BELL & HOWELL

MODEL 1568 HIGH-INTENSITY 16MM SOUND PROJECTOR

OWNERS AND OPERATORS GUIDE

IMPORTANT:
Please read these instructions carefully before operating this unit

IMPORTANT SAFEGUARDS

When using your photographic equipment, basic safety precautions should always be followed, including the following:

1. **Read and understand all instructions.**
2. **Close supervision is necessary when any equipment is used by or near children. Do not leave equipment unattended while in use.**
3. **Care must be taken as burns can occur from touching hot parts.**
4. **Do not operate equipment with a damaged cord or if the equipment has been dropped or damaged — until it has been examined by a qualified serviceman.**
5. **Position the equipment in such a way so as not to block any air intake or exhaust openings.**
6. **If an extension cord is necessary, a cord with a suitable current rating should be used. Cords rated for less amperage than the equipment may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.**
7. **Always unplug equipment from electrical outlet when not in use. Never yank cord to pull plug from outlet. Grasp plug and pull to disconnect.**
8. **Let equipment cool completely before putting away. Store the power cord properly in the storage area provided.**
9. **To protect against electrical shock hazards, do not expose this equipment to rain, moisture, or other liquids.**
10. **To avoid electric shock hazard, do not disassemble this equipment, but take it to a qualified serviceman when some service or repair work is required. Incorrect reassembly can cause electric shock hazard when the equipment is used subsequently.**

The serial number of your projector is included on the name plate located at the rear of the machine. Record the serial number in the space provided below.

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SAVE THESE INSTRUCTIONS

TABLE OF CONTENTS

YOUR NEW PROJECTOR

Your new Bell & Howell 16mm High-Intensity Sound Projector is a professional device of the highest quality. You can expect years of reliable performance from this equipment.

Model 1568 combines the features most sought after by the professional user in an easy to operate, dependable projector that is equally at home in a small theater, a traveling road show, or a corporate board room. The modern, high output light source assures auditorium quality projection over long distances. The powerful sound system provides faithful sound reproduction for large audiences or can be operated into permanent sound systems. Remote control and tandem operation capability allow the operator maximum convenience and makes possible the most professional showing of motion picture programs.

We are proud of this product which was designed to exacting standards of performance, quality, and durability. The material that follows will help you to use your new projector to the fullest extent of its capability.

SPECIFICATIONS

ILLUMINATION SYSTEM

Lamp. ..... 300 Watt Gas Discharge Arc Lamp with integral Dichroic Reflector.

Shutter. ..... Two Blade (48 interruptions per second)

Standard Lens. .. 2" (50mm) F/1.2 Straw Coated

Optional Lenses. . 1.5" (38mm) F/1.5 Straw Coated
2.5" (64mm) F/1.5 Straw Coated
3" (76mm) F/1.6 Straw Coated
4" (100mm) F/1.6 Straw Coated
Filmovara® Zoom for use with 1.5" (38mm), 2" (50mm), 2.5" (64 mm) and 3" (76mm) lenses. Magnification ratio 0.875 to 1.125.
Anamorphic lens (2X) for use with 1.5" (38mm), 2" (50mm), 2.5" (64mm), 3" (76mm), and * 4" (100mm) lenses.
* Anamorphic lens adapter for 4" (100mm) lens.

Screen Lumens. . 1700 typical

Color Temperature ..... 6000°K Typical

Lamp Life. ..... 75 Hrs. (warranty)

Lumen Maintenance ..... ≥75% of initial @ 40 Hrs.
≥50% of initial @ 75 Hrs.

Lamp Power Supply. ..... Built-in; Solid State

FILM HANDLING CAPABILITIES AND CONTROLS

Reel Arms. ..... Folding; Gear Driven; Weight compensated take-up torque in forward project.

Film Capacity. ... 400 Ft. to 2000 Ft. (120m to 600m)

Framing Control. Fixed Axis; Moves only film

Focus Control. .. Precision Rack and Pinion

Shuttle. ..... Three tooth Stellite

Film Guide Rails. Carbo-Nitride Treated

Elevation Adjustment. .... Knob type; Rack and Pinion

Threading. ..... Automatic

Loop Restorer. .. Automatic, synchronized with shutter

ELECTRICAL MODULAR SYSTEMS

Power. ..... 120VAC, 60Hz (operating range 105 to 132VAC), 8 Amps Max.

Line Cord. ..... 18/3 AWG SJT Non Captive 10 Ft. (3m) length

Protection. ..... Internal via fuses and electronic controls, plus —
1 — 8 Amp Type 3AG Fuse for Lamp Power Supply
1 — 2 Amp Type 3AG Fuse for Control Circuit, Audio Amplifier, Motor Drive Circuit, and Exciter/Blower Power Supplies.

AUDIO SYSTEM

Type. ..... Optical Sound Track

Amplifier Type. ..... Plug-in, all Solid State with safe operating area protection (overload shutdown); pushbutton resettable

Power. ..... Greater than 20 Watts RMS into 8 Ohm load at less than 1% Total Harmonic Distortion (THD). 25 Watts RMS at less than 5% THD

Frequency Response. ..... 50 to 10 KHz

Wow and Flutter. 0.3% Max (peak weighted)

Tone Control. .... 7db boost or cut at 8KHz

Microphone Input ..... ¼" phone jack (with 2mv sensitivity) provided for microphones of 200 Ohms to 50K Ohms impedance. Audio circuit is automatically activated when microphone is plugged in.

Amplifier Output. ..... 2 pin DIN jack for 4-16 Ohm load; operation below 8 Ohms not recommended for best sound quality.

Auxiliary Amplifier Output. ..... 3 pin DIN jack; 0.7V RMS (0dBM) 600 Ohm (minimum) unbalanced line

Speaker Cover. .. 8 Ohm total (2 speakers) included as standard equipment.

EXCITER LAMP

Type. ..... BAK 4V, 0.75 Amp
Approximate Life — 300 Hrs.

FILM TRANSPORT RATE

Forward Project. . 24 Frames/Second ±2%

Reverse Project. . 24 Frames/Second ±4%

Douser System. . Automatic; Shields film from lamp output during stop mode, between forward/reverse modes, and during auto thread mode

Drive System. .... D.C. Servo motor system with integrated timing and control logic

Cooling System. . Single D.C. Blower motor operates in all modes

Control System. . Single digital logic printed circuit board controls all projector functions

Remote Control. . Optional Accessory is fully protected from electrically noisy environments and the effects of static electrical discharges. Low voltage 3 conductor (Class II) Wiring.

SPECIFICATIONS (CONT'D)

Remote Control.. Con't.

Functions Controlled/Indicated —
Lamp On
Lamp Ready
Lamp Off
Forward
Stop
Reverse
Cord length 20 Ft. (6m)
Maximum length recommended 250 Ft. (75m).
50 Ft. (15m) extensions are available
Up to 5 remote control units may be used with each projector provided cumulative length of cord does not exceed 250 Ft. (75m).

Multimedia..... See special section for complete specifications.

Changeover/ Tandem Operation..... On site changeover and/or remotely controlled changeover.

Size..... See Page 34 — Mounting Drawings

Weight..... 38.5 lbs. (17.5 Kg) Complete

Options.....
Remote Control Module
Remote Control Extension Cable
Remote Control Podium Bracket
Tandem Changeover Cable
Microphone
Accessory Lenses
Orchestricon III™ Speaker
Exciter Lamp
Projection Lamp
Pedestal Base

APPROVALS

UL Listed

READ THESE INSTRUCTIONS BEFORE OPERATING THIS EQUIPMENT

CAUTION

This equipment is designed to operate only on 120VAC, 60 Hz current. Operating from any other source may damage the equipment and void the warranty.

Do not attempt to remove the top or metal back cover of the projector; no internal parts are serviceable without specialized equipment and tools. In addition, the high voltage present is hazardous, and especially dangerous to untrained personnel.

Keep the lamp house door closed except as necessary for access to the projection lamp. Do not look directly at the lamp when lighted, nor touch the lamp, lamp base, plug, or socket while the lamp is igniting or lighted. Starting voltage is approximately 15,000 volts.

When using the projector with an auxiliary amplifier, reduce the projector volume and tone controls to "0" and make all volume and tone adjustments on the auxiliary amplifier.

When changing the projection lamp, allow the equipment to cool thoroughly before handling the lamp. Be sure to unplug the power cord from the wall outlet before attempting to remove the lamp plug from its socket.

During normal operation, the projection lamp should remain lit for at least three minutes after ignition whenever possible. Shorter running time will degrade lamp life.

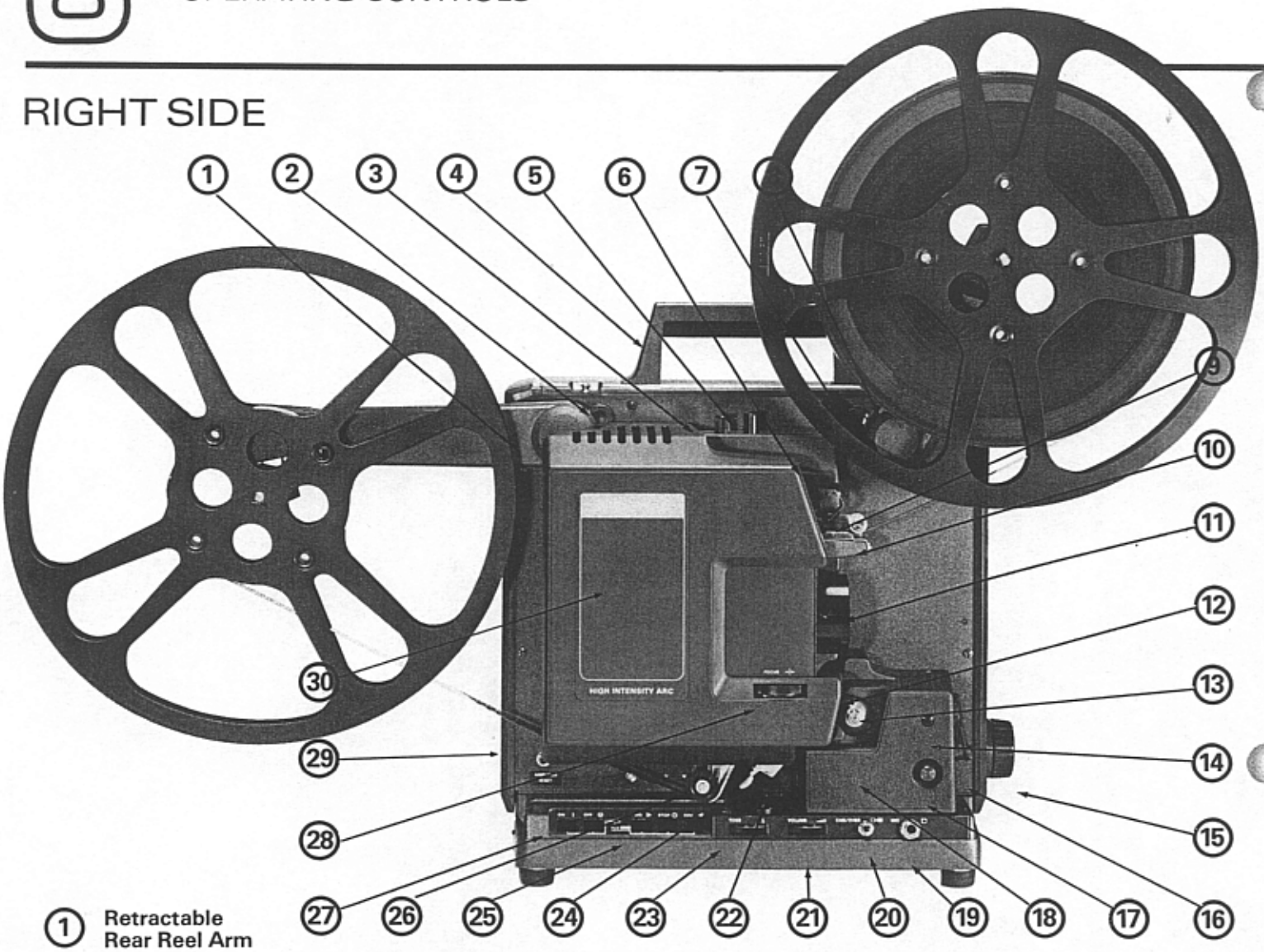
When using a microphone in a system wired for tandem operation, be sure to plug the microphone into the projector that is running. Plugging the microphone into a projector changes the control of the system over to that projector. Changeover cannot be effected to a second projector if the microphone is plugged into the first projector.

When connecting extension speakers to the internal sound amplifier, connect no more than two speakers of 8 ohms each in parallel.

When connecting the projector to a permanent sound system be sure the system is in proper operating condition to avoid possible damage to the projector audio amplifier.

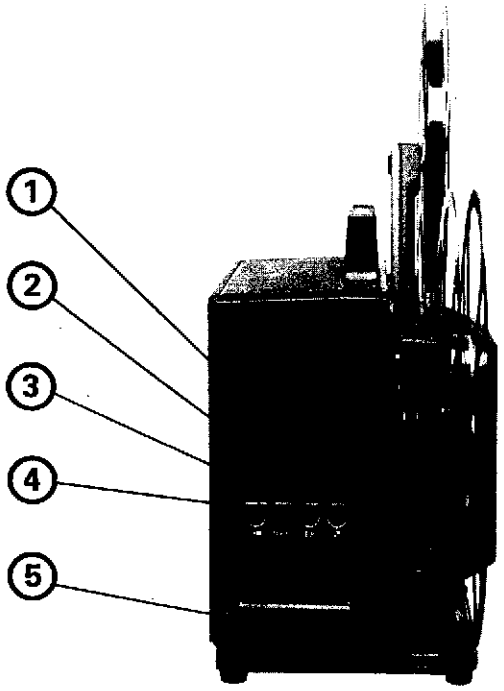
Ground polarity of the system must be observed and the proper plug used to mate with the jack on the projector. See specifications.

RIGHT SIDE



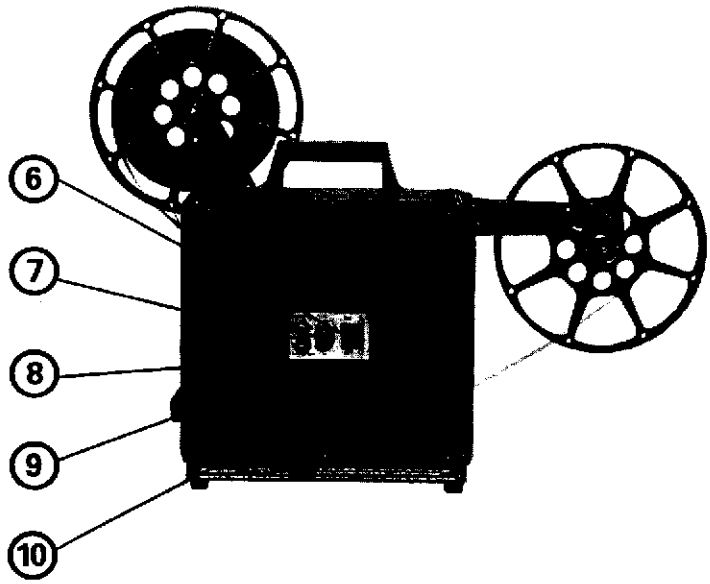
1. Retractable Rear Reel Arm
2. Rear Reel Arm Release Button
3. Framing Knob
4. Carrying Handle
5. High Speed Rewind Button
6. System Restorer
7. Front Reel Arm Release Button
8. Retractable Front Reel Arm
9. Sprocket Guards
10. Film Insert Channel
11. Lens
12. Stabilizing Rollers
13. Sound Drum
14. Exciter Lamp Indicator
15. Tilt Knob
16. Film Cutter Lever
17. Exciter Lamp Cover Screw
18. Exciter Lamp Cover
19. Microphone Jack
20. Changeover Button
21. Volume Control
22. Automatic Loop Restorer
23. Tone Control
24. Automatic Threading Lever
25. Film Forward, Stop, Reverse Buttons
26. Threading System Release Roller
27. Lamp On/Off Buttons
28. Focus Control
29. Amplifier Reset Button
30. Lamp House Cover

REAR



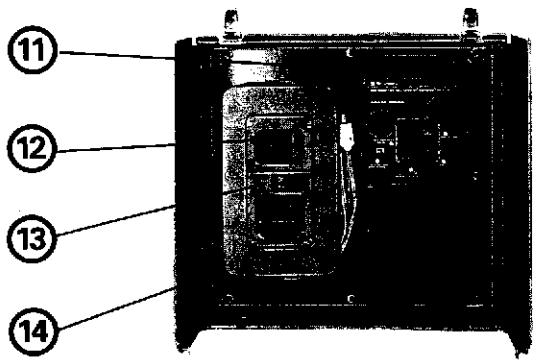
1. Remote Control Jack
2. Auxiliary Amplifier Jack
3. Speaker Jack
4. Changeover Jack
5. Name Plate/Serial Number

LEFT SIDE



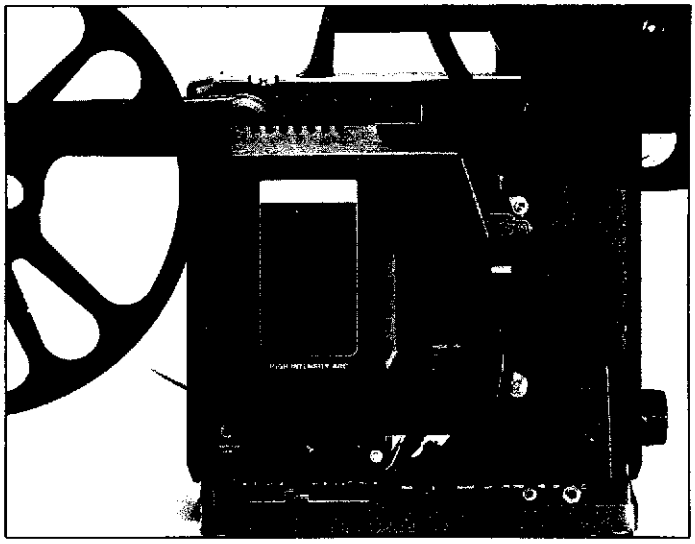
6. Main Power Switch
7. Lamp Fuse
8. Film System Fuse
9. Line Cord Receptacle
10. Multimedia Control Connector

SPEAKER



11. Threading Instructions
12. Exciter Lamp Storage
13. Extension Speaker Jack
14. Speaker Cord Storage

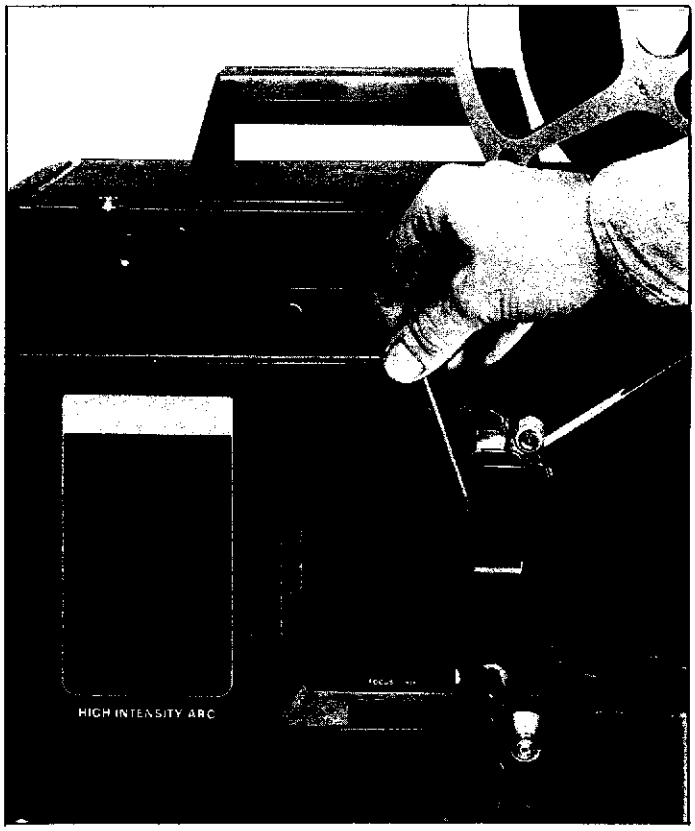
GENERAL FEATURES



The **Carrying Handle** is located atop the projector at a balance point which makes it easy to pick up and move the equipment.

Both **Front** and **Rear Reel Arms** are retractable. Each pivots upward from the storage position and locks in the operating position. To retract an arm, depress the **Reel Arm Release Button** by pressing in toward the projector body while moving the arm downward.

The **Framing Knob** allows the operator to move the film within the aperture to properly fill the screen with the projected image. Turning the knob clockwise raises the projected image in the aperture; counterclockwise lowers the image.



Pressing the **High Speed Rewind Button** after setting the operating controls for rewind allows the projector to rewind at highest speed.

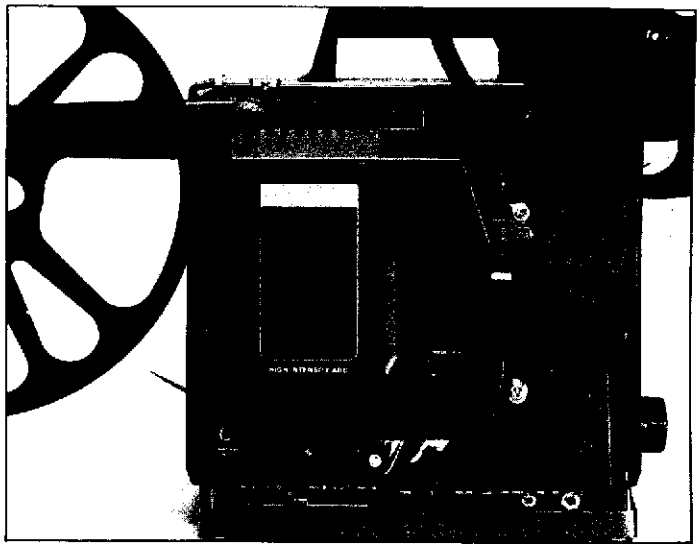
If a large portion of film is damaged and tension is lost around the sound drum, pressing down firmly on the **System Restorer** for at least one second will normally restore the film to the proper threading path.

The **Lamp House Cover** protects the lamp from damage and shields extraneous light from the projection area. To open the compartment door, grasp the cover at the top near the **Framing Knob** and pull away from the body of the projector. The **Cover Door** is hinged at the left side and will swing open easily. A spring clip holds the cover closed.

The **Focus Control** moves the projection lens forward and back.

Various lenses allow the operator to obtain optimum screen image size at any distance. See Page 31 for projection table. Each lens is a high quality, multi-element, Straw Coated device capable of projecting sharp, bright images.

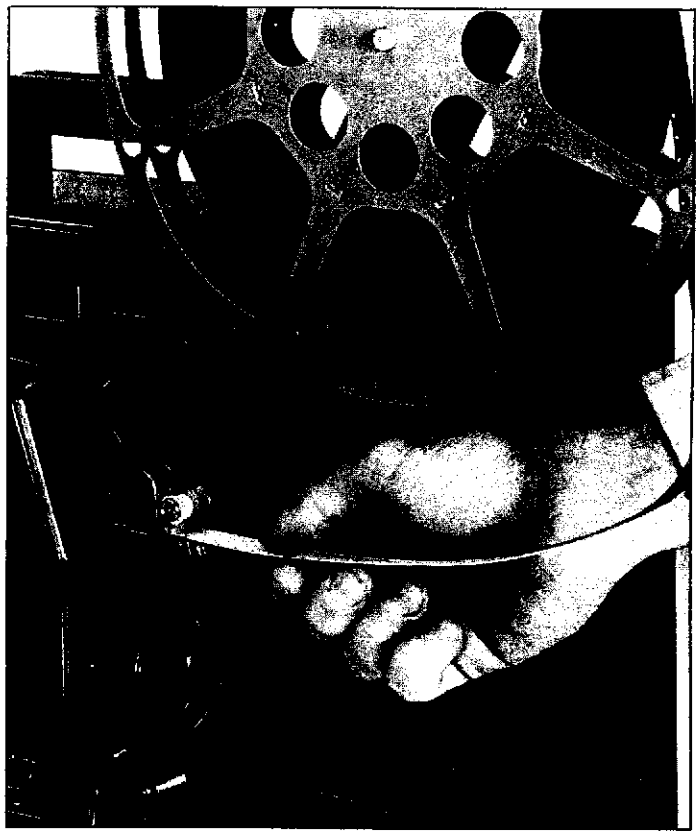
GENERAL FEATURES (CONT'D)



Stabilizing Rollers keep the film in proper relationship with the **Sound Drum** during projection, assuring high quality sound reproduction.

A **Tilt Knob** allows the operator to raise the front of the projector for projection on a screen located above the horizontal axis of the projector. To retain a square projected image, the top of the screen should be tilted toward the projector when the projector is tilted upwards.

An **Exciter Lamp Indicator** monitors the exciter lamp. This convenience device assures the operator that this portion of the sound system is ready for normal operation.



The **Exciter Lamp** cover protects the lamp from damage and shields extraneous light from escaping. The **Exciter Lamp Cover Screw** secures the cover in the closed position.

The **Film Cutter Lever** is used to properly trim the film leader if it is damaged or torn.

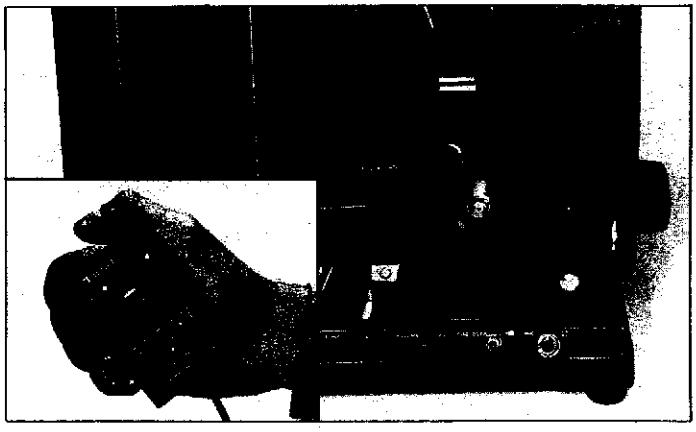
Torn perforations or bad splices will sometimes cause a loss of the lower loop below the film gate. The **Automatic Loop Restorer** will reset the lower loop.

The **Film Insert Channel** is the opening into which the end of the leader is first inserted as a part of the automatic threading procedure. **Sprocket Guards** keep the film on the sprocket.

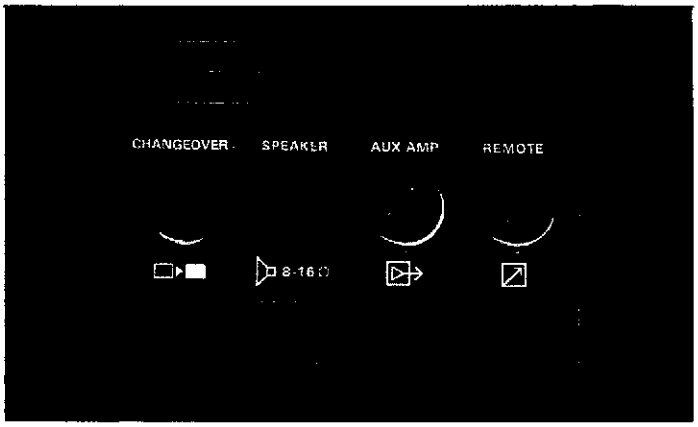
When preparing for Autoloading procedure, the **Automatic Threading Lever** is first moved forward to the Autoload position to ready the mechanism.

GENERAL FEATURES (CONT'D)

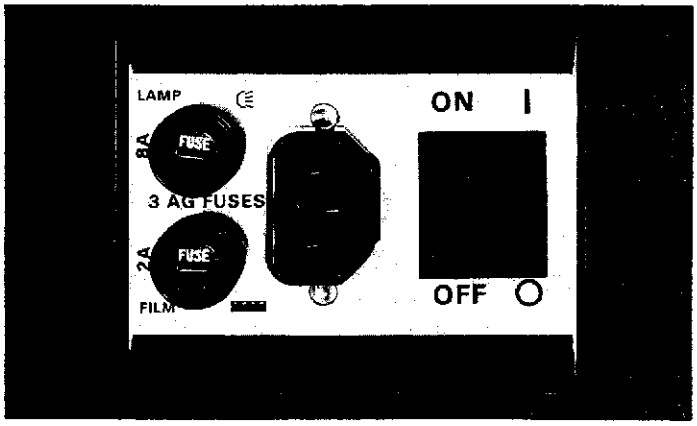
Various operating functions of the projector may be controlled from either the buttons on the machine or from the accessory **Remote Control Module. Lamp On, Lamp Off, Film Forward, Stop, and Film Reverse Buttons** are located on the projector housing and on the accessory **Remote Control Module** to activate the named functions. A **Changeover Button,** for tandem operation, is located on the projector; the accessory **Remote Control Module** may also be used to activate changeover from remote location. See section Page 18. A **Microphone Jack** is included to accept an accessory microphone which can be used with the projector's built-in sound system.



Four jacks are located in the panel at the rear of the projector. These jacks, which accept only DIN plugs, include the **Changeover Jack** for controlling a second projector when tandem operation is desired; **Speaker Jack** for driving the cover speaker from the internal sound amplifier; **Auxiliary Amplifier Jack** for connecting the projector to an external amplifier system; **Remote Control Jack** for use with the accessory **Remote Control Module.**



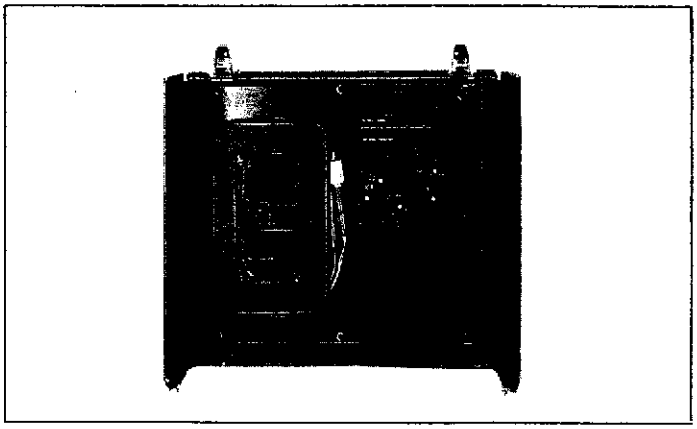
A panel on the left side of the projector includes the **Lamp** and **Film System Fuses,** the **Line Cord Receptacle,** and the **Main Power Switch.**



The Speaker Cover included with the machine contains two speakers for efficient sound reproduction. An additional speaker (8 Ohms minimum) may be plugged into the **Extension Speaker Jack** located on the **Speaker Cover Housing.**

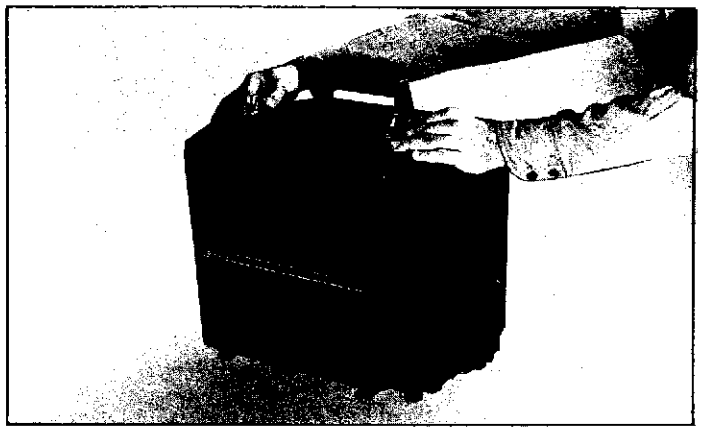
The threading procedure for Autoloading is printed inside the speaker cover for ready reference.

Speaker Cord Storage is provided in the **Speaker Cover** housing. Simply wrap the cord securely around the posts provided. Storage is also provided in the same area for a spare **Exciter Lamp.**

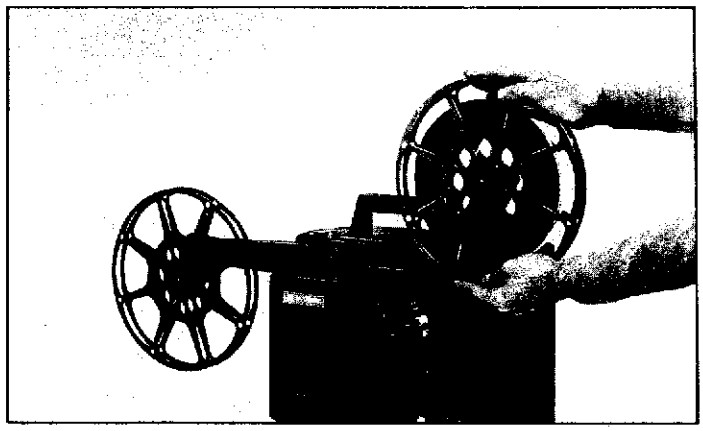


SETTING UP THE PROJECTOR

Place the projector on a sturdy projection stand or a solid table facing the screen. Release the two locking clamps at the top of the projector housing, remove the speaker cover, and place it near the screen. Extend the reel arms; they lock into place with an audible "snap." Select a reel of the same size or larger than the reel of film to be projected and place it on the rear take-up reel arm. Place the reel containing the film to be projected on the front reel arm.



Unwind the speaker cord and plug the cord into the appropriate jack at the rear panel of the projector. Assure that the main power switch is in the OFF position. Connect the main power cord to the projector at the receptacle built into the left side panel. Connect the other end of the power cord into a grounding type 120VAC, 60 Hz outlet.



CAUTION:

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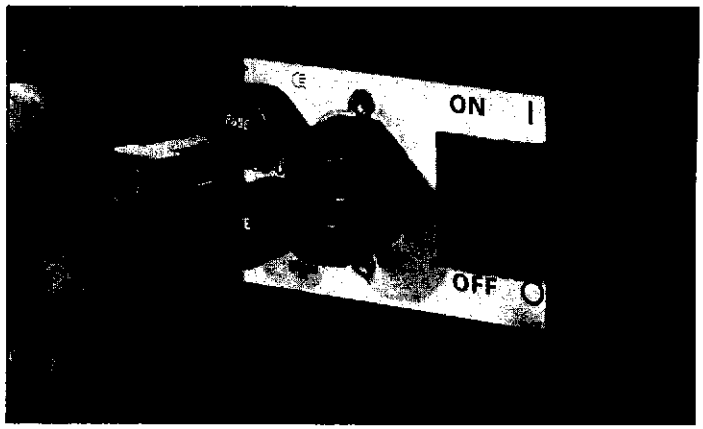
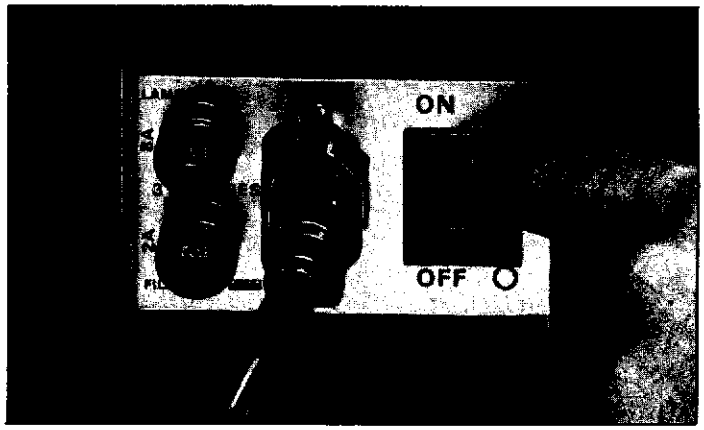


Move the Main Power Switch to ON. The projector fan will immediately start and an audible "clack" of the douser solenoid will be heard. The projector is now in the stand-by mode — both the lamp and motor systems are off. After about five seconds, the motor and lamp systems may be actuated. Test the motor system by pressing the Forward button; the motor should immediately start and the douser will open. The audio system is activated when the projector is in the Forward mode. Press the Stop button to stop the motor, close the douser, and mute the audio system.



SETTING UP THE PROJECTOR (CONT'D)

Ignite the projection lamp by pressing the Lamp On button briefly. (Pressing the Lamp On button for only 50 milliseconds will initiate the lamp starting sequence, although no harm will result from holding the button down for a few seconds.) Complete lamp warm up — full brilliance and proper color temperature — occurs in about three minutes.

CAUTION:

During normal operation, operate the projection lamp for at least three minutes after ignition whenever possible. Shorter running time will degrade lamp life.

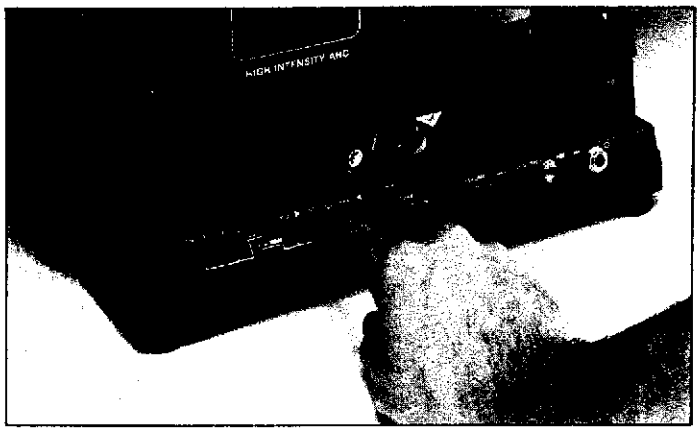
NOTE:

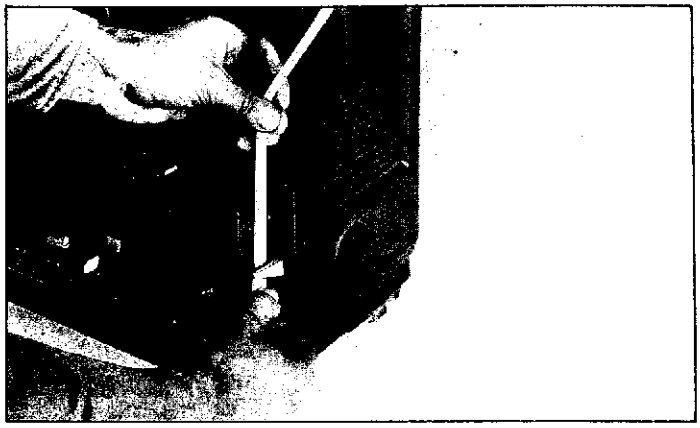
As an operator convenience feature, the Lamp Off button has a built-in time lag to keep the lamp on in case the Off button is pressed inadvertently. The time lag requires that the button be pressed firmly and held down for at least two seconds to turn off the lamp.

Press and hold the Lamp Off button for at least two seconds to turn off the lamp.

Check the leader on the film. The first three feet of film (leader) must be free of any defects. If the tip of the film is damaged or torn, insert it into the film cutter and press film cutter lever to trim the end.

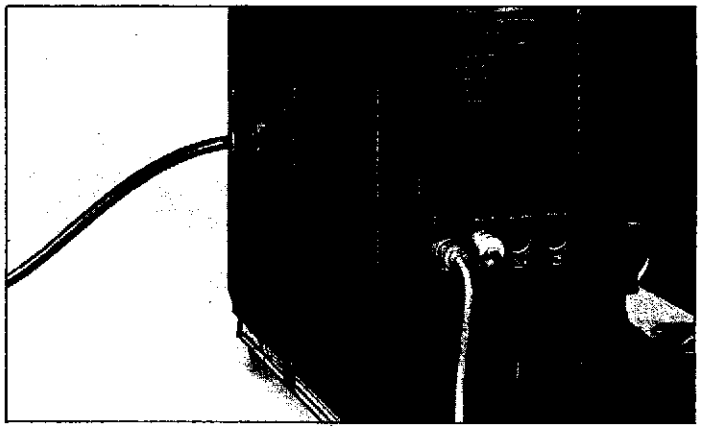
Press the Forward button to start the projector motor. Push the blue threading lever toward the front of the projector, to the Autoload position. Insert the film end into the film channel under the blue roller. Continue pushing the flim in until it engages the sprocket. The autoload mechanism will continue to thread the film through the projector. When the film completes its route through the projector and exits at the rear, catch the end and press the Stop button. Tug on the film to release the autoload mechanism. Wrap the film end around the take-up reel.





PROJECTING THE FILM

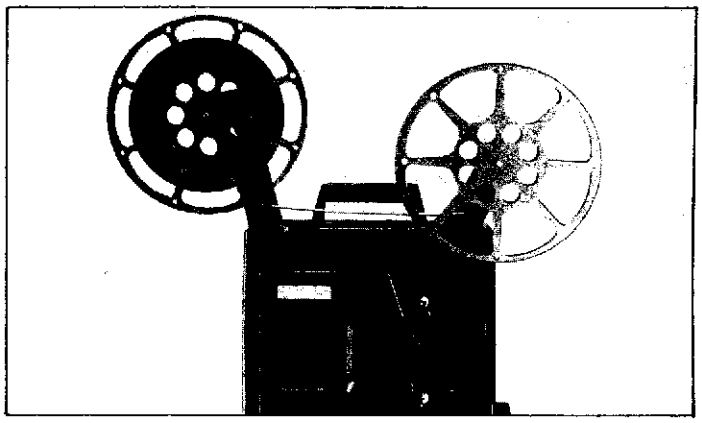
Before the actual showing, whenever possible, the film should be partially projected so that the image may be sharply focused on the screen, the projector aligned with the screen, and the volume and tone controls set for appropriate sound quality. During this preview showing, any additional connections to the projector may be made, such as the remote control module, auxiliary amplifier, tandem machine, or additional speakers. Reverse the film to the starting position before the actual presentation. To begin the actual showing, be certain the projection lamp has ignited and warmed up to full brilliance and correct color temperature. Press the Forward button to start the film. At the end of the film press the Stop button. Push and hold the Lamp Off button for at least two seconds to turn off the lamp.

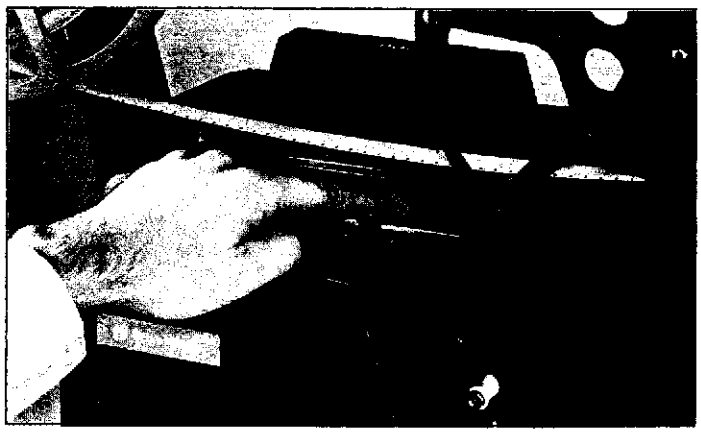


REWINDING THE FILM

Move the rear take-up reel arm to the rewind position by pressing in the reel arm release button while raising the reel arm. Unwind the last few feet of film from the take-up reel and attach the end of the film to the hub of the front film reel. Press the Reverse button to begin rewinding the film; then, press the rewind button above the lens housing to engage the rewind clutch for faster rewinding.

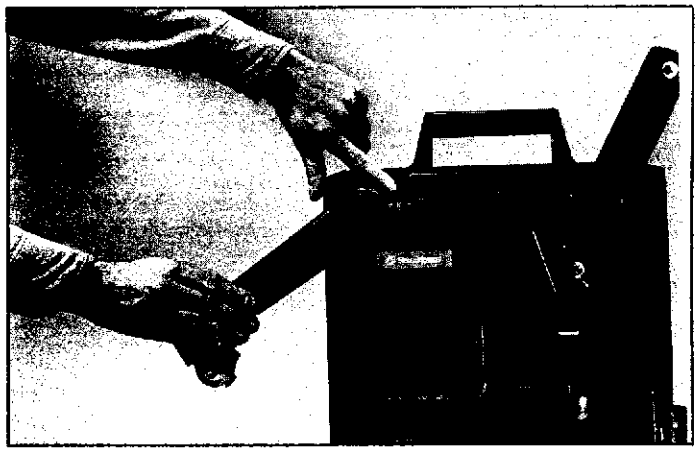
Move the autoload lever forward during rewind to close the douser and prevent light from projecting on the screen. After the film is completely rewound, press the Stop button.

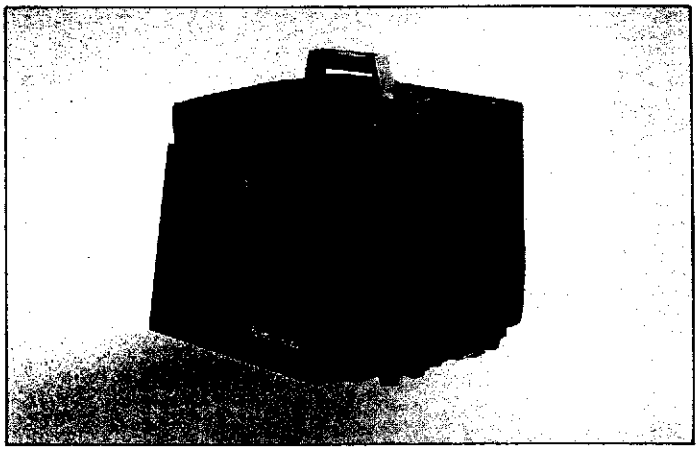




TAKING DOWN THE PROJECTOR

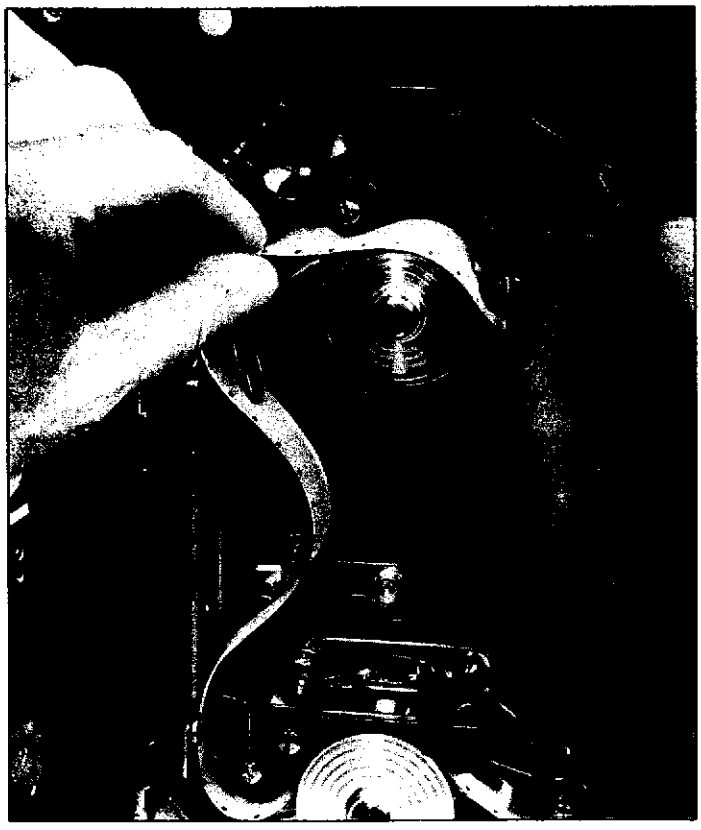
To take down the projector after use or for storage, first disconnect all power and interconnection cables. Then, remove the reels, press in on the reel arm release buttons, and fold in the reel arms. Wind the speaker cord on the storage pins in the speaker cover housing. Store any remaining cables and the reels in an appropriate place. Place the speaker cover on the projector and snap the two locking clamps on top of the projector firmly shut. Cover the projector with the vinyl dust cover.





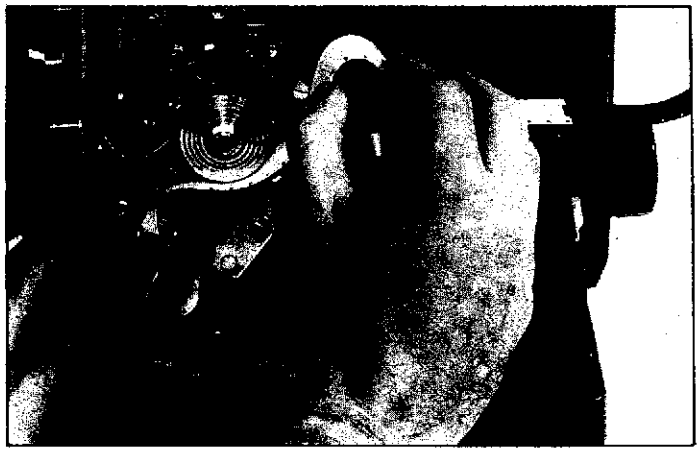
MANUAL UNTHREADING

To remove film in the middle of a reel, be certain threading mechanism door is open. Open hinged lens carriage and all three sprocket guards. Loosen exciter lamp cover screw and remove exciter lamp cover *(for easier unthreading procedure).* Turn feed reel clockwise to provide slack in film. Grasp film with right hand close to black roller and ease film out from under roller.



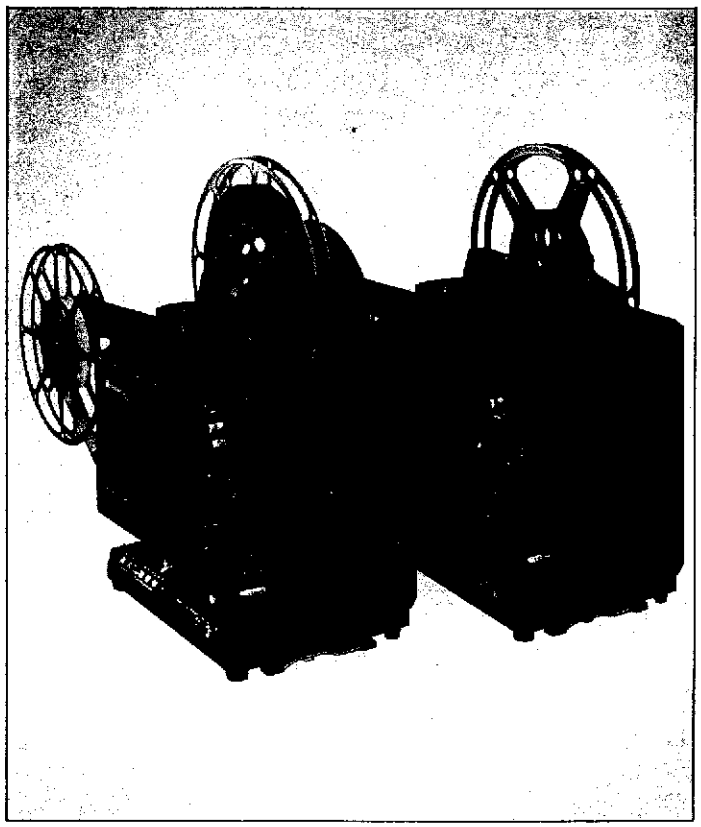
MANUAL UNTHREADING (CONT'D)

Hold film snug against first sprocket guard roller with right hand. Grasp film behind sprocket with left hand and slide film off of top sprocket. Grasp film under loop restorer roller with left hand and slide off of top of lower sprocket. Continue to ease film from under the stabilizing roller and off the sound drum. Hold film with the left hand at the rear of the lower sprocket and with the right hand, ease the film off the sprocket. Slide the film from the casting base and unthread the snubber roller. Leaving the reels on the reel arms, proceed with rewinding as described on Page 13.



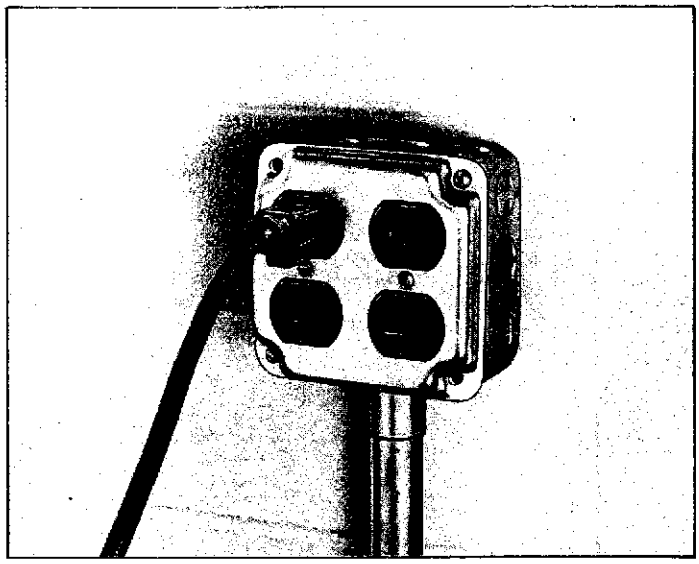
TANDEM OPERATION

To show multiple reels without interruption, two Model 1568 projectors can be operated in tandem. Changeover of the projected image and sound is accomplished automatically by pressing the changeover switch located near the front of the projector base. When the switch is pressed, projection and sound will be activated only from the machine on which the switch is pressed.



SETTING UP FOR TANDEM OPERATION

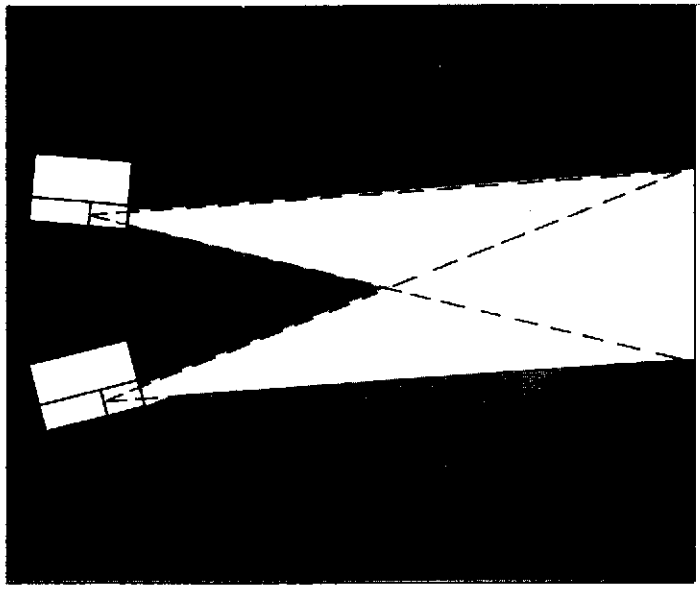
Special set-up consideration should be given when you are planning to use two projectors in tandem for a continuous, professional showing. Both projectors should be lined up on the screen as closely as possible to reduce any shift in image when changing from one projector to the other. Follow this procedure:



1. Plug the power cord of each unit into an appropriate 120VAC grounding type wall outlet. If adapters must be used, be sure the grounding terminals of each adapter are properly secured to the screw on the wall outlet for proper grounding. Have a trained electrician install the adapter and check the outlet wiring to be sure there is no shock hazard. Faulty wiring may cause damage to the equipment and personal injury to the operator.

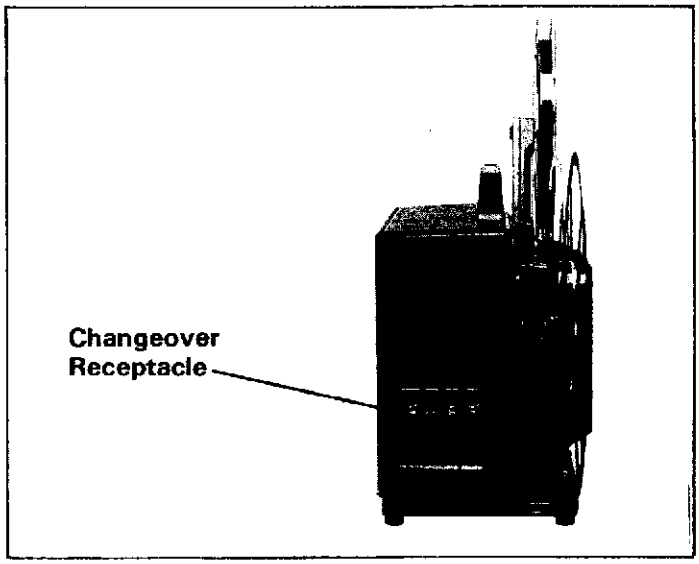
NOTE:

Fused electrical service to the wall outlet must be adequate to provide 8 amps current to **each** projector. Since two projectors will operate together, 20 amps service must be available.



2. Warm up the projectors and press the Lamp On switch of each. Press the Forward project button on one projector; light from that projector will appear on the screen. Center the light and use the tilt knob if necessary. Press the Forward project button on the second projector and align the projected image with the first.

3. Interconnect the two projectors by plugging the changeover cable into the receptacles marked Changeover at the rear of the projectors. Press the "Changeover" button on either projector to douse the projected light on the other projector.



4. Proceed with threading the film and set up for projection. Remember, projection and sound will be activated only from the machine on which the button is pressed.

PROCEDURE FOR TANDEM OPERATION

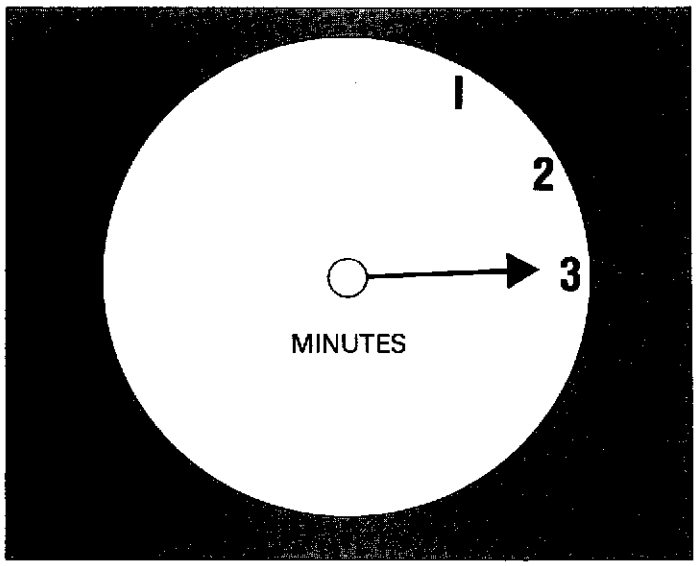
General procedure for tandem operation is the same as for single projection. Volume and tone controls on each projector should be set approximately at the same level and sound quality if projector speakers are used.

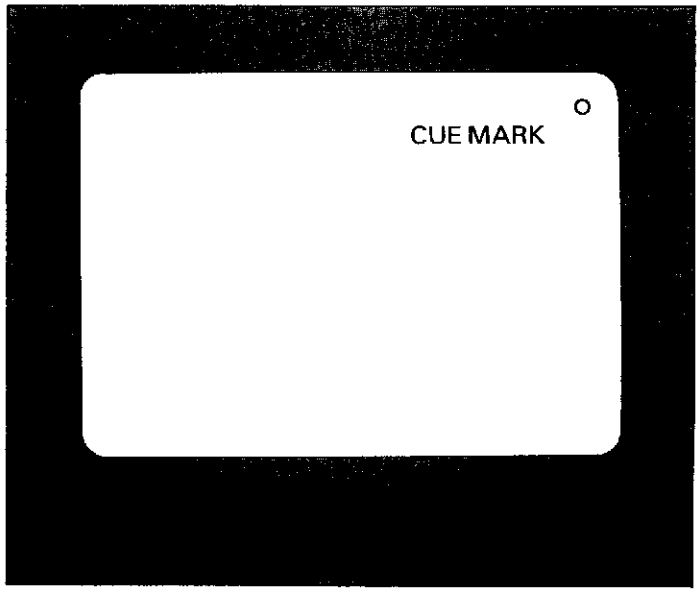
CAUTION:

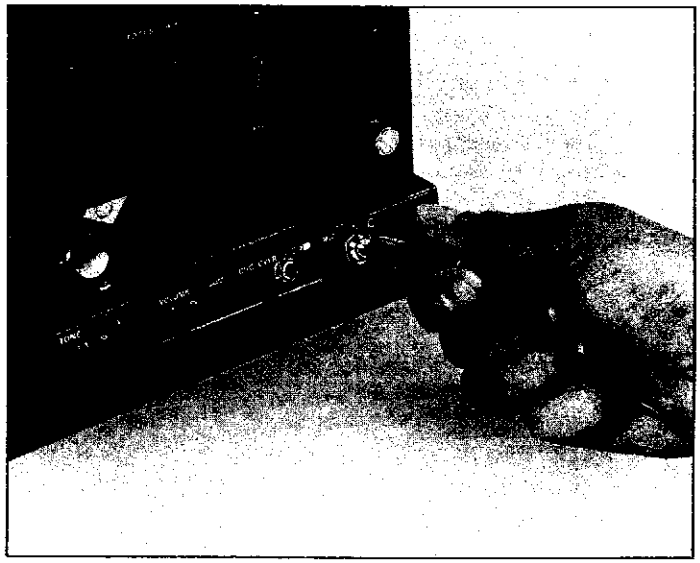
If an auxiliary amplifier is used, reduce the volume and tone controls on the projector to "0," and make all volume and tone adjustments on the auxiliary amplifier. About three minutes before the end of the first reel, press the "Lamp On" button on the second projector. (Be sure to allow approximately three minutes for the lamp to warm-up and come to full brilliance and correct color temperature.) As the film comes to the very end of the first reel watch for the changeover cue mark which appears for an instant in the upper right-hand corner of the screen. When it appears press the Forward project button on the second projector. Approximately six seconds after the first cue mark appears, a second cue mark will appear; on the second cue, press the changeover button on the second projector. Pressing the changeover button automatically opens the douser and transfers the sound to the projector on which the changeover button has been pressed. Remote changeover can be effected with the remote control module. See Page 18. If additional film is to be shown, rewind the film on the first projector, thread up with the next reel, and then follow the described procedure for lamp warm-up and cue marks. To conserve lamp life, turn off the lamp if the projector will not be in use within 30 minutes.

CAUTION:

When using a microphone in a system wired for tandem operation, be sure to plug the microphone into the projector that is running. Plugging the microphone into a projector changes control of the system over to that projector. Changeover cannot be effected to a second projector if the microphone is plugged into the other projector.





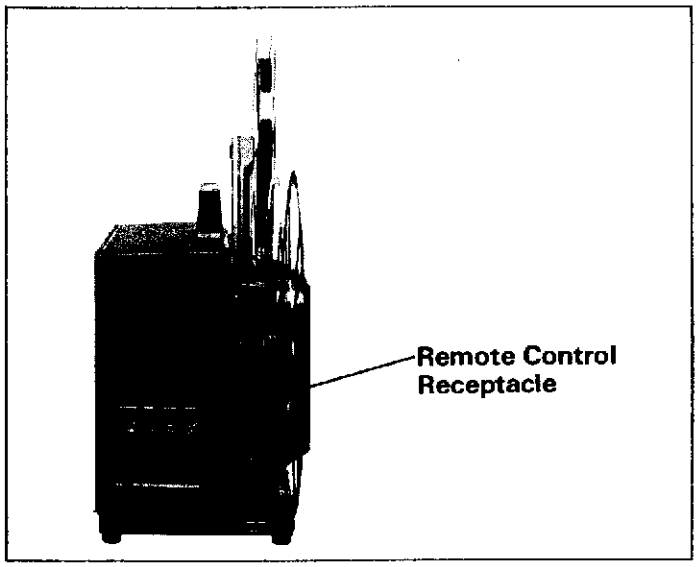


REMOTE CONTROL

Various operating functions of the projector may be controlled from either the built-in buttons or from the accessory remote control module. To use the remote control accessory, connect it to the control panel at the rear of the projector.

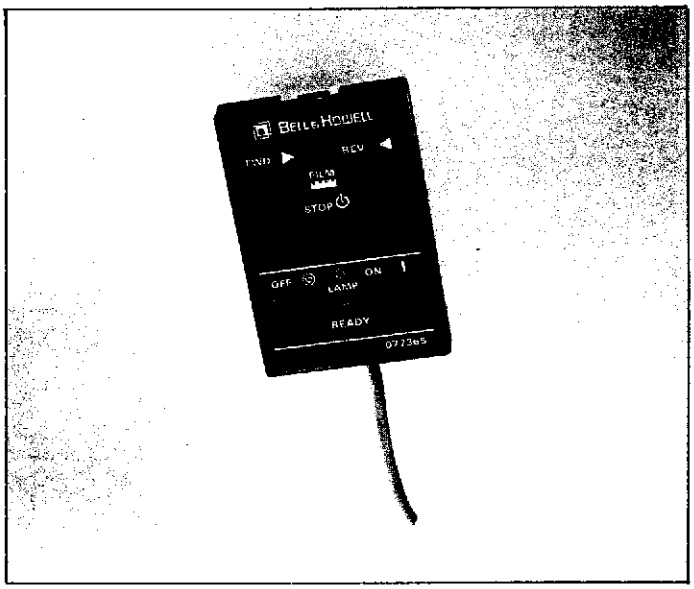
Controls on the module include Lamp On, Lamp Off, Film Forward, Stop, and Film Reverse buttons plus a Lamp Ready indicator.

Two remote modules may be used to perform remote changeover when two projectors are used in tandem. Connect a remote module to each projector. Place the first reel on one projector and the second reel on the other projector and "cue up" for changeover, stopping at this point. During the showing, about three minutes before changeover, press the remote module "Lamp On" button on the **second projector.** When the first cue mark appears on the screen, press the remote module Forward button on the **second projector.** On the second cue, press the remote module Stop button on the **first projector** for automatic changeover.



AUTOMATIC LOOP RESTORER

Torn perforations or bad splices will sometimes cause a loss of the lower loop below the film gate. The automatic loop restorer will reset the lower loop so that projection can continue without interruption. Loop restoration in the reverse projection mode is not possible. If the projector must be unthreaded manually, see instructions on Pages 14 and 15.

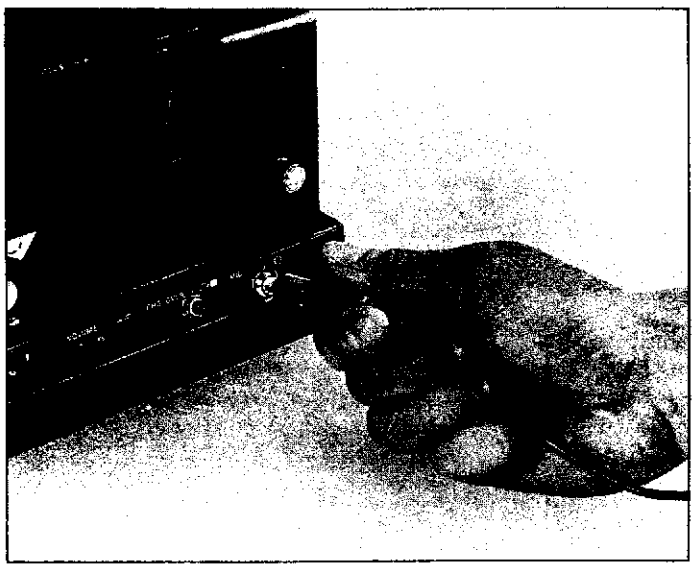


PUBLIC ADDRESS SYSTEM

An accessory microphone may be used with your projector for making announcements any time the projector is operative. Plug the microphone into the jack provided and adjust the volume and tone controls. When a microphone is plugged into the jack, the sound track on the film is silenced.

CAUTION:

When using a microphone in a system wired for tandem operation, be sure to plug the microphone into the projector that is running. Plugging the microphone into a projector changes the control of the system over to that projector. Changeover cannot be effected to a second projector if the microphone is plugged into the other projector.



GENERAL DESCRIPTION

Your Bell & Howell projector has been designed to interface with the most advanced state of the art multimedia programmers. A special connector provides easy access to projector control functions plus motor speed control as well. These function controls, available through the Multimedia Connector, are provided primarily for the professional using sophisticated programming devices with capability for advanced techniques. For the casual multimedia user, a simple but effective means of controlling the projector is described at the close of this section.

FUNCTIONAL DESCRIPTION

A. Functions
1. Motor Drive System
   a. Forward
   b. Stop
   c. Reverse
2. Projection Illumination System
   a. Lamp On
   b. Lamp Off
   c. Lamp Mode Indicator
3. Douser Control
4. Projection Speed Tachometer
5. Analog Motor Speed Control
6. Other Pin Functions

B. Description
1. One receptacle pin is dedicated to the motor drive system.

   Application of positive portion of the control signal will cause the motor to go into forward projection mode. Application of the negative going portion of the control signal will cause the motor to go into reverse projection mode. D.C. levels may also be used to cause the above mode changes. (See specification section.)

   Application of the entire control waveform to this pin will cause the motor drive system to stop.

   It should be noted that instantaneous reponse to any of the above signals (levels) is not to be expected. There are built-in noise rejection timing circuits and system inertial components which delay reaction to the control signals. (See specification section.)

2. One receptacle pin is dedicated to the projection illumination system.

   Application of the positive part of the control signal will cause the projection lamp to extinguish.

   Application of the negative part of the control signal will cause the projection lamp to illuminate. Shortly after lamp ignition, the projection lamp light output will be sensed and the D.C. level on the projection illumination system pin will change to indicate the presence of this light output.

   D.C. levels may also be used to cause the above mode changes. (See specification section.)

3. One receptacle pin is dedicated to controlling the projection system dousing shutter.

   Application of low impedance between this pin and the pin designated as the projector frame ground will cause the dousing shutter to close. (See specification section.)

4. Two pins of the receptacle are dedicated to use as projection speed tachometer nodes. One of these pins is intended to be supplied from a direct current source by the user. The other pin will output the supplied current in a modulated form which will increase from a low value to a high value and return to a low value again one time per each transported film frame, provided the film is presented to the transport mechanism with no more than two succeeding sprocket holes missing. (See specification section.)

5. One pin of the receptacle is dedicated to the projector analog motor speed control.

   Application of voltages (D.C.) to this pin will cause the projector transport system to run faster or slower proportionally to the voltage applied. Approximately $\pm$ 8 percent speed variation can be obtained by the user for the purpose of synchronizing the projector with another device. (See specification section.)

6. Other pin functions include: One pin used to output the projector control signal (square wave) to user equipment.

   One pin used as projector frame ground reference. (See specification section.)

THE RECEPTACLE

RECEPTACLE TYPE: TRW/CINCH TYPE
S308-AB

TO BE USED WITH: TRW/CINCH PLUG
TYPE P308-CCT

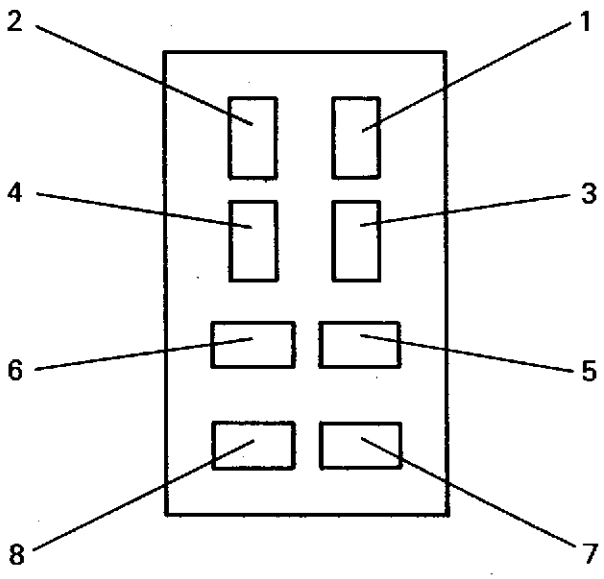
PIN-OUT AND NUMBERING:

VIEWED FROM OUTSIDE
PROJECTOR
(AS USER SEES RECEPTACLE)

PIN 1 = PHOTO TRANSISTOR COLLECTOR (TACHOMETER)
PIN 2 = ANALOG MOTOR SPEED CONTROL INPUT
PIN 3 = PHOTO TRANSISTOR EMITTER (TACHOMETER)
PIN 4 = PROJECTOR FRAME GROUND
PIN 5 = DOUSING SHUTTER CONTROL
PIN 6 = PROJECTOR MOTOR DRIVE SYSTEM CONTROL
PIN 7 = CONTROL SIGNAL OUTPUT (SQUARE WAVE)
PIN 8 = PROJECTOR ILLUMINATION SYSTEM CONTROL

RECEPTACLE LOCATION:

ON REAR PANEL OF PROJECTOR CASE IMMEDIATELY UNDER LINE CORD RECEPTACLE/FUSE PANEL.



SPECIFICATIONS

Pins 1 and 3: Photo-Transistor

A. Becomes low impedance during pull-down of film frame in projection gate.
B. Low impedance (conduction) state: Outputs 2.0 milliamperes minimum with 10 volts Vce (open circuit) applied; recommended load resistance 3300 ohms.
C. High impedance state: Outputs .01 milliampere maximum with 10 volts Vce (open circuit) applied.
D. Rate of transitions: Approximately 500 microseconds rise and fall times at projection speed. Longer at lower speeds.
E. A protection diode is included across this device. Reverse biasing is prohibited. Positive voltage is applied to Pin 1 for proper photo-transistor operation.

Pin 2: Analog Motor Speed Control Input Pin

A. A D.C. bias of approximately 7.4 volts D.C. will be present on the pin.
B. Under no conditions should this pin be subjected to voltages above + 11 VDC or below + 4 VDC.
C. A voltage of + 9.5 volts D.C. applied to this pin will cause the projector to run approximately 8 percent fast (26 frames per second).
D. A voltage of + 6.0 volts D.C. applied to this pin will cause the projector to run approximately 8 percent slow (22 frames per second).
E. A time lag of approximately five frames will be observed while correcting the projector speed by 8 percent. This assumes instantaneous changes in voltage at Pin 2.

Pin 4: Projector Frame Ground

A. This is reference Pin and current return for all other projector referenced pins.
B. This pin is conductively connected to the A.C. line cord ground.
C. Source/link currents appearing on this pin shall be limited to a maximum of 1.0 ampere peak.

Pin 5: Dousing Shutter Control

A. Dousing shutter can be activated by conductively connecting Pin 5 to Pin 4 (frame ground).
B. Open circuit voltage at Pin 5 is approximately 37VDC.
C. Closed circuit current is initially 650 milliamperes decaying to 200 milliamperes steady state about 50 milliseconds after closing of circuit with resistance of less than 3 ohms.

SPECIFICATIONS (CONT'D)

D. Device used to pull-down and maintain Pin 5 in "ON" state must not be allowed to drop more than 1.0 VDC in steady state condition. (1.5 VDC maximum in transition state)

E. Semiconductor devices used to activate Pin 5 will be protected (within the projector) from inductive effects by the presence of a diode shunting the dousing shutter solenoid coil. (See equivalent circuit section.)

Pin 6: Motor Drive System Control Pin

A. Static D.C. level on Pin 6 is + 6.0 volts D.C. (± 0.4 volts D.C.).

B. Apply top portion of control signal (+ 6 volts to + 11 volts) in order to produce forward mode. This signal must be applied for 0.35 seconds minimum.

C. As an alternate, a D.C. level greater than + 7.5 volts D.C. (but less than + 12 volts D.C.) applied to Pin 6 will produce the forward mode.

D. Apply the bottom portion (0 VDC to + 6 volts D.C.) of the control signal to accomplish the reverse function. This signal must be applied for at least 0.35 seconds for the mode change.

E. As an alternate, a D.C. level of less than + 4.5 volts, (but greater than 0 VDC) may be applied to Pin 6 in order to accomplish the reverse function.

F. By applying the entire 11 V.P-P control signal to Pin 6 the motor drive system is given a stop command. This command must be applied for a minimum of 0.35 seconds.

G. With input signals removed, the static D.C. level on Pin 6 is always ± 6.0 VDC (± 0.4 VDC). See equivalent circuit section.

Pin 7: Control Signal Output

A. Amplitude: Approximately 11 volts peak-to-peak.

B. Frequency: 3 to 5 kilohertz

C. Waveform: Nearly squarewave, duty cycle is 51 percent.

D. Use: May be used to supply return signals for activation of motor drive and projector illumination control pins.

E. Caution: Do not attempt to use more than 10 milliamperes peak-to-peak from this source.

Pin 8: Illumination System Control Pin

A. Has static level of 6 volts D.C. bias (± 0.4 volts D.C.)

B. Apply top portion of control signal (+ 6 to + 11 volts) for extinguishing projection lamp. This signal *MUST* be applied for a minimum of 3.0 seconds.

C. A D.C. level greater than + 7.5 volts (but less than + 12 volts D.C.) may be used as an alternate to accomplish the above mentioned mode change.

D. Apply bottom portion of control signal (0 to + 6 volts) for illuminating lamp. This signal must be applied for a minumum of 0.35 seconds.

E. A D.C. level of less than + 4.5 volts (but greater than 0 volts D.C.) may be used as an alternate to accomplish the "Lamp-On" mode.

F. After the projection lamp is turned on, the static voltage level appearing on Pin 8 will change from + 6 volts D.C. to 1.3 volts D.C. (± 0.3 volts). This gives the user an indication that the lamp is operating.

G. In order to turn the lamp off, it will be necessary to "pull-up" a load resistance of approximately 90 ohms to the + 7.5 volt D.C. level. (See equivalent circuit section.)

CAUTION:
If projector is operated at less than 22 frames per second with the douser de-activated (open) your film may be damaged from excessive overheating. Avoid this operating condition.

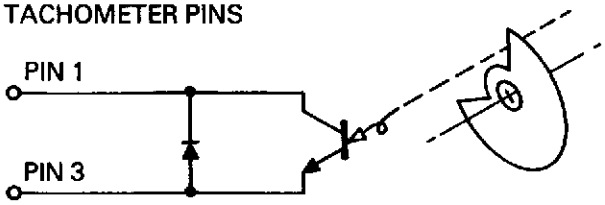
PROJECTOR INTERNAL CIRCUITRY

SCHEMATICS

EQUIVALENT CIRCUITS

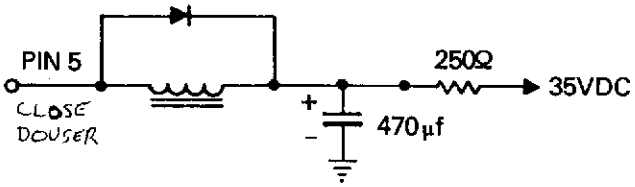
No. 1

PROJECTION SPEED TACHOMETER PINS



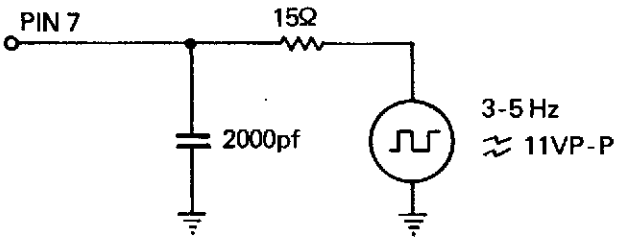
No. 2

DOUSING SHUTTER CONTROL PIN



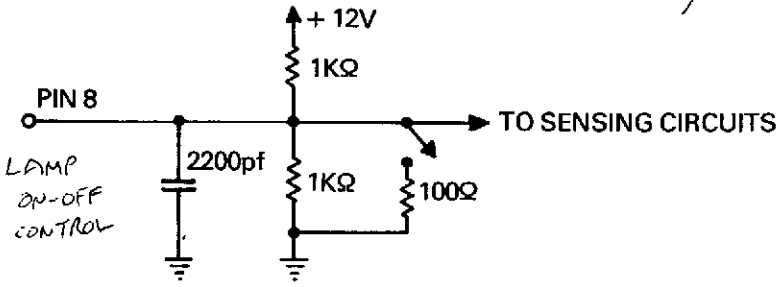
No. 3

SQUARE WAVE CONTROL SIGNAL SOURCE PIN



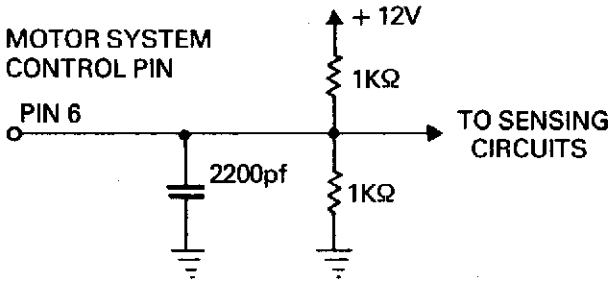
No. 4

ILLUMINATION SYSTEM CONTROL PIN



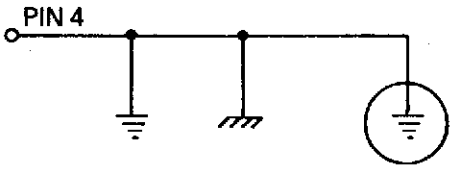
No. 5

MOTOR SYSTEM CONTROL PIN



No. 6

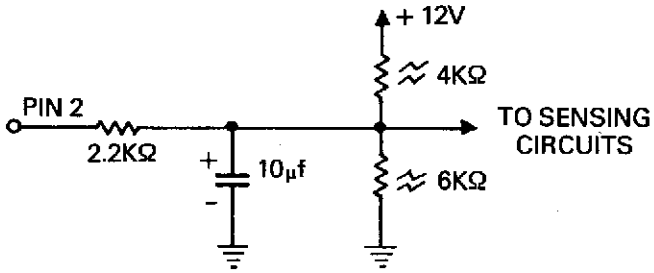
PROJECTOR CHASSIS (FRAME GROUND) PIN



CAUTION:
THIS PIN IS CONNECTED TO PROJECTOR LINE CORD SAFETY GROUND

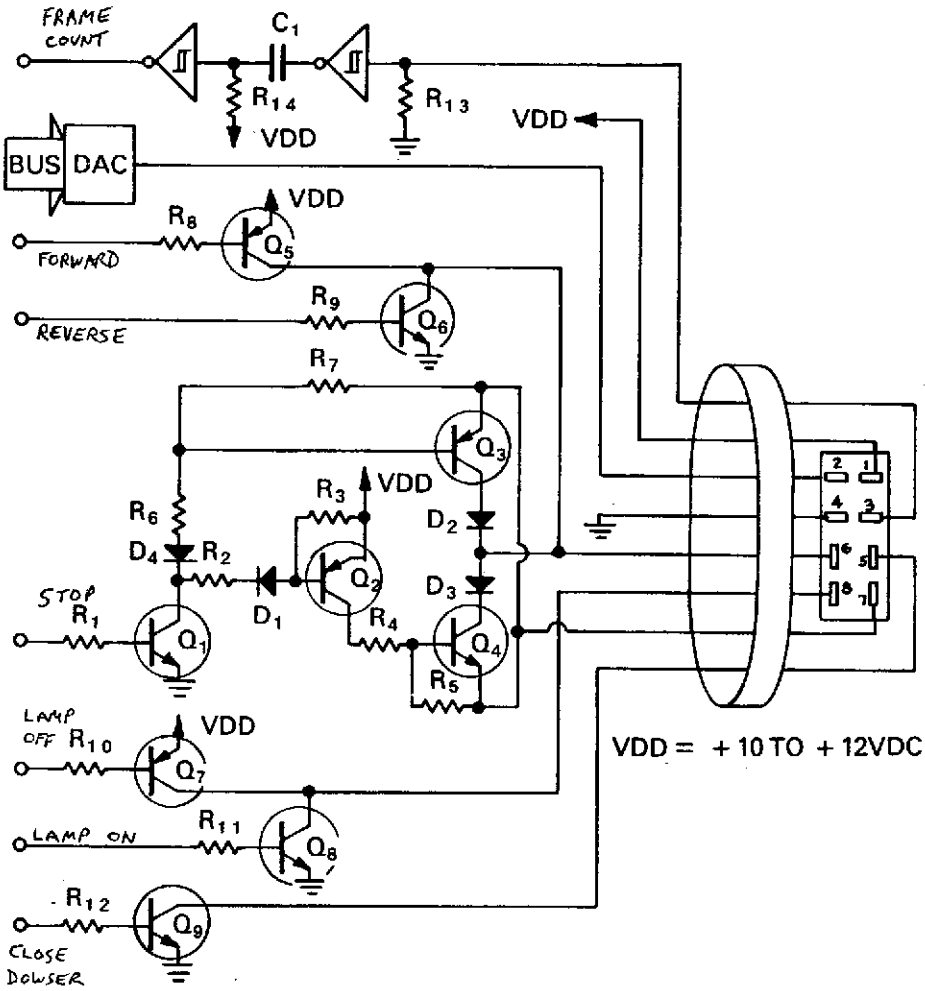
No. 7

ANALOG MOTOR SPEED CONTROL PIN



SCHEMATICS (CONT'D)

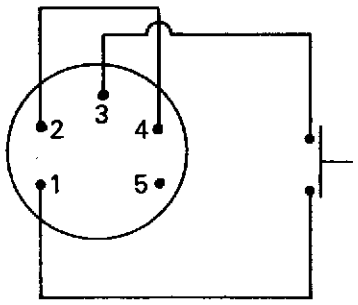
RECOMMENDED INTERFACE



R_1 = 3300Ω
R_2 = 3300Ω
R_3 = 2200Ω
R_4 = 3300Ω
R_5 = 2200Ω
R_6 = 3300Ω
R_7 = 2200Ω
R_8 = 3300Ω
R_9 = 3300Ω
R_{10} = 3300Ω
R_{11} = 3300Ω
R_{12} = 3300Ω
R_{13} = 3300Ω
R_{14} = 33KΩ
C_1 = .001 f
D_1 - D_4 = 1N914
Q_2, Q_3, Q_5, Q_7 = MPS6534
Q_1, Q_4, Q_6, Q_8 = MPS6531
Q_9 = D40K2 (GE)

SIMPLIFIED MULTIMEDIA

The changeover jack at the back of the projector may be used to remotely control the built-in douser for multimedia systems. Under these conditions the film will continue to transport. Additionally, the remote jack at the back of the projector may be used to remotely stop the film transport mechanism which will also close the douser and shut off light to the screen.



5 PIN DIN PLUG
(CHANGEOVER JACK)

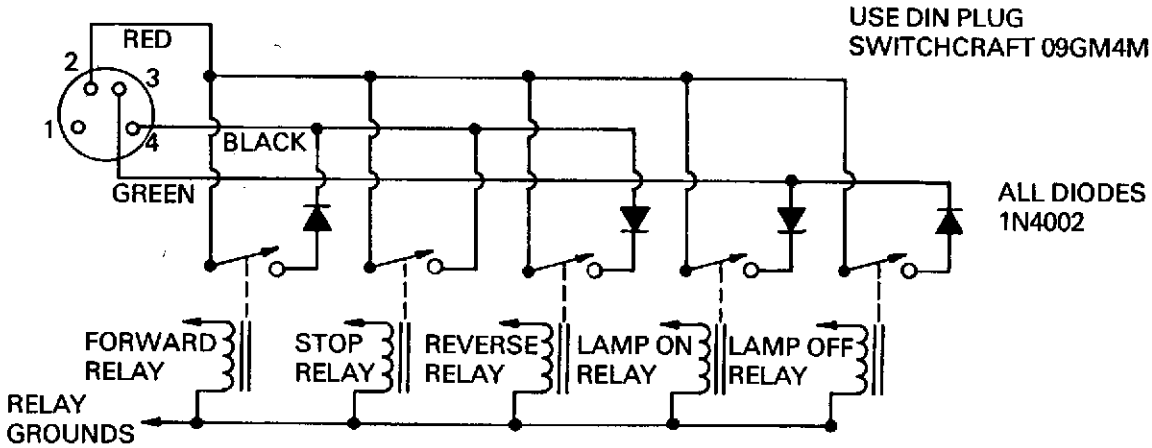
USE 5 PIN DIN PLUG
SWITCHCRAFT 12GM5M.
WIRE AS SHOWN.

CLOSE SWITCH TO
CLOSE DOUSER

SCHEMATICS (CONT'D)

OTHER FUNCTIONS
THROUGH REMOTE JACK

The circuit below may be used to interface your projector into a multimedia system to provide a variety of functions. Relays must be provided with the proper actuation time for proper projector operation. A delay generator, see below, TYPICAL PROGRAMMER, may be used with this system, also.



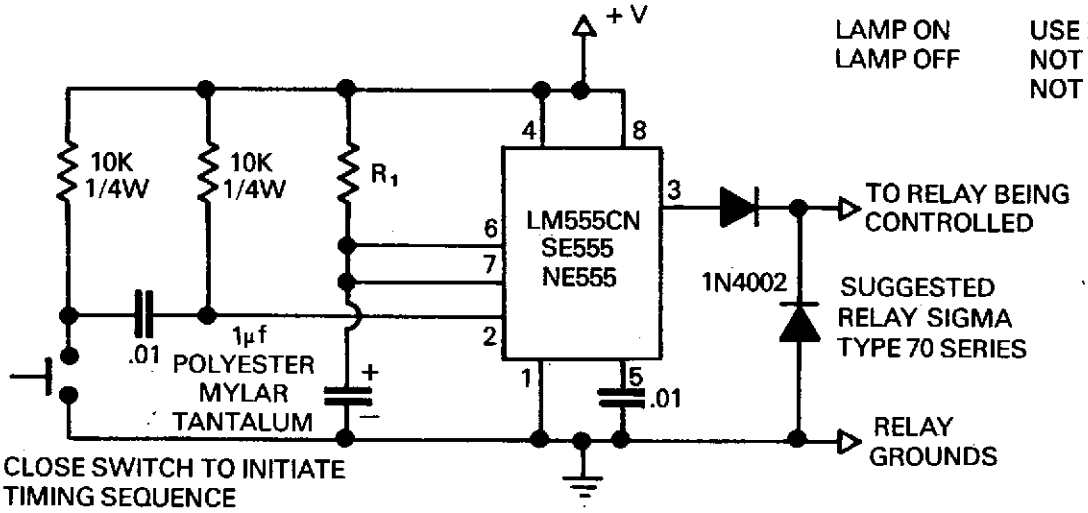
TYPICAL PROGRAMMER

A delay generator is required when using the remote jack to control various functions. For Forward, Reverse, Stop, and Lamp On, relay closure time must be not less than 350 milliseconds nor more than 1 second. For Lamp Off, relay closure time must be not less than 3 seconds nor more than 5 seconds. Use one of the circuits described below for each function you wish to control, with the appropriate resistor value for the function.

USE ONE OF THESE CIRCUITS FOR EACH FUNCTION YOU WISH TO CONTROL. USE APPROPRIATE VALUE FOR R1.

RECOMMENDED TIMING FOR RELAYS:

FORWARD REVERSE STOP	USE RELAY CLOSURE TIME OF NOT LESS THAN 350 MILLISECONDS: NOT MORE THAN 1 SECOND.
LAMP ON LAMP OFF	USE RELAY CLOSURE TIME OF NOT LESS THAN 3 SECONDS: NOT MORE THAN 5 SECONDS.



R_1 = 330K OHMS ± 5% FOR
FORWARD
REVERSE
STOP

R_1 = 3.3 MEGOHMS ± 5% FOR
LAMP OFF

MAINTENANCE AND CLEANING

Your Bell & Howell projector has been designed and engineered for long, trouble-free service with a minimum of maintenance. Factory lubrication is built-in; you'll never need to oil this projector. Permanently lubricated bearings mean extended service and longer life. Many parts which normally wear are adjustable, eliminating the need for frequent replacement.

Periodic maintenance is required, including cleaning and occasional replacement of some parts. Instructions for simple procedures follow. We recommend that you seek factory approved service from your Bell & Howell Approved Service Station periodically to assure that your equipment remains in first-class operating condition.

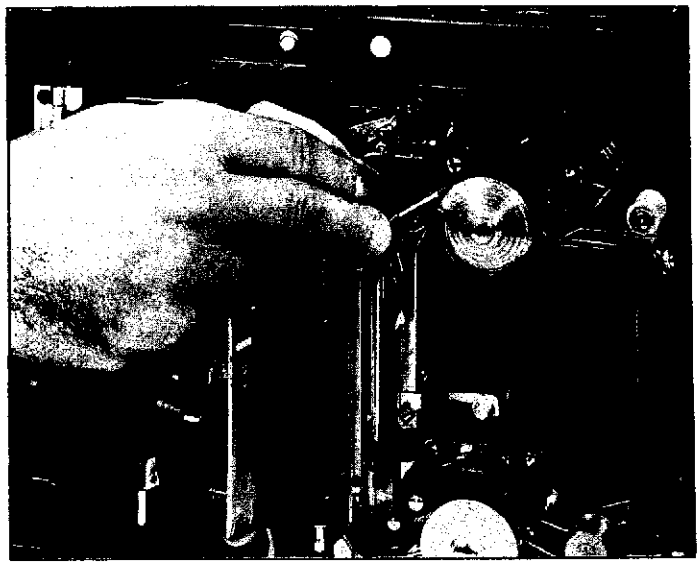
LAMP POWER SUPPLY

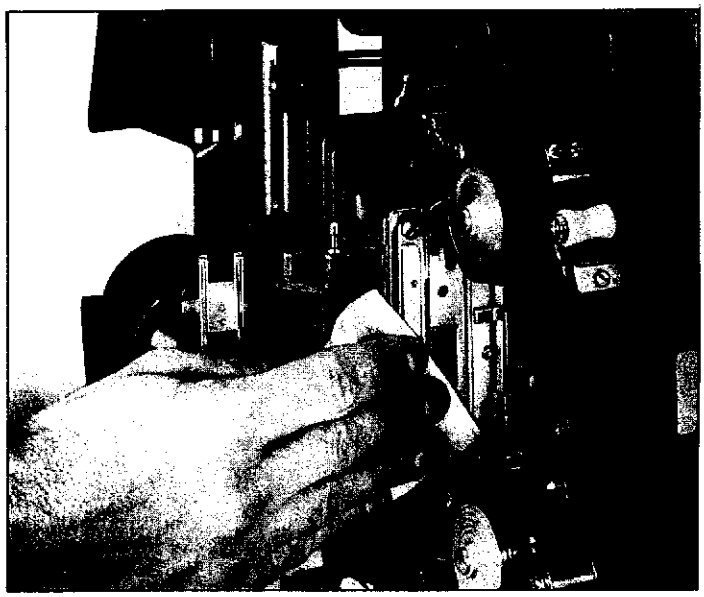
CAUTION:

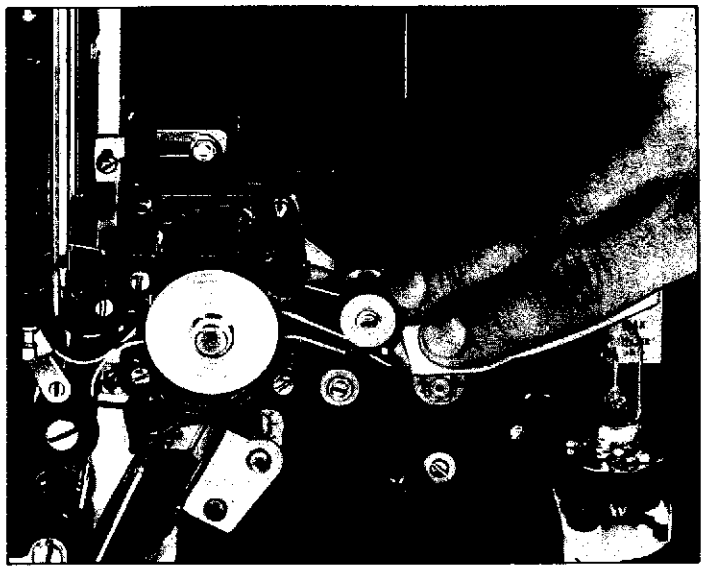
Do not attempt to remove the top or metal back cover of the projector; no internal parts are serviceable without specialized equipment and tools. In addition, the high voltage present is hazardous, and especially dangerous to untrained personnel.

CLEANING THE FILM PATH

To prevent damage to the film, all surfaces that contact the film must be cleaned frequently. To reach the film path, open the Lamp House Cover. Wipe all threading guides with a soft cloth or brush which has been moistened with any naphtha based agent such as lighter fluid. Remove the exciter lamp cover (see section on replacement of exciter lamp) to clean the sound drum, and the film guide that is part of the exciter lamp cover. Gently clean both sound drum stabilizing rollers. Remove any loose particles that may have become lodged in the film path.







CLEANING THE APERTURE AND PRESSURE PLATES

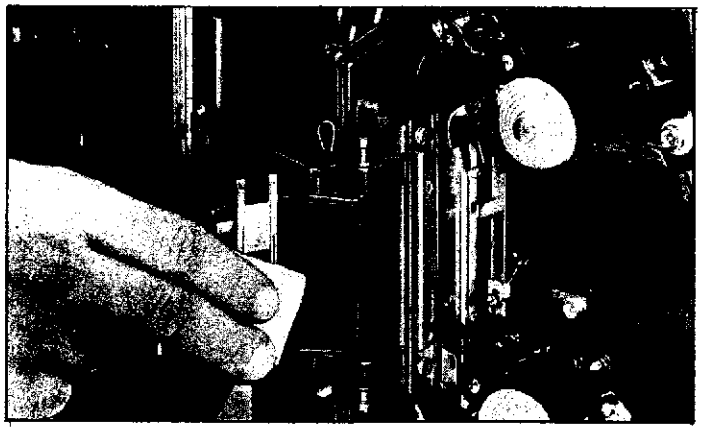
Swing open the lens carriage by pulling outward on the lens barrel. Gently wipe the aperture and the pressure plate with a cloth moistened with lighter fluid or naphtha based solvent to remove accumulated dirt or emulsion. Also clean the aperture side tension rail and the aperture opening. Be sure to press in on the side tension rail and clean the area of the aperture plate behind the side tension rail. Gently swing back the lens carriage into position; be sure the pressure plate seats properly. Snap the lens carriage closed.

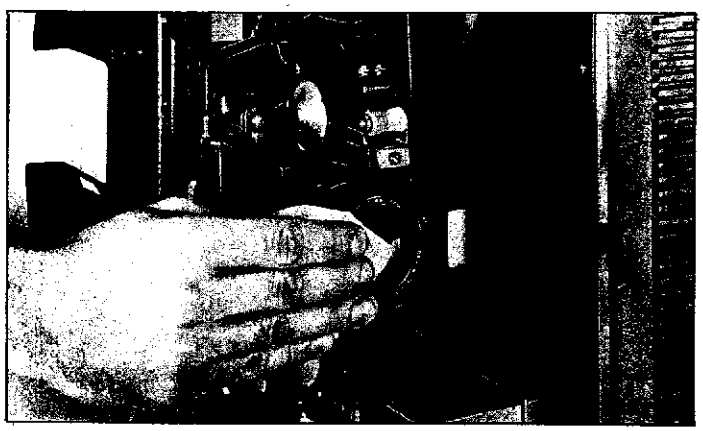
CLEANING THE LENS

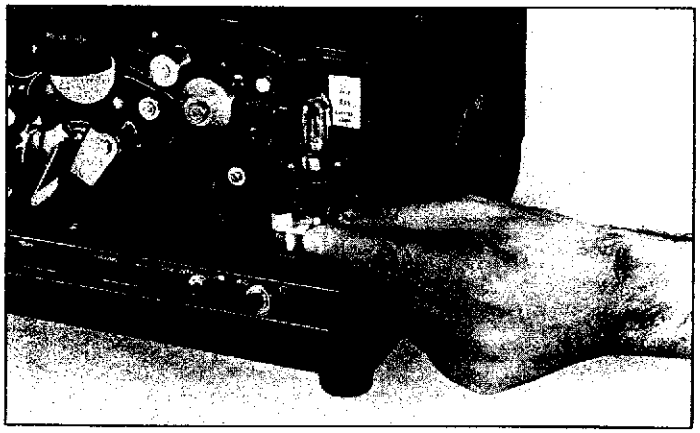
Swing open the lens carriage. The lens need not be removed from the lens barrel for cleaning. Use a lens tissue or soft cloth moistened with lens cleaner to wipe dust and fingerprints off front and rear lens elements. After cleaning, close the lens carriage, as described above.

REPLACING THE EXCITER LAMP

Before attempting to replace the exciter lamp, be sure the main power switch is in the Off position. Loosen the thumb screw which holds the exciter lamp cover in place, pull the cover straight out without tilting to remove. Note the registration pins which align the cover. Swing the exciter lamp lock lever counterclockwise about 90° to release the lamp. Rotate the lamp until it can be lifted off the guide pins. Place the new lamp over the guide pins and rotate the lamp clockwise. Rotate the exciter lamp lock lever clockwise to lock the exciter lamp into position. Replace the exciter lamp cover; be sure to match the two registration pins to the holes to align the cover. When the cover is firmly seated in place, hold it securely and tighten the thumb screw.

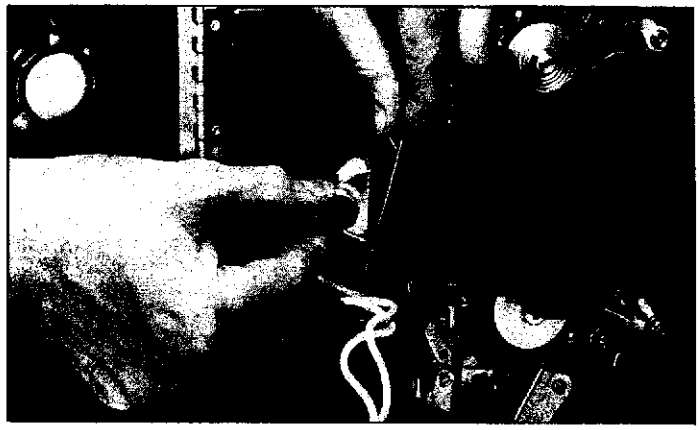


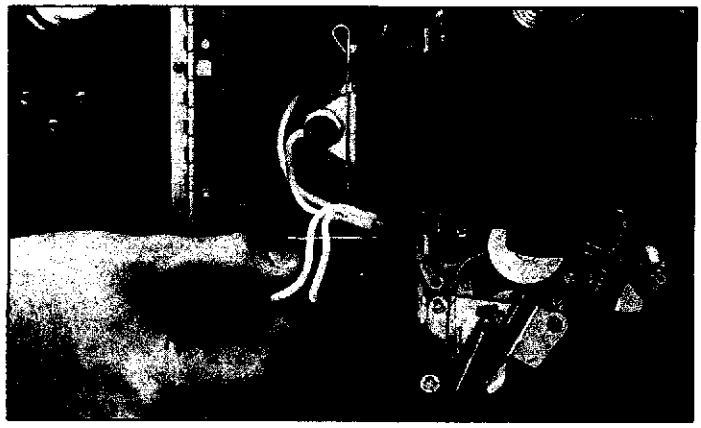


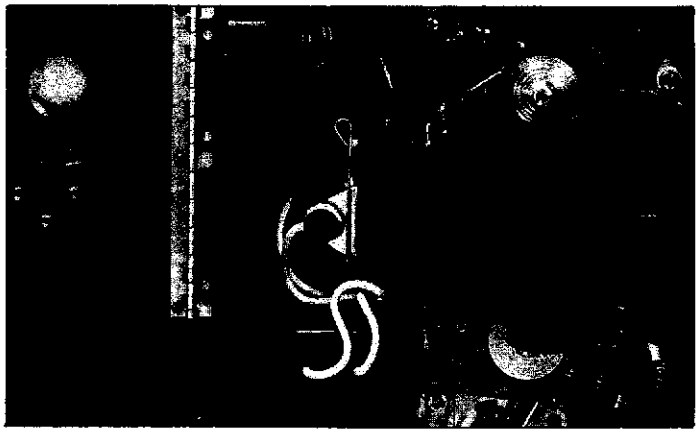


REPLACING THE PROJECTION LAMP

When changing the projection lamp, allow the equipment to cool thoroughly before handling the lamp. Be sure to unplug the power cord from the wall outlet before attempting to replace the projection lamp. Open the lamp house cover door. Unplug the lamp plug from the socket. Press in on the top of the lamp retaining spring clip to unlock, and then swing the clip around to release the tension on the lamp. Remove the lamp by hand (if the lamp is still warm to the touch, use a cloth or wear a glove). Place the new lamp in position, with the longer ceramic insulator pointing inward and the wires hanging down toward the socket. Handle the lamp only by the outer reflector shell. Be certain it is seated properly; it fits snugly in place in exact alignment with the projector housing. Apply pressure on the lamp with the retaining spring clip and lock the top of the clip in place to secure the lamp in position. Insert the lamp plug into the socket, note that the plug and socket are polarized and will fit only one way. Route the wires as shown in the bottom photograph. Lamp replacement information is given inside the lamp house cover. Close the door after lamp replacement.







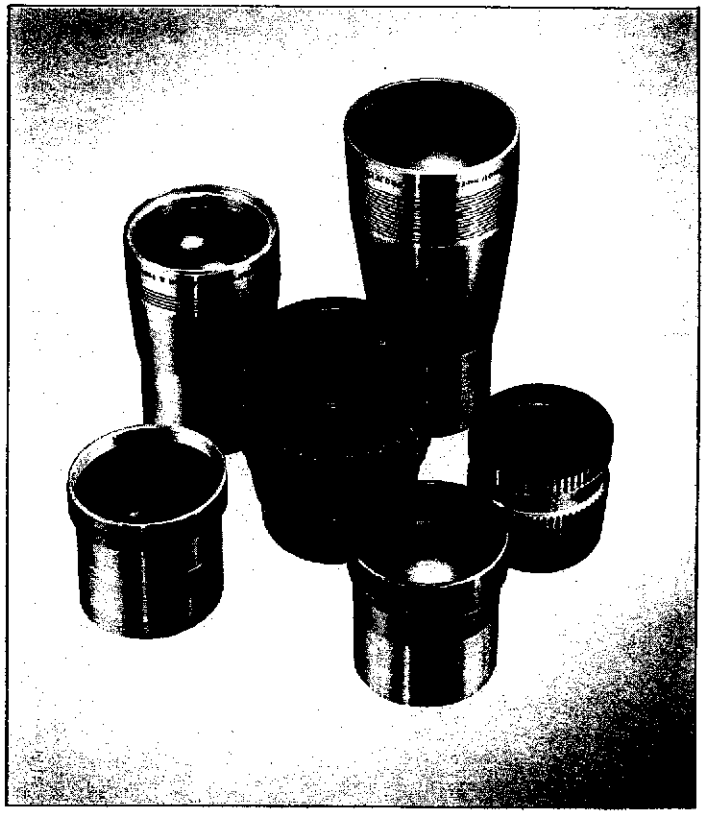
TROUBLE SHOOTING

The following information includes a variety of symptoms, a test which will pinpoint the nature of the trouble, the cause of the trouble, and a remedy. Many of the symptoms described may not ever be encountered during the life of the projector; this information is provided as a guide should the condition ever exist.

SYMPTOM	TEST	CAUSE	REMEDY
Projector completely inoperative (no blower, no exciter lamp).	Is main power cord plugged in? Is main power switch in ON position? Is 2 amp (film) fuse burned out?	If yes to all tests, internal power supply is not working.	Unplug main power cord and replace 2 amp fuse. If new fuse burns out, return projector to service station.
No film transport, but blower and exciter lamp operate.	Disconnect all cables from rear panel, except speaker. Press film forward or reverse button.	If operation resumes, look for defect in remote control module. If no film transport, internal control module is not working.	Return projector to service station.
No lamp operation (blower and exciter lamp operative).	Unplug main power cord. Open lamp house cover door and assure lamp plug is firmly plugged into the socket.	Plug is loose.	Reinsert plug into socket.
	Turn on main power switch. Press Lamp On button for one second. Listen for clicks.	If no clicks, power to lamp circuit incomplete.	Check 8 amp fuse; If fuse burned out, replace. Repeat test. If fuse burns out again, return projector to service station. If fuse not burned out but symptom continues, return projector to service station.
		If clicks at rate of about 2 per second, lamp is inoperative.	Replace lamp with known good lamp. Repeat test. If symptom continues, return projector to service station.
Sound fails during show	Check to see if exciter lamp is on.	If connection tight, amplifier load may be excessive or output shorted.	Remove plug from speaker jack. Push amplifier reset button. If exciter lights and stays on, check speaker wire for short circuits or excessive loading (less than 4 ohms). Decrease number of speakers on line to 2 or less. Check speaker cable for shorts or replace with known good cable.
		If no, bad exciter lamp.	Replace lamp.
		If yes, speaker cable or auxiliary amplifier cable may be loose.	Tighten connection.
		Internal failure.	Return projector to service station.
Lamp goes off during show.	Listen for blower noise; if no noise and exciter lamp is lit.	Blower failure.	Return projector to service station.
Lamp lights but color is violet or blue.	Wait 5 minutes for full warm-up. Is color still blue?	End of lamp life.	Replace projection lamp.

ACCESSORY LENSES

A variety of accessory projection lenses are available to give sharp, brilliant movies for every audience or location. Ranging from 1.5" (38mm) through 4" (100mm) in discrete lenses, and including Filmovara® Zoom, and Anamorphic attachments, virtually every screen size can be filled at projection distances up to 200 feet. It is best to have a lens of the right focal length to fill the screen. The focal length required will vary according to screen size and distance between the projector and screen. The projection table which follows will show the relationship between lens focal length, screen size, and distance. It is best to have the projector located as far toward the rear of the room as possible to avoid obstructing the view of your audience.
Due to the optical characteristics of the illumination system in this product, using a lens with a focal length of less than 1.5" (38mm) is not recommended as non-uniform illumination will result.

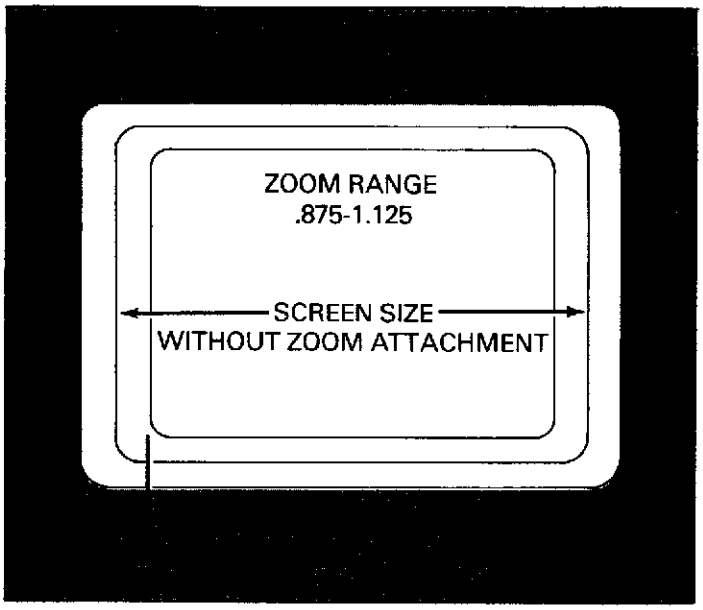


FILMOVARA® ZOOM

The Filmovara zoom attachment will enable you to project a variety of image sizes with a single lens.
The Filmovara can be used with the following lenses:

1.5" (38mm) F/1.5
2" (50mm) F/1.2 (standard lens)
2.5" (64mm) F/1.5
3" (76mm) F/1.6

The magnification ratio ranges from .875 to 1.125. See the projection table for the span of screen size/distances you can achieve with this attachment. To use the Filmovara attachment, screw it onto the front of the projection lens. (It screws on with clockwise rotation). Revolve the rear, black, knurled collar of the attachment until your image fills the width of the screen at the selected projection distance. Clockwise rotation of the ring decreases picture size; counterclockwise rotation increases picture size. Sharpen the image with the projector focus knob as with any other lens.



ANAMORPHIC LENS (2X)

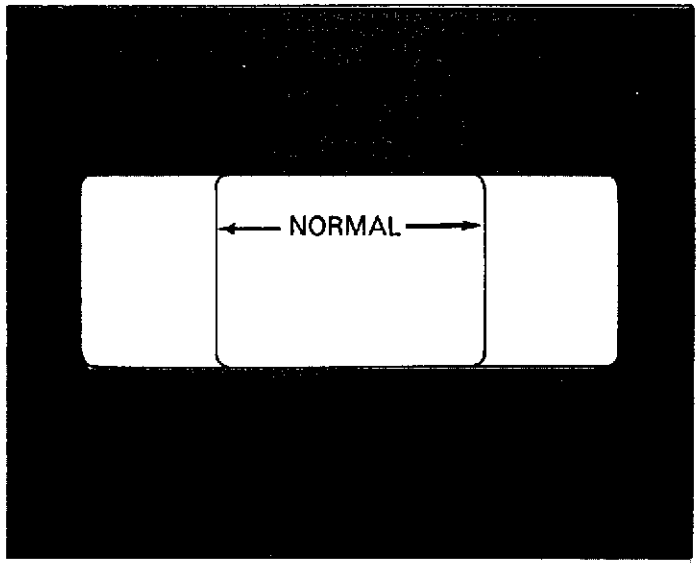
The Anamorphic lens will enable you to show wide-screen 16mm films. This lens doubles the width of the projected image without altering the height. This accessory fits the following lenses without an adapter:

1.5" (38mm) F/1.5
2" (50mm) F/1.2 (standard lens)
2.5" (64mm) F/1.5
3" (76mm) F/1.6

With an accessory adapter, the Anamorphic lens may be used with:

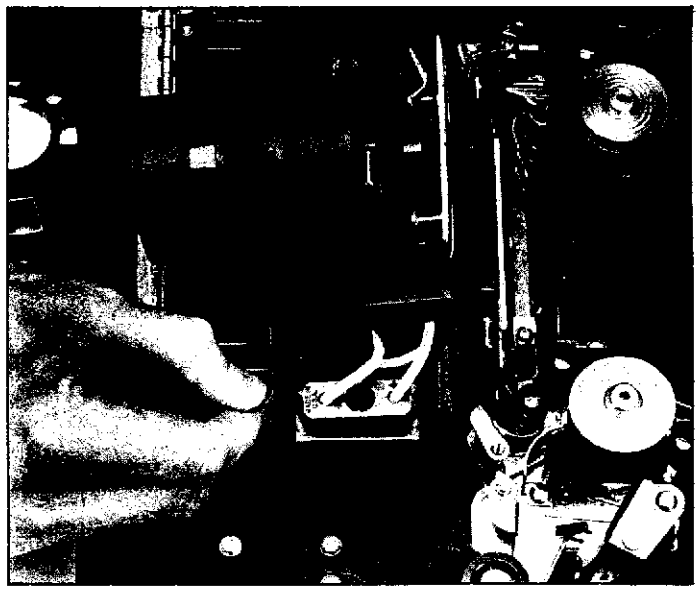
4" (100mm) F/1.6

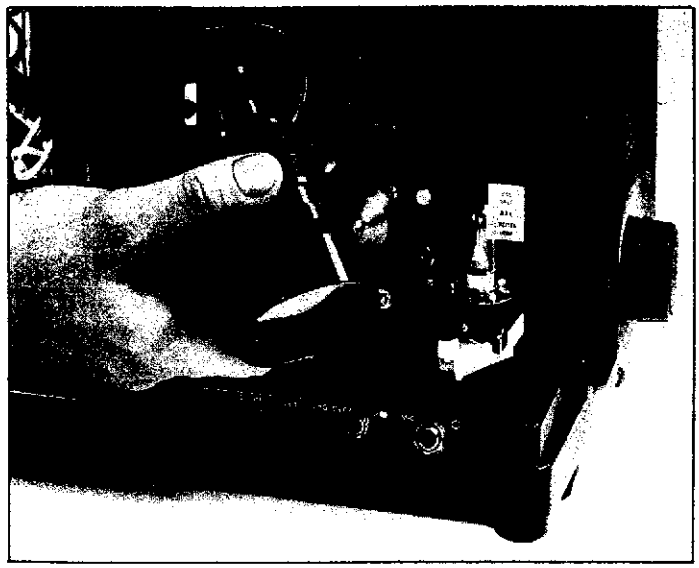
To use the Anamorphic lens, screw it into the front of the projection lens. (It screws on with clockwise rotation.) Position the projector to fill the width of the screen by rotating the lens assembly. Preset the projection distance on the Anamorphic lens barrel, then sharpen the image with the projector focus knob as with any other lens.



CHANGING LENSES

This projector is equipped with a lens locking system to discourage unauthorized removal of the projection lens. The locking system consists of an Allen screw and wrench supplied with the projector. The Allen screw is installed in the threaded hole on the underside of the lens housing. The screw should be installed when the lens is focused all the way in. To remove the lens, back out the screw with the wrench; turn the focus knob until the lens is racked out as far as it will go, then grasp the lens barrel and remove it from the housing. To replace lens, insert it into the housing, rack the focus knob to engage the lens, move the lens all the way in and retighten the Allen screw.



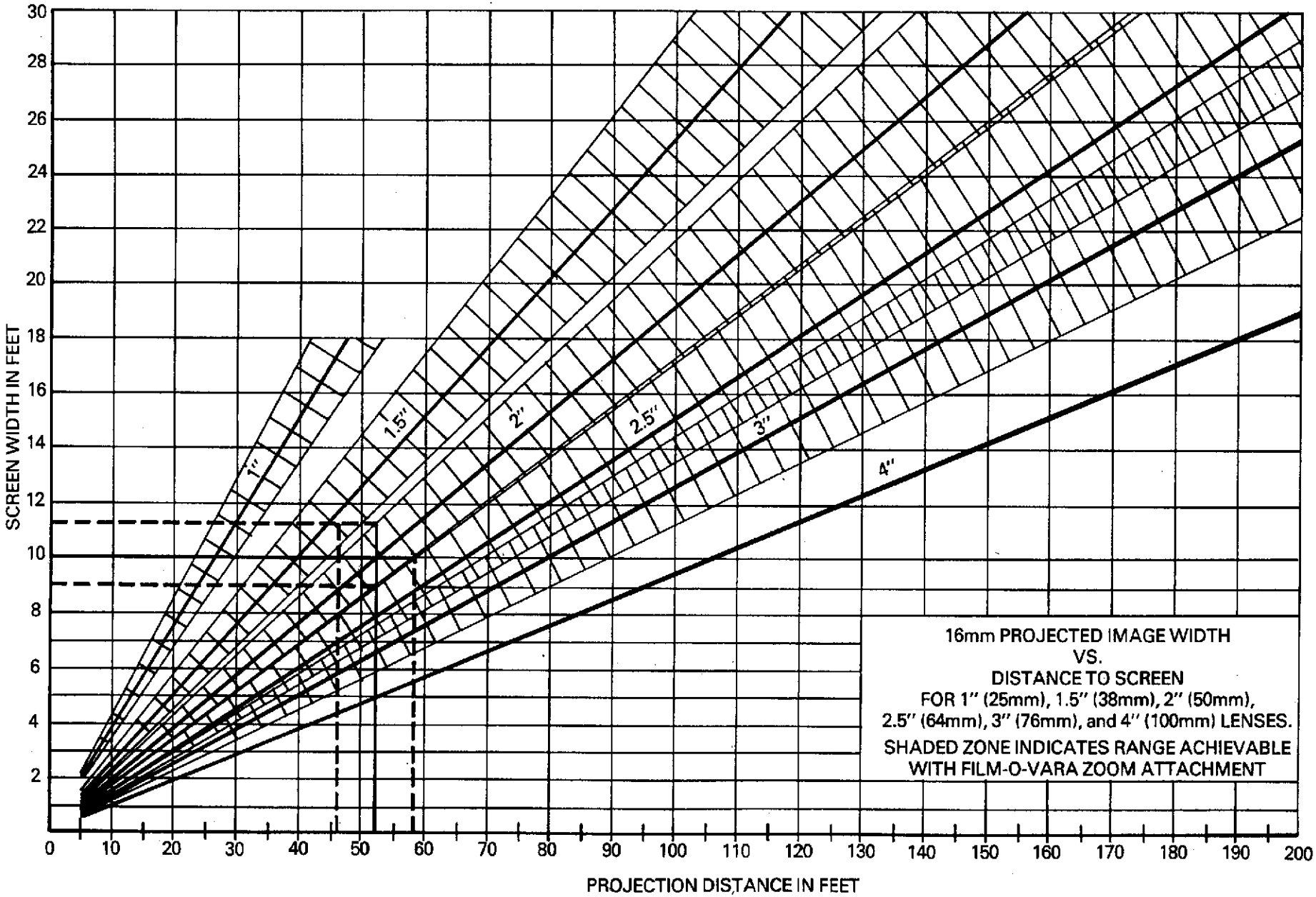


PROJECTION TABLE

This table shows the relationship between lens focal length, screen size and distance. It is based on the equation:

$$\text{Screen Width (feet)} = \frac{.38 \times \text{Projection Distance (feet)}}{\text{Focal Length (inches)}}$$

For example: a 10 foot wide screen used with a 2" (50mm) lens requires a projection distance of 52 feet. When Filmovara® Zoom attachment is used, the projection distance can vary from 46 feet to 58 feet. Or, the Filmovara attachment could be used to adjust the image width from 9 feet to 11.2 feet at a fixed projection distance of 52 feet.



ACCESSORIES

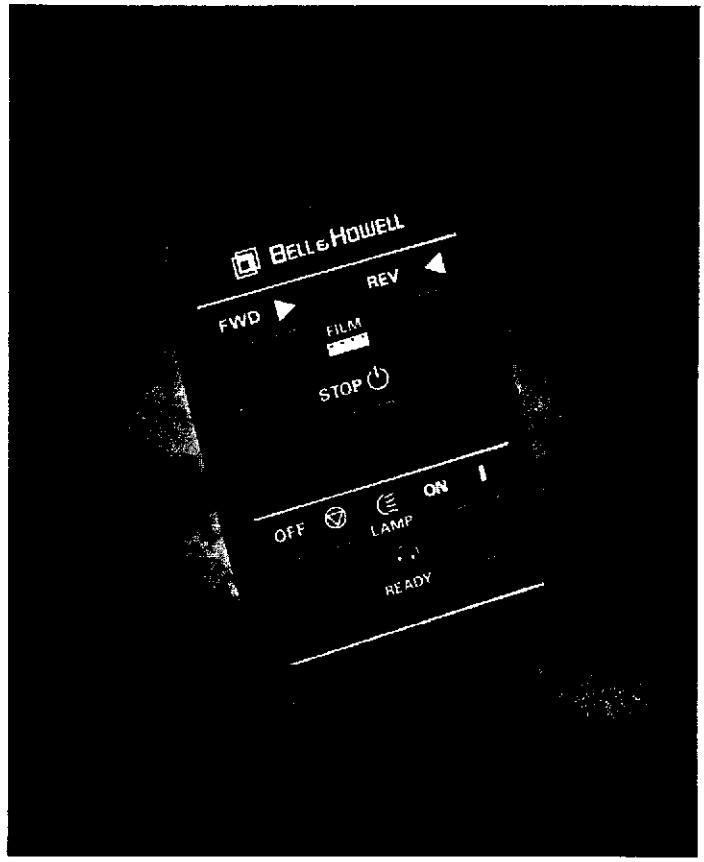
REMOTE CONTROL MODULE
Bell & Howell Part No. 077365
Allows control of the projector operating functions from a remote location. For ultimate convenience and versatility, up to five remote control modules may be used with a single junction box. Attached cord 20' (6M)

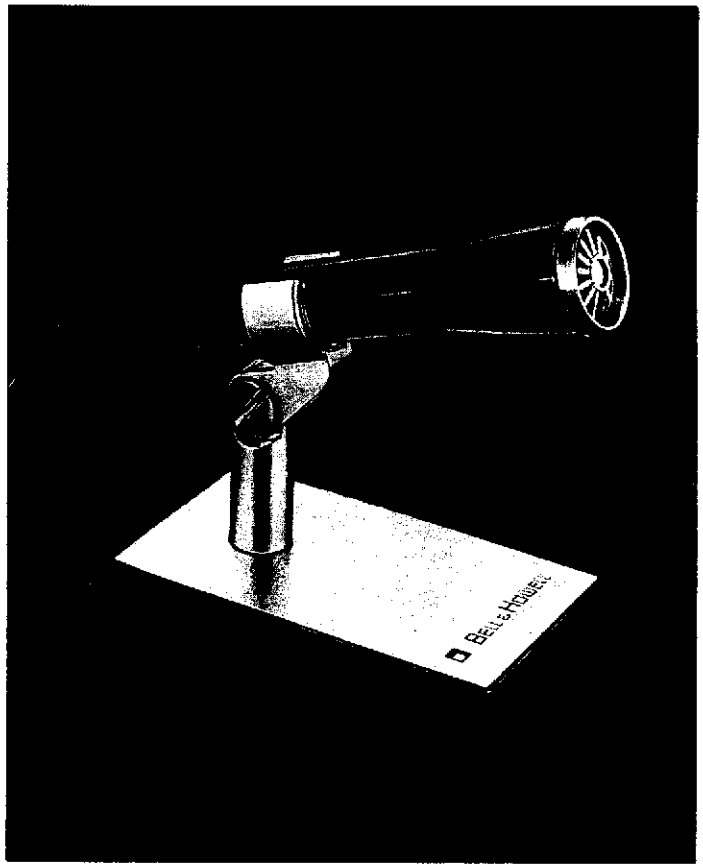
REMOTE CONTROL MODULE EXTENSION CABLE
Bell & Howell Part No. 709941
One or more extension cords of 50' (15M) length can extend the possible distance between remote control module and the projector. Extensions can be added to a cumulative maximum of 250' (75M) of cable.

REMOTE CONTROL PODIUM BRACKET
Bell & Howell Part No. 710241
Allows remote control module to be firmly attached to podium. Assures operator of complete control, and protects module from damage through mishandling.

TANDEM CHANGEOVER CABLE
Bell & Howell Part No. 709934
Connects two projectors together for uninterrupted showing of multi-reel features.

MICROPHONE
Bell & Howell Part No. 043591
Wide frequency range 600 ohm dynamic microphone with adjustable stand.





ACCESSORIES (CONT'D)

ACCESSORY LENSES
1.5" (38mm) F/1.5
Bell & Howell Part No. 204441
2.5" (64mm) F/1.6
Bell & Howell Part No. 204442
3" (76mm) F/1.6
Bell & Howell Part No. 204443
4" (100mm) F/1.6
Bell & Howell Part No. 201004

FILMOVARA® ZOOM
Bell & Howell Part No. 204665
For use with 1.5" (38mm), 2" (50mm), 2.5" (64mm), and 3" (76mm) lenses.
Magnification ratio .875 to 1.125.

ANAMORPHIC LENS (2X)
Bell & Howell Part No. 204440
For use with 1.5" (38mm), 2" (50mm), 2.5" (64mm), 3" (76mm), and *4" (100mm) lenses.

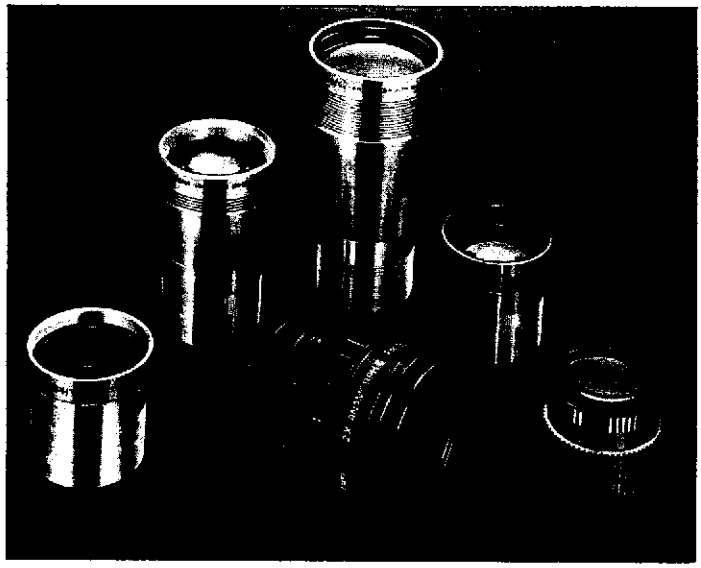
***ANAMORPHIC LENS ADAPTER**
Bell & Howell Part No. 204287
Required with 4" (100mm) lens.

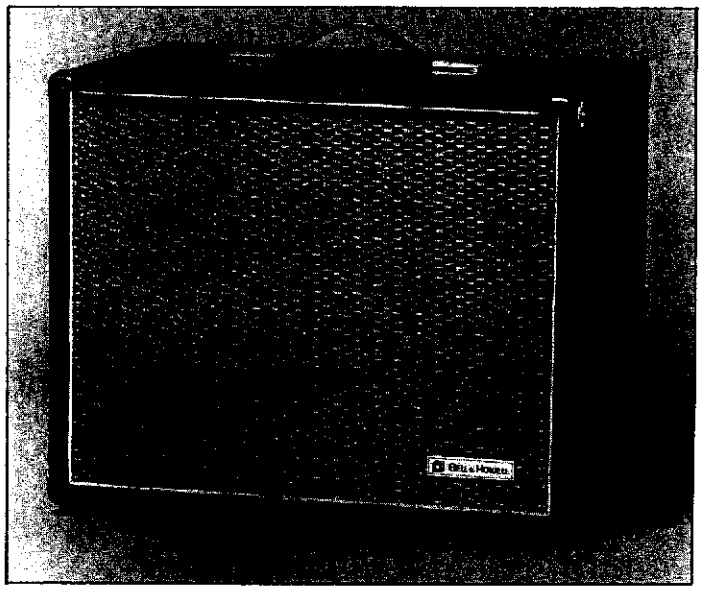
ORCHESTRICON III™ SPEAKER
Bell & Howell Part No. 077799
Remote 12" (30cm) speaker complete with 50' (15M) cord.

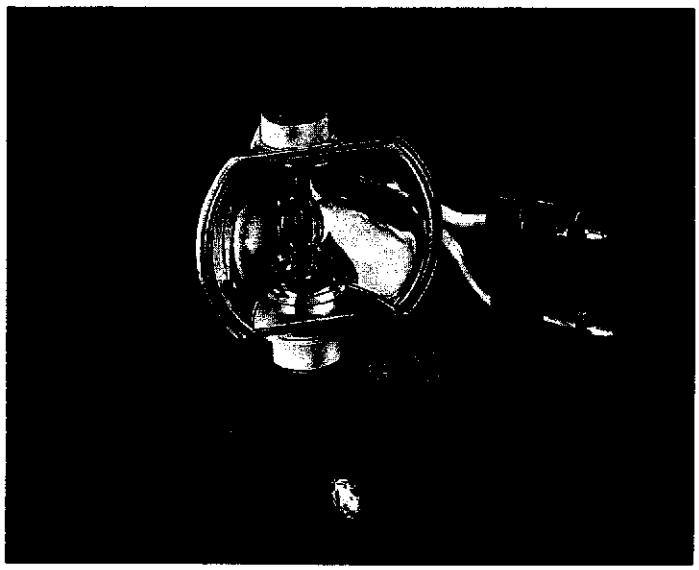
PROJECTION LAMP
Bell & Howell Part No. 710875

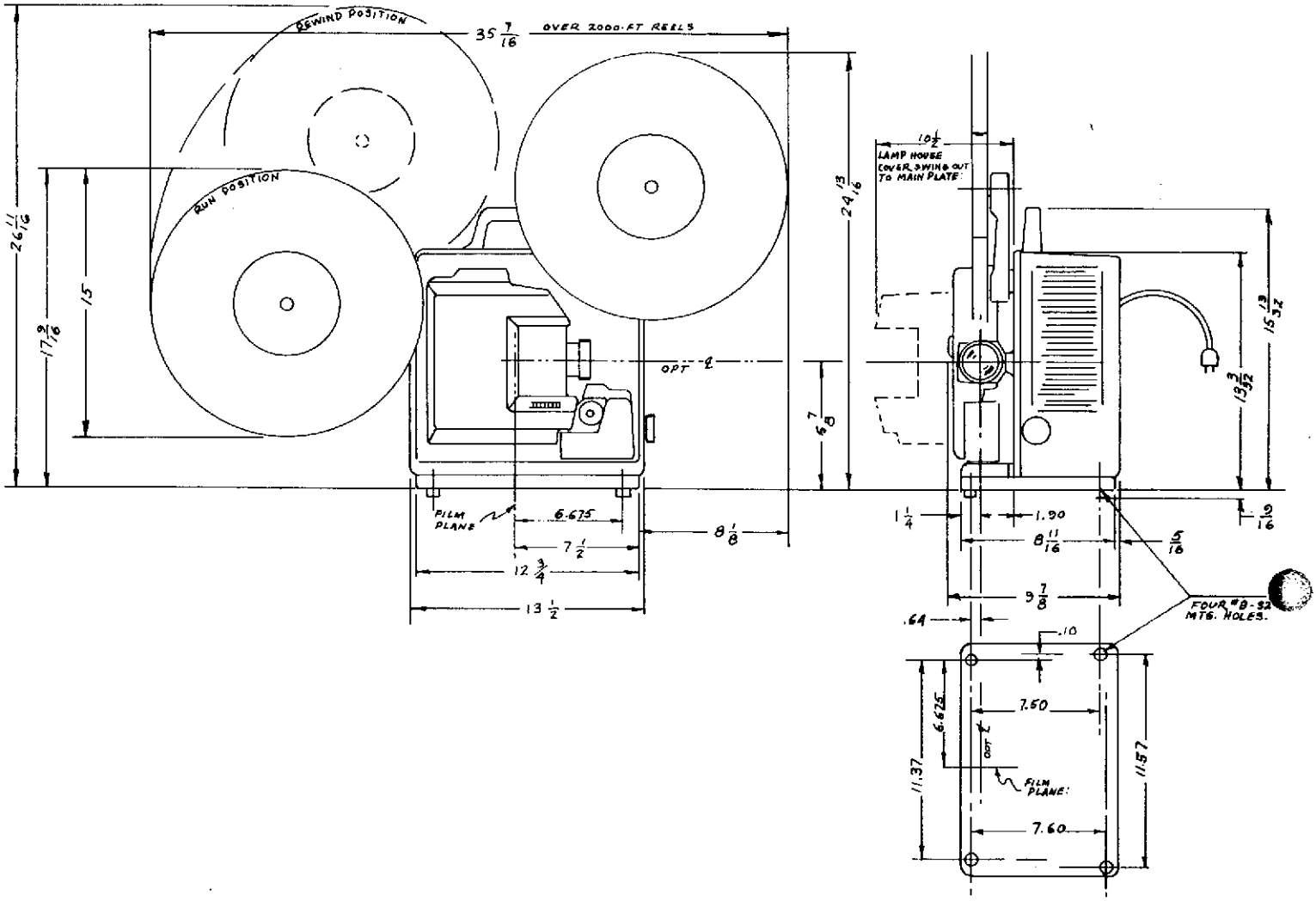
EXCITER LAMP
Bell & Howell Part No. 34884
BAK 4V 0.75 Amp.

PEDESTAL BASE
Bell & Howell Part No. 077797
For permanent installations, with built-in height adapter.









DRILLING DIAGRAM

For permanent installations, your projector can be mounted on the accessory pedestal stand or another solid surface. The drilling diagram that follows gives the key installation dimensions to allow complete clearance for all operating controls. When making a permanent installation, use adequate mounting hardware and install the required electrical outlets to handle one or more projectors.

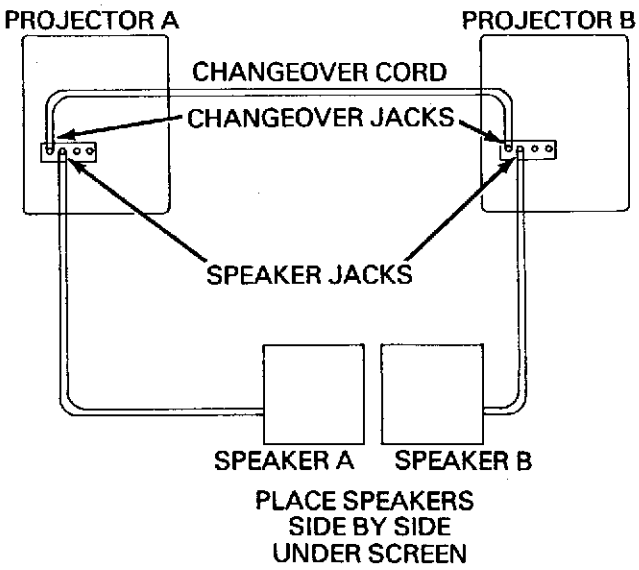
CAUTION:

To assure proper cooling, DO NOT REMOVE RUBBER FEET FROM THE PROJECTOR BASE. Use screws long enough to pass through mounting surface and rubber feet, and securely fasten to the projector base.

TANDEM CHANGEOVER WITH TWO SPEAKER SYSTEM

(This is the preferred system)
Sequence of installation:

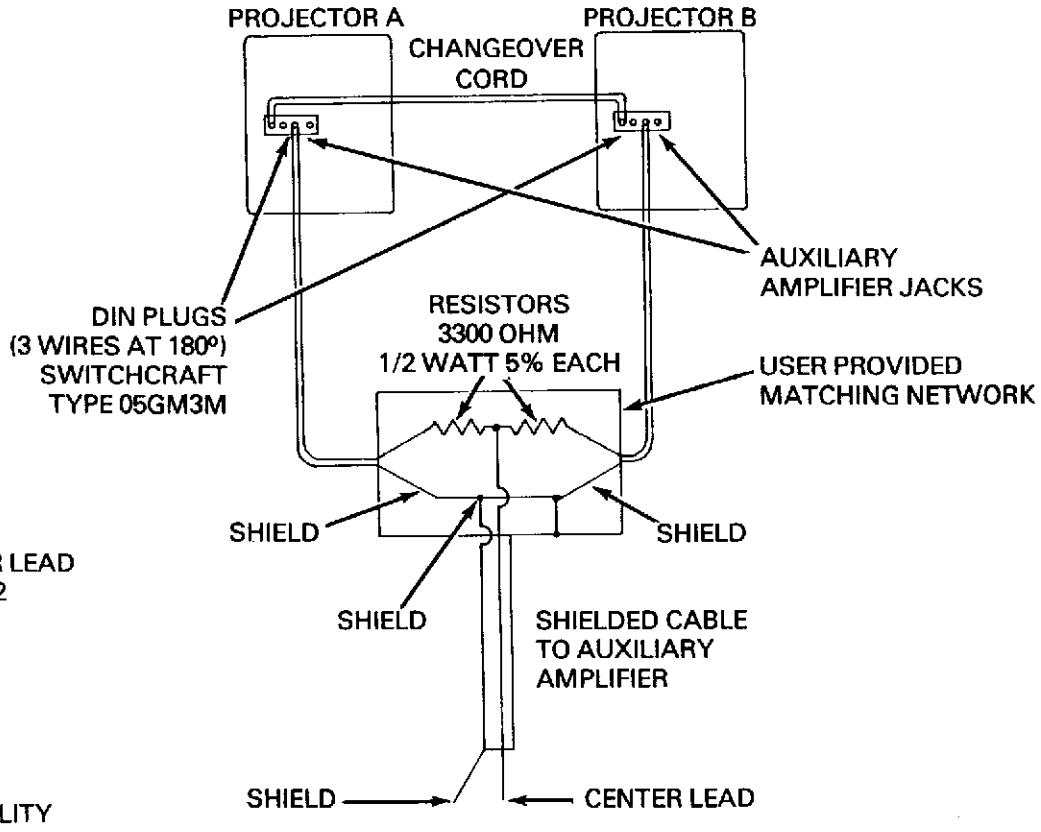
1. Connect the two projectors with the accessory changeover cable.
2. Plug one speaker cord into each projector.
3. Turn on both projectors.
4. Prepare for the show.

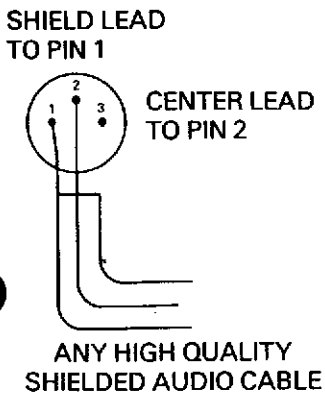


TANDEM CHANGEOVER WITH AUXILIARY AMPLIFIER

This system allows two projectors to operate in tandem when interfaced with an auxiliary sound system. The output from the matching circuit described below is approximately -4dbM (450MV RMS).

NOTE:
The auxiliary amplifier system must have an input impedance of more than 10K ohms for use with tandem projectors.





BELL & HOWELL

AUDIO-VISUAL PRODUCTS

7100 N McCormick Road Chicago, IL 60645 (312) 262-1600

Specifications subject to change without notice.

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