Channel D Seta®

Balanced Direct-Coupled 5 MHz Bandwidth Phono Preamplifier

Installation and Use Guide

Seta Model L for Low Output / Low Impedance Phono Cartridges

AGM Rechargeable Battery Power Supply

Selectable Voltage Mode / Transimpedance (Current) Mode Operation

QUICK START

1. Allow your Seta preamplifier to fully acclimate to ambient temperature before removing it from the inner plastic bag.

2. Current mode (transimpedance) phono preamplifiers use balanced input wiring. Balanced wiring consists of a twisted pair of two independent conductors inside a shield, for a total of three independent conductors. *Current mode phono preamps may exhibit audible hum with unbalanced (coaxial conductor with shield) wiring*. RCA to XLR adapters* may be usable, but a properly wired* balanced interconnect is needed to guarantee no audible hum.

*XLR pin 1 must be connected only to the cable shield; for adapters, pin 1 left open / not connected

3. *Unmodified* Rega turntables and tonearms cannot be connected to balanced preamplifiers because Rega connects the chassis ground to a cartridge signal connection, preventing making a balanced signal connection, resulting in noise and hum.

4. Connect the turntable and output connections. Connect the power adapter to the Seta. The barrel connector of the power adapter will *easily* slide into the power input jack on the rear of the Seta. If it seems to not slide in easily, verify the alignment of the plug and try again. It can be damaged by using excessive force. Next, plug the line cord into utility power.

5. It's best to keep the Seta continuously connected to utility power. This will allow the circuitry to come to thermal equilibrium for best performance, and will also optimize the battery life.

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AGM Rechargeable Battery Power Supply

With Selectable Voltage Mode / Transimpedance (Current) Mode Operation

Use Guide Revision 2

Channel D • (609) 818-0700

email: softsupport@channld.com

web: http://www.channel-d.com

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Congratulations on your purchase of a Seta phonograph preamplifier! The Seta is a low noise, fully balanced design featuring an ultra-wide frequency bandwidth of up to 5 MHz (Model L), unprecedented for a phono preamplifier. This provides you with the key to obtaining stunning, three-dimensional music reproduction from your phonograph records.

By substantially increasing the signal bandwidth, linear operation is assured because audio frequency signals will present an unchallenging signal to the preamplifier.

The signal propagation delay in the front end of less than 50 nanoseconds permits using negative feedback without the usually associated deleterious effects, because the circuit is able to respond 1000 times faster than any audio signal. Consequently, feedback precisely tracks the input signal, providing exceptional linearity and coming as closely as possible to the proverbial "straight wire with gain."

This faithfully preserves the complex transient and phase relationships present in even the densest musical passages, conveying the utmost three-dimensionality and clarity in the presentation of music.

Seta Model L phono stages manufactured in late 2020 and afterwards can be configured by the user for transimpedance (current amplification) input mode.

Modern manufacturing methods are used, including low-noise, four-layer circuit boards and precision, surface mount components. Surface mount components provide the shortest signal paths and highly optimized circuit layouts, with low stray inductance, capacitance, improved unit to unit consistency and performance all eclipsing old-fashioned through-hole designs. The result is a phono preamplifier with exquisite performance far exceeding expectations, especially considering its relatively modest price in the arena of most high end components.

The high precision (better than ± 0.1 dB) RIAA EQ accuracy (when configured with the optional analog RIAA EQ) provides standard RIAA-corrected phono preamplifier outputs with outstanding quality. The Seta may be used as a front-end preamplifier for connecting to high resolution (192 kHz / 24 bit), balanced - input computer audio interfaces. In conjunction with Channel D *Pure Vinyl* software, used for applying the RIAA phono correction curve, the strengths of the latest, 21st century cutting-edge analog and digital technologies are brought together, delivering superb, high definition, transparent vinyl playback.

A benefit of having the availability of Flat and RIAA outputs facilitates linking analog LP playback with the performance and flexibility of high resolution digital audio, should you desire to do so later in the future. The Flat and RIAA outputs may be used simultaneously (another unique feature), to support the best of the Analog and Digital worlds.

Getting Started
Please take the time to read this Installation and Use Guide, to familiarize yourself with the installation and operation of the Seta.

Important: If the package you received from your shipper is below ambient temperature, please allow the package / plastic bag containing the product to acclimate at room temperature for a few hours before opening it, to avoid causing condensation on cold internal surfaces.

After unpacking, connect the provided external power supply to an AC power source and plug the barrel connector into the power jack on the rear panel of the Seta. The plug will *easily* slide into the jack. If it seems not to mate with the jack, check the alignment and carefully try again. It will take the Seta at least one hour for the internal circuitry and solid copper parts to become stabilized to normal operating temperature.

The following items are included. Please check the package and notify Channel D of any shortage:

- Seta Preamplifier, with Internal AGM Batteries Installed
- 15-volt DC power supply, 110 / 220 Volt universal 2 - wire (Isolated) Input
- Precision 2 mm slotted screwdriver and "practice" load switch on PCB chip
- Seta Battery Replacement Video (.mp4 movie file on SD card, open on computer with movie player application)
- 3/32"Allen L-key (Seta Plus)

The first time using your Seta, the internal battery should be fully recharged at least once before operating the preamplifier (playing music). The Seta automatically disconnects the battery charging power supply when a signal is detected. Therefore, if you would like to immediately use the Seta to play music, charging should be manually locked in for at least two hours by selecting the **Charge Lock** front panel button. This will cause the **Charge Lock** indicator to illuminate (as well as the **Batt** indicator, if the Seta wasn't already charging). The **Charge Lock** mode also is useful for component burn-in or noncritical listening.

It's safe to make signal connections to the Seta while the power supply is connected. ***Be sure to mute the Pure Vinyl application software, if running on the computer, or otherwise mute or power down your power amplifier(s) while making signal connections, to avoid generating transient noises which could damage loudspeakers.***

Siting the Preamplifier
To avoid premature degradation of the rechargeable batteries from higher than normal temperatures, **<u>do not</u> place the Seta where it may be exposed to direct sunlight**. Also, **do not** place it on top of any component which is a source of heat. For optimum battery life the Seta should be operated in an environment with ambient temperatures between 40° F and 75° F. Lower temperatures within this range will prolong battery life.

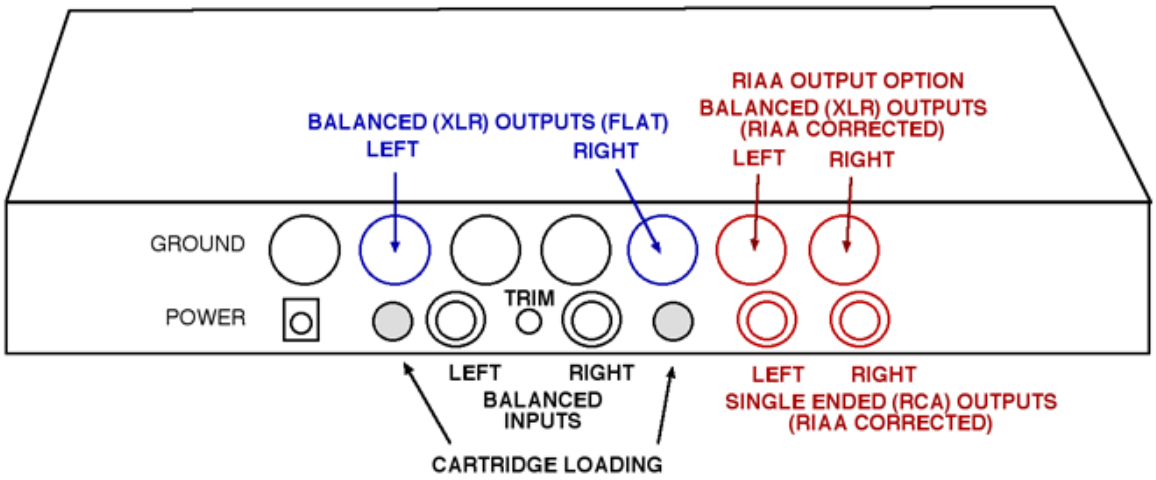
<u>Signal Inputs</u>

- The RCA inputs may be used with conventional shielded cable (single-ended) phono connections. They also serve as single-ended to balanced adapters (provided that the turntable ground connection is isolated). *Consult the section of this Installation Guide concerning the proper configuration of the internal single ended / balanced jumpers (Page 7). The factory setting is with the jumpers set for balanced operation.*

- The XLR inputs are intended for use with balanced (twisted pair or star quad) turntable connections. For optimum, low noise operation this is the preferred type of connection. Balanced wiring provides better noise immunity than conventional shielded (single conductor plus shield) cable.

Signal Outputs

- The low impedance, balanced "Flat" XLR outputs are intended for connection to the **balanced** inputs of a professional audio interface, for use with Channel D's Pure Vinyl software (for MacOS computers) for applying RIAA compensation (or other similar software on other computer platforms). (Consult the Pure Vinyl software User Guide for more information.)



If using an audio interface with single-ended, unbalanced inputs (not recommended), ***do not*** connect either XLR output pin to common/ground. The correct wiring configuration would be to use XLR Pin 2 as signal and XLR Pin 1 as ground, if using a balanced to single ended adapter.

RIAA Outputs (with Optional RIAA Output Module)

- Balanced and single ended outputs are provided. Use the connection appropriate for your other equipment. Do not use an XLR to RCA adapter to connect to single ended connections; use the single ended outputs.

Power

- Connect the barrel connector of the supplied power adapter to the power input jack. IMPORTANT: Do not substitute any other adapter for the factory-supplied galvanically isolated two-wire adapter, as this will result in improper operation and damage the Seta.

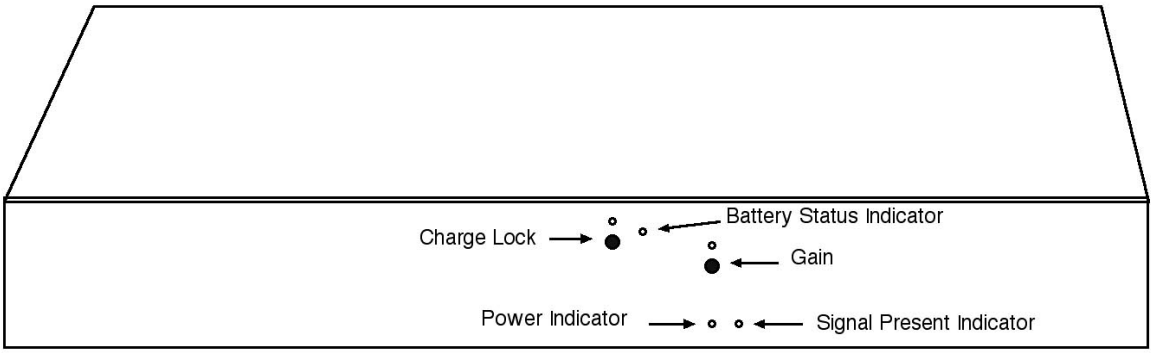
Chassis Ground

- Securely connect the chassis ground wire from your turntable / tonearm (if so equipped) to the grounding lug on the rear panel of the Seta. If your turntable doesn't have a grounding connection, leave this terminal disconnected. Do not connect the Ground terminal to anything except the ground connection from your turntable.

- In lieu of the built-in RIAA Output Module, the Ground will be mounted on the chassis in the LEFT RIAA output position. The Ground chassis position shown in the figure will be occupied by the 5-pin power connector for the optional external RCM (RIAA Correction Module).

Power-Up (Initial) Configuration

- **Charge Lock**: Initialize indicator by pressing button after first connecting power, if not illuminated.
- **Sig** indicator: initially on, extinguishing after several minutes. *(If the Sig indicator does not extinguish, be sure to check if an input connection has become loose or dislodged.)*
- **Gain**: must be initialized after connecting power, see below.



Gain Adjustment

Upon connecting the power supply, the gain setting must be initialized by pressing the front panel Gain button several times, until the Low (Light Blue) indicator appears. The gain setting will be preserved as long as power is supplied (and, as indicated below, in the AGM Rechargeable Battery Operation and Charging section, the Seta should normally be maintained in a powered state).

Indicator Color / Gain	Gain (Standard RIAA Outputs)	Gain (Flat Outputs)
Light Blue (Low)	55 dB	43 dB
Blue (Medium)	58 dB	46 dB
Violet (Medium High)	61 dB	49 dB
Red (High)	65 dB	53 dB

WARNING! ***Always make changes to the Gain Setting at a reduced or muted playback volume,*** to keep **loud** transients (thumps) from playing through the loudspeakers. The Seta gain control isn't meant to be adjusted frequently. It's designed for ease (in contrast to having internal jumpers or switches) of setting the phono preamplifier gain, to provide the optimum input signal level for your digital audio interface and phono cartridge. With that purpose in mind, any circuitry for preventing "thumps" that also could compromise audio quality was omitted in the Seta design.

The *Pure Vinyl User Guide* includes complete information on setting the proper preamplifier gain. Briefly, **you should aim for "Dry" signal level peaks in Pure Vinyl between -20 and -4 dBFS, for the music that you usually play.** Provided that peaks usually reach these levels, it's not necessary to have to adjust the gain setting frequently, or at all. It's prudent to allow at least 4 to 6 dB of headroom below full scale, to accommodate unexpectedly loud modulation levels. (At the **low** end of the suggested signal range above, be certain that a signal peak represents music, and not "pops" or "clicks" from defects in or contamination on the surface of the LP.)

If your audio interface permits setting nominal input signal levels to consumer or professional format (true of professional audio interfaces from Lynx, RME, etc.)**, first try the consumer ("-10 dbV") setting, in conjunction with the minimum gain setting on the Seta.**

- **If signal levels remain too high,** set the **input** of the audio interface to professional ("+4 dBu") format.

- **If the levels are too low,** increase the gain on the Seta. (For monitoring / playback, if the **output** levels of your interface can be adjusted independently of the input levels, use the +4 dBu setting for the **output**.)

(The High gain setting on the Seta Model H preamplifier is provided as a convenience for using low-output moving-coil cartridges with the Model H. The desirable audio reproduction qualities of the Seta are retained, even at high gain settings, because the Seta design insures that bandwidth is independent of gain. However, for dedicated use with low-output moving-coil cartridges, the Seta Model L is preferred, because the noise characteristics of the low impedance, high-bias-current devices used in the Model L are *specifically tailored* to offer quieter operation and wider bandwidth with low-output moving-coil cartridges than is possible with the circuitry used in the Model H. *Note:* the Model L cannot be used with high-impedance cartridges such as moving - magnet or "high output" moving coil.)

> Note: If you're accustomed to using conventional phonograph preamplifiers, the available "Flat" Seta gain settings may seem somewhat lower than usual. However, they are tailored to using the Seta with Channel D Pure Vinyl's digital vinyl compensation curve. The required gain is about 10 to 12 dB less than needed in a conventional phono preamplifier, because the signal is provided to Pure Vinyl with treble emphasis (boost) intact. *(Note for the technically knowledgeable: this turns out to be somewhat less than the maximum 20 dB boost of the RIAA compensation curve at 20 kHz, due to the frequency balance of most music.)* For example, if you would normally use a preamplifier gain of 58 dB for your moving-coil cartridge, then the proper setting on the Seta would be 46 dB. (The Seta with the optional RIAA hardware compensation module has an overall gain 12 dB higher than the settings listed in the table.)

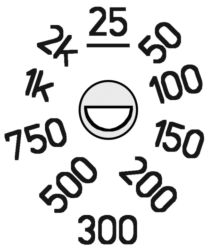
Cartridge Balance TRIM Control

The Seta rear panel features a unique, precision trim control for adjusting the inter-channel cartridge balance. The range of the control is 2 dB. The neutral position is with the slot in the brass actuator oriented vertically. To properly adjust the cartridge balance, use a small slotted screwdriver while playing a monophonic record (or a record with the music mixed to the center). Observe the RIAA Balance indicator in the Pure Vinyl application, and adjust the trim control until the value is close to zero (within ± 0.1 dB is sufficient). This adjustment should only need to be performed once, and can be left alone, unless or until a new cartridge is later fitted to your turntable. The setting is not affected by the overall Seta gain.

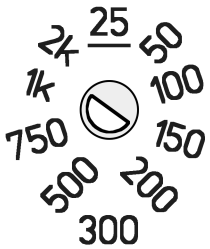
Cartridge Load Adjustment (Model L)

Moving coil cartridge resistive loading is adjusted with rear panel rotary switches. The rotary switches require the supplied 2 millimeter precision screwdriver for adjustment. To adjust the load, carefully insert the screwdriver into the receptacle on the rotary switch and rotate to the desired setting. The setting with the flat side of the screwdriver receptacle facing up is the 25 ohm setting (the 25 ohm label is underlined on the preamplifier as a mnemonic aid). **The factory setting is 150 Ohms.** The screwdriver also has a black index line on the shaft, to assist in determining the selector position. The load settings correspond to having the Single Ended jumpers (see below) set to the factory supplied Balanced position. The load resistance setting also can be confirmed with an ohmmeter, if desired (important: before doing so, disconnect the turntable from the preamplifier). Connect the ohmmeter across the RCA input terminals.

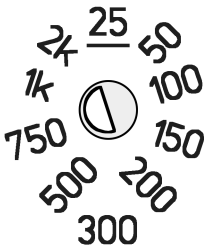
A "practice" switch mounted on a small circuit board is included to aid in visualizing the proper insertion of the screwdriver into the rotary switch on the preamplifier.



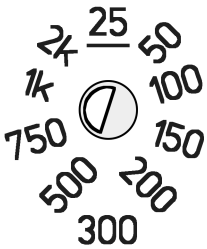
25 Ohms



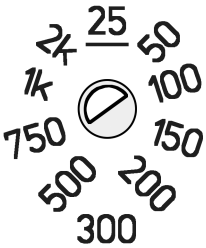
50 Ohms



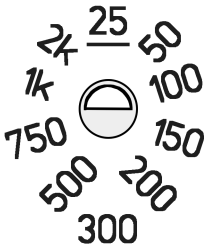
100 Ohms



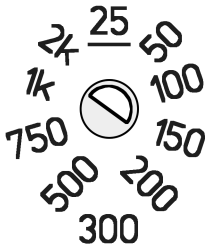
150 Ohms



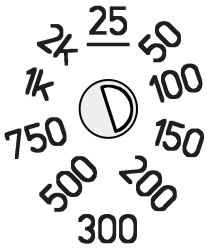
200 Ohms



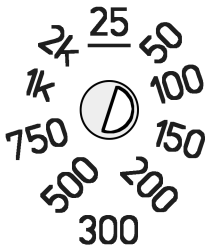
300 Ohms



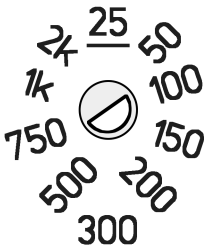
500 Ohms



750 Ohms



1000 Ohms



2000 Ohms

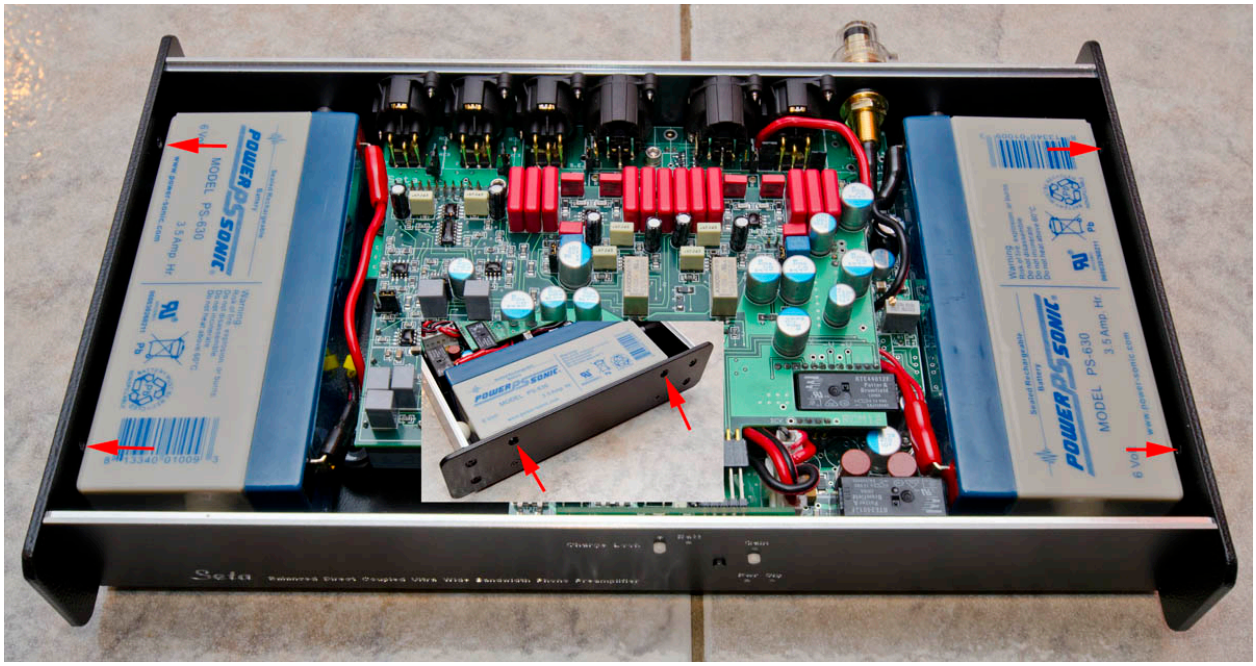
Other load settings can be obtained by inserting user-supplied resistors in the sockets provided on the main circuit board, as described in the next section of the manual. Low impedance traces are used, to accommodate resistors as low as 1 Ohm. The sockets are connected electrically in parallel with the switch load resistance setting, so be sure to take account of that when determining the resulting load resistance:

Total Load = 1 / [(1 / Switch Setting) + (1 / User Installed Resistor Value)]

Cartridge Loading (User Installable Components)
Besides external selector switches, the Seta also has user-replaceable internal components, allowing customization of the load. The sockets are premium, machined gold-fingered, high reliability type. The sockets are on 0.3 inch centers, and will accommodate the leads of typical passive resistors, and capacitors with this lead spacing.

Removing Cover (Seta with RIAA Correction Module shown)

Seta Plus: Remove 6 hex screws (inset figure shows side view)



Seta: Remove 4 Philips screws (inset figure shows side view)

To access the User cartridge loading components:
Unplug the external power supply. Remove the fasteners from the locations indicated (two on each side) in the above illustration using the supplied 3/32" Allen key L-wrench (Seta Plus), and remove the top cover.

There are two component locations for capacitive load (marked **C** on the circuit board) for each channel, and one resistive (marked **R**). The components for each channel are connected in parallel; therefore, capacitor values should be summed (if using more than one capacitor *per channel*). The *minimum* capacitive load (this includes the internal wiring) is 10 pF (by removing all plug-in capacitors). Be sure components are securely seated in the internal sockets after installing.

Note: capacitor component sockets are only provided with the Seta Model H (high impedance cartridges).

Single Ended / Balanced Operation Jumpers
Two internal, gold contact jumpers (marked on the circuit board as S.E.) are used to configure the Seta for single ended or balanced operation. In single ended operation, the negative cartridge terminals are connected to circuit common. This connection should *ONLY* be used if noise (hum) is detected, AND the connecting cable between the cartridge / turntable is the standard, consumer type shielded RCA cable (a single shielded conductor).

The single ended setting is the jumper "bridging" position. Both jumpers *must* be configured the same way for proper operation. For balanced operation, simply place the jumpers in the "Parking" position (with one jumper pin open).

The Seta will function noiselessly (no detectable hum) even in single ended mode with most tonearm / turntable setups, including those with the tonearm "ground" connected to the cartridge (such as Rega tonearms), using the RCA input connectors. However, for optimum low-noise operation, it is strongly advised that balanced (shielded twisted pair) cable be used to connect the turntable to the Seta. This may entail rewiring the turntable. For low impedance (low output cartridges, such as moving coil, with an internal resistance of 100 ohms or less, and nominal output voltage around 0.6 mV or less) shielded twisted pair microphone / standard audio signal cable can be used. For high impedance / high output cartridges (such as moving-magnet with standard output of about 4 mV or more), "star quad" type shielded twisted quad audio cable will provide superior immunity to noise (hum) pickup. To use the star quad cable, the conductors of the same color should be connected together at each end of the cable. While extremely effective at rejecting electronic interference, the disadvantage of star quad is high capacitance, 40 pF per foot, or more (consult the manufacturer's specifications), and this must be taken into account when setting the cartridge loading.

The shield should be connected to the XLR connector pin 1; positive cartridge connection to pin 2, and negative to pin 3. For more information, see the *Pure Vinyl User Guide*.

Take care to confirm that your turntable / tonearm / cartridge doesn't connect the chassis ground or common to any of the cartridge signal leads. Examples of this are Rega tonearms. The internal circuit connector has the tonearm ground connected to the left channel negative signal lead. This will cause excessive hum with the Seta. The tonearm output connector must be carefully disassembled and the negative signal lead disconnected from the circuit connector. The tonearm ground then should be provided with a separate connection to attach to the Seta external grounding lug. Another example includes cartridges having a connection or lug that connects the cartridge housing to one of the signal leads (usually the left channel "negative" lead). This should be disconnected or removed by gently bending or tugging with fine tip pliers or other such tool.

Ground Bypass Jumper
The internal ground jumper (located above the RIGHT channel load resistor, see illustration) may be used to bypass (in the bridging position) the 100 ohm local ground isolation resistor directly to common. This may provide more, or less, "hum" immunity, depending on your other equipment.

AGM Rechargeable Battery Operation and Charging
The Seta should always be kept powered, to maintain both a stable circuit temperature and the condition of the AGM battery. The power consumption (no signal) when the battery is fully charged is low, less than 5 watts. If necessary, the Seta may be disconnected from the power supply for up to a few months without adversely affecting the battery life. *Do not store the Seta at elevated temperatures*, such as in an attic or garage.

The Seta *must* be connected to the external power supply for operation. This design insures that the battery isn't accidentally over-discharged, which could shorten its life. The power supply is used to activate two normally-open relays, connecting the battery to the Seta circuitry, and the charging supply to the battery. When a signal is detected, the second relay is deactivated, disconnecting the charging supply from the battery (and the Seta preamplifier circuitry). The battery voltage monitoring and power management are automatic.

The battery, when fully charged, is capable of supplying power for well over 24 hours of continuous operation. The AGM type lead/acid battery is superior to *all* other battery types used in high-end audio applications (see http://www.channld.com/seta.html, under the Rechargeable Battery section).

The Seta will automatically activate Charge mode under either of the following two normal conditions:

- A signal resulting in an *output* level of less than -40 dBV isn't detected for about 20 minutes.
- The AGM battery has exhausted its charge.

The switching to Charge mode (or from Charge to Battery mode) will be unnoticeable, even while playing music. A faint, mechanical click may be heard (from an internal relay) if holding an ear close to the preamplifier.

If you want to use the Seta to burn in another component, or use it for noncritical listening, the Charge Lock selector switch is provided to lock the Seta in Charge mode, overriding the signal level detector.

Battery Life / Battery Replacement
Typical battery life will be between 3 and 6 years; up to 20 years is possible. The battery life is determined by three factors:

(1) operating environment temperature (temperatures above 80 F should be avoided, as this will degrade battery life)

(2) the number of deep discharges (defined as continuous operation for more than 24 hours without activating the Charge or Manual Charge mode)

(3) battery life will be extended by keeping the Seta continuously connected to a power source (the idle power consumption is less than 5 watts) and the battery fully charged.

The battery capacity also typically will increase slightly (by a few percent) during the first few discharge / recharge cycles.

When the Battery indicator illuminates with a continuous violet or red color (the normal indication while

charging is a blue color), **AND** the preamplifier automatically switches into Charge mode in less than about 6 hours (while continuously playing records), the internal rechargeable batteries should be replaced.

The AGM lead/acid battery is a widely available type, commonly used for security alarm systems or remote power backup (from solar or small windmill).

Seta Plus: Any sealed type rechargeable 6 volt lead-acid battery with dimensions of 3.7 (h) x 6.0 (w) x 1.3 (d) inches, offset (from centerline) 0.187" spade lug terminals and capacity of 7.0 ampere-hours is acceptable. For example, McMaster-Carr (mcmaster.com) part number 7448K24 (Power Sonic PS - 670).

Seta: Any sealed type rechargeable 6 volt lead-acid battery with dimensions of 2.4 (h) x 5.3 (w) x 1.3 (d) inches, offset (from centerline) 0.187" spade lug terminals and capacity of approximately 2.3 ampere-hours is acceptable. For example, McMaster-Carr part number 7448K13 (Power Sonic PS - 630).

- The batteries ***must*** be replaced in pairs, and only sealed lead-acid type batteries can be used. **All** other battery types are incompatible with the internal battery monitoring and maintenance circuitry and Seta power and voltage requirements.

- It's best to obtain a "fresh" replacement when needed, rather than keeping spares on hand, because degradation will begin to occur if stored for more than a few months without charging. (The Seta may be operated continuously, even with degraded batteries, by using the Charge Lock button, so waiting for replacements to ship shouldn't be a problem.)

- Replacement batteries should be at ambient room temperature before installing.

The included AGM Battery Replacement Instructions (Appendix 2) provide instructions for replacing the batteries. There also is an .mp4 format video on the included SD card illustrating the operation.

If you don't wish to perform the battery replacement yourself, the Seta can be shipped to Channel D for battery replacement. *Please contact Channel D for shipping information and pricing, and a Return Material Authorization.*

Voltage Mode / Transimpedance Mode configuration
The Seta is configured from the factory in "conventional" voltage mode. This mode works with a wide variety of low output moving coil cartridges.

Besides its existing conventional voltage-amplification mode, the Seta L now can be operated in what is becoming recognized as a very desirable circuit topology for low impedance MC cartridges: transimpedance (current-amplification) mode.

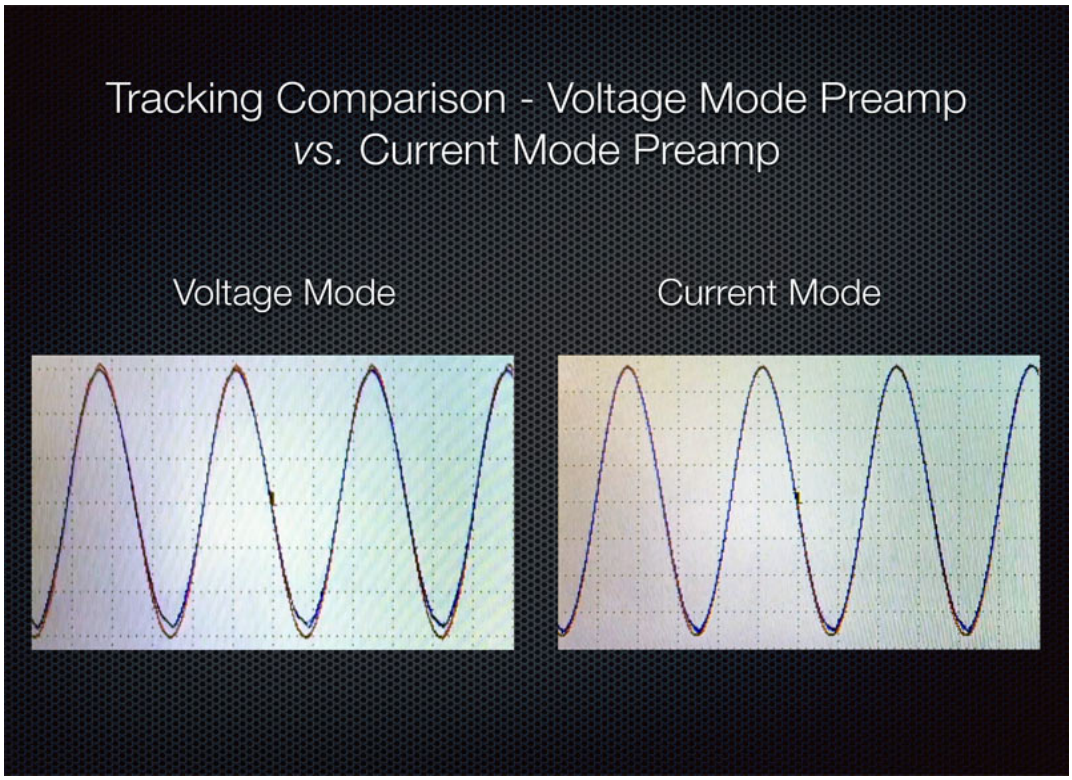
Transimpedance mode uses the current, rather than voltage output from a cartridge and provides improved cartridge electromechanical damping and a potentially improved signal to noise ratio. Cartridge loading is automatic. And by providing both voltage and current mode operation, the Seta L now provides the best of both worlds for optimal performance and compatibility with any low output MC cartridge.

Current-mode improves cartridge tracking through superior damping
Transimpedance mode offers better control of stylus motion via improved electromechanical damping compared to conventional load resistors, as in voltage mode.

Shown below is the waveform obtained from playing the Hi-Fi News Analogue Test LP 300 Hz +16 dB track (vertical mark in center is the oscilloscope's trigger level setting cursor). At this LP modulation level, the cartridge was mistracking slightly, indicated by the deformation of the waveform. Tracking is improved in current-mode, compared to our conventional voltage-mode.

This is not because of lower distortion in the preamp. This is lower distortion in the signal coming from the cartridge itself, because of more effective electromechanical damping of the cartridge moving coil generator and stylus motion. Not magic, just simple physics... but the effect on the sound quality seems magical!

Note: the new mode selection capability of the Model L can be retrofitted to most older Seta Model L phono stages by the factory. Please contact Channel D for more information.

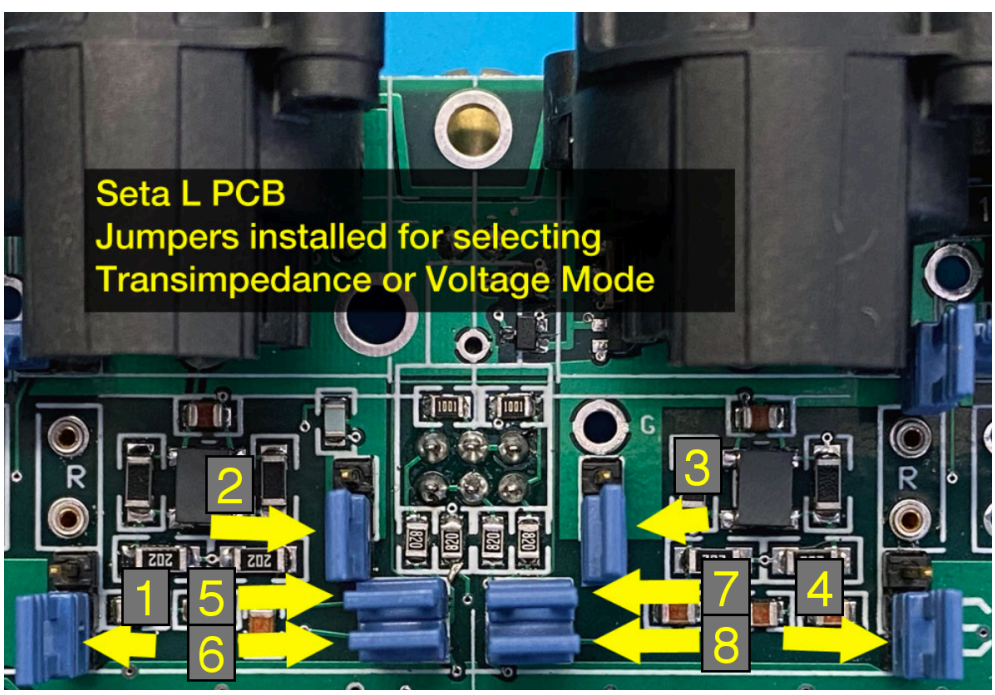


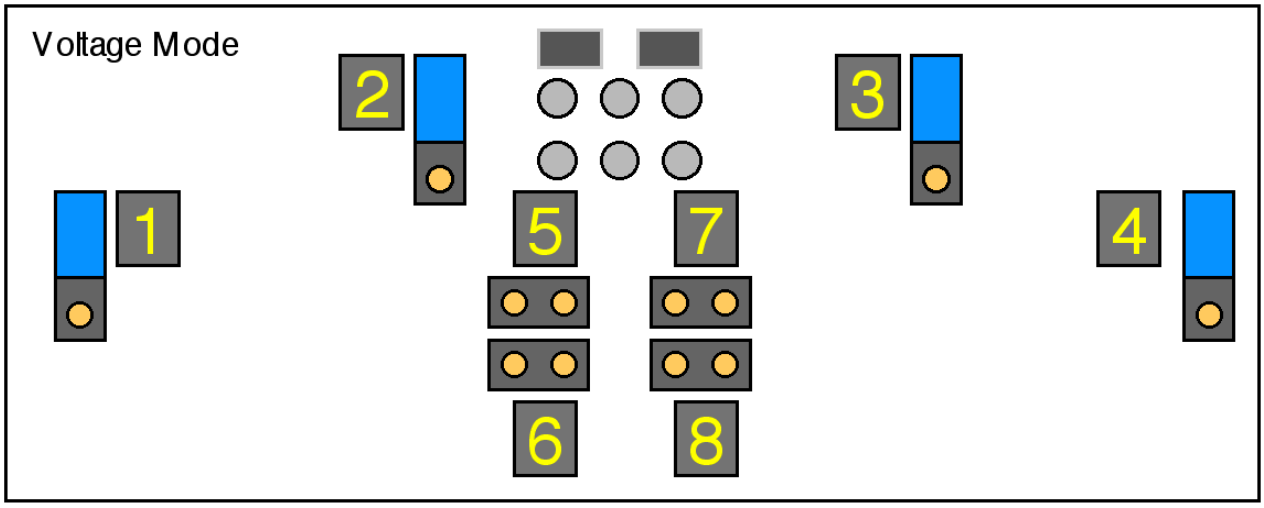
Seta L Voltage Mode / Transimpedance Mode comparison

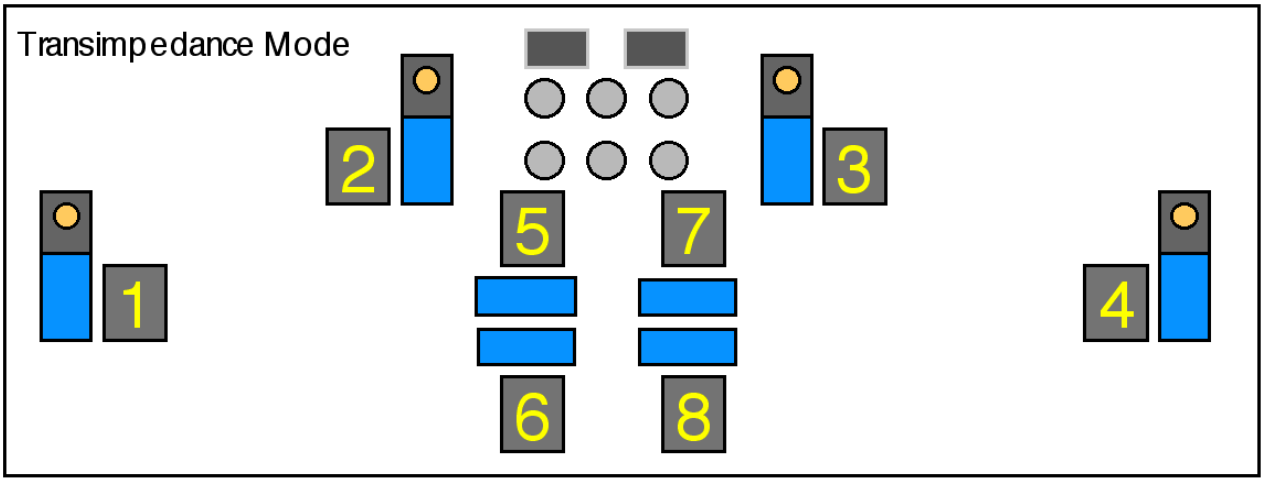
	Voltage Mode	Transimpedance Mode
Cartridge Impedance	Any Low Output MC Cartridge	Cartridge DC Impedance: 20 Ohms or less (10 ohms or less preferred); Cartridge Inductance 50 microhenrys (μH) or lower (10 μH or lower preferred)
Cartridge Output Voltage	0.1 mV or greater preferred	Does Not Matter
-3 dB Signal Bandwidth	5 MHz, any cartridge	Depends on Cartridge Characteristics; 50 kHz to 500 kHz*
Stylus Damping	Determined by Load Resistance	Optimal
Cartridge Loading	Must be Configured for Optimum Performance	Automatic
Cartridge Balance TRIM control	Active	Has No Effect

* This is the bandwidth of the entire signal chain, as determined by the cartridge inductance and impedance. Cartridges with higher impedance and inductance will have lower overall bandwidth. However, the bandwidth of the front-end circuitry itself in transimpedance mode will be at least 1 MHz.

Voltage Mode / Transimpedance Mode configuration jumper settings







Jumper Number(s)	Voltage Mode	Transimpedance Mode
1, 2, 3, 4 (3 pins)	**Upper** 2 Pins Bridged	**Lower** 2 Pins Bridged
5, 6, 7, 8 (2 pins)	Open, or "Parked"	2 Pins Bridged

Note: "Parked" means placing one pin of the jumper onto *one* terminal pin, as a convenient way to store it.

1. Important - Disconnect the power adapter from the utility line to power down the Seta.

2. Remove the cover per the instructions on Page 7.

3. Configure the jumpers for the desired operation mode. Refer to the diagrams and table above showing the jumper number and bridging position.

4. Reattach the lid and connect the power. The Seta can be operated with the lid off, but be very careful not to drop any metallic objects inside. If that happens by accident (or you drop *any* objects inside), immediately disconnect the power and then retrieve the object. Or else, for convenience, the cover may be simply placed on top without attaching the fasteners.

IMPORTANT: Please double-check **and then triple-check** that ***all*** 8 jumpers are correctly placed, before connecting the power supply to the utility line.

Specifications - Seta Model L, for Low Output/Low Impedance (Moving Coil) Cartridges

- **Voltage Gain (in Voltage Amplification Mode):** 55, 58, 61, 65 dB (Flat outputs: 43, 46, 49, 53 dB)
- **Input Load Resistance (in Voltage Amplification Mode):** maximum 2 kΩ; user adjustable
- **Frequency Response (-3 dB) (in Voltage Amplification Mode):** DC to 〉5 MHz, at any gain setting; slew rate greater than 500 volts per microsecond (5 volts peak to peak output, 25 to 75%)
- **Phase Shift:** ultralinear, less than 1 degree, DC to 100 kHz, at any gain setting
- **Signal Propagation Delay:** less than 50 nanoseconds, input to output
- **Distortion:** less than 0.001%, 10 Hz to 40 kHz, at any gain setting, 0 dBV (3 Volts) output level
- **Circuit Topology:** Fully balanced, direct-coupled (no capacitors in the signal path). Voltage or Current (transimpedance) mode
- **Cartridge Fine Balance Trim:** 2 dB range, not affected by Voltage Gain setting (disabled in transimpedance mode)
- **Inputs:** Neutrik, Premium Gold Pin XLR Balanced; WBT, premium wide bandwidth helical gold pin RCA (RCA inputs function as single-ended to balanced adapters)
- **Outputs:** Neutrik, Premium Gold Pin XLR Balanced
- **Output Impedance:** less than 40 ohms
- **Output Drive Capability:** Balanced cable, up to 33 feet (10 meters), 600 ohms or greater load impedance
- **Storage Temperature (with charged AGM batteries):** 0 to 78 degrees F
- **Operating temperature:** 40 to 75 degrees F; battery life will be diminished at higher temperatures
- **Power Consumption:** less than 5 watts idle / maintenance AGM float; less than 20 watts while operating or with AGM recharging

Note: circuit gain in transimpedance mode is dependent on cartridge characteristics

Optional RIAA Correction Module

- **Circuit Topology:** Fully balanced, direct coupled; second order, dual-range DC servo (primary time constant 10.3 seconds). Passive high frequency EQ; premium, low distortion wide bandwidth FET based gain stage for active low frequency EQ. Independent single ended (RCA) ground referenced and balanced outputs; low noise 4-layer circuit boards and surface mount component technology
- **Gain:** adds 12 dB to "flat" signal
- **Channel Separation:** ≥ 80 dB, 20 Hz - 20 kHz (greater than 100 dB at 1 kHz)
- **Frequency Response (-3 dB):** DC to 12 MHz, balanced or single-ended outputs
- **Channel Match:** better than ± 0.02 dB, 10 Hz - 50 kHz
- **Deviation from RIAA Standard:** less than ± 0.1 dB, 10 Hz - 50 kHz
- **Harmonic Distortion (20 Hz - 20 kHz):** less than 0.001%
- **RIAA Overload Margin:** 26 dB at 1 kHz, 15 dB at 20 kHz
- **High-pass filter:** -12 dB / octave; -3 dB at 10 Hz (can be disabled with internal jumpers)
- **"Neumann" setting:** 50 kHz RIAA modification, can be enabled with internal jumpers
- **Outputs:** Neutrik, Premium Gold Pin XLR Balanced; WBT, premium wide bandwidth helical gold pin RCA
- **Output Impedance:** less than 40 ohms
- **Output Drive Capability:** Balanced cable, up to 33 feet (10 meters), 600 ohms or greater load impedance
- **Components:** Precision (0.1 percent) metal film resistors; ultra low dissipation factor sprayed metal film polypropylene capacitors, hand selected to match design within 0.1 percent tolerance; ultra low ESR power supply decoupling capacitors

Dimensions

- 15.1"X 2.4"X 6.6" (W x H x D) Weight 9 pounds (Seta Plus)

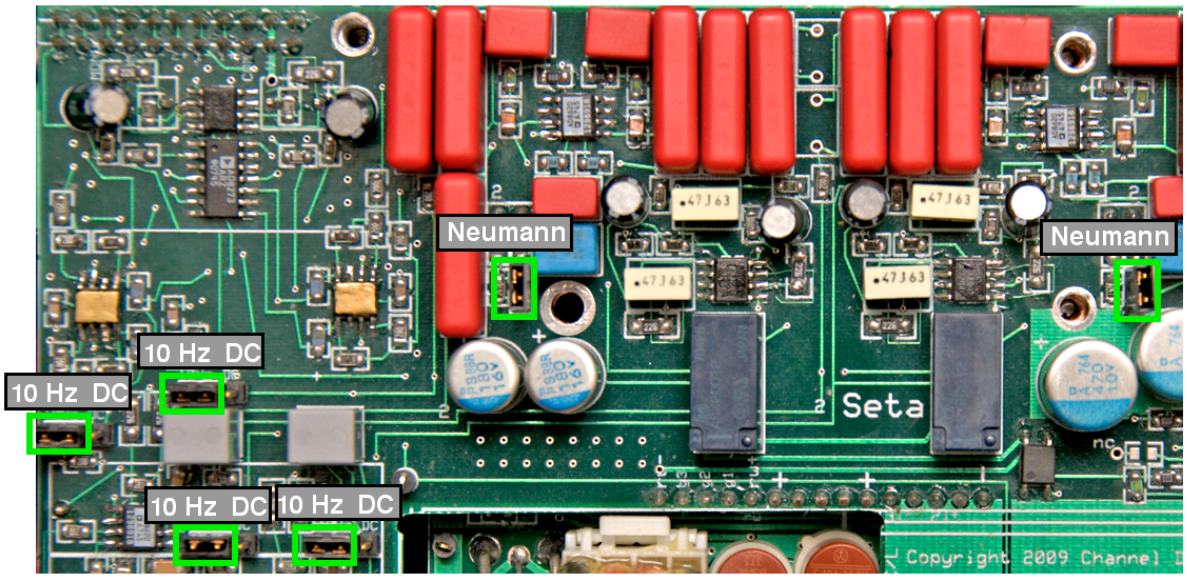
- 12"X 2"X 7" (W x H x D) Weight 6.5 pounds (Seta)

Warranty

- Electronics, five years parts and labor; Batteries, three years, limited warranty. In the unlikely event your Seta must be returned to Channel D for repair, contact Channel D in advance for a return material authorization number and shipping instructions.

In keeping with our continuing efforts to enhance and improve our products,
we reserve the right to change specifications without notice.

Appendix 1 - Jumpers on optional Internal RIAA Module



Low Pass Filter

As configured from the factory, the low pass "rumble" filter is set at the 10 Hz position. To disable the filter (this is intended for test bench testing and is not recommended), move **all four** jumpers indicated into the DC position.

Neumann RIAA Curve Modification

The Seta is configured from the factory for the standard RIAA curve. The Neumann modification introduces an extra high frequency time constant to compensate for the putative roll-off of the mastering lathe cutting head. The Neumann setting can be enabled by removing the two jumpers indicated (or placing them in the "parking" position, with one pin open).

Appendix 2 - AGM Battery Replacement

Note: These instructions are provided for reference purposes, when battery replacement becomes necessary. Typically, the Seta battery life will be between 3 and 6 years, up to 20 years.

An SD card with a video showing the battery replacement procedure is included with the Seta. On Page 17 also follow written replacement instructions.

Replacing an AGM battery is slightly less convenient than replacing other types of batteries. However, this small inconvenience is worthwhile, compared to the uncompromising level of performance that is attainable with this type of battery.

The AGM type lead/acid rechargeable ("secondary") battery is superior to all other battery types for high-end audio. Audio doesn't require the lower mass of lithium (such as automotive or aircraft). The charging electronics of Li-ion are potentially troublesome, and such batteries can fail in spectacular (and hazardous) ways. AGM will not leak electrolyte if the case is damaged / cracked because the electrolyte is contained by the sponge-like fiberglass battery plate separators. AGM is also about one-fifth the cost of a Li-ion battery with the same energy storage capacity.

"Primary" (throw-away or non-rechargeable) batteries such as 1.5 or 9 volt alkaline cells are unsuitable for high quality audio applications because of their very high internal impedance and susceptibility to electromagnetic noise pickup.

The AGM lead/acid battery is a widely available type, commonly used for security alarm systems. Any sealed type rechargeable 6 volt lead-acid battery with dimensions of 2.4 x 5.3 x 1.3 inches and capacity of approximately 2.3 ampere-hours, with terminals along the same edge (as contrast with on opposite corners) is acceptable. For example, McMaster-Carr part number 7448K13 (Power-Sonic PS-630) or Digi-Key part number 522-1001-ND (either can be ordered via the Internet). They also can be obtained from online retailers such as Amazon (at Amazon, search for Power Sonic PS-630; we recommend *only using the genuine gray and blue Power Sonic brand* rather than a putative "replacement" type).

- The batteries ***must*** be replaced in pairs, and only sealed lead-acid type batteries can be used. **All** other battery types are incompatible with the internal battery monitoring and maintenance circuitry and Seta power and voltage requirements.

- It's best to obtain a "fresh" replacement when needed, rather than keeping spares on hand, because degradation will begin to occur if stored for more than a few months without charging. (The Seta may be operated continuously, even with degraded batteries, by using the Charge Lock button, so waiting for replacements to ship shouldn't be a problem.)

- Replacement batteries should be at ambient temperature before installing. It's best to allow the new batteries to acclimate to the ambient temperature near the Seta for 245 hours before installing.

- Handle the batteries gently, to avoid damaging them.

If you don't wish to perform the battery replacement yourself, the Seta can be shipped to Channel D for battery replacement. *Please contact Channel D for shipping information and pricing, and a Return Material Authorization*.

Battery Replacement Procedure

1. Unplug the external power supply and disconnect all other external signal and ground leads. All internal circuitry is powered-down when the external power supply is unplugged. **Move the Seta to a comfortable, well-illuminated flat work surface.**

2. Remove four screws as shown on Page 7 and remove the top cover.

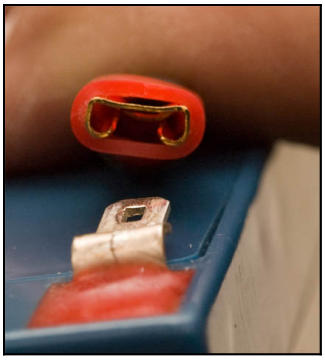
3. **IMPORTANT! Unplug the white, 6-pin power connector attached to the circuit board.** Hazardous *voltages* aren't present, but the battery is capable of supplying large (over 20 ampere) currents (similar to an electric arc welder). *This high current capability is important to the superior audio performance of the Seta,* but also necessitates caution. If a single battery terminal is accidentally shorted to a metallic conductor, such as a circuit board *while the power connector is attached,* the resulting electrical arc / sparking may severely damage the Seta. This possibility is essentially eliminated by unplugging the connector (care must still be taken to avoid simultaneously shorting *two* bare battery terminals to any metallic object). It's safe to touch or handle the bare battery terminals with your *bare* hands. However, it's also prudent to remove any metallic personal jewelry or items that could inadvertently contact the battery terminals. High temperatures generated by large currents conducted through metallic objects, possibly melting them, can result in serious burns.

4. ***Use a felt tip marker or attach pieces of tape to mark the batteries to be removed.*** This insures that the old batteries won't accidentally be mixed up with the replacements.

5. Tip the right-side battery, lift and stand it upright in the chassis.

6. Remove the spade lugs from the battery by gently yet firmly pulling by gripping the lug (not by pulling on the wire), being very careful not to contact any metallic objects with the battery terminals.

7. Exchange the old battery with the replacement. If the new battery was supplied with protective terminal covers, remove them and install them on the terminals of the old battery. (Please be sure to dispose of the batteries in accordance with your local recycling regulations. Do ***not*** place them in the trash. You also may ship the batteries to Channel D for disposal. Contact us first for a return material authorization number and shipping information.)



8. Reattach the gold-plated connecting lugs, **taking care to attach the red wire to the positive terminal** (which should also have a red mark or + indicator) and the black wire to the negative terminal. Note the correct orientation of the lug (open side towards the battery, as shown in the photograph at right), which provides slightly more mechanical clearance than the other orientation. Make certain that the terminal is inserted into the "wings" of the lug, and not accidentally inserted between the lug and the insulating sleeve. Insure that the lug is fully seated onto the terminal.

9. Install the new battery into the chassis by gently but firmly tipping / tilting the battery, insuring that the end of the battery clears the bumper post at the rear of the chassis, and the terminal side of the battery is seated against the black rubber bumpers (around the circuit board supports). The terminals should be closest to the top side of the chassis.

10. Repeat Steps 5-9 above for the left-side battery.

11. Confirm that all battery terminals are securely attached.

12. Plug the six-pin power connector into the circuit board, carefully matching the sockets to the corresponding mating pins on the circuit board connector. It will “click” when fully seated.

13. Double-check again to verify that the connections haven’t accidentally become dislodged from the batteries.

14. Observe the routing of the connecting cables as shown below.

15. Replace the top cover. Reinstall the four fasteners.

16. Connect the audio connections and external power supply.

A new set of batteries should be fully charged at least once before allowing them to discharge. Depending on the initial state of charge of the replacement batteries, this may take up to 10 hours.

If you would like to operate the preamplifier and play music while charging the new batteries for the first time, the Charge Lock mode can be activated, which illuminates the Charge Lock indicator, bypassing the signal level detector.

It is normal for the battery condition indicator to illuminate red initially with a new set of batteries until they are fully charged.