# SOLSTICE™

High Quality, 2-channel Mixer|Blender Preamp

**duncan|turner** acoustic research


**Did you ever wonder how the best acoustic musicians get that great sound night after night in every venue? One of the secrets they've learned is that their signature sound not only includes their instruments, but also their pickups, microphones, cables, and the all-important pre-amplification and equalization stages of the signal chain. Duncan-Turner Acoustic Research ("D-TAR") is dedicated to providing the electronic links between your strings and your listeners' ears so you can get a consistently great sound under virtually any circumstance, day in, day out.**

**D-TAR is a company founded by musicians who want to make the kind of gear our fellow musicians deserve. We've spent a lot of time listening to and playing fine instruments as well as amplification and recording gear, and we are dedicated to building the best sounding gear with the most useful features that we can. We would like to hear your comments on how you use your Solstice Mixer/Blender Preamp, and hope the music you make with it fulfills your dreams.**

# "WITH RESPECT TO ACOUSTIC TONE"

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# Basic Setup

### Inputs

The regular 1/4" input jacks for each channel are very high impedance inputs; this means you can plug in any kind of pickup, active or passive, and get the fullest frequency response possible. These inputs also accommodate "stereo" signal sources coming in on a "TRS" (tip, ring, and sleeve) plug; this is a common configuration when using dual source pickup systems. With Solstice, you can plug a stereo input plug into either channel.

Many modern acoustic pickup systems (such as the D-TAR Timber-line cable pickup) are coupled with onboard buffer preamps. The high impedance inputs of Solstice work perfectly fine with these as well, providing no "load" to the signal and thus preserving the signal just as your cable delivers it.

# Getting Top Performance Right Away

One of the first things you should know about Solstice is setting the "Gain" and "Output" volume controls for best performance and lowest noise. Most of the controls, inputs, and outputs are pretty much self evident, but to get maximum headroom and lowest noise, you should adjust the gain control(s) so the clipping light comes on just a bit when you play or sing your loudest into the unit. Then control the volume at the output. With the LED is just flashing, you have about 6 dB more headroom before Solstice goes into clipping. This is covered later in the manual, but it is the key to getting superior performance from the unit, hence we mention it here.

### Cable Connections, Front Panel – Inputs

1. Jacks 1 and 15 are stereo 1/4" inputs. These inputs are ultra-high impedance on the tip connection and will accept un-buffered piezo signals (e.g. under-saddle pickups) as well as active and passive magnetic pickups. The ring connection can be supplied with phantom power for microphones or for active pickup systems that work from off-board power. The ring signal is automatically assigned to the channel opposite of the one plugged into, assuming that the other channel's 1/4" input jack is unused. To take advantage of the stereo input feature, a stereo cable must be used, with the pickup signal on the tip and the microphone signal on the ring.

2. XLR jacks 5 and 19 are intended for microphone level signals. 40dB of gain is provided with the option of a 20dB pad (4, 18) that can be used with high output condenser microphones.

### Cable Connections, Rear Panel – Outputs

1. 1/4" jack 4 is intended as the cable connection to a power amplifier. Its level is controlled by the Master volume on the front panel. It can be shut off with the Mute switch.

2. 1/4" jack 5 is intended as a tuner output, but can be used as an auxiliary output for many purposes. It is not affected by the Master volume or the Mute switch.

3. XLR jack 3 is a line level balanced output. It contains the blended signal from both channels.

4. 1/4" jacks 7 and 8 are the send and return jacks for the master effects loop. The signal output is line level (+4dBu or 1.2V RMS) and intended for professional effects processors.

5. 1/4" stereo jacks 10 and 12 are insertion points for channels 1 and 2, respectively. They can be used as individual channel effects loops or as points where a signal can be taken out of or inserted into the individual channels' signal chain. A stereo cable is required for most functions involving the insertion jacks; the send signal is on the tip and the return is on the ring. The input impedance is low (4.7K ohms), so it will be necessary to drive the return side with an active device.

6. XLR jacks 9 and 11 are balanced signal outputs for each channel. They can be used as individual balanced signal sends to a mixing board or for recording a live performance. This feature will also allow the Acoustic Mixer to be used as a stereo mic preamp.

### Setting the input level properly for lowest noise operation

1. Turn the Master all the way down.

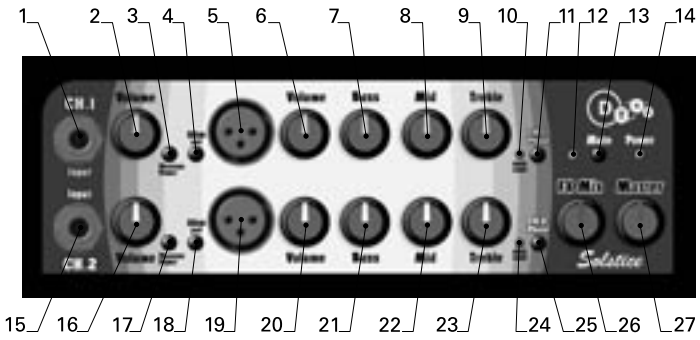
2. Plug the instrument or microphone into the appropriate input jack on the front panel.

3. Turn up the input Volume control for the jack that you have plugged into until the red overload LED just begins to light when you are playing or singing loudest.

4. Turn up the Master until you approach the desired sound pressure level. If there is any tendency towards acoustic feedback, try using the Phase Reverse button.

5. Adjust the EQ, if necessary. If a significant amount of EQ is used, it may be necessary to re-adjust the input and output levels slightly.

# Explanation of features




## Front Panel

**1, 15 - High Impedance Input Jacks**
These inputs can be used for basically anything connected to a 1/4" plug. The input impedance is 10Meg Ohms (10,000,000 Ohms), so they are well suited to piezo type pickups (for more information on Impedance considerations, see Appendix A.) The input stage is a low-noise hybrid circuit with internally adjustable gain variable from 0dB to 24db. We have pre-set it at 18db. This allows a signal of nearly 1 Vrms to be present at the input without clipping.
Both Ch.1 and Ch.2 input jack will accept stereo signals, but this feature is functional only if one of the two high impedance inputs is unused. In other words, you can plug a stereo signal into channel 1, and the signal present on the ring will be automatically routed to the unoccupied channel 2, or vice versa. If the phantom power switch is engaged, +15V will be supplied to the ring of the respective channel jack.

**Please note**: Because of this unique feature, a pop noise will tend to be generated when removing a plug from either jack. Therefore, it is advisable to either turn the channel volumes down or engage the Mute button before removing a plug from the high impedance input jacks.

**2, 16 High Impedance Input Volume Control**
Acts as a normal volume control located directly after each respective high impedance input.

**3, 17 Phantom Power Button**
Engages or disengages +15V phantom power for each channel. Press button in to engage. Phantom power will be present at the + and – terminals of the XLR input and at the Ring connection of the High Impedance input. Please be sure to only engage phantom power if it is truly needed in your system. Inappropriate use of phantom power could be harmful to certain electronic devices in your signal chain.

**4, 18 20dB Mic Pad**
Push this button in to engage a 20dB pad (gain reduction) on the XLR input if your microphone signal is particularly hot.

**5, 19 Microphone Inputs**
This stage is another low-noise hybrid circuit. The design is unique, but is very similar to some stages used in top of the line mixing consoles. The gain is set at 40db but can be reduced to a level more compatible with high output condenser microphones by engaging the 20dB pad switch.

**6, 20 Microphone Volume Control**
Acts as a normal volume control located directly after each respective mic amp.

## EQ Controls in General

The Solstice EQ section is made up of filters composed of low noise discrete components that are side-chained out of the direct signal path. For more information on the subject of EQ, see Appendix B.

**7, 21 Bass Control**
The Bass control provides 12dB of boost and cut and is centered at 155Hz/Q-.61.

**8, 22 Midrange Control**
The Midrange control provides 12dB of boost and cut and is centered at 796Hz/Q-.56.

**9, 23 Treble Control**
The Treble control provides 12dB of boost and cut and is centered at 10KHz/Q-.37.

**10, 24 Clipping Indicators**
Indicate that the signal level, as sensed after the EQ section, is 6dB below clipping or +14dbm. At the onset of clipping you will start to hear audible distortion, a sign to turn down either your input gain control or to back off of EQ boost. If you are seeing the indicator light up using a microphone plugged into one of the XLR connectors, you might try engaging the 20 dB mic pad. See "Setting Your Level" on page 1.

**11, 25 Phase Switch**
Allows reversal of signal phase for feedback control or to provide phase agreement between two signal sources. See Appendix C for more information on phase.

**12 Mute Indicator**
The yellow LED will be lit when the Mute button is engaged.

**13 Mute Button**
Removes the signal normally present at both the XLR output and the single ended output. The Tuner output remains functional to allow for silent tuning. The mute LED will be lit when the mute is engaged. For more information on the use of the mute and using a remote foot switch for muting, see the section on page 3.

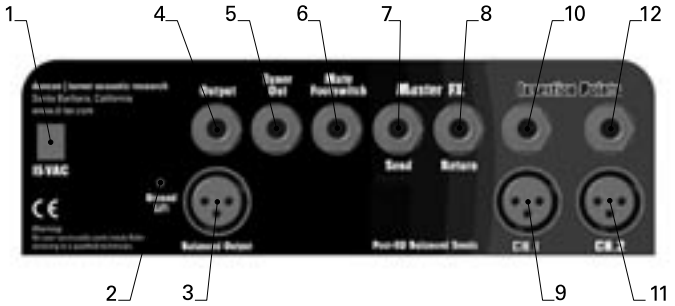
**14 Power Indicator**
Shows the presence of DC power from the power supply. The power remains on until the cable from the wall-mounted transformer is removed or until the transformer is unplugged from the wall. Note that there is no power switch on Solstice; if it's plugged in it's on!

**26 Effects Mix**
Blends the signal present in the Master Effects Loop with the dry signal. If no external device is plugged into the Master Effects Loop jacks, this control will have no effect on the signal.

**27 Master Volume**
Controls the single ended output only, the XLR output is unaffected by this control.

# Explanation of features

## Rear Panel




**1 AC Power Input Jacks**
Plug the 15VAC power wall mounted transformer supplied with the product into this jack.

**2 Ground Lift Switch**
When this button is pushed in, the ground for the Master XLR Output is lifted. This switch can be useful for breaking ground loops that can occur during recording sessions. The XLR ground should typically remain engaged.

**3 Balanced Output, Blended Signal**
This jack provides a balanced, low impedance signal that is independent of the Master Volume control. It is located near the end of the signal chain, just before the Master Volume and is a blended signal of both channels. This output will typically be used to feed the Solstice's blended output to a PA or recording system.

**4 Single Ended Output**
This jack is located at the end of the signal chain and is controlled by the Master Volume. It is buffered and provides very low output impedance. This output will typically be used to send Solstice's signal to a power amplifier.

**5 Tuner out**
This jack provides an auxiliary signal that is located pre-Master Effects and is unaffected by the Master Volume or the Mute switch. It is ideal for connection to a tuner, but can be used to provide an extra output signal for whatever use that comes up.

**6 Mute Footswitch Jack**
This jack allows remote access to the Mute function. If you plan to employ remote foot switching, a special stereo footswitch is needed in order to have the Mute light turn on and off properly. A simple schematic is available if you wish to make your own footswitch.

**7, 8 Master Effect Loop**
These jacks provide send and return locations for an effects processor. The level is optimized for +4dBu effect processors. When using –10dBu processors, it may be necessary to reduce input levels somewhat to avoid overdriving them.

**9, 11 Channel XLR Balanced Output**
This jack provides a balanced, low impedance signal that is taken post-EQ at the end of each channel's signal chain but before any mixing has occurred. It allows the unit to be used as a stereo mic preamp for recording purposes or provides individual channel signals to go to a mixing board.

**10, Channel Insertion Point / Effect Loop**
Stereo jacks are provided for each channel to allow flexibility in the use of effects and in sending and receiving auxiliary signals. The Send signal is assigned to the Tip and the Return signal is assigned to the Ring. The tip signal can also be treated as auxiliary signal outputs and, likewise the ring signal can be treated as auxiliary signal inputs. These effect loops are series-type, so inserting or removing a signal will break the internal signal path. It will be necessary to use a stereo cord and a Y connector to insert an effects processor (Radio Shack 6 foot Y-adapter 1/4" stereo to (2) RCA plug cable #42-2547 and 2 each of RCA plug to 1/4" mono phone plug adapter #274-320). If it is desired to take an auxiliary signal out, you can simply insert a standard patch cord. If it is desired to insert an auxiliary signal, such as a drum machine, it will be necessary to make a cable with a stereo plug on one end and mono on the other. The cable must be wired with the tip on the mono end connected to the ring on the stereo end. The mono end is then connected to the signal source and the stereo end is plugged into the Acoustic Mixer channel Insertion jack. As an option, you can use a Hosa stereo "Y" cord (part #STP-201, 202, 203, or 204) and just use the mono plug of the "Y" which is connected to the ring of the stereo plug.

Notes:
- Turn the input gains up until you just see the red LEDs flash on the highest peak notes and you can leave it there – you still have 6 dB of headroom before hard clipping.
- Mute switch – if you plug it in, it takes over and controls the LED on the front panel. Requires a stereo cable.

## Troubleshooting Guide:

| Common Problem | Try the Following Steps |
|---|---|
| No sound | • Make sure power indicator is on<br>• Check mute switch / foot switch<br>• Make sure your red over-load LED indicator is flashing to show a signal<br>• Unplug the output to make sure the problem isn't further downstream (in the power amp) |
| Distorted sound | • Check input level and make sure it's not overloaded<br>• Lower effect input level (it may be necessary to raise the output level of the effect to minimize signal loss) |
| Excessive noise | • Input level is set too low<br>• Output level is set too high |

Excessive amount of EQ boosting Excessive hum
(Note: un-buffered high-impedance signals are very susceptible to hum) (See excessive noise above)
- Try unplugging instrument to isolate the source
- Check shielding on input devices
- Try ground lift on master balanced (XLR) output
- Not enough gain on the mic channel Make sure 20dB pad is not engaged

## APPENDIXES to SOLSTICE INSTRUCTIONS

### A) IMPEDANCE CONSIDERATIONS WITH ACOUSTIC INSTRUMENT PICKUPS

Piezo pickups are particularly sensitive to the "input impedance" of the first stage of electronics into which they are plugged. The effect is the audio equivalent to trying to balance a 200-pound gorilla on a seesaw with a 40-pound child...without moving the fulcrum point. If the input impedance is too low, as it is with most guitar amps or PA boards, the resulting mismatch will rob your pickup of output and low end warmth, just about the last things you want when amplifying an acoustic instrument! Impedance matching is basically a balancing act with a slight twist: it is best to send a lower impedance output (for instance a pickup) to a preamp with an input impedance many times greater.

Also, pickups do not do a great job of driving a signal down a cable, and this is why most high quality piezo pickups have on-board preamps to condition the signal for its trip to the amp or console. If you do use a "passive" piezo system in your instrument, keep cable length to a minimum. You will know whether your guitar pickup system is active or passive by whether it needs battery power or not. Some magnetic pickups and nearly all piezo pickups work best when there is a preamp/buffer stage right in the guitar. Pickups do not make great "line drivers" and you can suffer significant signal loss and degradation with long runs of cable. We have designed your Solstice preamp to work with either style of pickups, but if you are going to go passive, use the shortest, lowest capacitance cable you can get to preserve maximum signal.

### B) EQ, USE AND MISUSE

One of the keys to getting great sound is to use just as much EQ as you need and no more than necessary. A good rule of thumb is that if a signal source needs a lot of EQ to sound decent, it's probably a bad source. In the best recording studios in the world, the engineers will first choose the best microphone(s) for the instrument and work carefully with mic placement to get the sound they are after. Only then will they apply EQ to shade the basic sound they are getting from the straight sound of the mic. Overzealous use of EQ can cause more problems than it solves by altering the phase relationships among sounds and by just adding too much noise and a processed quality to the end result. If you think your pickup needs a lot of EQ to sound right, perhaps what you really need is a better or more appropriate pickup.

It is helpful to understand just what problems you are trying to solve using EQ. Is it the guitar sound itself? Is it the sound of the PA? Is it a room specific problem? It is also important not to be duplicating or counteracting what might be going on elsewhere in your system with other EQ devices. You may not even realize how much EQ your instrument signal is going through when you plug into a PA, there may be some in your instrument, there's the EQ on Solstice or an amplifier, then the EQ on the channel(s) of the mains PA console and perhaps a separate monitors console, there may be auxiliary outboard EQ patched into the console, and then there is usually some EQ dedicated to the speakers and/or room taming. You may just be dealing with as many as five or six different equalizers in your signal chain when one or two may just do the trick.

One of the best ways to dial in your sound for amplified acoustic instruments is to work with headphones to dial in your pickup blend (if using dual sources), EQ, and effects. Take Solstice's output into a headphone amp or through a console and use high quality headphones to monitor your sound. This way you will know that you are using your gear to get just the right instrument sound free of anomalies with loudspeaker response or room resonances. Then when you play out live, you can deliver your concept of correct tone to a sound engineer with the instructions to do nothing or as little as possible to that sound. He or she should already have their dedicated PA and room EQ set correctly, and then the only further possible need of EQ might be for feedback control in cases where you are trying to achieve loud monitor levels on stage with acoustically lively instruments.

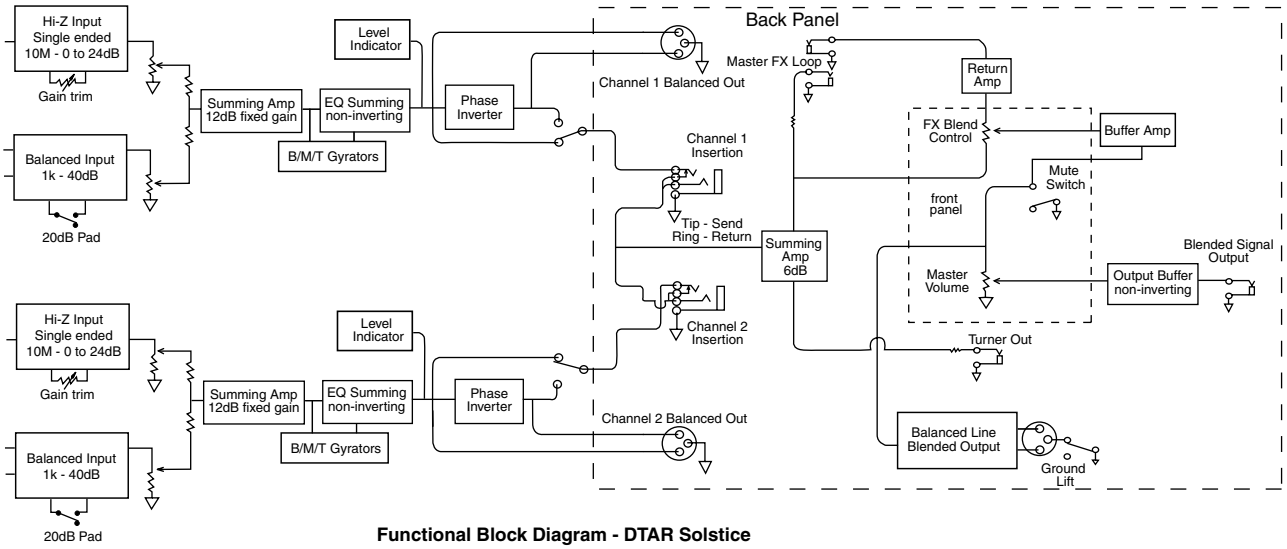
Some musicians go so far as to carry their own vocal mics with them along with acoustic instrument preamplification and even stage monitors so they have as close to the same sound on stage every night no matter what might be happening in the house with the main PA. Solstice and D-TAR's other fine acoustic amplification gear makes this easy. You can carry your own personal sound with you, feed that to the PA, and have several less things to worry about.

### C) A FEW NOTES RE. PHASE, SOUND, AND FEEDBACK REDUCTION

Acoustically, a sound wave is physically made up of alternating low and high pressures acting on your eardrums. Phase is the relationship, in time, between the "the peaks and valleys" of two sound sources (or signals). If the soundboard or loudspeaker creating a guitar signal first moves outward, the first thing that hits your ear is a positive pressure, which pushes your eardrum inward. If the soundboard or speaker cone first moves in, it creates a negative pressure on your ear, pulling the eardrum out.

Guitar tops, pickups, preamps, amplifiers, and speakers all affect this phase relationship, and things really get complicated when you combine these elements and then start pushing sound levels up further and further. Certain phase relationships among all these elements can lead to uncontrollable feedback at even moderate volume levels.

Having the ability to switch the phase relationship between your guitar signal and the speakers can make all the difference between being in feedback hell or sonic heaven. This can be worth 4 to 10 dB more level when you need it.




**Functional Block Diagram - DTAR Solstice**

Blending two signal sources from an acoustic instrument makes things even more complicated. The most common combo would be UST (Under Saddle Transducer) plus internal mic or UST plus magnetic pickup. Often one phase relationship between the two sources will sound thin and lifeless while switching the phase of one of the two signals can fatten up the sound and bring the instrument to life. With Solstice you can switch the phase relationships between the two channels, and also switch the overall phase of the output by switching both channels if necessary.

The caveat when using phase switching to control feedback is that if you change your position on stage relative to the speakers, you may find that the feedback threshold changes, and that you are better off switching phase the other way. Your relationship to the phase of amplified sound is also affected by your distance from the loudspeaker(s) and the frequency of the problem notes. This is one of those "try it to get it right" situations.

**D) GLOSSARY OF SOME AMPLIFICATION TERMS**

AMPLIFIER
A device for making small electrical signals bigger. The amplifier was actually invented in the late 1800's before there were any devices that could make building one possible! In music, the term often refers to a self contained "combo amp"—-an electromechanical device combining a preamp, amplifier, and loudspeaker usually including some kinds of tone shaping circuitry. With Solstice, you have the option of "custom building" your amplifier by matching the preamp/mixer/blender stage to a separate power amp and loudspeaker system.

BUFFER
A preamplifier designed to isolate the source from the next stage of amplification. Buffer amps have high input impedances and low output impedances and can also feature some "gain" or signal boosting capability. Buffers are required with piezo crystal or piezo polymer pickups, and are often built into acoustic-electric guitars. Solstice features high impedance buffer stages for both channels so you can use either active or passive pickup systems. D-TAR makes several on-board buffered pickup systems for acoustic instruments.

CARDIOID MIC
A microphone designed to be more sensitive in one direction than in others, a directional mic. Cardioid mics are used more often than other types on stage because they make it easier to isolate one voice or instrument from the others for mixing. Hypercardioid mics, sometimes called shotgun mics, are designed for use at a distance as they can be aimed at the sound source and used from many feet away. The good old Sure SM-57 and 58 are cardioid mics.

CHORUS
An electronic device that can split a signal, mildly shifting the pitch and timing of one part, then mix it back in with the original signal. The effect is roughly like several people (they're the chorus) playing the same part at the same time. Solstice has effects loops to allow convenient interface with chorus effects.

COMPRESSOR
A processor that "squeezes" the dynamic range of the signal by limiting peaks and bringing up the level of soft passages. A limiter can be used to fatten a sound or give it more apparent sustain. If you've ever wondered why music sounds kind of flat on FM radio compared to live, overuse of compression can be one reason. On the other hand, the Beatles used tons of compression on their acoustic guitar recordings and it sounds great. Can be used in Solstice effects loops.

CONDENSER MIC
A microphone in which an electrically charged diaphragm moves with sound waves while a charged back plate stays stationary. Because the diaphragms of condenser mics can be made very light in weight, the frequency response can be very good with a condenser mic. Neumann mics, considered by many to be the ultimate mics for recording voice and acoustic instruments are condenser mics. "Condenser" is an old term for capacitor. Condensor mic derive their name from the fact that they are sensing the change in capacitance between the diaphragm and the backplate and converting it to a signal voltage.

CONTACT PICKUP
Sometimes called "soundboard transducers" are most often piezoelectric accelerometers (acceleration monitors). They put out an electrical signal that is an electrical equivalent to the mechanical vibrations occurring where they are placed. The D-TAR SA-2 is an excellent example of this type of pickup.

DI (see also "DIRECT BOX")
The British term now common in the US for "directly interfacing" a pickup signal into a recording or PA console, thus bypassing amplifiers, speakers, and mics. Used especially for electric bass to get a clear tone. Many home enthusiasts directly connect their acoustic guitars to the recording device to gain better isolation from track to track than they can get just using microphones. Solstice has XLR outputs to allow using it as a DI source.

DIAPHRAGM
In a microphone, a thin, stretched, plastic film, the equivalent of your eardrum. The diaphragm vibrates with sound, then transforms that acoustical energy into an electrical signal that can be amplified.

DIGITAL DELAY (DDL)
A signal processor that converts analog signals into a stream of digital information that can be delayed and mixed to give echo-like sounds. Digital delay is usually included with other sonic colorings in multi-effects processors. Can be used with Solstice's effects loops.

DIRECT BOX
A device used to buffer or isolate guitar and bass signals so they can be "DI'd". Many of the direct boxes designed for electric guitars and basses do not have a sufficiently high input impedance for interface with piezo pickups. Direct boxes can either be passive, using transformers, or active, using tube or transistor based circuitry. Solstice serves as a high quality direct box.

DYNAMIC MIC
A microphone which works like a backwards loudspeaker. The diaphragm is attached to a small coil of very fine wire that is surrounded by a magnetic field. When the diaphragm and coil vibrate with sound waves, a small electrical signal is generated in the coil that can be amplified through a mic preamp and other devices. The Sure SM-57 & 58, two of the most common mics used in clubs and studios, are dynamic mics. Dynamic mics are noted for being tough; the mic you can drive a nail with is probably a dynamic.

EFFECTS LOOP
A set of jacks on an amp or preamp which allow sending a signal out to an effect and bringing the modified sound back to the main unit. The advantage of an effects loop is that it is buffered (yes, same concept) on the output and input, the effect will "see" a predictable impedance and level, and the modified signal can be master volume controlled in the main amp or preamp.

ELECTRET MICROPHONE
Miniature mics that work on condenser mic principles but have permanently charged polymer diaphragms. Electric mics have miniature preamplifiers built in and require low voltage DC power (usually 1.5 to 18 volts) often supplied as "phantom power." The Seymour Duncan Mag Mic uses an electric element for it's second source with "on-board" blending.

EQUALIZATION or EQ
An electronic means of shaping frequency response; the term generally refers to sophisticated tone control circuitry. Originally used to mean correction for the unequal frequency response of old PA, recording and playback gear.

EXTERNAL MIC
Generally referring to the good old practice of standing in front of a mic on stage as opposed to installing a mic in your guitar. You've seen them, you've used them, and now you know what they're called. There are now some bracket devices for mounting an external mic on your guitar.

FEEDBACK
Yowl, howl, etc., feedback by any name is the sonic nemesis of the performer. It happens when amplification goes beyond control, and the amplified sound itself is re-circulating and becoming further amplified. The sonic equivalent of Chernobyl—-audio meltdown. "Ringing" is the precursor of feedback and refers to a barely controlled resonance just shy of feedback. D-TAR's "Equinox" features two notch filters designed to combat feedback.

FLOATING PICKUP
A magnetic pickup mounted to the end of the fingerboard on a guitar or to some other non-vibrating part of a musical instrument. Floating pickups are sometimes used on archtop acoustics so the adding of a pickup will not interfere or change the vibration pattern of the top. Seymour Duncan makes a variety of floating pickups including the Bob Benedetto signature pickup for use with archtop guitars.

GRAPHIC EQUALIZER
An equalizer that uses sliding potentiometers (slide pots) to control the level of the signal in various frequency bands. Called so because the knobs form a graphic representation of the frequency contouring. Graphic equalizers are generally either "1/3rd octave" or "1/10th octave" referring to the width of the audio bands covered.

HUMBUCKING PICKUP
A type of pickup using two coils to cancel magnetically induced hum. Invented by Seth Lover at Gibson in the 1950's, the "humbucker" is noted for it's loud and warm sound. Check the Seymour Duncan website for the world's most complete selection of humbucking pickups.

IMPEDANCE
A measurement of the resistance to the flow of AC (which is what audio signals are); impedance is affected by resistance, capacitance, and inductance in a circuit and is also frequency dependent. Impedance is often mistaken for resistance and is also incorrectly thought of as being a measurement of the voltage from a pickup. In practical terms, you want low impedance sources feeding into high impedance loads; this gives maximum accuracy in signal transfer.

INTERNAL MIC
A microphone, generally an electric condenser mic, mounted inside an instrument.

LIMITER
A limiter keeps hot signals from overloading the next stage of electronics. Les Paul takes credit for inventing the limiters as used in recording studios. He related that he got the idea from watching Mary Ford turn her head while singing loud passages as she watched the recording VU meters. She physically limited the input signal to the mic with this technique.

LINE-LEVEL
The voltage level at which most pro gear sends pre-amplified signals to other devices such as equalizers, limiters, compressors and power amplifiers. Generally considered to be +4(dBm) or 1.2 Volts RMS.

MAGNETIC PICKUP
A pickup that consists of a magnetic structure and one or more coils of very fine wire which "transduce" or transform the vibration of plain steel or steel cored wound strings into an electrical signal.

MIDI
Musical Instrument Digital Interface, the computer language used in modern synthesizers and signal processors to "communicate" with other devices.

MINI-MIC
Miniature mics derived from hearing aid and CIA "mic in the martini olive" technology. These are generally electric mics, a simpler variation on the condenser mic.

MIXER
Used to combine or mix multiple sound signals into a mono, stereo, or other simpler signal to go onto tape, a CD, or through a PA system. Also refers to the person who does the mixing, not to be confused with re-mixer, the person who doesn't mix live, but works on mix-downs of pre-recorded mix-ups. If you're reading this, you probably have a Solstice mixer/blender.

MONITOR
Generally referring to a set of speakers aimed at musicians used to give performers a chance at hearing themselves on stage. Watch for "In-Ear" monitors the latest thing in stage monitoring; these are like hearing aids for musicians. The term "Monitor" implies accuracy as well as in, "Studio monitor speaker."

"NATURAL" SOUND
Often achieved with the most unnatural of means, natural sound is the Holy Grail of most acoustic musicians. To hear it, try listening to truly acoustic music - no, no, not MTV Unplugged! Our goal at D-TAR is to help you achieve the most natural sound you can get … plugged in.

NOTCH FILTER
A specialized kind of equalizer that can be tuned to "notch out" problem frequencies without affecting neighboring frequency bands. Usually used to kill feedback frequencies. D-TAR's "Equinox" equalizer features two switchable notch filters.

OMNIDIRECTONAL MICROPHONE
A mic that picks up sound more or less equally in a spherical pattern all around the mic's diaphragm.

ONBOARD and OUTBOARD
Generally refers to where pickup buffering and/or EQ stages are located. Onboard in your instrument, outboard is somewhere else, man.

PA SYSTEM
Originally "Public Address" system. Do you remember, "Would Johnny

Brown please come immediately to the principal's office?" Some of the first PA systems were used in department stores and schools. Now the term refers to sound systems designed for amplifying live music.

PARAMETRIC EQ
A type of equalizer that allows continuous control over three parameters: frequency, bandwidth, and amount of boost or cut. While a bit harder to intuitively understand than graphic equalizers, parametric EQ is preferred by pro audio engineers for fixing specific sonic problems without affecting other frequencies as happens often with graphic EQ. D-TAR's "Equinox" is a three band parametric EQ with two bands of notch filtration.

PHANTOM POWER
A system wherein DC current is run up the same cable used to send the signal down to a mixer. Used most often in the studio to power high end condenser mics, but sometimes used for powering mics and other electronics inside guitars.

PHASING
The relative polarity of two or more signals that contain similar information. In-phase signals add together while out-of-phase signals tend to cancel. See Appendix "C".

PICKUP
Any device that changes vibrations of a soundboard or strings into an electrical signal. The most common pickups are magnetic and piezoelectric.

PIEZO PICKUPS & PIEZOELECTRICITY
Certain crystals, ceramics, and polymers exhibit the phenomenon of piezoelectricity. Piezo means pressure in Greek, and piezo materials directly transform mechanical vibrations into electrical signals. Most under-saddle pickups, like D-TAR's Timber-line and SA-2 pickups are based on the piezoelectric effect.

POLEPIECES
These are magnetically conductive elements of a magnetic pickup used to shape the magnetic field. Some pickups such as the classic humbuckers have adjustable polepieces for making fine adjustments to the volume of each string.

PREAMP
An electronic device usually designed for matching low-level signals to a power amplifier. EQ and other signal processing is usually done with or within the preamp stage. Solstice is a preamp in addition to being a mixer-blender.

PRESENCE CONTROL
A section or knob of an equalizer operating in the upper midrange.

PROCESSOR
Any signal-modifying device often combining several effects such as

EQ, chorus, delay, and reverb. You can use processors with Solstice by inserting them in the effects loop(s). Digital multi-effects units are commonly used for modifying guitar tones.

PROXIMITY EFFECT
A characteristic of cardioid mics whereby low end is boosted as you get closer to the mic. Proximity effect can make a mic sound overly boomy if you get too close.

RACK MOUNT
Gear that is designed to be mounted in the international standard 19" "relay rack". The standard was set by the phone company for its racks upon racks of electrical switches that routed phone calls in days of old when phones had dials and dial tone really meant something.

REVERB
The sound of surf music, echoey without the discreet pulses or repeats obtained from delay units. The original reverb effect was (and still is) derived from vibrating a set of springs with a little loudspeaker-like driver and picking up the reverberant sound at the other end of the springs.

RIBBON MIC
A type of microphone in which a very thin conductive ribbon, usually aluminum, vibrates in a magnetic field. A small current is induced in the ribbon itself and is then preamped like other types of mic signal.

SIGNAL
The word I've used more often than any other in this glossary. In amplification, the signal is the electrical analog of the musical note(s) traveling through the amplification chain.

SINGLE-COIL PICKUP
Refers to the simplest style of magnetic pickup having one coil of magnet wire. Noted for a certain clarity and focus. Seymour Duncan is famous for it's recreations of the most famous single coil pickups from the "golden era" of magnetic pickup design.

THREE-BAND EQ
Sounds like a good night at the Fillmore, but in our context it refers to types of equalizers having low, mid, and high frequency controls. Solstice features a three-band equalizer on each channel.

TRANSDUCER
Any device that changes mechanical or acoustic energy into an electrical signal or vice versa. Mics, pickups, and loudspeakers are all transducers. The term transducer is often used with accelerometer style piezo pickups, but is not exclusive to such pickups.

TRANSIENT RESPONSE
The quality of how fast a preamp, amplifier, or signal processor responds to an input signal. Related to "slew rate". Fast is good, slow is bad.

TUBE
An electrical device that can amplify low-level signals into higher equivalents. Tubes are the oldest technology for this purpose and are still preferred by many in preamps, direct boxes, and amplifiers. They're made of glass like lightbulbs, and boy, do they get hot!

TWEETER
A loudspeaker designed specifically for high frequencies. Tweeters usually cover the range from 3000 or 4000 cycles (3 to 4 Kilo Hertz) on up to 20 K Hz. Think "Tweetie Bird."

WOOFER
A loudspeaker designed for reproduction of low frequencies, generally from 20 Hz to 1 to 3 K Hz. "Midrange" drivers are used sometimes to cover the frequencies between 1 K Hz and 4 K Hz.

## Limited Warranty

D-TAR offers the original purchaser a one-year limited warranty on both labor and materials starting from the day this product is purchased from an Authorized D-TAR Dealer. D-TAR will repair or replace this product, at its option, if it fails due to faulty workmanship or materials during this period. Defective products should be returned to your USA dealer, international distributor, or sent direct to our factory postage prepaid along with dated proof of purchase (e.g., original store receipt) and a RMA number clearly written on the outside of the box. Please call our factory at 805-964-9610 for an RMA number.

This warranty does not apply to damage to this product or an instrument caused by misuse, mishandling, accident, abuse, or alteration. Product appearance and normal wear and tear (worn pain, scratches, etc.) are not covered by this warranty. D-TAR reserves the right to be the sole arbiter as to the misuse or abuse of this product.
D-TAR assumes no liability for any incidental or consequential damages, which may result from the failure of this product. Any warranties implied in fact or by law are limited to the duration of this express limited warranty.

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