Accelerator 124

version 2.1

Open loop single channel scanner amplifier

Lighting Systems Design, Inc.
4625 Winter Garden Road, Suite A-2
Orlando, Florida 32811-1777 U.S.A.
Phone 407-299-9504 • Fax 407-299-3965
www.lsdi.com

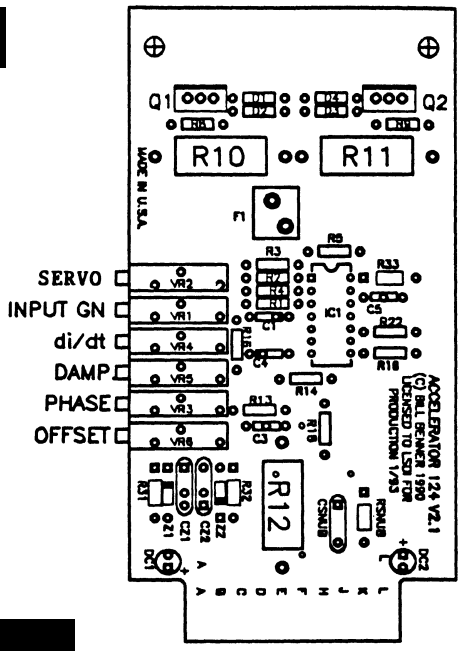
ACCELERATOR 124

INTRODUCTION

The Accelerator 124 is a single channel scanner amplifier that provides closed loop performance with open loop, non-feedback scanner, such as the General Scanning G124. The advanced design of the Accelerator 124 derives positional information from the scanner drive itself. The card provides optimal drive current to affect position change quickly and accurately. It can also drive G100 and G120 scanners in an open loop configurations, often "resurrecting" older scanner with damaged position sensors. In addition to XY deflection, the Accelerator 124 can be used with galvo blanking and color modulation.

INPUT PIN CONFIGURATION

PIN#	FUNCTION
A	DC+ INPUT (+15V to 18V)
B	SIGNAL INPUT (HIGH)
C	N/C
D	N/C
E	GROUND
F	GROUND
H	GALVO HIGH
J	N/C
K	GALVO LOW
L	DC- INPUT (-15V to -18V)



Amplifier output is fused at 1.5 amps (Microfuse).

ADJUSTMENTS ON CARD

Servo Gain	adjust feed-forward compensation
Input Gain	adjust level of input signal
Derivative (di/dt)	adjusts level of derived feedback
Damping	adjusts velocity signal level
Phase	fine-tune adjust to balance X-Y scanner pair
DC offset	allows DC position of the scan to be adjusted

Warning! Feedback Oscillation may occur with this amplifier misadjusted. This oscillation can quickly destroy a scanner. Do NOT allow scanners to oscillate for any period of time.

Test pattern for adjusting scanners: Quadrature square wave, 50 Hz, ±2.5 volts peak-to-peak.

INITIAL SETTINGS FOR CALIBRATION

Servo Gain	full counter-clockwise
Input Gain	full counter-clockwise
Derivative (di/dt)	full counter-clockwise
Damping	full counter-clockwise
Phase	mid range
DC offset	normally set to zero (center range)

ADJUSTMENT PROCEDURES

CALIBRATING DC OFFSET:

Remove the fuse (F1) from the board. This prevents the scanner from going to an extreme position if the offset is incorrect. Second, attach the positive lead of a multimeter to either side of R33, and the negative side to the ground side of R12 (nearest the edge connector). Third, power up the card; adjust the DC offset trim potentiometer until offset is 0 volts. Fourth, power down the card, re-install the fuse, and then continue with the adjustment steps listed below. **Note: DC offset control is intended as a fine-tune control and should <u>not</u> be used for continuous extreme offsets. This type of operation can damage the cards, the scanners, or both.

1. Adjust input gain to obtain reasonable image size. This does not need to be full size at this time.
2. Adjust damping to minimize overshoot to about 10 percent of the image size. Some overshoot should still be present.
3. Adjust derivative to minimize undershoot. Overshoot may increase slightly. At some point the undershoot will be at a minimum, and then start to increase. Find the “null” point with minimum undershoot.
4. Increase damping to minimize overshoot. If any undershoot remained, it may also diminish. Try to completely remove the undershoot.
5. Start adjusting the phase control. You are looking for another “null” point where the overshoot is at a minimum. It may lie in either direction of adjustment of the pot, so try both. Its effect is only noticeable when the damping is already adjusted fairly well, and serves as a “fine tune” control.
6. If you have not achieved critical damping, it may be necessary to play the derivative, damping, and phase against one another. The derivative acts to reduce undershoot, pushing out corners. The damping primarily affects overshoot, but also affects some undershoot. If derivative is too high, it will cause overshoot, and vice versa.
7. Once critical damping has been achieved, adjust the image to full size. Further touchup on damping may be needed. Using an X-Y diagonal pattern, adjust the servo control to match the velocity of the two scanners. Different velocities cause the “fishing out” of a diagonal line. The servo also increases the risetime of the scanner. More servo is faster, with a stronger drive to corners. As the servo gain is increased, the damping may require adjustment to maintain critical performance. The highest servo gain compatible with critical damping should be used.