KODAK AV EQUIPMENT MEMO

TECHNICAL INFORMATION ABOUT AUDIOVISUAL EQUIPMENT

S-80-25

AUTOMATIC CHANGEOVER FOR *KODAK PAGEANT* PROJECTORS

(NOTE: *Eastman Kodak Company does not manufacture or distribute changeover devices.)*

INTRODUCTION

Automatic changeover allows you to switch from one motion picture projector to another without interrupting the picture or sound.

For the changeover, a dowser (metal disc) is used to block the light beam leaving the projector. *KODAK PAGEANT* 250A Sound Projectors (as well as previously manufactured *PAGEANT* Arc Projectors) have built-in dowsers; however, for other *PAGEANT* Projector Models, a dowser must be provided.

This equipment memo describes how you can build a changeover for use with *PAGEANT* 250A (and Arc) Projectors—plus, with modifications, other *PAGEANT* Projector Models.

The parts needed for both the changeover circuitry and the dowsers are as follows:

PARTS LIST

CODE	DESCRIPTION	QUANTITY	
		Changeover	Dowsers
DS-1	Pilot lamp assembly, 115 V	1	
J-1	Phone jack—1/4-inch (6.3-millimetre*) diameter for current *PAGEANT* Projectors (SWITCHCRAFT 11) —0.206-inch (5.2-millimetre) diameter for older *PAGEANT* Projectors (SWITCHCRAFT 5-11)	1	
J-2, J-3, J-4, J-5	Receptacle—2-conductor, 125 V, 1 A rating or greater, to mate with P-2, P-3, P-4, P-5 (Jones S-302-CCT-K or equiv)	2	2
K-1	Relay—4PDT, 115 V ac continuous-duty coil (Potter and Brumfield GA17, Guardian 500-CG115 ac, or equiv) 5 AMP CONTACTS	1	
L-1	Solenoid—115 V ac continuous duty (Kodak Part No. 181905,† Guardian No. 11, Dormeyer B221A1, or equiv). This solenoid has approximately 1 inch (25 millimetres) of travel		2 (for external use only)
P-1, P-6, P-7	Phone plug—1/4-inch diameter (Switchcraft 250, 270, or 280) —0.206-inch diameter (Switchcraft S-250 or S-280)	3	
P-2, P-3, P-4, P-5	Plug—2-conductor, 125 V, 1 A rating or greater, to mate with J-2, J-3, J-4, J-5 (Jones *P*-302-CCT-L or equiv)	4	
P-8	Power plug—standard 2-conductor	1	
R-1, R-2	L or T pads—to correspond to speaker output (permit setting monitor-cue levels for judging program level)	2	

* For ease in reading, the metric equivalent is given once per dimension.

† These parts can be purchased from Eastman Kodak Company, Parts Services, Rochester, NY 14650. Parts not available from Kodak can be purchased from an electronics supplier.

PARTS LIST (continued)

CODE	DESCRIPTION	QUANTITY	
		Changeover	Dowsers
S-1, S-2	Switch—SPST, 125 V, 1 A rating or greater	2	
S-3, S-4	Switch—SPDT, lever- or roller-actuated, 125 V, 1 A rating or greater (Micro BA-2RL2 or equiv)	2	
S-5	Switch—SPDT, center-off	1	
S-6, S-7	Switch—SPST, toggle, 125 V, 1 A rating or greater	2	
	Spring—closes dowser (Kodak Part No. 181870†)		2
	Spring—opens dowser (Kodak Part No. 182962†)		2
	Dowser—metal disc and bushing (Kodak Part No. 183091†)		2 (for external use only)
A-MP 42474-1 or 121204-Kent	Faston connectors—to connect to the solenoid or master-control switch		4 (or as required)
	Control box, grommets, wire		

NOTE: The monitor-cue speaker, the VU meter, and the circuit indicated by the dotted lines on the wiring diagram for the changeover, page 4, are not essential. If these are omitted, S-5, R-1, and R-2 are unnecessary, and K-1 can be 3PDT instead of 4PDT.

For a permanent installation, direct connections can be made to the program speaker, the dowsers, and switches S-3 and S-4. In this case, parts S-6, S-7, J-1, J-2, J-3, J-4, J-5, P-1, P-2, P-3, P-4, and P-5 will not be needed.

WIRING

Basic wiring diagrams shown. Modification may be necessary. Wiring must conform to local electrical codes.

Internal Dowser

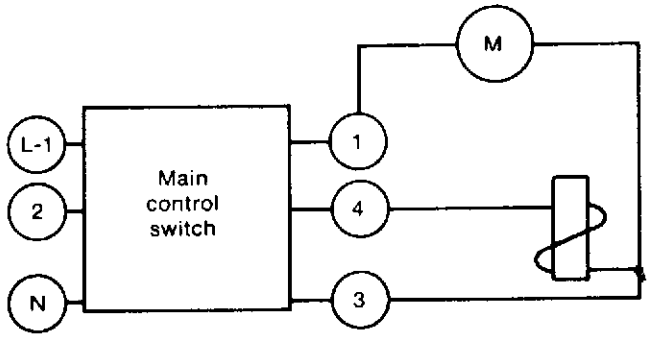


FIGURE 1 Existing wiring of the *Internal* dowser of a *KODAK PAGEANT* 250A Projector

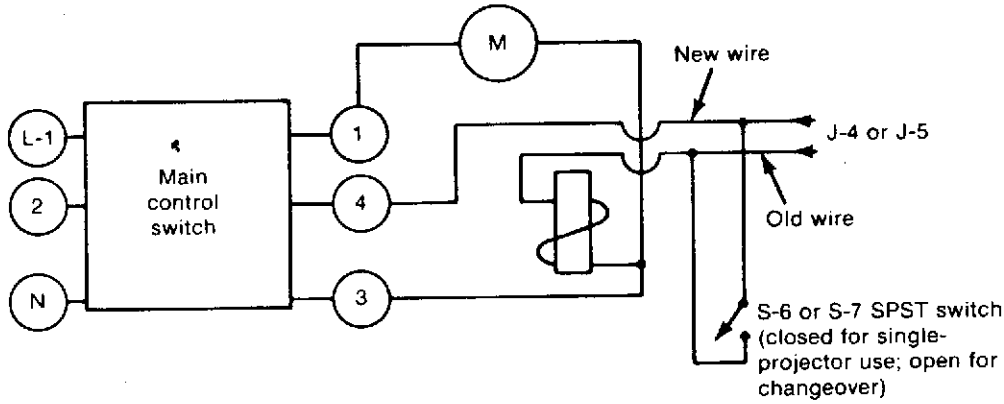


FIGURE 2 Modified wiring of the internal dowser

Internal Dowser Control Switch

The SPDT switch (S-3 or S-4) is mounted under the control lever so that it will be actuated when the lever is moved to PROJECT or LAMP (Figure 3).

To wire the internal dowser and the switch, proceed as follows for each projector (designate one projector *A* and the other *B*):

1. Disconnect the wire from terminal 4 of the main control switch (Figure 1).
2. Connect or solder a 6-inch (152-millimetre) length of new wire to terminal 4.
3. Connect the other end of the new wire and the end of the old wire (step 1) to the new receptacle J-4 or J-5 (Figure 2). This receptacle will hold the P-4 or P-5 plug from the changeover. This switch is used to restore the projector to its original wiring when it is used without the changeover.
4. Wire the S-6 or S-7 switch as shown in Figure 2. (A shorting plug in J-4 or J-5 can substitute for this switch.)
5. Mount switch S-3 or S-4 on the projector (Figure 3), making sure the mounting screws do not interfere with any internal parts. Connect the plug P-2 or P-3 to the switch.

   NOTE: On S-3, P-2 (projector *A*), use the common and normally *closed* contacts; on S-4, P-3 (projector *B*), use the common and normally *open* contacts.
6. Label the connectors properly for projectors *A* and *B*.

Any exposed connections or bare wires must be properly insulated.

For projectors that do not have a control lever, mount the switch so that it will be actuated when the rotary or toggle switch is in the LAMP position.

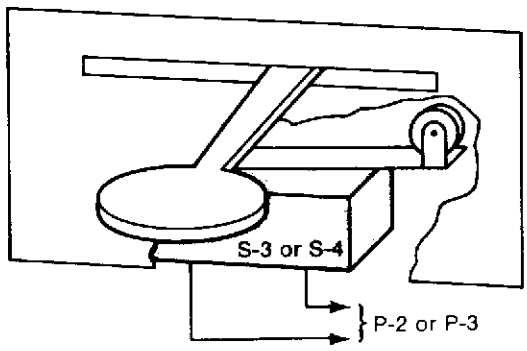


FIGURE 3 Internal dowser control switch

External Dowser

For wiring of the *external* dowser for use with *PAGEANT* Projectors other than the Model 250A, follow Figure 4.

The dowser shutter can be made of any lightweight metal. It should be circular and large enough to cover the end of the lens. For proper functioning, it should be located in front of the projector lens and positioned so that when the solenoid (L-1) is actuated, the shutter will open; and when the solenoid is off, the shutter will close, either by gravity or spring tension.

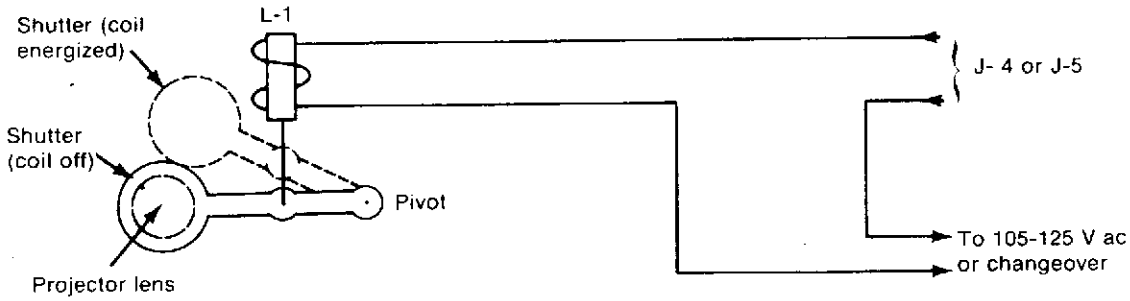
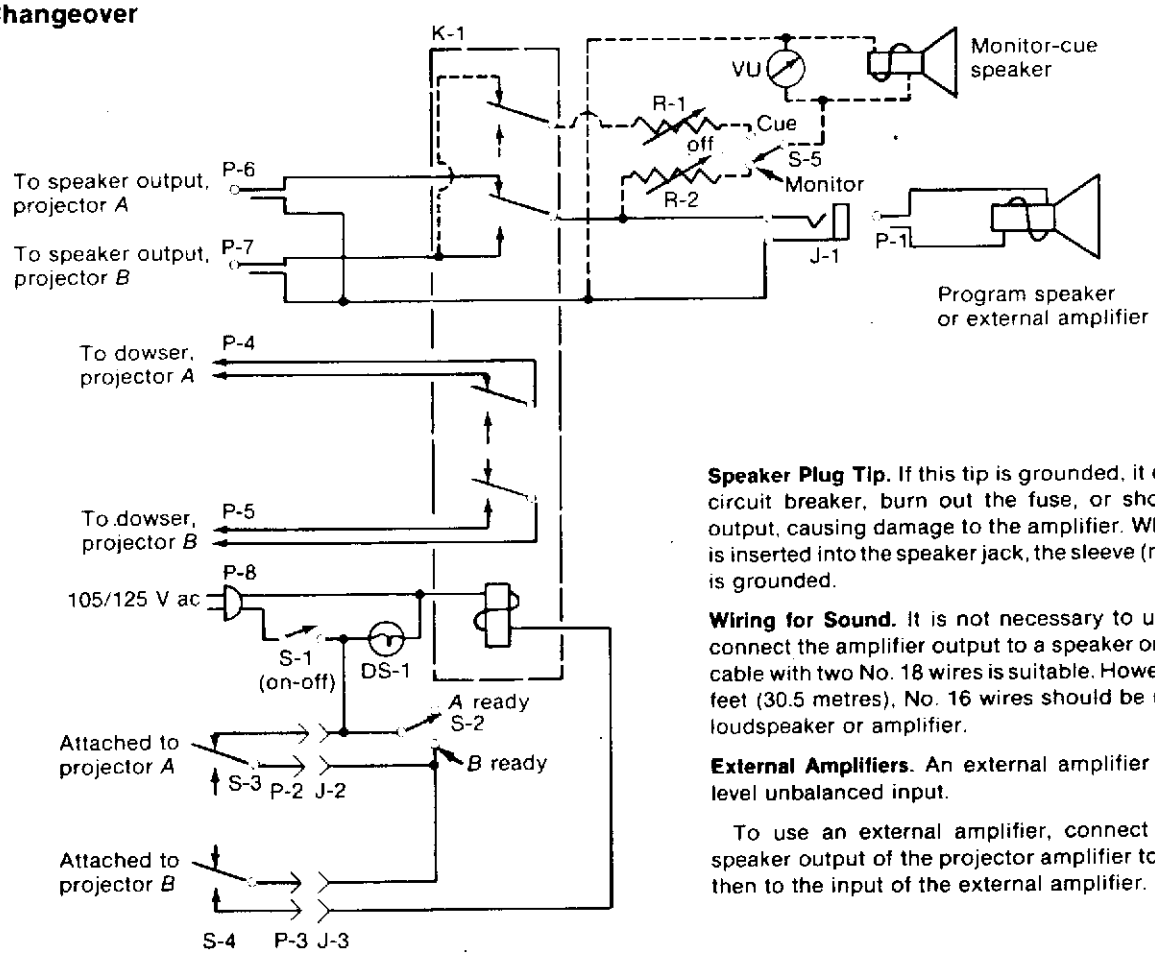


FIGURE 4 External dowser wiring

Changeover



Speaker Plug Tip. If this tip is grounded, it can trip the amplifier circuit breaker, burn out the fuse, or short out the amplifier output, causing damage to the amplifier. When the speaker plug is inserted into the speaker jack, the sleeve (not the tip) of the plug is grounded.

Wiring for Sound. It is not necessary to use shielded cable to connect the amplifier output to a speaker or another amplifier. A cable with two No. 18 wires is suitable. However, for runs over 100 feet (30.5 metres), No. 16 wires should be used to connect to a loudspeaker or amplifier.

External Amplifiers. An external amplifier should have a high-level unbalanced input.

To use an external amplifier, connect it directly from the speaker output of the projector amplifier to the changeover and then to the input of the external amplifier.

FIGURE 5 Wiring for projector changeover

SPEAKER REQUIREMENTS

PAGEANT Projectors should be used with high-efficiency speakers, such as the one supplied with the projector. However, in some situations you may find it advantageous to use larger auxiliary speakers to improve the sound output.

Current *PAGEANT* Projectors have a speaker output jack that accepts a 1/4-inch-diameter phone plug. On the other hand, the jacks on older *PAGEANT* Projectors require a 0.206-inch-diameter plug. (Suitable phone plugs for 1/4-inch speaker jacks include Switchcraft 250, 270, or 280; use Switchcraft S-250 or S-280 plugs for 0.206-inch jacks. These plugs are available from most electronics dealers, or directly from Switchcraft, Inc., 5527 North Elston Avenue, Chicago, IL 60630.)

The amplifier in the current *PAGEANT* 250A and 250S Sound Projectors is designed for use with an 8-ohm speaker that has a maximum rating of 25 W. (Previously manufactured 25 W *PAGEANT* Projectors — Models 256-TR and Arc—are designed for a 16-ohm speaker system.) Phased speakers of higher impedances may be used but this approach will result in reduced power delivered to the sound system. Note that using a speaker system with an impedance *less* than the minimum impedance for which the amplifier was designed may overload and damage the amplifier.

POWER AND VENTILATION REQUIREMENTS

During operation, a *PAGEANT* 250A Projector and *KODAK* Arc Power Supply draw about 9 A from a 105 to 125 V, single-phase, 60 Hz ac line. However, when the lamp (General Electric Marc 300/16A) is first turned on, the projector can draw up to 13 A. Thus, a 26 A line is a *minimum* requirement for two projectors and power supplies.

A *PAGEANT* 250S Projector using a 200 W tungsten-halogen lamp (EJL) requires approximately 100 W plus the lamp wattage. Two projectors with 200 W lamps require a maximum of 600 W.

The maximum heat generated by two *PAGEANT* 250A Projectors and power supplies is approximately 4800 Btu. For two *PAGEANT* 250S Projectors with 200 W tungsten lamps, the maximum heat generated is about 2050 Btu or approximately 1370 Btu in normal changeover (one lamp off).

In ordinary room temperatures with two projectors running in a small projection room or booth, a minimum airflow of 100 ft^3/min (2.8 m^3/min) is suggested. Additional allowance must be made for other heat-producing elements in the room and also for the operator.

PROJECTOR OPERATION

Setting Up

In the following procedure, the wording assumes that the projectors are equipped with control *levers*. If your projectors are equipped with rotary or toggle switches, substitute *rotary switch* or *toggle switch* whenever "control lever" is mentioned.

Arrange the projectors side by side. Then proceed as follows:

1. Connect the projectors and the changeover to a 105 to 125 V, 60 Hz power supply.
2. Insert the speaker plugs into the changeover speaker receptacles; then insert the changeover phone plugs into the projector speaker jacks (1/4 inch for current *PAGEANT* Projectors or 0.206 inch for older models).
3. Connect the dowser plugs (from the changeover) to the dowser receptacles.
4. Turn the selector switch on the changeover to "*A* ready." Thread projector *A*, turn it on, align it, and adjust it as you normally would. Project the film to its starting point (if using cued leader, to the cue mark; if not, to the first picture frame); then move the control lever to the OFF position. (The life of the arc lamp in the *PAGEANT* 250A Projector will be reduced by excessive switching on and off. Leave the lamp on if the projector will be used again in 5 or 10 minutes; otherwise, turn it off.)
5. Turn the changeover selector switch to "*B* ready," and repeat step 4 for the second film segment and projector *B*.
6. Return the changeover selector switch to "*A* ready."

Starting the Show

With a *PAGEANT* 250A Projector, turn on its lamp about 1 minute before the projector is to be run.

1. Turn on the amplifier.
2. Move the control lever of projector *A* as follows:
   a. If the film has been cued *ahead* of the first image position, move the control lever to the MOTOR position. When the film reaches the starting point, move the control lever to the PROJECT or LAMP position.
   b. If the film has been cued *at* the first image position, move the control lever to the PROJECT or LAMP position.
3. Recheck the focus, image framing, and sound level as you would for a single-projector showing.

Performing the First Changeover

If projector *B* has an arc lamp, turn it on at least 1 minute before the first changeover is to be made.

1. Turn on the amplifier.
2. Move the changeover selector switch to "*B* ready."
3. Move the control lever of projector *B* as follows:
   a. If the film has been cued *ahead* of the starting point, move the control lever to the MOTOR position. When the film reaches the starting point, move the control lever to the PROJECT or LAMP position.

b. If the film has been cued *at* the starting point, move the control lever to the PROJECT or LAMP position.

NOTE: When the control lever of projector *B* is moved to the PROJECT or LAMP position, the dowser of projector *A* will close, the dowser of projector *B* will open, and at the same time the sound track will switch to projector *B*. Projector *A* can continue to run (it will not interfere with the program) until its entire film is on the take-up reel.

4. Recheck the focus, image framing, and sound level.
5. The first reel of film can be rewound, or it can be removed for rewinding at a later time. Install an empty take-up reel for a third film segment.

Preparing for the Second Changeover

Thread projector *A* with the third reel of film. With the changeover selector in the "*B* ready" position, projector *A* can be operated with its control in any position without having the dowser open and without the sound going to the program speaker. Thus if a monitor-cue speaker and switch are used, sound level can be adjusted and the film can be cued at the starting point.

Performing the Second Changeover

Use the procedure described in Performing the First Changeover, except that references to "projector *B*" should read projector *A*.

Repeat this procedure for each film segment.

After the Final Changeover

1. The projector not in use can be turned off.
2. When the last reel of film has been projected, turn off all equipment.
3. Rewind the film, if necessary.

Nonchangeover Operation

Without disconnecting the changeover, either projector can be used for single-projector operation if the changeover switch is in the proper "ready" position.

The changeover can be disconnected, if necessary, in this way:

1. Disconnect the changeover plugs from the projectors.
2. If internal dowsers are in use, close the SPST dowser switches, or insert shorting plugs into the dowser receptacles. When external dowsers are being used, pull out their connecting plugs. Move the dowsers away from the lenses.
3. Insert the speaker plugs into the speaker jacks on the projectors.

Either projector can now be operated without changeover.

The "off" projector can be operated without interfering with the sound or picture of the "on" projector if the changeover selector switch is set in the "ready" position for the "on" projector.

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