TRUE
systems

P2analog

2-CHANNEL PRECISION MICROPHONE PREAMPLIFIER
with M/S decoding, Direct Inputs and Stereo Phase Correlation Display

OPERATION MANUAL

Version 1.1

SAFETY and OPERATING PRECAUTIONS

Important Information:

This symbol indicates the presence of dangerous voltage within the product enclosure that presents the risk of electric shock injury. When this symbol appears next to an operation discussed in this manual, only qualified technical personnel should perform that operation.

This symbol indicates important operating or maintenance instructions that should be read carefully. Failure to observe these instructions could result in damage to the product or other property.

WARNINGS:

- **To reduce the risk of electric shock injury, do not remove the top cover or rear panel. Uninsulated dangerous voltage exists within the product's enclosure. Refer servicing to qualified personnel.**
- Do not defeat the earth ground connection in the AC power cable. Tips for eliminating ground loops are discussed in the "**TROUBLESHOOTING**" section of this manual.
- Do not operate this unit in the presence of rain, liquids or condensing moisture. Liquid entering the product enclosure presents the risk of electric shock injury. Do not touch the AC plug or enclosure with wet hands.
- Do not defeat intended AC power connection polarization.
- Do not use a damaged or excessively worn cord to connect this unit to AC power.

CAUTIONS:

- **Severe damage may be caused to your unit if the AC voltage setting is not correct for the AC power available in your area.** The voltage setting is visible on the red selector switch on the rear panel. See section on "AC Mains Connection" for instructions on selecting the proper AC voltage setting. If you are unsure about this, contact your dealer or **TRUE Systems**. Product failure caused by improper voltage setting will not be covered under warranty.
- Do not operate this unit in the presence of rain, liquids or condensing moisture. Liquid entering the product enclosure is likely to cause performance degradation or failure. Failures due to moisture entering the enclosure will not be covered under warranty.
- Should liquid spill on the unit, immediately disconnect it from the AC power source and return it to your dealer or **TRUE Systems** for servicing.
- This product is designed to operate in an ambient temperature environment not to exceed 50°C (122°F). Please ensure that this unit is mounted in such a way that vents are not blocked and ambient temperature does not exceed 50°C.

CERTIFICATIONS

FCC Notice

This product complies with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with instructions in this manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference to radio communications – which can be determined by turning the product off and on. If this product does cause harmful interference, the user should try to correct the interference by one or more of the following measures:

1. Re-orient or relocate the receiving antenna.
2. Increase the separation between this product and the receiver.
3. Connect this product to an outlet on a different circuit from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

NOTE: Modifications to the product not expressly approved by Sunrise Engineering and Design Inc. could void the user's authority to operate the equipment.

Declaration of Conformity – CE

Sunrise Engineering and Design Inc. hereby declares the **TRUE Systems P2*analog*** 2-channel microphone preamplifier to be in material conformity with the following directives and related standards:

- 73/23/EEC – Low Voltage Directive
- 89/336/EEC – EMC Directive
- EN60065:1998
- EN55103-1: 1997
- EN55103-2: 1997

Technical files are maintained at corporate headquarters of Sunrise Engineering and Design Inc., 1634 S. Research Loop, Suite 110, Tucson, Arizona 85710, USA.

Owner's Record

We recommend that you record the following information for reference in the event that you need to contact **TRUE Systems** for technical support or repairs. Please return your completed Warranty Card today.

Serial No._____ Purchase Date _____

Dealer _____

Address _____

Phone _____

CONTENTS

INTRODUCTION

The **P2analog** is designed to provide the detailed, transparent sonic performance necessary for the most critical direct tracking and live sound applications. It includes a unique combination of functions that make it useful as a complete input system for standalone or PC-based recording systems. And, the **P2analog** has special features that provide the serious musician or recordist with useful tools to get the best sound more quickly and easily.

We appreciate the confidence you have placed in **TRUE Systems** by purchasing this product. Please feel free to contact us with questions or comments. And, we always appreciate hearing about successful projects you have completed.

OVERVIEW

In addition to our acclaimed **TRUE** preamps, **P2analog** features two instrument direct inputs (DI's) that offer sonic performance previously thought to be available only with dedicated, high-end DI's. You'll get incredible articulation and control for electric bass, detail and smoothness for stringed instruments and keyboards. And, there's even an impedance modification option to help you get the most out of your vintage Strat!

Even with today's emphasis on powerful digital audio platforms and software plug-ins to perform signal-processing tasks, the issue of microphone placement remains a critical variable in determining the quality of your final sonic product. The **P2analog** incorporates powerful features that assist you in achieving optimum microphone placement for nearly any stereo recording situation. One of these features is a selectable M-S (Mid-Side) decoder which provides creative spatial control that is useful in attaining an exciting stereo image with minimum effort and microphone repositioning. The M-S microphone technique can be employed effectively in a wide variety of circumstances, from classical ensemble, to drum kit overheads, to solo vocal or instrument – whenever accurate capture of the performance and its acoustical space is desired. M-S micing also eliminates the "hole-in-the-middle" effect.

And, whether using M-S, X-Y or other stereo mic techniques, our Stereo Phase Correlation Display can assist in positioning the microphones for a rich stereo image.

In addition to the previously mentioned features, the **P2analog** includes:

- Dual Gain Ranges - to accommodate a wide range of microphone sensitivities
- Selectable High-Pass Filters - to minimize breath and wind noise
- Relay Signal Switching - to provide the cleanest possible signal path
- Polarity Reverse - to correct polarity inversions caused by mic position or cable wiring variations
- XLR and TRS output connectors - for easy connectivity
- Phantom Power (48V)

UP-AND-RUNNING IN A HURRY

1. Read the "**SAFETY and OPERATING PRECAUTIONS**" on page 2 of this manual.
2. Check the voltage selector on the rear panel to make sure it is set for the appropriate AC mains voltage in your area.
3. After making sure the main power switch is off, connect the AC power cord.
4. Connect output signal cables between **P2analog** and the analog line level inputs of your recorder, mixer, signal processor, etc. Use either the 1/4" TRS or XLR balanced output connectors. See the section "Connections" for wiring details.
5. Connect mic cables to **MIC 1** and **MIC 2** as needed.
6. Turn on the AC power.
7. Select **48V** and **180°** (polarity) buttons as appropriate on each channel.
8. Adjust Channel **1** and Channel **2** gain controls for adequate signal level as indicated on the **P2analog** level indicators or on the level indicators of the device to which it is connected.

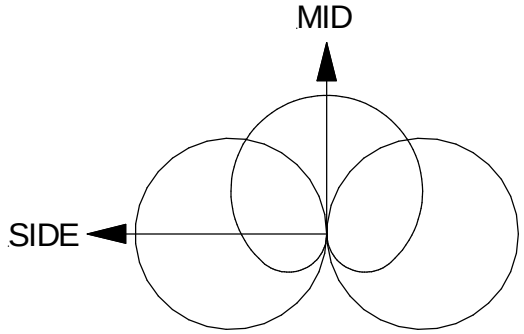
If you're using the DI's for electric instrument input:

1. Connect your instrument cables to **DI-1** and/or **DI-2** on the front panel. Any microphones plugged into **MIC1** or **MIC2** will be automatically de-selected. NOTE: DO NOT use TRS plugs for these inputs as the DI will not function correctly.
2. Select **180°** (polarity) buttons as appropriate.
3. Adjust Channel **1** or Channel **2** gain controls for adequate signal level as indicated on the **P2*analog*** level indicators or on the level indicators of the device to which it is connected.

If you're using the M-S Decoder:

1. Connect the cardioid or omni **MID** mic to **MIC 1** input.
2. Connect the figure 8 **SIDE** mic to **MIC 2** input. Face the **SIDE** mic toward the left side of the sound field (perpendicular to the axis of the **MID** mic). See Figure 1.
3. Press the **M-S** button to select the Mid-Side Mode. "Left" signal is routed to Channel 1 output. "Right" signal is routed to Channel 2 output.
4. Adjust the Channel **1** gain control for adequate mono signal level.
5. Adjust the Channel **2** gain control to vary the image width as desired.
6. See the section "More About M-S Decoding" for more information.

Figure 1
M-S microphone orientation



Using the Stereo Phase Correlation Display

If you wish to use the Stereo Phase Correlation Display to assist with stereo mic positioning:

1. Press the **ON/OFF** button to activate the display.
2. Adjust microphone positions so that most display activity occurs in the yellow and green LED's, with minimal activity in the red LED's. See the section "Stereo Phase Correlation Display" for more information.
3. NOTE: The Stereo Phase Correlation Display is intended for use with stereo mic placement techniques. The display may not provide meaningful information for independent, two-channel applications.

INSTALLATION

Unpacking and Inspection

We recommend that you inspect your **P2analog** upon unpacking it from the factory shipping carton. In the unlikely event that the unit exhibits any physical damage, DO NOT connect it to the AC mains power, but contact your dealer immediately.

In addition to the **P2analog**, the shipping carton should also include:

- An AC power cord
- A warranty registration card
- A "Caution" sheet
- This Operation Manual

We recommend that you keep the shipping carton and foam supports in the event that the unit must be shipped at some time in the future. DO NOT package the unit in "packing peanuts" or similar material as it will settle during shipping and damage will likely occur. If original packing materials cannot be located, wrap the unit with a liberal amount of plastic "bubble wrap" material extending at least 2" beyond the extremities of the **P2analog** enclosure.

Mounting

The **P2analog** is designed for conventional rack mounting, or stand-alone mounting by use of the adhesive rubber feet supplied. Avoid locating the unit next to equipment that emits strong electromagnetic fields. If the unit is to be permanently mounted in a high-vibration environment, you may wish to provide additional side or rear support to prevent possible distortion of the mounting ears.

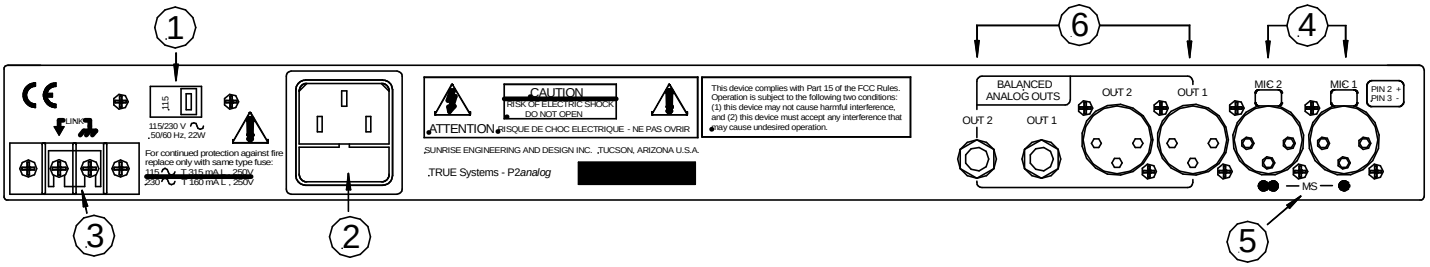
- Do not locate the unit where it is exposed to rain, moisture, or liquid spills.
- Do not locate the unit where it is exposed to temperature extremes.

Ventilation

We recommend that you provide adequate ventilation so that the air temperature surrounding the unit does not exceed 55°C (122°F). If multiple units are to be mounted in a poorly ventilated rack or travel case, a 1 3/4" blank space should be located after every three units (three units mounted together, blank space, three more units, etc.).

OPERATION

Connections



AC Mains Connection: Prior to connecting the AC mains power cord, verify that the Voltage Selector switch (1) on the rear panel is set for the AC mains voltage in your area.

Voltage Selector Position	Operating Voltage Range	Fuses (2)
115V	100-132VAC 50/60Hz	T 315mA L, 250V
230V	200-264VAC 50/60Hz	T 160mA L, 250V

For other operating voltage options, consult **TRUE Systems**.

CAUTION: To provide continued protection against fire, replacement fuses should be only of the types listed above. AC mains power cord must be removed to gain access to Fuse Drawer (2) for fuse replacement.

The Signal Ground **LINK** (3) connects signal ground to earth ground. Signal ground is isolated from earth ground if the **LINK** jumper is removed. This jumper will normally be installed. See "Troubleshooting" section for usage tips.

Microphone Connection: Microphone connection is made to standard XLR receptacles (4) on the rear panel. The wiring configuration used for the microphone connectors on the **P2*analog*** is:

- Pin 2 is positive (+)
- Pin 3 is negative (-)
- Pin 1 is shield

Do not attempt to connect unbalanced microphones (with single-pin connectors) to the **P2*analog***. It is not intended to operate with this type of microphone.

You may note the M-S (mid-side) connection symbol (5) below the **MIC 1** and **MIC 2** connectors. This is simply a visual reminder, when using an M-S mic setup, to connect the MID mic to channel 1 and the SIDE mic to channel 2. See the section "More About M-S Decoding" for more information.

CAUTION: We recommend that you avoid "hot-patching" microphone inputs when using a patch bay at the microphone inputs of the **P2*analog***. Please **TURN OFF** phantom power and turn down the gain prior to connecting or re-patching microphone inputs routed through a patch bay.. Failure to do so may result in transients that can damage the **P2*analog*** or equipment that is connected to its outputs-not to mention your ears!

Output Cable Connection: For ease of connection, two styles of balanced output connector (XLR and TRS) are provided (6) . Both connector types are electrically equivalent and may be used simultaneously to connect to Line Inputs on mixing consoles, recorders, etc. If both pairs of outputs are used, care should be taken to avoid system ground loops. See **"**Troubleshooting**"** section for tips on avoiding hum caused by grounding problems.

The TRS and XLR output connectors are not electronically isolated. Therefore, if you chose to connect either one of the output connectors to an unbalanced input, the other connector will automatically be unbalanced. When connecting an output of the **P2*analog*** to an unbalanced input, you **must** connect the negative signal pin (pin 3 of the XLR or "ring" of the TRS) to the shield. Failure to do this will result in audible distortion. The wiring configuration used for the output connectors on the **P2*analog*** is:

For XLR:
- Pin 2 is positive (+)
- Pin 3 is negative (-)
- Pin 1 is shield

For TRS:
- Tip is positive (+)
- Ring is negative (-)
- Sleeve is shield

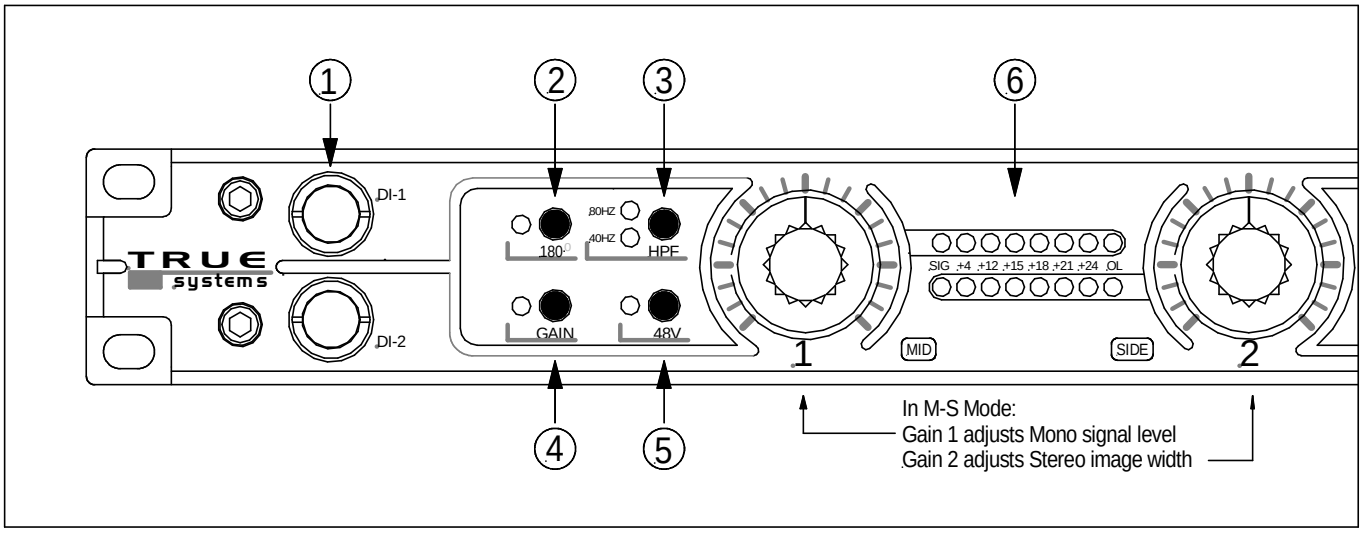
A Word About Cables.....

Most users of the **P2*analog*** have invested much time and money in their selection of microphones and preamplifiers. We recommend that you give some consideration to the microphone, instrument and output cables you select, as well.

- Use high-quality, low capacitance cable. Braided shielding and "star quad" type mic cables will perform better in electrically noisy environments. Manufacturers such as Canare®, Mogami® (and others) make high performance cable of this type.
- Some "house brand" cables are made by quality manufacturers, but others can be inferior. Be careful. Use cables with high-quality connectors (Neutrik®, Switchcraft®, etc.).

- Our studio testing has shown that some of the more esoteric guitar/instrument "super-cables" do, indeed, sound better. Noticeable improvement, but at a stiff price. Try before you buy!
- Avoid excessive cable length.
- Replace damaged connectors.

Front Panel Controls



(1) **DI-1** and/or **DI-2** connectors are used to connect electric instrument pickups to channel 1 or channel 2 of the **P2analog**. Any microphones plugged into **MIC1** or **MIC2** will be automatically de-selected. Direct inputs **DI-1** and **DI-2** are controlled by gain controls for channels 1 and 2, respectively. Input selections for **GAIN**, **HPF**, and Polarity (**180°**) apply to the DI inputs in the same manner as they apply to MIC inputs. See below for explanation of these functions. The gain range for the direct inputs is from -4 dB to +44 dB at normal gain (**GAIN** indicator ON) and -16 to +32dB at low gain (**GAIN** indicator OFF).

NOTE: DO NOT use TRS plugs for these inputs as the DI will not function correctly.

(2) Polarity reverse selector (**180°**). Input signal polarity is reversed when the **180°** indicator is illuminated. Use this to reverse input polarity to correct for microphone position or cable wiring differences.

(3) High Pass Filter selector (**HPF**). Use this to reduce undesirable low frequency wind, stage or handling noise. In general, the **40Hz** setting is appropriate for musical sources and the **80Hz** setting is appropriate for voice. Note that use of the **HPF** will most likely *not* eliminate the need for a pop screen for close-mic'd vocals.

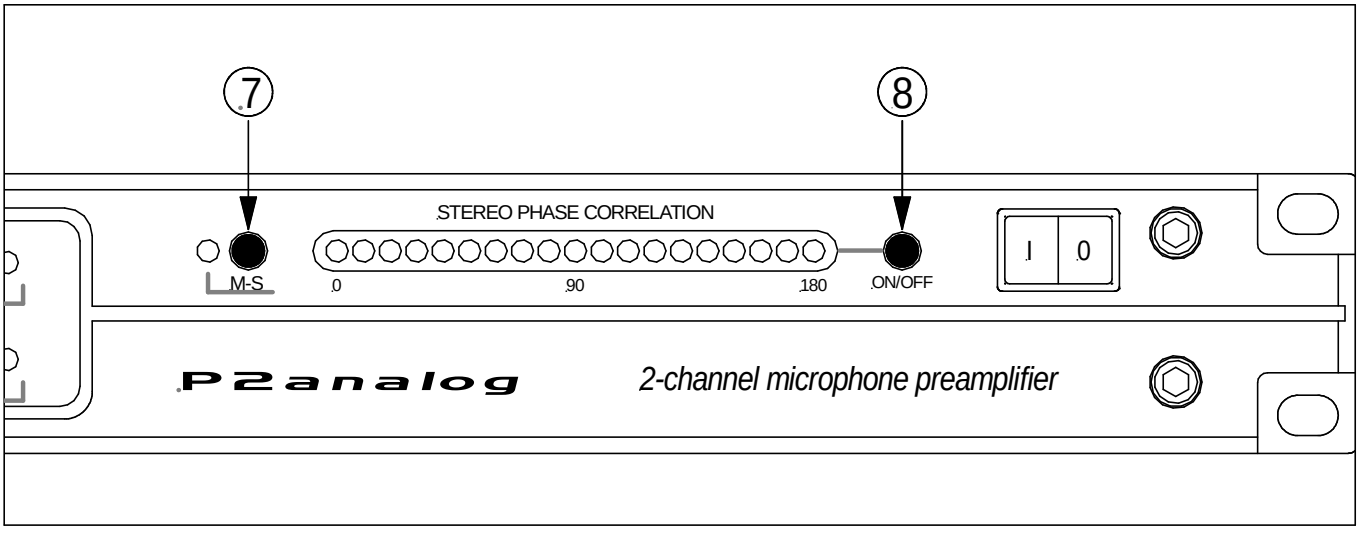
(4) Gain range selector (**GAIN**). Use this to select the appropriate gain range. This selector can be thought of as a "pad" although it does not have any sonic impact as

can happen with a conventional pad circuit. Normal microphone gain range (15.5dB to 64dB) is selected when the indicator is ON. Low gain range (3.5dB to 52dB) is selected when the indicator is OFF.

(5) Phantom power selector (**48V**). Phantom power (+48VDC) is activated when the **48V** indicator is illuminated. Avoid selecting phantom power if you are using a ribbon microphone. While not required, it is advisable to de-select **48V** when using a dynamic microphone or a **DI** input.

(6) Level indicators. Use these to match signal level between the **P2analog** and devices to which it is connected - and to avoid overloading the preamp.

- **SIG** indicates that a signal is present on the channel. It illuminates when the signal level exceeds -24dBu.
- **+4** illuminates when the signal reaches normal operating level of +4 dBu.
- **OL** illuminates when the signal level exceeds +26 dBu, which is 5 dB below the overload point for the **P2analog** *.
- .Note that the overload level of the **P2analog** is +31dBu at the output*. This level exceeds the input capability of some devices (check manufacturer's specifications). In such cases it is appropriate to use the intermediate level indicators (+15, +18, +21, +24) to set the maximum output level of the **P2analog** to match the maximum input capability of the connected device. In other words, it is possible to cause overload distortion in the connected device even though the **P2analog** level indicator does not show a red light. * Maximum output level in the low gain range is +27dBu.



(7) Mid-Side mode selector (**M-S**). When the **M-S** indicator is ON, Channel 1 output becomes "Left" and Channel 2 output becomes "Right". The Channel 1 gain control adjusts the mono signal level applied to both the Left and Right outputs. The Channel 2 gain control adjusts the stereo image width.

NOTE: When **M-S** is selected, **GAIN** and polarity (**180°**) are set to normal on both Channel 1 and Channel 2. The **GAIN** selectors for both channels are "locked" together so that pressing either one causes a similar gain range setting in both channels.

(8) The Stereo Phase Correlation display selector (**ON/OFF**) determines whether the LED display is illuminated or not. In some circumstances the display can be very active or distracting. This selector allows you to simply de-activate the display. See the section "Stereo Phase Correlation Display" for more information.

Direct Inputs

The Direct Inputs (DI's) are used for connection of electric instrument pickups or unbalanced sources such as synthesizers. The DI's we've designed for the **P2analog** match (or exceed) the sonic performance of acclaimed, dedicated DI products. They provide excellent articulation and control for electric/acoustic bass, detail and smoothness for stringed instruments and keyboards. Simply plug the instrument cable into the front panel **DI-1** or **DI-2** connector. When an instrument is connected to the DI input, it overrides the microphone connection. Here are some tips for using the DI's:

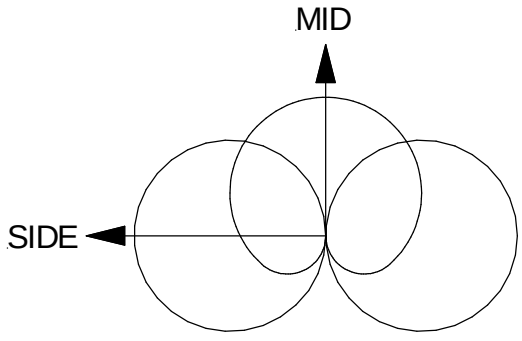
- The **HPF** may, in some cases, be used to produce useful tonal variations. See the "Front Panel Controls" section for more information.
- If you have an instrument with two pickup outputs available, you may want to try using the **M-S** mode to obtain interesting image or tonal variations.
- As some guitarists know, certain instruments produce a desirable tone when the pickups are terminated with a specific resistance/impedance value. While the input impedance of the **P2analog** is quite high (2.5 megohms), we've provided the capability to modify the input impedance for a specific application. Since this modification requires opening the product enclosure, it should only be performed by qualified technical personnel. Contact **TRUE Systems** Technical Support for more information.
- Use only ¼" unbalanced (tip/sleeve) plugs to connect to the DI. See the "Front Panel Controls" section for more information.

More About M-S Decoding:

M-S (Mid-Side) decoding is a particularly creative feature of the **P2analog**. While the M-S microphone technique has been around for many years, the opportunity to use it is frequently limited by the need for specialty microphones and/or decoders.

What is M-S?

It is a stereo microphone placement technique that uses a center, forward-facing omni or cardioid mic (Mid) and a side-facing figure 8 mic (Side). The signals from these two mics are passed through matrix circuitry that combines them in particular phase and level relationships to produce a stereo L and R output.



What good is M-S versus the typical XY microphone placement?
Originally, M-S was used because it provided a stereo signal with good mono compatibility. While this is not very interesting for contemporary stereo CD's, it is still valuable for broadcast and film sound production. But there is another significant benefit: varying the gain of the Side mic in relation to the Mid mic causes a variation in the stereo image - from none, to extreme separation. It is not necessary to change the angle or position of the microphones in order to change the stereo image. This feature can really speed up the time-consuming process of finding a "sweet spot" that provides both good tonal quality and good imaging.

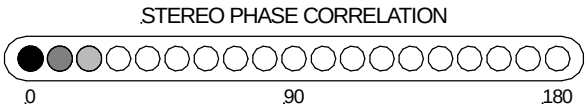
What are the best applications for M-S?
M-S does an excellent job of capturing the natural sonic perspective of acoustical ensembles.

- Orchestral and choral recording: use an M-S pair for the central array
- Drum kits: use an M-S pair for drum overhead micing.
- Vocal and instrumental ensembles: use M-S to give realistic perspective to backup vocals or instrumental groups.
- Individual instruments or vocals: try M-S on acoustic guitar and in situations where you wish to capture room ambience.
- Broadcast/film sound: use M-S to capture audience noise or background ambience. M-S can also be used in TV and film work to match the sonic image width to the visual image width.

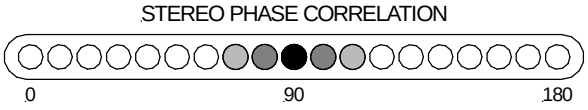
Stereo Phase Correlation Display
The Stereo Phase Correlation circuit "listens" to the two preamp outputs in the frequency range where human hearing is most sensitive to audio phase information. It analyzes the phase information and displays the following conditions:

- Output signals are essentially mono
- Output signals exhibit phase information that indicates a good stereo image
- Output contains too much out-of-phase information, producing tonal variance or muddiness (Adjust the microphone positions)
- Outputs are completely out-of-phase. (Select the "**180°**" polarity reverse on one channel)

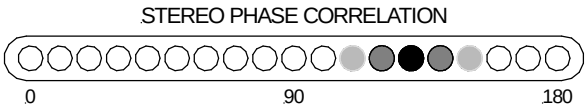
The Stereo Phase Correlation Display is also useful when placing two mics on an instrument (for instance, acoustic guitar) to achieve a particular tonal effect. The Phase Display will show any phase errors that produce a comb-filtering effect, allowing you to interactively adjust the microphone position for optimum sound.



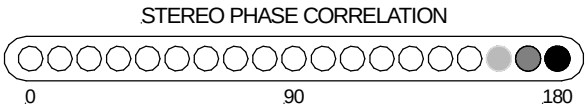
Output signals are essentially MONO



Typical STEREO display



Excessive PHASE ERRORS
(Adjust microphone)



POLARITY REVERSAL
(Reverse polarity on one microphone)

Here are some tips for using the Stereo Phase Correlation Display:

- When attempting to get a good stereo image, position the mics so that most of the Phase Display intensity is centered around the middle (yellow) range.
- The Stereo Phase Correlation Display should not be thought of in the same way that you think of a Level Indicator. In general, we don't want to see a RED Level Indicator because it means we're going to get distortion. But, with the Phase Display, some amount of "red activity" is normal when we have an acceptable stereo image. This happens because there is a mix of various phase information in any complex audio signal (music, voice). Conversely, an "all green" display is "safe" in that it shows minimal out-of-phase information, but, for the same reason, the output signals will not exhibit much of a stereo image.
- You may want to become familiar with the Phase Display by observing its activity in known situations. That is, situations where you know from experience that you have good mic positioning and stereo image. Also, observe the Phase Display in situations that you know will produce poor sonic outcome.
- The Stereo Phase Correlation Display is intended for use with stereo mic placement techniques. The Display may not provide meaningful information for independent, two-channel applications.
- When using the **M-S** mode it is unlikely that you will see a Polarity Reversal situation as illustrated in the figure above. However, a right/left reversal may occur due to wiring variations or reversed orientation of the SIDE mic. This can be corrected by selecting **180°** on Channel 2.

- As always, your ears are the final reference! The Stereo Phase Correlation Display is provided as an accessory to help you with a potentially difficult and subjective part of the recording/sound reinforcement process. But when all is said and done, what you hear is more important than what you see on this Display.
- The Phase Display can become quite "busy" with complex sound sources. After mic positioning has been determined, you may wish to turn off the flickering Display. We've provided the **ON/OFF** selector for that purpose.

DESIGN APPROACH

P2analog features a high-voltage composite architecture with discrete devices plus integrated circuits. The totally balanced, dual servo, dc-coupled design provides exceptional transient response, headroom, imaging and noise performance. Military grade, hand-matched components are utilized in critical circuit areas. All signal switching is done via hi-rel gold-contact relays in order to maintain an extremely short signal path. These design features result in the transparent, detailed sound quality for which **TRUE** preamps have become known.

SPECIFICATIONS

Gain, preamp:	3.5 to 52dB and 15.5 to 64dB (dual range)
DI:	-16 to 32dB and –4 to 44dB
Frequency Response: (gain=40dB)	1.5 Hz to 500kHz (-3dB)
Maximum Output Level:	+31 dBu (+27 dBu in low gain mode)
Maximum Input Level:	+15 dBu (+25 dBu in low gain mode)
Noise (Rs=0 Ohms):	-132 dB e.i.n.
Slew Rate:	>40 V/uS
CMRR (CMV= +10 dBu):	85 dB
THD (preamp) (+26dBu, 100kOhm)	.0008%
Input Impedance, preamp:	5.5 Kohm
DI:	2.5 Mohm (impedance modification available)
Power Consumption:	22W
Enclosure Dimensions:	17.5 in. (44.5 cm) W, 13.75 in. (35cm) D, 1.75 in. (4.5cm) H
Front Panel Extension:	1 in. (2.5cm)
Weight:	15 lbs. (6.8kg)

Typical performance. Specifications subject to change without notice.

TROUBLESHOOTING

Symptom	Solution
No signal output. Main power switch is on, but no LED's are illuminated.	• Check AC power source and cord. • Check fuses (pull fuse drawer under power cord inlet)
No signal output. Main power switch is on and some LED's are illuminated.	• Check status of phantom power. • Check continuity of mic and electric instrument cables. • Check continuity of output cables.
Output signal is distorted. Outputs are connected for **balanced operation**.	• Make sure gain is adjusted so that the **OL** indicator does not activate during the audio program. • Make sure the high output capability of this unit is not overloading the device or monitoring system to which it is connected - set **GAIN** selector to match capability of device or monitoring system, then adjust gain control according to indications on the Level Indicator LED's. • Check continuity of output cable. • Make sure outputs are not connected to a load impedance of less than 600 ohms.
Output signal is distorted. Outputs are connected for **unbalanced operation**.	• Make sure the minus (-) output signal pins are connected to the shield and not left unconnected. See "Output Cable Connection" section. • Check troubleshooting tips for balanced operation (above).
Hum can be heard in the audio program.	• Disconnect grounding **LINK**. • Check continuity of output cables (particularly shields). • Disconnect shields on one end of output cables. Connect grounding **LINK**.
Channel 1 signal can be heard in Channel 2 output - and vice versa.	• Check status of **M-S** selector. It should be OFF for individual channel mode and ON for Mid-Side mode.
Channel 2 seems to have no output	• Check status of **M-S** selector. It should be

when used with Channel 1 as a stereo pair	OFF for individual channel mode and ON for Mid-Side mode. • Make sure the **180°** selectors for both Channels 1 and 2 are OFF.
In M-S mode the stereo channels are **reversed** (Channel 1 is Right and Channel 2 is Left)	• Make sure the front of the bi-directional "Side" mic is aimed 90 degrees to the left of the axis of the "Mid" mic. Alternatively, select **180°** on Channel 2 to reverse channel positions.
In M-S mode the stereo channel **phasing** is incorrect	• Make sure the **180°** selectors for both Channels 1 and 2 are in the same position.
Electric instrument connected to a Direct Input does not produce a signal or signal is distorted.	• Check continuity of electric instrument cables. • Check the batteries or AC power source of any "foot pedal" effects processors connected to the Direct Input. • Make sure that the instrument cables have standard tip-sleeve 1/4" phone plugs. - DO NOT use TRS plugs.
Radio Frequency Interference can be heard in the audio program (swishing sound or audio from a radio transmitter).	• Make sure that mic cables are of good quality and that the shield is properly connected. Avoid excessive length. • Make sure that earth ground connection is maintained via the AC power cord - DO NOT use an isolator. • Make sure the unit is located away from known sources of radio frequency energy.

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REGISTRATION and WARRANTY

Don't forget to register your **P2analog** by filling out the enclosed Registration Card and returning it to us. This allows **TRUE Systems** to contact you regarding any updates, upgrades or applications information that may become available.

SUNRISE ENGINEERING and DESIGN INC. ("SUNRISE") warrants the **TRUE systems P2analog** to be free from defects in material and manufacture, when properly installed and used according to instructions in the Operation Manual, for a period of one year from the date of sale to the original purchaser. Units returned for warranty repair to SUNRISE or an authorized **TRUE Systems** repair facility will be repaired or replaced at the manufacturer's option, free of charge. Supplementary shipping charges will apply to units returned to addresses outside the continental USA. All units returned to SUNRISE or authorized **TRUE systems** repair facility must be **prepaid**, **insured and properly packaged**. Purchaser must obtain a Return Material

Authorization (RMA) number from SUNRISE prior to returning a product. SUNRISE may require proof of the purchase date in the form of a copy of a dated original retail invoice.

This warranty is void if, in the sole judgment of SUNRISE, the product has been abused, neglected, misapplied, or has been damaged by an accident, modification, or attempted repair by unauthorized personnel. This warranty will not apply to cosmetic damage incurred due to normal handling and use. SUNRISE reserves the right to change or improve the product design at any time without prior notice. Incorporation of design changes in future versions of the product does not imply the availability of upgrades for existing units.

This warranty is in lieu of all other warranties, expressed or implied, and SUNRISE specifically disclaims all implied warranties, including, but not limited to, warranties of merchantability and fitness for a particular purpose. The purchaser acknowledges and agrees that in no event shall SUNRISE be held liable for any special, indirect, incidental or consequential damage, or for injury, loss or damage sustained by any person or property, that may result from the use of, or failure of this product to operate correctly at any time. In the USA, some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damage, so the previous exclusion may not apply to you. This warranty gives you specific legal rights, and you may have other rights that vary from state to state.

SERVICE and SUPPORT INFORMATION

- Registered users may obtain customer support by calling (520) 721-2735. Please ask for Tech Support. You may also visit our website: www.true-systems.com or email us at: techsupport@true-systems.com.

- Other than cleaning the exterior surfaces of your **P2analog** and occasional inspection of the AC power cord and audio cables for damage, no maintenance procedures should be attempted by the user. Exterior cleaning can be performed using a lint-free cloth dampened with Windex® or equivalent.

There are no user-serviceable components inside the product enclosure. Many of the electronic components are selected and matched at the factory. For this reason, as well as personal safety considerations, we recommend that you refer servicing to **TRUE Systems**. If you choose to have repairs performed by other qualified service personnel, we recommend they contact us prior to performing repairs. We will be happy to advise them of any special repair considerations.

All units returned to SUNRISE or authorized **TRUE systems** repair facility must be **prepaid**, **insured and properly packaged**. Purchaser must obtain a Return Material Authorization (RMA) number prior to returning a product.

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