

## SUSTAINIAC<sup>®</sup> MODEL GA-2 electro-magnetic sustainer

This is the in-guitar magnetic sustainer that we sold in 1988-1991. It is installed in thousands of guitars made by Hamer, Fernandes, ASI and other manufacturers. The Sustainiac<sup>®</sup> GA-2 was also retrofitted into other guitars. There is considerable effort involved in the installation. Only an experienced technician familiar with electronics and precision guitar body rework should attempt the installation. Our newer Sustainiac Stealth and Stealth PLUS models have made this process much easier. For new installations, we recommend that you purchase one of these newer sustainers.

The Sustainiac<sup>®</sup> GA-2 sustainer consists of a 2in. x 2in. circuit, which has two miniature toggle switches attached to it. The circuit mounts in the guitar electronics cavity. The POWER switch turns the Sustainiac<sup>®</sup> GA-2 on and off. The HARMONIC switch controls the sustained vibration mode of the strings. This switch has three positions, FUNDAMENTAL, MIX, AND HARMONIC. FUNDAMENTAL position produces almost totally fundamental vibration mode of the strings. MIX position produces a subtle mix of both fundamentals (on high strings) and harmonics (on low strings), of less intensity than the other two modes. The HARMONIC position produces intense harmonic vibration of all played notes.

Two controls on the back of the GA-2 circuit allow setting of SENSITIVITY (how fast note sustain takes over) and STRING VIBRATION (how much power is transferred from the string-driver transducer to the strings). These controls should be set once, and then left alone. It is possible to replace one or both of them with front-mounted controls, but this is not recommended, nor does it offer any appreciable improvement or quality of the system. See the SETUP section below for details on how to set the controls.

The Sustainiac<sup>®</sup> GA-2 transducer resembles a “mini-rails” humbucker pickup in appearance, and must go into the neck pickup position. All of the guitar pickups and output jack must electrically connected to terminals on the circuit board. When the GA-2 is turned ON, the guitar bridge pickup is automatically selected, no matter what position the instrument pickup selector switch is set to. The bridge pickup can be tapped to provide single-coil sounds (See hookup drawings). The Sustainiac<sup>®</sup> GA-2 sustainer is compatible with many available humbucker bridge pickups. Some bridge pickups must be reversed magnetically and/or electrically, to be made compatible with the GA-2. See the “How to Test Pickup” section on the website. (Single-coil bridge pickups cannot be used with the GA-2 or GA-1.) Active pickups, such as EMG types, are not recommended. Our newer Stealth/Stealth PLUS models have removed all of these limitations, so that virtually any bridge pickup will work with the system.

When used with dual humbucker guitars having full-size humbuckers, the GA-2 transducer (driver) mounts into the neck pickup cavity as close to the neck as possible. Then, the remainder of the cavity can be filled with a single-coil. The use of “mini-blade” humbuckers in this cavity is not recommended because of magnetic feedback problems that are caused.

Two 9-volt alkaline or Ni-Cad batteries are connected “in series” to power the Sustainiac<sup>®</sup> GA-2 sustainer, providing 18 volts. These fit into a special plastic battery case which is usually mounted on the back of the instrument. The normal instrument output jack is replaced with a stereo-type output jack. This is connected to the sustainer circuit and also to the battery, so that whenever a standard guitar cord is plugged in, the circuit goes into “Standby” mode.

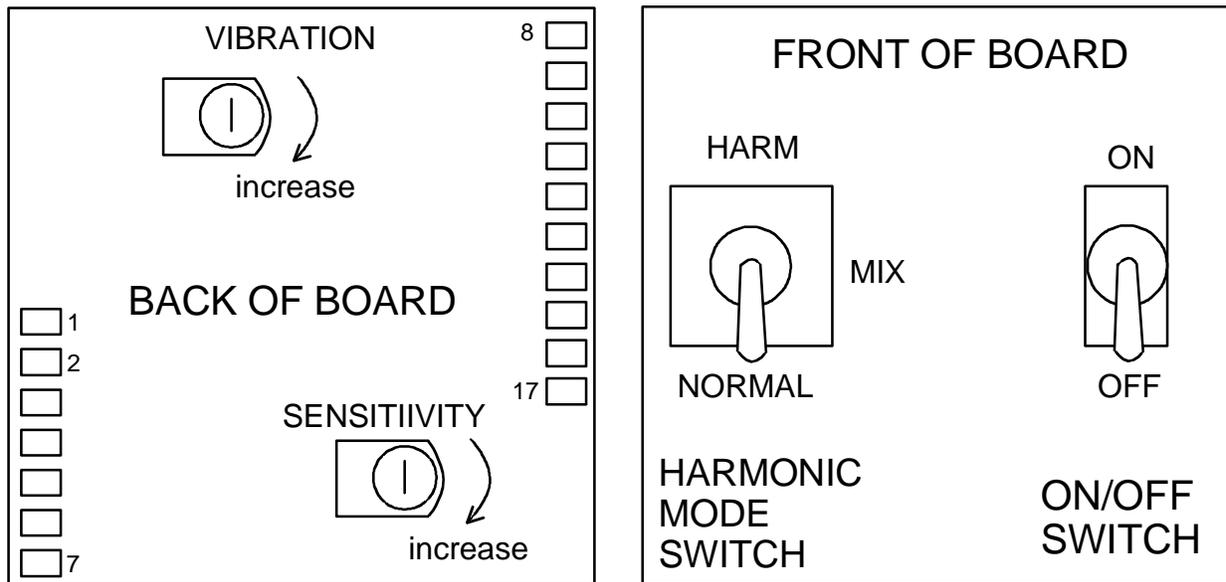
Battery life depends on how often the unit is turned on, and also upon the setting of the STRING VIBRATION control. Typical battery consumption is 10ma in STANDBY, and 80 ma during a low note in FUNDAMENTAL mode, which is a maximum condition. 9v alkaline batteries are typically rated at 500 ma hours. Actual battery life is usually around 15-20 hours. Don't use regular “dry cell” batteries. Use only alkaline. Also, Nicads have short life, and only produce about 7.5 volts each. If you want to use a “wall wart” supply, you must get a REGULATED SUPPLY of 15-20 volts. Voltage must be within these limits at all times.

The guitar body must usually be routed to provide a cavity for the Sustainiac<sup>®</sup> GA-2 sustainer circuit and for the battery case. Also, some routing must often be done to fit the string driver transducer in the neck pickup cavity.

See the GA-2 electrical hookup diagrams on the Installation page of the Sustainiac website.

**GUITAR SETUP:** Set the bridge pickup and driver as close as possible to the strings. Both have an equal affect on the gain and performance of the sustainer. To do this, first fret the strings at the top fret. Set both driver and bridge pickup to be about 1/16 inch (1/5mm) below the little E-string, and 3/16 inch (4.5mm) below the big E-string.

**SUSTAINER SETUP:** The two trimpots on the circuit board control how strong the string vibrations are (VIBRATION pot), and how fast the strings “take off” into feedback sustain (SENSITIVITY pot). Before setting the controls, allow the sustainer to be in STANDBY mode (guitar cord plugged in, sustainer OFF) for 5-10 minutes, particularly if the sustainer has not been powered up for an extended period of time. Gain will gradually increase for the first few minutes of operation. Setting either or both pots too high can cause uncontrolled oscillation (squealing) of the system. Turning the controls CLOCKWISE increases the setting. (Unlike the older GA-1, where COUNTERCLOCKWISE rotation increases the setting.) First, set both pots to mid-rotation (“12 o’clock”). If sustain is not strong enough, then increase the SENSITIVITY pot setting.



**SQUEALING:** This will occur mostly in HARMONIC mode. So, after adjusting the SENSITIVITY pot, gently rub the wound strings. If the sustainer is on the verge of oscillating, “chirping” or “jitter” will occur. Turn the SENSITIVITY pot down to just below this point. The VIBRATION pot can usually be set for about mid-rotation and left there.

**TROUBLESHOOTING:**

Uncontrolled squealing:

- (1) Turn down SENSITIVITY POT and VIBRATION pot. If the pots must be turned down too far for good sustainer operation, then one of the driver wires might be broken. Check the driver carefully. Driver resistance should be about 7-8ohms (red/white to green/black wires). 16 ohms each coil. The coils are connected in parallel. If you get 16 ohms, then one coil is open.
- (2) Check the bridge pickup for proper magnetic and electrical polarity. If the north magnetic pole does not face the neck, or if the pickup doesn’t have “positive-on-pullaway” electrical polarity, then this must be corrected. See “How to test bridge pickup” on the Installation page of the website.
- (3) If the sustainer is installed onto a pickguard, there must be no metal shielding within 1 inch of either driver or bridge pickup.
- (4) Make sure guitar wiring is ok. Only bridge pickup should function when sustainer is ON.

No Sustain:

- (1) Check for 18 volts between pins 8 and 10.
- (2) Make sure gray wire (pin 12) is connected to RING terminal of output jack. This wire must be connected to ground in order for sustainer to function.