the preamp to be mixed with the dry sound. For example, a delay that can be set to only output the echoes works very well here. A significant advantage of this type of loop is that the effect switching is handled by the preamp, which does so in a manner that had only been used in studios until around 1995 when *The Ultimate Tone* book was released. Mixing mode also assures that your sound does not disappear completely while the mixed in effect from a processor changes, during which there is often a 30ms mute.

2016 versions of SUPER STANDARD and MINI-MARSHMALLOW have a single Return, where later releases have a six-mode dual return. In mixing mode (S=out), the three functional modes of the loop are as follows:

Cable in RTN-1 only: dry to both Outs; wet to both Outs

Cable in RTN-2 only: dry in both Outs; wet in Out-2 only

Cables in both RTNs: dry in both Outs; RTN1-wet to Out-1; RTN2-wet to Out-2

With the loop in series-mode (S=in), the signal routing is as follows:

Cable in RTN1 only: FX to both Outs

Cable in RTN-2 only: FX to Out-2; no sound from Out-1

Cables in both RTNs: FX-A to Out-1; FX-B to Out-2

The D.I. output tracks the Out-2 signal but is not effected by the Out-2 level control.

Channel selection and the effects loop status are controlled from the front-panel via two switches, providing four voices overall: Low-Gain, High-Gain, Low-Gain plus effects, High-Gain plus effects. Remote control is possible using a two-button foot switch of the standard type, comprised of alternate-action push-on/off switches, and connected via the TRS-1/4" jack (3-wire; “stereo” plug). This type of foot control might

PRODUCT OVERVIEW (cont'd)

require hitting both switches at the same time to go from one voice to another, so there is also a provision to use London Power's FS4-2W foot switch box, which provides direct and random access from any one voice to any other voice for up to four voices, as SUPER STANDARD and MINI-MARSHMALLOW have, and with 2-way communication between the preamp and remote controller, detailed in the System Configuration section.

SUPER STANDARD and MINI-MARSHMALLOW can be used in various ways: connected to a stereo system, to a recording system, and/or to a guitar amp. Multiple preamps can be tied together using the Link outputs, allowing a single instrument to drive as many preamp inputs as desired without signal degradation, provided that each preamp has a Linking circuit as ours do.

SUPER STANDARD and MINI-MARSHMALLOW can be used with any type of electrified musical instrument, including guitar, bass, keyboard, or any acoustic instrument fitted with a dynamic or piezo-electric pickup. The preamp can be part of the primary tone generation path or be used to re-amplify recorded signals. It is hoped that the versatility of SUPER STANDARD and MINI-MARSHMALLOW encourages creative explorations by the studio personnel and by the player.

Section-5: CONNECTIONS

All connections are made via rear-panel jacks, except for an auxiliary input on the front panel. In a studio environment, it is common to use a patch bay for access to equipment inputs and outputs, as the jacks in the patch bay are designed for repeated insert-extract cycles. For a clean rack appearance it is preferred to have the wiring between the equipment and the patch bay at the rear, allowing clear access to all of the front-panel controls.

On SUPER STANDARD and MINI-MARSHMALLOW the front-panel instrument input over-rides the rear-panel input.

Mains: AC Mains is connected via the female IEC connector at the left-hand end of the rear panel looking from the rear. Use only an approved and intact IEC power cable with the appropriate wall-plug end for your locale. For 2016 models, assure that the RANGE switch is set to the local mains voltage and that the front-panel Mains switch is 'off' (out) prior to connection of the power cable. Use only a properly grounded AC source. 2017+ has an auto-ranging power supply that detects the mains level and configures itself accordingly.

100-120-240: (2016 models) This is the AC RANGE switch which matches the power transformer in SUPER STANDARD and MINI-MARSHMALLOW to the nominal local mains voltage. Move the slider to the correct position for the local mains voltage prior to connecting the power cable to the amplifier or to the wall socket.

100 - Japan

120 - North America

240 - Everywhere else and parts of Japan

Input: This is the instrument signal input. Use a standard guitar cable or similar fitted with 1/4"-TS male ends.

Link: This is the instrument-level signal output, which is ground-compensating and impedance-matched to eliminate ground-loop issues. Use a GC-wired cable, as described in the Wiring Conventions section, to take full advantage of this capability, or use a standard guitar cable or similar fitted with 1/4"-TS male ends to have traditional performance.

Send: This is an instrument- or line-level signal output to the external effects unit, which is ground-compensating and impedance-matched to eliminate ground-loop issues. Use a GC-wired cable, as described in the Wiring Conventions section, to take full advantage of this capability, or use a standard guitar cable or similar fitted with 1/4"-TS male ends to have traditional performance. The front-panel Send controls the level.

Return: (2016) This is an instrument- or line-level signal input from the external effects unit, which is ground-compensating to eliminate ground-loop issues. If the effect has GC outputs, use a GC-wired cable, as described in the Wiring Conventions section, to take full advantage of this capability, or use a standard guitar cable or similar fitted with 1/4"-TS male ends to have traditional performance. The front-panel Return controls the level from the external effect.

CONNECTIONS (cont'd)

RTN1, RTN2: (2017+) These are instrument- or line-level signal inputs from the external effects unit, which is ground-compensating to eliminate ground-loop issues. If the effect has GC outputs, use a GC-wired cable, as described in the Wiring Conventions section, to take full advantage of this capability, or use a standard guitar cable or similar fitted with 1/4"-TS male ends to have traditional performance. The front-panel Return controls both **RTN** jack levels from the external effect. **RTN1** feeds the **Out-1** path and **RTN2** feeds the **Out-2** path.

Out1,2: These are the main outputs of the preamp, and are ground-compensating and impedance-matched. Use a GC-wired cable, as described in the Wiring Conventions section, to take full advantage of this capability, or use a standard guitar cable or similar fitted with 1/4"-TS male ends to have traditional performance. The front-panel **Out-1** and **Out-2** Level controls the signal amplitude of the related output.

D.I.: (Direct Injection) This is an electronically-balanced impedance-matched signal taken after the entire circuit including the effects loop. The signal can be balanced or unbalanced using a 3-wire cable or 2-wire cable fitted with a female-XLR at the preamp end, then male-XLR or male-TRS-1/4" for balanced, or male-TS-1/4" for unbalanced. **D.I.** follows the signal present for **Out-2** but is not effected by the **Out-2 Level** control.

TRS-FSW: Remote control of the preamp is possible via the TRS-1/4" FSW footswitch jack. Tip (T) controls channel selection. Ring (R) controls the effects loop status. Sleeve (S) is ground. When a cable is inserted into **TRS-FSW**, the front-panel channel **Select** and effects loop **FX-On** switches are disabled. The external foot switches should be push-on/off latching types.

DIN6-FSW: The 6-pin DIN connector provides access to the channel and effects loop switching in a more sophisticated manner, allowing direct and random access from any one voice to any other in a single switch transaction. This greatly improves ergonomics for the player or studio personnel. The matching foot switch is London Power's **FS4-2W**, which the preamp provides power to and communicates with via a 6-wire cable fitted with female 6-pin DIN plugs at both ends. With no cable plugged into the **TRS-FSW**, the four-button **FS4-2W** and the preamp front panel channel and effects loop switches are all active, and channel and loop status change with switch actuations at either place. Further, additional **FS4-2Ws** can be daisy-chained for multi-station control. Further still, a single **FS4-2W** can be tied to two preamps at once and control both simultaneously, switching both preamps in the same fashion.

Because the **DIN6** carries 2-way communication, the player can control the preamp via the **TRS-FSW** but then use the **DIN6** to control other equipment via interfaces such as London Power's **QRK** switching kits, or through Arduino or similar. Similarly, the **FS4-2W** can be connected to the **DIN6** and the feed-through **DIN6** on **FS4-2W** can be linked to other equipment.

Section-6: FRONT PANEL

All of the user controls are on the front panel. There is also an auxiliary input for convenience in the control room.

Input & Select

Input: This is an unbalanced 1/4"-TS instrument input jack which over-rides the rear-panel jack. The nominal instrument-level signal (-20dB, 100mVpk) is accommodated.

Select: **Select** actuates one channel or the other, where **Select**=out activates the Low-Gain channel and **Select**=in activates the High-Gain channel. Each channel has its own status LED to indicate that it is active.

Low-Gain Channel

Drive: This control alters the signal level passed from the input stage to the second stage. For 2016 models, high **Drive** settings will create a warm clean sound to mild over-drive depending on how the voicing switches are set. For 2017+ models, high **Drive** settings will produce anything from a warm clean up to a heavy distortion sound depending on how the voicing switches are set.

Level: This control sets the loudness for the Low-Gain channel.

On (LED): The LED is lit when the Low-Gain channel is active.

1,2: 2017+ MINI-MARSHMALLOW has four voicing switches as 1,2 lower and 1,2 upper. These determine the gain and frequency emphasis of the Low-Gain channel. 2016 models have only the lower switches. Push the switch in to activate the voicing/gain element. The switches can be used in any combination. The new voicing switches access gain not previously available in the 2016 model.

1,2,3: 2017+ SUPER STANDARD has six voicing switches as 1,2,3 lower and 1,2,3 upper. These determine the gain and frequency emphasis of the Low-Gain channel. 2016 models have only the lower switches. Push the switch in to activate the voicing/gain element. The switches can be used in any combination. The new voicing switches access gain not previously available in the 2016 model.

High-Gain Channel

Drive: This control alters the signal level passed from the input stage to the second stage. For 2016 models, high **Drive** settings will create a warm clean sound, a mild over-drive or heavy distortion depending on how the voicing switches are set. For 2017+ models, high **Drive** settings will produce anything from a warm clean up to very heavy distortion - in MINI-MARSHMALLOW this is much heavier than traditional "Dumble" amps and clones achieve.

Gain1, Gain2: MINI-MARSHMALLOW has additional interstage level controls to provide complete control over the character of the overdrive sound, unlike the original HD models.

Level: This control sets the loudness for the High-Gain channel.

On (LED): The LED is lit when the High-Gain channel is active.

FRONT PANEL (cont'd)

- 3,4:** 2017+ MINI-MARSHMALLOW has four voicing switches as 3,4 lower and 3,4 upper. These determine the gain and frequency emphasis of the High-Gain channel. 2016 models have only the lower switches. Push the switch in to activate the voicing/gain element. The switches can be used in any combination. The new voicing switches access gain not previously available in the 2016 model.
- 4-9:** 2017+ SUPER STANDARD has twelve voicing switches as 4-9 lower and 4-9 upper. These determine the gain and frequency emphasis of the Low-Gain channel. 2016 models have only the lower switches. Push the switch in to activate the voicing/gain element. The switches can be used in any combination. The new voicing switches access gain not previously available in the 2016 model.

Equalisation (common to both channels)

- Low:** This control adjusts the amplitude of bass frequencies. Turn clockwise to increase and counter-clockwise to reduce bass emphasis.
- Mid:** This control adjusts the level of mid-range frequencies. Turn clockwise to increase and counter-clockwise to decrease emphasis.
- High:** This control adjusts the amplitude of treble frequencies. Turn clockwise to increase and counter-clockwise to reduce treble emphasis.

Setting both **High**, **Mid** and **Low** controls to 12-o'clock creates a close to flat frequency response with little emphasis and a small mid-dip like traditional guitar amplifier tone controls.

- Loud:** This control is similar to a true master volume where all voices of the preamp can be increased or reduced without changing their relative balance. Turn clockwise to increase and counter-clockwise to reduce overall volume.

Effects Loop

- Send:** This control sets the signal level through the rear-panel **Send** jack, in combination with the rear-panel **20dB** switch. Turn clockwise to increase and counter-clockwise to reduce overall signal level sent to the external effect.

- Return:** This control taps the signal level through the rear-panel **RTN (Return)** jack(s), in combination with the rear-panel **20dB** switch. Turn clockwise to increase and counter-clockwise to reduce overall signal level sent to the effects mixer and ultimately to the main outputs and D.I..

- FX On:** Push the **FX** switch in to engage the effects loop; the On LED will light to indicate that the loop is active. The effects loop is off when **FX** switch is out.

- Series:** This switch selects the basic operating mode of the effects loop as either “series” or “mixing”. **Series**=out is mixing mode; **Series**=in is series mode. Series mode breaks the internal ‘dry’ signal path between the tone generation part of the preamp and the main outputs, as described in the Overview section. Mixing mode allows the ‘dry’ preamp signal always to be present in both outputs, and be mixed with the effect signal as determined by the use of the Return jacks.

FRONT PANEL (cont'd)

Outputs

Level-1, Level-2: These controls set the signal level for the respective **Out** jacks on the rear panel. Turn **Level-1** clockwise to increase and counter-clockwise to reduce overall signal level sent to **Out-1**. Turn **Level-2** clockwise to increase and counter-clockwise to reduce overall signal level sent to **Out-2**.

B1,B2: These are low-frequency boosts for the respective outputs. **B1**=in engages a bass boost for **Out-1**; **B1**=out turns the boost off. **B2** functions similarly for **Out-2**.

LP1,LP2: These are high-frequency roll-offs for the respective outputs. **LP1**=in engages a treble roll-off for **Out-1**; **LP1**=out turns the filter off. **LP2** functions similarly for **Out-2**.

Mains: This is a push-on/off switch to connect the AC mains to the power transformer. Power is 'on' when **Mains** is 'in'. **Mains** 'out' is power-off. The LED will illuminate when power is 'on'.

All of the controls and switches can be set in any combination that sounds good.

Section-7: SYSTEM CONFIGURATIONS

SUPER STANDARD and MINI-MARSHMALLOW can be the basis for very simple or elaborate tone generation systems for musicians or studio personnel.

NOTE !!! Turn off phantom power to any mixer channel that does not require it !!!

In any of the configurations below, the D.I. or any output may be connected to a mixing console while other outputs are used for local monitoring, or not used at all. The presence of +48Vdc phantom voltage on the mixer input can damage most preamplifier outputs, active guitar preamps and passive guitar pickups. London Power uses high-voltage plastic dielectric output capacitors to safely block phantom voltage if it is present. Still, it is good practice to default to PHANTOM=OFF unless a specific microphone requires it.

Preamp-Only

The simplest system is to use the preamp alone to generate the complete sound, with one of the main Outs fed to a stereo, mixer or other type of monitoring system incorporating full-range loudspeakers. In this case, it is likely that the **LP1.2** filter would be employed to give a sound similar to using a guitar speaker. Such a system used live is referred to as an “ampless stage setup” as the usual back line of amplifiers and speaker cabinets for the individual instruments is not used; rather, the musicians rely on stage monitors or in-ear monitors to hear their own instrument and the rest of the band.

Similarly, the preamp alone can be used to play or practice at home through a stereo when there is no dedicated guitar amplifier. This approach actually makes one aspect of life easier for the player inasmuch as the tone does not rely on specific speakers, just the player, the instrument and the preamp, thus providing great freedom with respect to where the player can perform and still have the expected sound.

The preamp alone can be used for recording at home or in the studio and lends itself well to the “silent” recording method of monitoring through headphones. As a note here, it is never quite good enough to rely on headphones alone when recording; rather, use near-field monitors or full loudspeakers for part of the mixing process to get things right. Pure headphone mixes never sound correct through real speakers.

Preamp-only Plus Effects

In the “preamp-only” scenario, one can add effects in the effects loop and/or ahead of or after the preamp and have all of the benefits of the system described above. This applies to any other system configuration as well, inasmuch as within the alternate system type the addition of effects does not change the essence of the system.

Preamp Plus Power Amp

The preamp can be combined with a single-channel power amplifier and speaker cabinet, either full range or guitar type. With the full-range cabinet, the LP filter is useful even if the preamp is used with acoustic guitars. Since only one output of the preamp is needed to control the power amp, the other can be used for a feed o a recording console or front-of-house PA.

SYSTEM CONFIGURATIONS (cont'd)

Preamp Plus Stereo Power Amp

The preamp has dual outputs, encouraging one to build a system with two power amps which might be conveniently acquired as a standard stereo power amplifier. This system can use full range loudspeakers or guitar cabinets. When using full range speakers, the **LP** filters are useful to have a more listenable tone, similar to if guitar cabinets used. An advantage with this system is that the loudness from each PA and speaker can be controlled independently from the preamp, using the **Output Level-1/2** controls. This allows the player to “zone” the stage with higher/lower loudness for different areas as required.

Preamp Plus Guitar Amp

The preamp output can easily be sent to the input of a dedicated guitar amplifier provided the preamp **Output Level** control is set low enough not to distort the input of the guitar amp. In this configuration, the LP filters are not required if the guitar amp is a combo with built-in guitar speaker, or if the amp is a head-type plugged through a guitar speaker. However, the **LP** filter can be useful here to keep overall system hiss and harshness low.

A guitar amp with an effects loop offers the possibility of bypassing the amp’s internal preamp. If the loop has mixing capability, then the player can select between the internal and external preamps and have optimal noise control.

Preamp Plus Two Guitar Amps

Because the preamps have dual outputs, it is easy to have two guitar amps connected to the outputs with individual level control for each. The amps can be used simply to have stereo effects, or as separate wet and dry paths, or to zone the stage. If an amplifier mute is configured then one amp at a time can be activated and synchronised with the channel selection of the preamp.

Using the Preamp to Control Other Equipment

The **DIN6** connector is a 2-way communication link point and by definition can output system controls to other equipment. A 5-wire cable will provide the four system status lines plus ground, with the receiving equipment having its own local power supply. The status/control lines use a positive pulse to activate the system voice, where the pulse is approximately 5ms at 9V, requiring latching circuitry to convert to continuous enable/disable action at the receiving end. A pulse on any line should automatically cancel the status of previous pulses on any other line. London Power’s **Q-LATCH** easily handles this function. Pin assignment is as follows: 1-LG, 2-HG, 3-LGx, 4-HGx, 5-(+9V), 6-Gnd. Receiving-only input impedance should be 100k Ω . Transmitting equipment into **DIN6** should have an open-collector output referenced to +9V NOT to ground.