Gentle Electric Pitch and Envelope Follower Service Manual

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This manual contains diagrams and instructions from the original service documentation of the Gentle Electric Model 101 Pitch Follower, as well as additional materials from the Serge Modular Systems version as well as the Aries AR-333 version.

For more information, visit www.gentleelectric.com
For best results, with an aligned unit, turn it on, select the
1000 Hz oscillator (A1 and A2), and adjust the control lever. Then
adjust the level of the signal to be a little above 1X. Select for an extended time.
If the unit is not in a fixed position, you may adjust the
level to the 800 Hz oscillator in their proper positions before ascertainment.

3b. To turn unit on, turn the line 1 knob clockwise, then
open the lid below the 1160 control to turn the unit 90 degrees, then
return it to the original position. Continue as above.

4. To adjust the signal level, turn the knob clockwise, then
counter-clockwise until the level is at the desired level. Then
adjust the signal level to the desired level.

5. To adjust the signal level, turn the knob clockwise, then
counter-clockwise until the level is at the desired level. Then
adjust the signal level to the desired level.

6. To adjust the signal level, turn the knob clockwise, then
counter-clockwise until the level is at the desired level. Then
adjust the signal level to the desired level.

7. To adjust the signal level, turn the knob clockwise, then
counter-clockwise until the level is at the desired level. Then
adjust the signal level to the desired level.

8. To adjust the signal level, turn the knob clockwise, then
counter-clockwise until the level is at the desired level. Then
adjust the signal level to the desired level.

9. To adjust the signal level, turn the knob clockwise, then
counter-clockwise until the level is at the desired level. Then
adjust the signal level to the desired level.

10. To adjust the signal level, turn the knob clockwise, then
counter-clockwise until the level is at the desired level. Then
adjust the signal level to the desired level.

11. To adjust the signal level, turn the knob clockwise, then
counter-clockwise until the level is at the desired level. Then
adjust the signal level to the desired level.
115V POWER SUPPLY, UP TO 300mA

CONNECT: POWER SUPPLY GROUND
(DIM M, AID)

ALL DIRECTLY TO GROUND TERMINAL ON MILLIAMP. DO NOT INTERCONNECT GROUNDS IN ANY OTHER WAY.

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A101 - P101
SUGGESTED INTERCONNECT SIMILAR TO MODEL 101
01, FEB 1978
This module uses two PCB boards stacked together with long plastic stand-offs. The wiring to this board differs from the wiring of other SERGE modules in that there are no pads labelled for connecting wires from the panel components to the PCB boards. Instead, there are edge connector "fingers" which are soldered to. If desired, 22-pin edge connectors can be used, but they are not supplied with this kit. There are holes drilled on one side of the PCB boards for the "fingers". Wires are inserted into these holes and soldered like the wires to the pads on other SERGE modules. Care should be taken to ensure that the insulation is not stripped too far back where wires can short out against traces on the PCB boards or against other wires.

The boards are mounted as shown in the lower right of the wiring diagram. Edge "fingers" point to the right as seen from this diagram. Do not mount the stand-offs until last.

The P101 board should be mounted in the rails with the rest of the PCB boards for this panel, and it should be wired to the places indicated in the diagram.

The LED's are mounted without our standard LED driver PCB board. Use the plastic collar on the rear of the panel to hold the LED assembly firmly in place. Sometimes it is necessary to carefully touch the clip and collar with the tip of a hot soldering iron to fuse them permanently. Be very careful not to touch the LED with the soldering iron. The leads should be cut to about 3/8 inch and soldered directly to the wires as shown. Keep the stripped portion of the stranded wire short (1/8"), and try not to heat up the leads of the LED any more than absolutely necessary. Excessive heat will melt the LED. Also, the leads should not have too much stress on them, since they can easily break the plastic LED package.

The wiring could be fairly straightforward. The ground connection of the microphone jack has a lot of wires, but if you are neat, the lug should accommodate all of them. Note that the black power supply wire is connected to this point rather than to the PCB boards. After all the boards in the rails have been wired, wire up the A101 PCB board. The wires will have to be long enough to reach around the P101 board and up to the A101 mounted on stand-offs, so make sure they will reach after the boards are stacked and folded onto the panel in the final assembly.

After the A101 is wired, wire the inter-board jumpers as shown in the diagram. These should be about 1-1/2" each. Then install the stand-offs.

The shield strands on the shielded wire is connected on one and only. Make sure that no strands can short against other wiring on the PCB board. The strands should be cut flush with the outer insulation, slightly pulling on the insulation will pull it over to completely cover the shield strands. Then use plastic electrical tape to cover the shield strands.
AR-333 PITCH AND ENVELOPE FOLLOWER
NOTES ON OPTIMUM PITCH-EXTRACTOR PERFORMANCE IN THE REAL WORLD

Although there are some applications where errors in the pitch follower are useful and desirable, here we assume that you want to get the best pitch follower behavior possible. For the pitch extraction to work well a fair amount of care must be taken with the signal. For best results the signal should be strictly monophonic and should be low-noise and should have a fair amount of signal present at the fundamental frequency or a broad spectrum of harmonics. More specifically:

MONOPHONIC Instruments producing a mix of more than one pitch at a time such as piano or mono guitar will be very difficult to pitch follow. On pianos, harpsichords, harps, and the like, it is just about impossible to play only one note at a time in the sense that even when only one key is depressed at a time, the instrument still reverberates the previously-played notes. Somewhat better results can be had with normal guitars (not being defined here as those not having separate outputs for each string), or stringed instruments like violins. However, care must be taken in the playing technique to only play one string at a time and to damp any other strings that are previously vibrating (sympathetic vibrations are generally so harmful).

When more than one pitch is present, the pitch follower may either behave totally erratically, or try to follow the "greatest common denominator" frequency (i.e. try to treat the pitches as both being harmonics of some lower fundamental). Pitches tuned to some perfect interval (such as a perfect fifth or a just third) are especially good at eliciting the latter response.

LOW NOISE Any signal components which are extraneous to the actual pitch will cause the pitch output to be rough or erratic. Noise in this context can refer to any of the following:
1) Noise or hum introduced in the pickup or its preamp;
2) Plucking, stricking, tonguing, bowing, or key noise;
3) Wind, either from the instrument or the weather;
4) Misc. extraneous sounds (other instruments, traffic noise, talking, etc.);
5) Reverberation, including that introduced by the room acoustics; and
6) Feedback, either of the instrument sound, or from the synthesizer.

For these reasons, best results with instruments will be had with high-quality pickups designed specifically for the instrument, and for winds, those pickups located near the mouthpiece will be better than those in the bell. If an air microphone must be used, place it where the pitched sound will be strongest in relation to any other noise produced by the instrument. For flutes and voice, this means keeping the microphone out of the breath stream. The best pitched sound in the woodwind generally comes out of the instrument near the first open holes. If the player is willing to move the instrument around to keep a fixed microphone near the holes of the instrument while playing, reasonably good results can be had. (This also allows the player to control the synthesizer volume somewhat independently of the straight sound volume.) The sound coming out of the bell is generally not quite so good, and often contains a "pop" when a key is depressed.

HARMONIC CONTENT The ideal signal for pitch following would have most of the sound energy in the fundamental, and any harmonics present would be "phase locked" to the fundamental (as in a steady-state timbre. The most notable exceptions are the shifting harmonics of a string, or in the voice during a vowel change). The AR-333 is quite good with handling harmonics, and is not confused by phase-shifting harmonics. For this reason it does perform quite well with voice, or strings. However, the worst sort of signal is when some particular harmonic strongly predominates over the fundamental, in which case the pitch follower may occasionally jump to the harmonic frequency. For this reason one should generally avoid the use of cheap pickups which have strong resonances which therefore may favor some harmonic over the fundamental. Also for this reason,
It is best to derive the signal from as large an area of an instrument as possible because each separate part will tend to resonate at certain frequencies. When placing a contact pickup on a string instrument, it is generally best to place it on or near the bridge (before the body resonances affect it) while exciting the string as close to the center of its vibrating part as possible. However, for electric string pickups, like those on electric guitars, or for microphones which actually pickup directly from the string, it is best to locate these near the center of the string (i.e. on an electric guitar use the neck pickup in preference to the bridge pickup). Some sounds, like certain bells, in which the tones are not harmonically related, may be hard to pitch-follow.