# STEREO PANNER

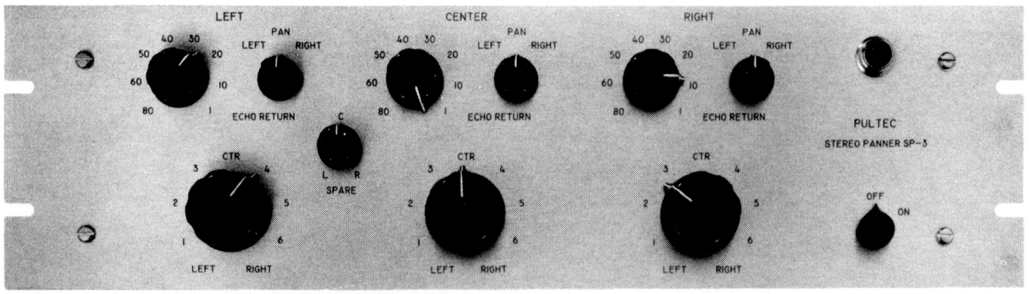
**MIXES & POSITIONS STEREO SOUND**

Solid State

**PULTEC®**

**MODEL**

**SP-3**




Accepts 4 Sound Tracks and 3 Echo Return Signals  Supplies 2 Channel Stereo Output

When producing stereo tapes and discs, it is usually necessary to mix down from **three or more** tracks to 2 tracks. During this mix down, each of the original tracks must be acoustically located in exactly the preferred position somewhere between extreme left and right in the final 2 channel output. Echo is often added at this time.

If 4 tracks of a tape playback are fed into the LEFT, CENTER, RIGHT and SPARE inputs, then the 2 channel (left and right) stereo output will contain all 4 input signals split between left and right according to the settings of the pan pots. **Any input signal can be** "walked", if desired, by turning its pan pot.

Three echo returns (signals **from** the echo chambers) are also accepted as input signals. Each of these echo signals can be selected to be entirely in the Left stereo output or in the Right stereo output **or to pan between the** outputs with the corresponding input signal. Regardless of where the echo is positioned, an associated level pot controls the amount of echo.

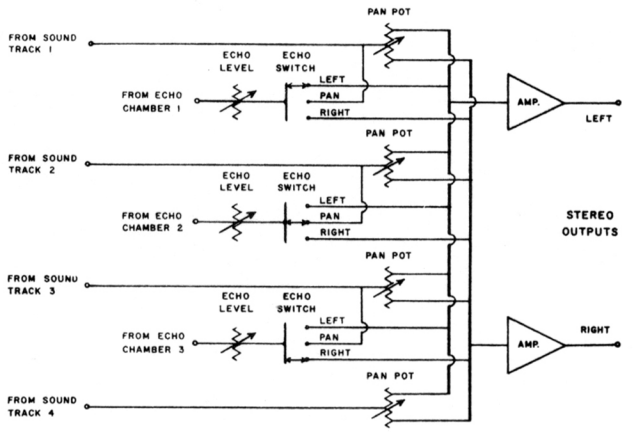
FIX THE LOCATION OF EACH SOUND TRACK
Anywhere from extreme left to right.

MOVE OR WALK ANY TRACK ANY TIME
Smoothly over any part of sound stage.

SET AMOUNT & LOCATION OF EACH ECHO
Independently of direct signal.

7 INPUTS — EACH CONTROLLED

2 OUTPUTS — LEFT and RIGHT




PULTEC SP-3 SIMPLIFIED DIAGRAM

## Specifications

**GAIN:** 0 dB. No gain, no loss from any input to the output to which the particular input is fully panned.

**INPUT LEVEL:** −10 dBm provides greater than 60 dB signal to noise ratio. +4 dBm allows generously for signal peaks without clipping.

**OUTPUT LEVEL:** +21 dBm maximum into 600 ohms.

**NOISE:** Below −70 dBm.

**FREQUENCY RESPONSE:** 20 Hz to 20kHz; +0, −1 dB from 1000 Hz reference.

**DISTORTION:** 0.10% at +10 dBm into 600 ohms.

**NET WEIGHT:** 9½ pounds.

**ISOLATION:** Between Left, Center, Right and Spare Inputs exceeds 70 dB at all frequencies.

**INPUT IMPEDANCE:** All inputs are 600 ohms, unbalanced.

**OUTPUT TRANSFORMERS:** Feed 600 ohm loads. Connections can be changed for 250 or 150 ohms.

**POWER REQUIRED:** 117 volts, 50/60 Hz, 6 watts. 234 volts, 50/60 Hz available on order.

**PANEL SIZE:** 5¼ x 19 in. Depth behind panel is 6¾ in.

**PANEL FINISH:** Brushed aluminum satintone.

**MOUNTING:** Standard EIA rack mount.

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PULTEC

# MODEL SP-3 STEREO PANNER

## 1. GENERAL

THE PULTEC MODEL SP-3 STEREO PANNER ACCEPTS SEVEN SIGNALS; FOR EXAMPLE, 4 TAPE TRACKS AND 3 ECHO RETURNS, AND MIXES THEM DOWN TO A 2 TRACK STEREO OUTPUT. POTENTIOMETERS AND SWITCHES ARE EMPLOYED IN A PURELY RESISTIVE NETWORK TO FACILITATE DISTRIBUTION OF THE INPUT SIGNALS TO THE TWO OUTPUT CIRCUITS IN ADJUSTABLE AMOUNTS. THUS IT IS POSSIBLE TO ACOUSTICALLY* POSITION THE SIGNALS BY DETERMINING HOW MUCH OF EACH INPUT SIGNAL APPEARS IN EACH OF THE 2 OUTPUTS.

AMPLIFIERS RESTORE THE LOSSES OF THE MIXING NETWORKS; THEREBY PROVIDING A NO LOSS, NO GAIN UNIT. THE POWER SUPPLY IS SELF CONTAINED.

## 2. DESCRIPTION OF CONTROLS

THE THREE LARGE CONTROLS AT THE BOTTOM OF THE PANEL MARKED LEFT, CENTER AND RIGHT AND THE SMALL KNOB MARKED SPARE ARE THE PANNING CONTROLS. EACH OF THESE CONTROLS IS A DUAL POTENTIOMETER THAT ADJUSTS THE AMOUNT OF SIGNAL FED TO THE LEFT AND RIGHT OUTPUTS.

WHEN A PAN POT IS ROTATED TO THE EXTREME LEFT, ITS SIGNAL IS FED ENTIRELY AND ONLY TO THE LEFT OUTPUT (NONE IS IN THE RIGHT OUTPUT). AS THE PAN POT IS ROTATED TOWARD THE RIGHT, THE AMOUNT OF SIGNAL FED TO THE LEFT OUTPUT IS SLOWLY REDUCED AND SOME SIGNAL IS FED TO THE RIGHT OUTPUT. WITH THE PAN POT AT THE CENTER OF ITS ROTATION, SIGNAL IS FED EQUALLY TO THE TWO OUTPUTS. AT THIS POINT, THE SOUND IS ACOUSTICALLY CENTERED BETWEEN LEFT AND RIGHT. CONTINUED ROTATION TO EXTREME RIGHT PLACES ALL THE SIGNAL IN THE RIGHT OUTPUT WITH NO SIGNAL IN THE LEFT OUTPUT. NOW THE SOUND IS LOCATED AT THE EXTREME RIGHT.

IT IS IN THIS WAY THAT EACH PAN POT OPERATES TO ACOUSTICALLY POSITION ITS SIGNAL ANYWHERE BETWEEN EXTREME LEFT AND EXTREME RIGHT.

THE THREE PAIRS OF CONTROLS MARKED ECHO RETURN DETERMINE THE LEVEL AND ACOUSTIC LOCATION OF THE ECHO SIGNALS. (THESE ECHO RETURN SIGNALS MUST BE SUPPLIED TO THE INPUTS OF THE SP-3 FROM EXTERNAL ECHOING DEVICES OR CHAMBERS.)

THE LARGER KNOB IN EACH PAIR CONTROLS THE LEVEL OF THE ECHO SIGNAL BY MEANS OF A POTENTIOMETER CALIBRATED IN DB. THE MAXIMUM GAIN AVAILABLE FROM ANY ECHO INPUT TO EITHER OUTPUT IS UNITY.

THE SMALLER KNOB IN EACH PAIR OF ECHO CONTROL KNOBS OPERATES A THREE POSITION SWITCH. THIS SWITCH DETERMINES WHETHER THE ECHO SIGNAL WILL APPEAR EXCLUSIVELY IN THE LEFT OUTPUT OR EXCLUSIVELY IN THE RIGHT OUTPUT --- REGARDLESS OF THE SETTING OF ITS PAN POT --- OR WHETHER THE ECHO WILL PAN WITH THE PRIMARY SIGNAL AS ITS PAN POT IS TURNED.

ALTHOUGH THE PRINCIPAL USEFULNESS OF THESE CONTROLS MARKED ECHO RETURN IS WITH ECHO SIGNALS, IT IS NOT NECESSARY THAT THE SIGNALS FED TO THESE INPUTS BE ECHOES. ANY SIGNALS OR EFFECTS, WHETHER DIRECTLY RELATED TO THE PROGRAM MATERIAL OR NOT, CAN BE EMPLOYED AT THE ECHO INPUT TERMINALS.

*WHEN REFERENCE IS MADE TO ACOUSTICALLY LOCATING THE SIGNAL OR THE SOUND, IT IS, OF COURSE, ASSUMED THAT EACH OUTPUT OF THE SP-3 IS CONNECTED TO A SPEAKER AMPLIFIER AND TO A SPEAKER.

## 3. OPERATION OF THE PANNER CONTROLS

SUPPOSE 3 TRACKS (FIRST, SECOND AND THIRD TRACKS) OF A TAPE ARE FED INTO THE LEFT, RIGHT AND CENTER INPUTS OF THE SP-3. THEN EACH OF THE 2 OUTPUTS WILL CONTAIN THESE THREE INPUT SIGNALS IN RATIOS DETERMINED BY THE SETTINGS OF THE INDIVIDUAL PAN POTS.

PERHAPS THE LEFT PAN POT IS TURNED TO ITS EXTREME COUNTER-CLOCKWISE POSITION. THEN THE FIRST INPUT TRACK WILL APPEAR EXCLUSIVELY IN THE LEFT OUTPUT. THIS SIGNAL IS NOW ACOUSTICALLY ON EXTREME LEFT.

MAYBE THE RIGHT PAN POT IS TURNED TO ITS EXTREME CLOCKWISE POSITION. THEN THE SECOND INPUT TRACK WILL APPEAR EXCLUSIVELY IN THE RIGHT OUTPUT, AND THIS SIGNAL IS ACOUSTICALLY ON EXTREME RIGHT.

THE RESULT OF THE ABOVE SETTINGS MIGHT BE TOO GREAT AN APPARENT DISTANCE BETWEEN PERFORMERS OR SECTIONS OF AN ORCHESTRA --- AN ACOUSTIC HOLE IN THE MIDDLE. THIS CAN BE REMEDIED IN SEVERAL WAYS:

1. THE LEFT PAN POT CAN BE TURNED CLOCKWISE, THEREBY MOVING ITS PERFORMERS TOWARD THE RIGHT, BRINGING THEM ACOUSTICALLY NEARER TO THE PERFORMERS LOCATED AT EXTREME RIGHT, OR
2. THE RIGHT PAN POT CAN BE TURNED COUNTER-CLOCKWISE TO MOVE ITS PERFORMERS TOWARD THE LEFT. THIS WILL BRING THEM ACOUSTICALLY NEARER TO THE PERFORMERS LOCATED AT EXTREME LEFT, OR
3. BOTH OF THE PRECEDING STEPS, 1 AND 2, CAN BE TAKEN. THIS BRINGS EACH GROUP TOWARD THE OTHER INTO THE REGION OF ACOUSTIC CENTER.

IF STEP 3 WERE CONTINUED UNTIL BOTH PAN POTS REACHED MID-ROTATION; THEN BOTH GROUPS OF PERFORMERS WOULD BE AT ACOUSTIC CENTER, MID-WAY BETWEEN THE TWO SPEAKERS. OF COURSE, FURTHER TURNING OF THE PAN POTS WOULD EVENTUALLY LOCATE THE FIRST INPUT SIGNAL AT THE EXTREME ACOUSTIC RIGHT AND THE SECOND INPUT SIGNAL AT EXTREME ACOUSTIC LEFT.

SO FAR, ONLY THE INPUT SIGNALS FED TO THE LEFT AND RIGHT PAN POTS HAVE BEEN CONSIDERED. SUPPOSE THE THIRD TAPE TRACK CARRIES THE VOCALIST AND IS CONNECTED TO THE CENTER INPUT. THEN BY TURNING THE CENTER PAN POT FROM COUNTER-CLOCKWISE TO CLOCKWISE, THE VOCALIST CAN BE MADE TO WALK FROM LEFT TO RIGHT ACROSS THE STAGE. SHE CAN BE STOPPED AND MADE TO REMAIN AT ANY LOCATION, OR SHE CAN BE PERMITTED TO CASUALLY CHANGE HER POSITION FROM TIME TO TIME.

A FOURTH PAN POT AND INPUT MARKED SPARE ARE ON THE SP-3. IF A FOURTH TAPE TRACK IS AVAILABLE, IT CAN BE CONNECTED TO THIS SPARE INPUT AND BE MIXED AND PANNED. OF COURSE, A SOUND EFFECT, OR ANY OTHER TYPE OF SIGNAL, CAN BE UTILIZED AT THE SPARE INPUT.

## 4. OPERATION OF THE ECHO RETURN CONTROLS

IN THE "OPERATION OF THE PANNER CONTROLS" DISCUSSION, IT WAS ASSUMED THAT 3 TRACKS OF A TAPE PLAYBACK WERE FED INTO THE LEFT, RIGHT AND CENTER INPUTS OF THE SP-3.

NOW SUPPOSE THAT THESE 3 TAPE TRACK SIGNALS ARE ALSO FED TO 3 INDIVIDUAL ECHO CHAMBERS AND THAT THE ECHO RETURN SIGNALS FROM THE CHAMBERS ARE CONNECTED TO THE RESPECTIVE ECHO INPUTS OF THE SP-3.

AS ALWAYS, THE ACOUSTIC LOCATION OF THE PRIMARY LEFT INPUT SIGNAL WILL BE DETERMINED ENTIRELY BY THE SETTING OF THE LEFT PAN POT.

THE ACOUSTIC LOCATION OF THE LEFT ECHO RETURN SIGNAL CAN, IF DESIRED, ALSO BE DETERMINED BY THE SETTING OF THE LEFT PAN POT. THIS WILL BE TRUE IF THE ECHO SWITCH IS SET TO THE PAN POSITION. THEN THE LEFT PAN POT WILL CONTROL THE ACOUSTIC POSITIONING OF BOTH THE PRIMARY INPUT SIGNAL AND THE ECHO RETURN SIGNAL. BOTH SIGNALS WILL MOVE AS THE PAN POT IS TURNED.

IF THE ECHO SWITCH IS SET TO ITS LEFT POSITION, THIS PARTICULAR ECHO SIGNAL WILL BE ONLY IN THE LEFT OUTPUT. THE ECHO WILL NOT BE AFFECTED BY MOVING THE PAN POT.

SIMILARLY, IF THE ECHO SWITCH IS SET TO ITS RIGHT POSITION, THIS PARTICULAR ECHO SIGNAL WILL BE ONLY IN THE RIGHT OUTPUT. THE ECHO WILL NOT BE AFFECTED BY MOVING THE PAN POT.

REGARDLESS OF WHERE THE ECHO IS POSITIONED, THE ASSOCIATED LEVEL POT MAKES IT POSSIBLE TO SET THE PERCENTAGE OF ECHO.

THE ABOVE IS BY WAY OF EXAMPLE. THE SAME IS INDEPENDENTLY AND SIMULTANEOUSLY TRUE FOR ECHO RETURN SIGNALS FROM A CENTER ECHO CHAMBER AND A RIGHT ECHO CHAMBER.

IF PREFERRED FOR NOVELTY OR EFFECTS PURPOSES, THE SIGNAL FROM THE LEFT ECHO CHAMBER COULD BE CONNECTED TO THE RIGHT ECHO INPUT AND PANNED WITH THE PRIMARY RIGHT SIGNAL. OR ANY ECHO RETURN COULD BE CONNECTED TO THE SPARE INPUT AND PANNED INDEPENDENTLY OF ALL OTHER SIGNALS.

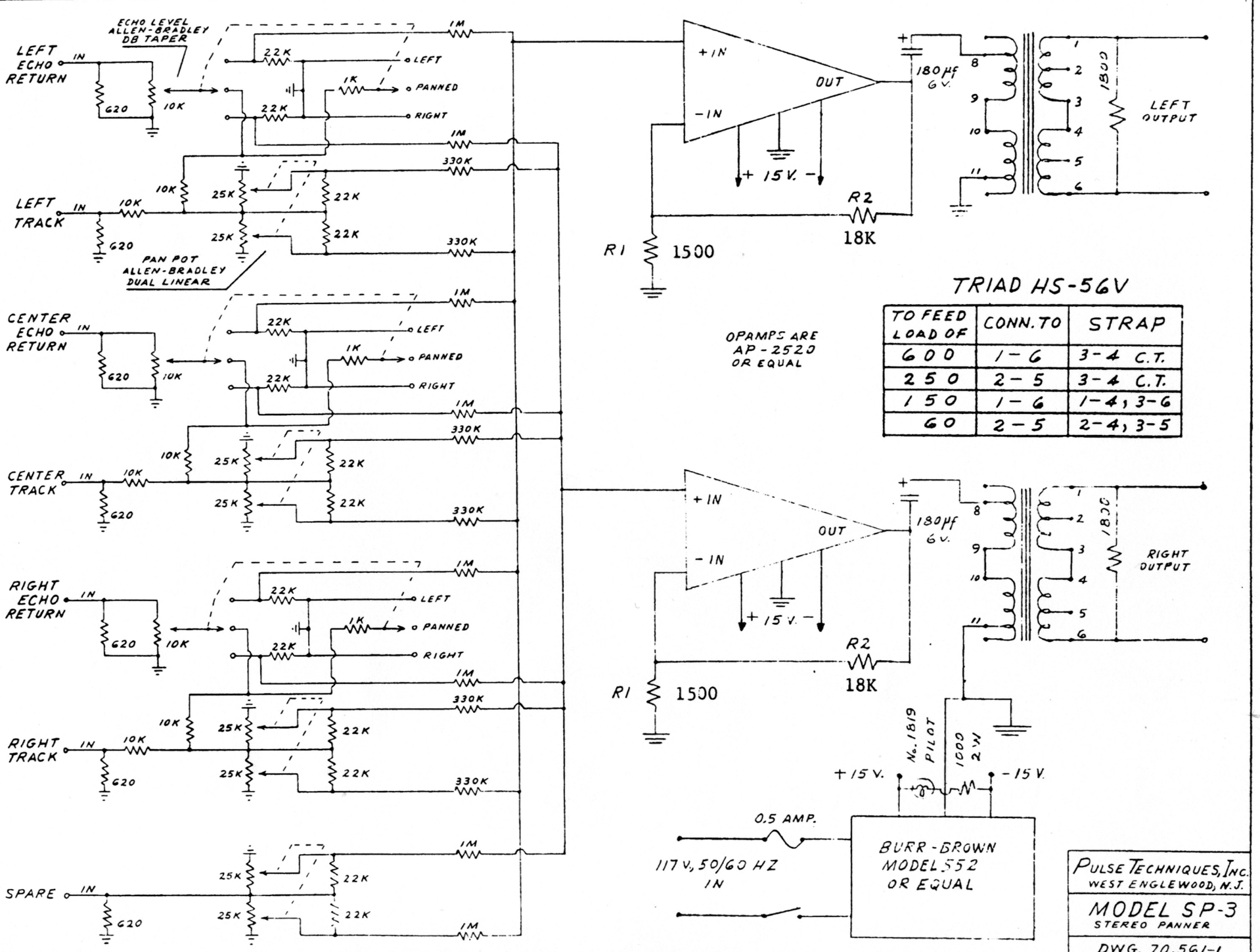
## 5. SUMMARY

EACH SOUND TRACK SUPPLIED TO THE SP-3 CAN BE PRECISELY LOCATED AND FIXED IN ANY DESIRED ACOUSTIC POSITION.

ANY SOUND TRACK SUPPLIED TO THE SP-3 CAN BE MADE TO WALK ON THE ACOUSTIC STAGE AT ANY TIME.

PING PONG STEREO CAN BE PRODUCED BY RAPIDLY TURNING THE PAN POT FROM ONE EXTREME OF ROTATION TO THE OTHER. OR THE SIGNAL CAN BE CONNECTED TO AN ECHO INPUT AND ITS ECHO SWITCH TURNED BACK AND FORTH FROM LEFT TO RIGHT.

EACH ECHO RETURN SIGNAL CAN BE PLACED ONLY IN THE RIGHT OUTPUT OR ONLY IN THE LEFT OUTPUT, OR IT CAN BE "TIED" TO THE PRIMARY SIGNAL AND BE ACOUSTICALLY POSITIONED BY THE PAN POT.




## TRIAD HS-56V

| TO FEED LOAD OF | CONN. TO | STRAP |
|---|---|---|
| 600 | 1 – 6 | 3 – 4 C.T. |
| 250 | 2 – 5 | 3 – 4 C.T. |
| 150 | 1 – 6 | 1 – 4, 3 – 6 |
| 60 | 2 – 5 | 2 – 4, 3 – 5 |

PULSE TECHNIQUES, INC.
WEST ENGLEWOOD, N.J.

# MODEL SP-3
STEREO PANNER

DWG. 70,561-1