

FILM-TECH

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8mm SOUND PROJECTOR

2-TRACK

INSTRUCTION MANUAL

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 appliance is used by or near children. Do not leave appliance unattended while in use.
3. Care must be taken as burns can occur from touching hot parts.
4. Do not operate appliance with a damaged cord or if the appliance has been dropped or damaged until it has been examined by a qualified serviceman.
5. Do not let cord hang over edge of table or counter or touch hot surfaces.
6. If an extension cord is necessary, a cord with a suitable current rating should be used. Cords rated for less amperage than the appliance may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.
7. Always unplug appliance from electrical outlet when not in use. Never yank cord to pull plug from outlet. Grasp plug and pull to disconnect.
8. Let appliance cool completely before putting away. Loop cord loosely around appliance when storing.
9. To protect against electrical shock hazards, do not immerse this appliance in water or other liquids.
10. To avoid electric shock hazard, do not disassemble this appliance but take it to a qualified serviceman when some service or repair work is required. Incorrect reassembly can cause electric shock hazard when the appliance is used subsequently.

SAVE THESE INSTRUCTIONS

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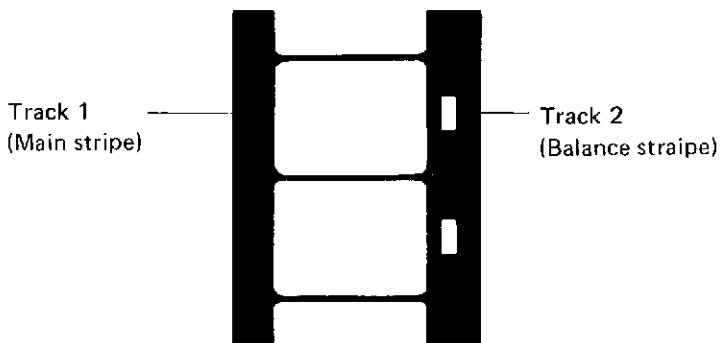
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Two Track System



As shown in the above illustration, 8mm sound film comes striped with magnetic coatings on both edges, also known as "magnetic stripe." The wide or "main" stripe is used to carry the sound track when used in conventional projectors. This sound stripe will be called Track 1 hereafter in this manual.

The narrow or "balance" stripe, that runs just outside the film perforations, is used for balance to ensure smooth film travel through the projector.

Though Track 2 is narrow in width, it is coated with the same quality magnetic oxide as that on Track 1. So, the Elmo ST-600 utilizes both the main stripe and the balance stripe for recording and playback. We have designated this new sound system a Two Track System.

After receiving your sync-sound film from the processing laboratory, there will most likely be sound on Track 1.

Music and narration can be added to the balance track (Track 2) to accompany your original sound on Track 1. You may record on Track 2 as often as desired or until you are totally satisfied with the mixed recording. This is done without affecting the original sound on Track 1.

[If the film does not come striped with a magnetic coating, it is necessary to ask your nearest photo dealer to have your film striped when sending it in for processing.]

Two Track Recording and Playback Techniques

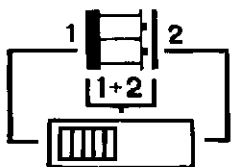
The following three methods can be used to record and playback with the two track sound system.

- 1 Both track 1 and track 2 can be used to record and playback independently.
- 2 Both track 1 and track 2 can be played back simultaneously; sync-sound on Track 1 and post-recorded music and narration on Track 2.
- 3 Recording Sound on either track can be monitored through an earphone or headset.

Two Track Recording and Playback Operation

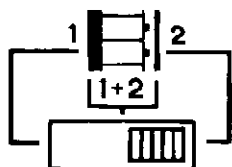
Set the track selector in the correct position to perform the following.

■ Track Selection



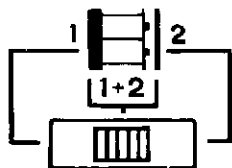
Position 1

- Select position 1 to record or playback Track 1.



Position 2

- Select position 2 to record or playback Track 2.



Position 1 + 2

- Select position 1 + 2 to play both tracks simultaneously.

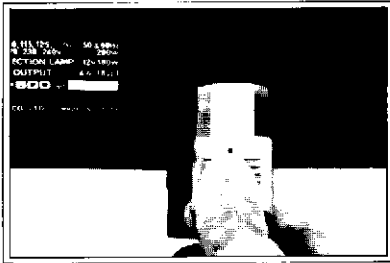
Note: Both tracks can't be recorded simultaneously. Particularly when recording, be sure to select the correct position conforming to the track to be used. Erroneous track selection may result in undesirable erasure.

PROJECTION

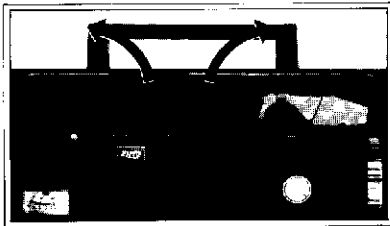
Preparing For Projection

- 1 Place the projector on a stable stand or table and face the projection lens to the screen.

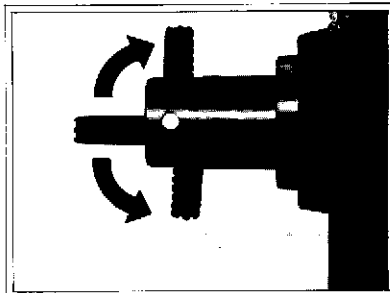
Note: Be sure to use a firm stand. If the projector is mounted on an unsteady surface such as a thin-board box, a possible resonance may develop causing poor projection performance.



- 2 Plug the power cord.

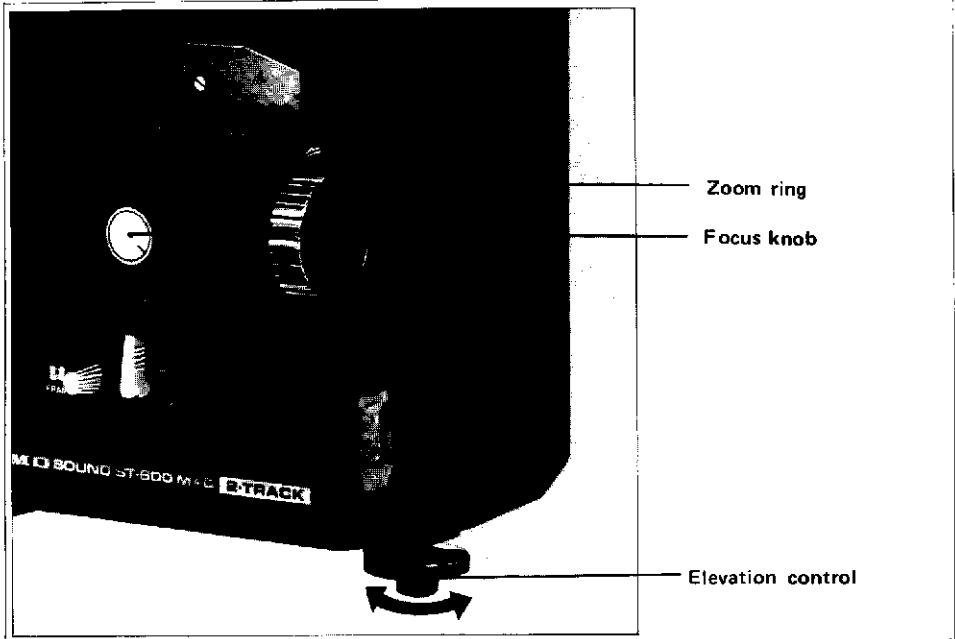



- 3 Pull both reel arms up into position.



- 4 Place your film on the front arm and the take-up reel on the rear arm. Press the reel locks until the reels are snug against the spindles.

Note: Be sure to snap down the reel locks.

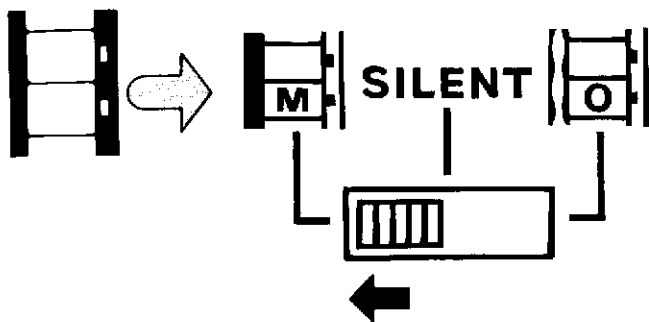


Before threading the film, advance the motor switch to  position and project the light on the screen for adjusting the picture position with use of the elevation control.

Set the appropriate screen size by turning the zoom ring.

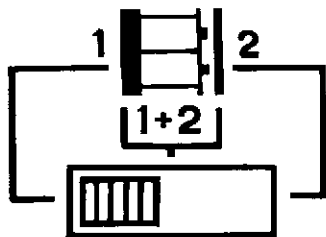
- 7 Select the sound mode according to the type of film to be projected.

Magnetic Sound Film



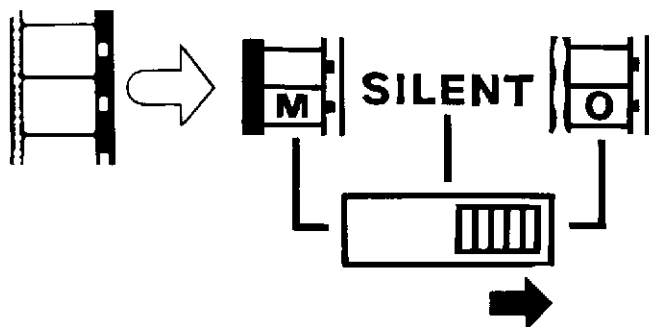
Set the Sound Selector to "M"

- ◇ Select the Track Selector.



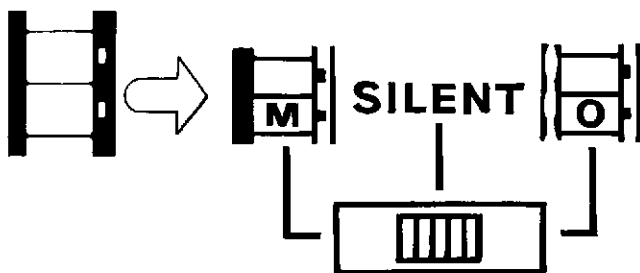
- Select position 1 to playback Track 1.
- Select position 2 to playback Track 2.
- Select position 1 + 2 to playback both tracks simultaneously.

Optical Sound Film (Model M-O only)



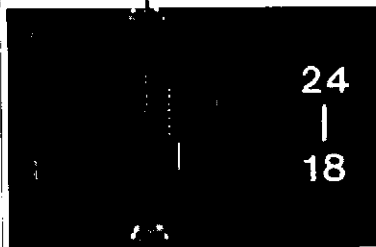
Set the Sound Selector to "O".

Silent Film



Set the Sound Selector to "SILENT".

Projection speed selector

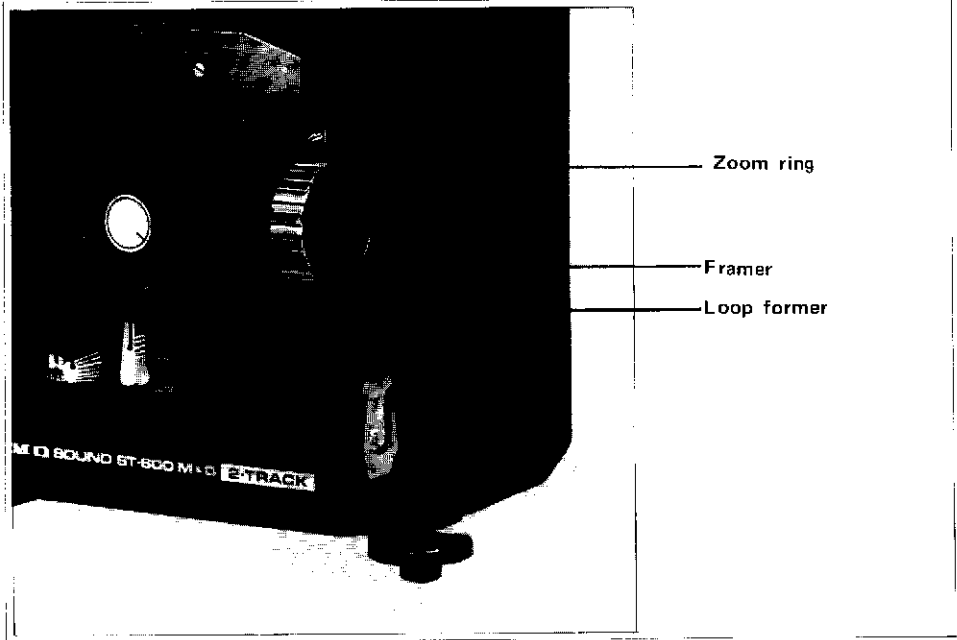


- 8 Select the proper projection speed, either 24 fps (UP) or 18 fps (DOWN).

Important:

Be sure the motor is OFF when changing projection speed.

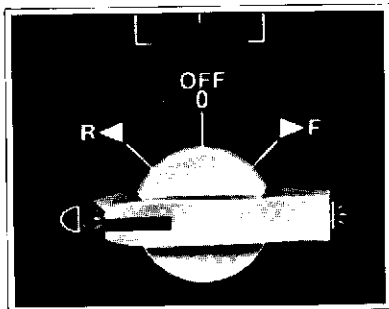
Image Adjustment




- A** Adjust the picture size to the screen by turning the zoom ring.
- B** Adjust the framer to eliminate frame line.
- C** Press the loop former to restore the film loop if lost during projection.

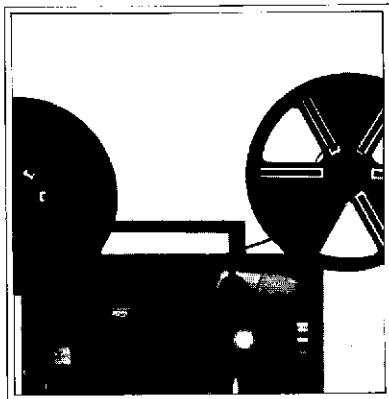
Note: When the film loop is lost during projection, check the film's perforations and splices after projection is over.

Reverse Projection

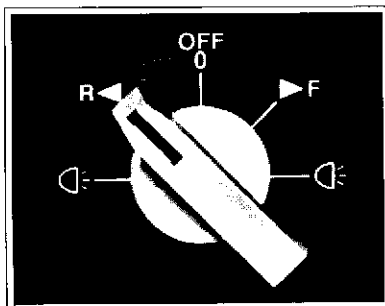



- 1 Advance the motor switch counterclockwise to the  position.

Rewinding the Film

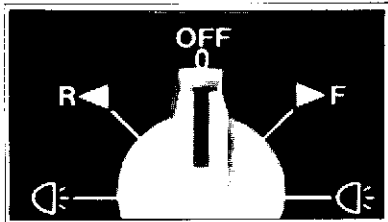


- 1 After projection is finished, wind the film back on the feed reel.



- 2 Advance the motor switch to the R  position and the film is rewound automatically.

Removing the Film During Midway Projection

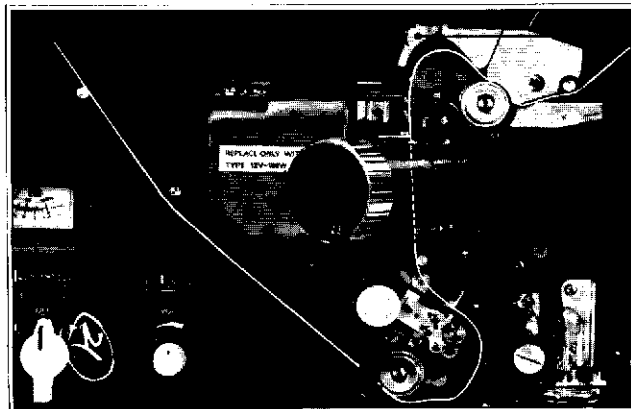


- 1 Turn the motor switch to the OFF position.
0



Cover

- 2 Open the cover by pulling the top toward yourself.

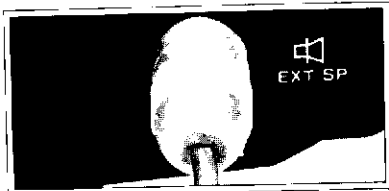


Auto-thread lever

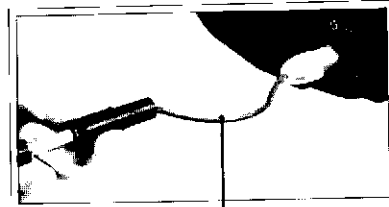
Second sprocket shoe

- 3 Swing the lens barrel to the arrow direction.
- 4 Open the auto thread lever upward and remove film.
- 5 Press the second sprocket shoe downward and remove film.

■ Extension Speakers



- When using Elmo extension speakers, (Twin two-way or ES-650), connect the speaker line to EXT. SP. connector.

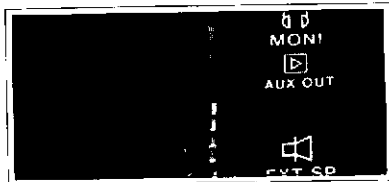


Adaptor (SC-002) Cord

- When adapting your own extension speaker, the optional SC-002 adaptor cord with 6φ jack can be used for connecting a speaker line with EXT. SP. connector.

- Note:
1. Be sure to use speakers with an impedance rating of 8 ohms.
 2. Be careful not to short the speaker circuit. If shorted by accident, a circuit protective device cuts off the power to the amplifier automatically. In such a case, unplug the power cord and leave it as it is for 20 to 30 seconds. By doing so, the amplifier can be restored.

■ Reproducing Sound Through a Stereo Amplifier



- Plug the accessory cord into the projector AUX. OUT jack and connect the other end to either AUX. IN or LINE IN receptacle on your own stereo amplifier. Use the left channel input and set Amplifier to Mono position.

Refer to Page 30 for accessory cords.

■ Using an Earphone or Headset

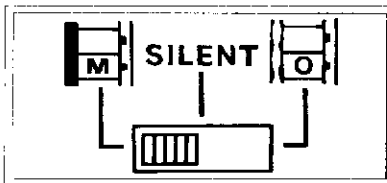


- Connect the earphone or headset to the monitor jack. In this case, sound will not playback through the built-in or extension speakers.

RECORDING

How to Record on Two Tracks

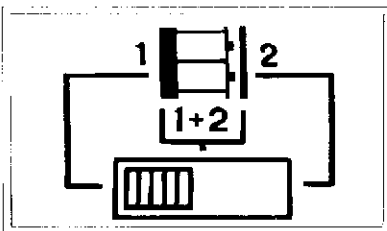
- 1 Be sure both edges of your film are magnetically coated. If just one edge is coated, only half of the projector's capabilities can be utilized.



- 2 Set the sound selector to "M".
(Model M-O only)



- 3 Select the appropriate projection speed, either 24 fps (UP) or 18 fps (DOWN), in conformity with the speed at which the picture has been taken.



- 4 Set the track selector either to Track 1 or Track 2.
The sync-film carries sync-sound on Track 1. So, set the track selector to Track 2 to build new music or narration on Track 2 without affecting the sound on Track 1.

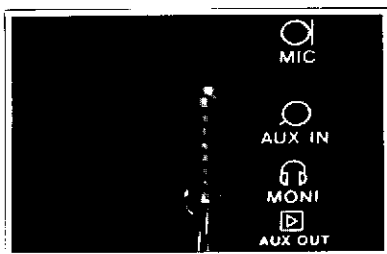
- Note:
1. With the track selector at 1 + 2 position, both Tracks 1 and 2 cannot be recorded simultaneously.
 2. If a new sound is overlapped on a previously recorded track, the previous sound is erased.

-
- 5** Load the projector with film.
-

6 Connect record input lines.

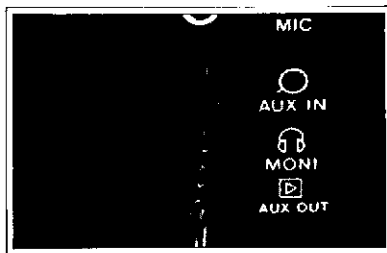
Use either one of two input jacks, MIC or AUX. IN. If both inputs are plugged in simultaneously, the MIC jack will not function.

■ Microphone Jack (MIC)



Connect the microphone plug to MIC jack. When using the microphone, hold it as close to your mouth as possible. The built-in limiter circuit eliminates distortion to a maximum input level, achieving optimum narration recording.

■ Tape Recorder, Tuner, & Stereo Set



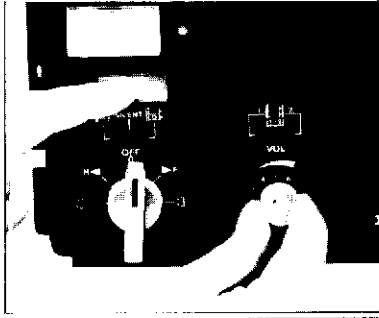
Connect LINE OUT or AUX. OUT jack of the tape recorder, tuner, or stereo set, to the AUX. IN jack of the projector.

With AUX. IN jack, only manual recording is effective.

When connecting with a 2-channel stereophonic unit, use an MC-003 stereo-to-monaural adaptor cord.

- When recording from a recorder or player without an AUX. OUT or LINE OUT jack, connect AUX. IN jack of the projector to either EARPHONE or EXT. SP. receptacle of the unit with an accessory cord MC-009. Refer to Page 30 for accessory cords.
-

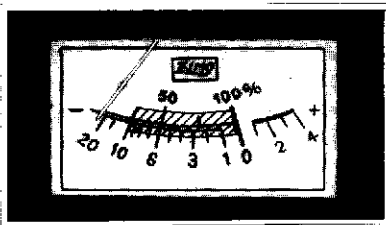
Record button



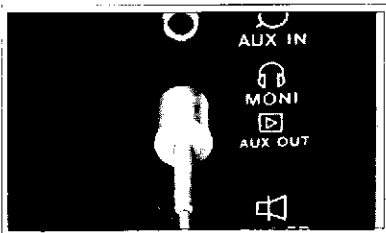
- 7 Depress the record button and the record lamp comes on.

Adjust the sound input level by turning the volume control clockwise while checking the recording level on the level meter.

Adjust the level in such a way that the needle of the level meter stays within the shaded zone (from -10 to 0) in the figure at left.

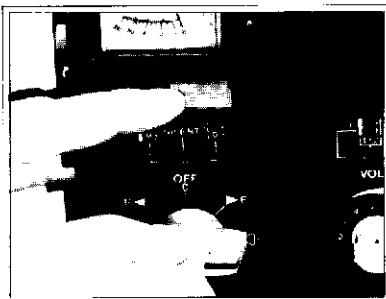


- When recording on Track 2 of a film with sound on Track 1, it is recommended to make test recording to adjust the recording level to the one on Track 1.




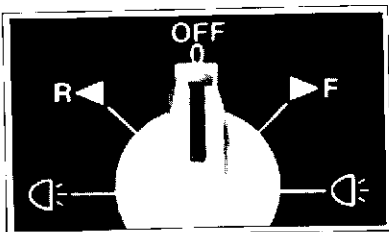
8 Monitoring

Connect an earphone to MONI jack to monitor the sound being recorded.



9 Start Recording

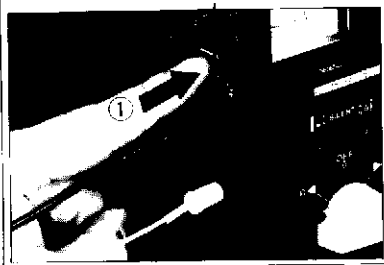
Advance the motor switch clockwise to the  position while depressing the record button.



10 Stop Recording

Turn the motor switch to the OFF position.
0

Record control button



11 Record Control Button

This button allows you to make spot recordings without stopping the projector. Depress the record control button ① together with the record button ② when the desired film position is reached. Release your finger from the record control button ①, and the record button ② is locked.

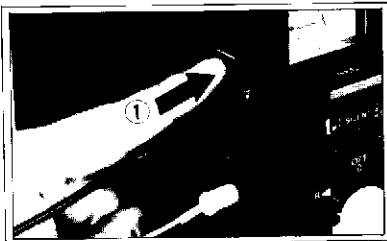
Record button



12 How to Release Record Control Button

Just depress the record control button, and the recording setup is released.

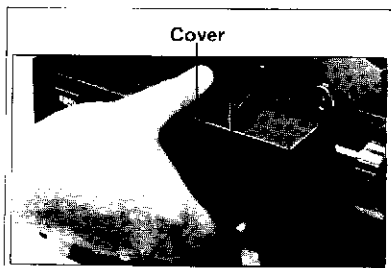
This procedure permits you to resume playback from the recording position without stopping the projector.



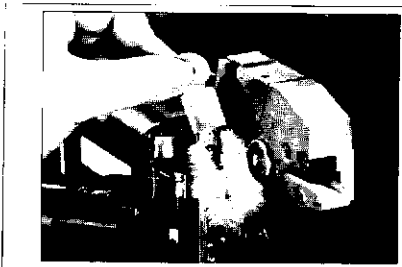
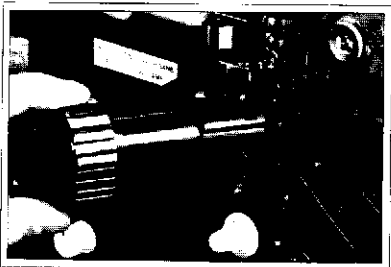
MAINTENANCE HINTS

Cleaning

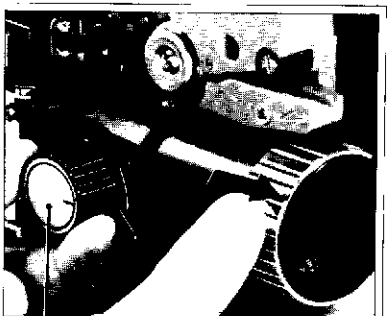
Periodical cleaning of the projector is important for keeping it (and your films) in top condition.



- 1 Pull the cover down to open.
- 2 Swing the lens away from the projector in the direction of the arrow.
- 3 Gently clean the aperture and pressure plates with the supplied brushes or a soft lint-free cloth.



- 4 Dirt or dust deposits on the sound heads will degrade the sound playback quality. Clean the sound heads with a cotton swab or soft cloth. In this case, be sure to disconnect the power cord and set the motor switch at the OFF position.



Focus knob

How To Remove the Lens

Turn the focus knob clockwise as far as possible and pull the lens forward.

Wipe the lens surface gently with a clean soft cloth or lens cleaning tissue.

When putting the lens back in position, match the lens pin with the lens barrel slot with the focus knob turned fully clockwise.

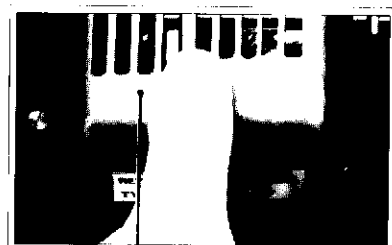
Replacing Lamp

- ◆ When replacing the lamp, be sure to unplug the power cord.

■ Projection Lamp

- Use a 12V-100W halogen lamp with cold mirror. (Code EFP)
- It's recommended to keep a spare lamp on hand in case of unexpected breakage.

- 1 Pull the cover down to open.



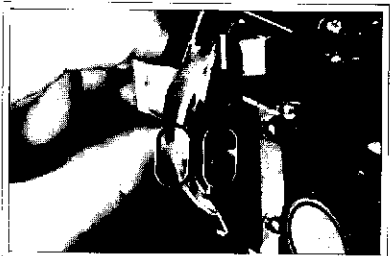
Lamp cover

- 2 Take hold of the upper part of the lamp cover and turn toward yourself to remove.

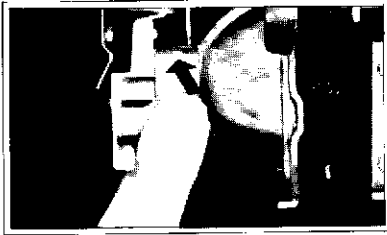


- 3 Push up the lamp ejector and the lamp will detach from the lamp socket.

Note: Be sure the lamp has cooled sufficiently before handling.



- 4 Place the protrusion of the lamp reflector edge facing towards you.



- 5 Insert the lamp all the way into the socket and swing down the lamp ejector.

Important:

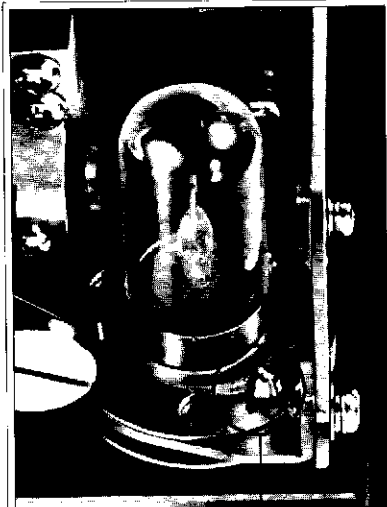
Avoid touching glass bulb area with your bare fingers. Oil from your fingers will affect the heat conductivity of the glass and will shorten the life of the bulb. Touch only the base or use cotton gloves or cloth when installing a new lamp.

■ Exciter Lamp (Model M-O only)

- Use exciter lamp ANSI code BRS or equivalent.

- 1 Pull the cover down to open.

- 2 Take hold of the lamp head and turn it counterclockwise to remove.

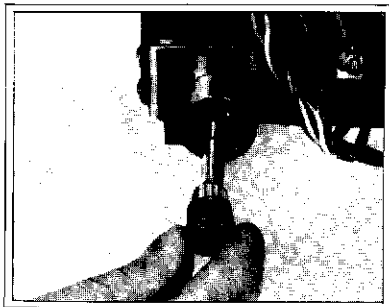


Notch

- 3 To install a new lamp, align the holes on the lamp base with the three guide pins of the socket and turn clockwise until the holes are snug against the pins. The notch in the lamp base should be facing forward.

Replacing Fuses

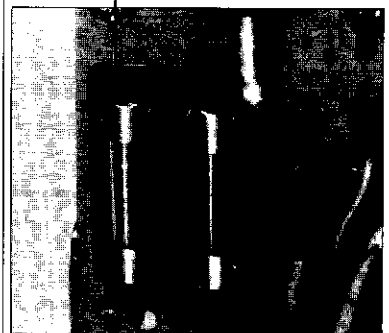
When replacing the fuse, be sure to unplug the power cord.



■ Main Power Fuse

Turn the slotted head screw counterclockwise on the fuse box at the rear of the projector and pull it out.

Exciter lamp fuse



Amplifier fuse

■ Amplifier Fuse & Exciter Lamp Fuse

There are two fuses beside the transformer. The left one is for the exciter lamp and the right one for the amplifier.

- Don't use fuses other than those rated at specified value.
- Be sure to disconnect the power cord before replacing fuses.
- Remove both screws to take off the rear cover as shown.

Voltage Selection

Voltage can be adjusted to comply with electrical requirements of each country.

- 1 Disconnect the power cord.
- 2 Loosen two screws and remove the cover.
- 3 Pull out the voltage selection plug. Align the notch with the proper voltage and then insert the plug back into the socket so the voltage can be read through the notch.



Caution

The projector sold in the USA is not designed for voltage alteration.

Trouble-shooting Hints

Motor fails to start.

- Is the power cord properly plugged in?
- Is the power fuse blown? (See page 25)

Projection lamp fails to come on.

- Is the lamp correctly plugged into the socket? (See page 23)
- Is the lamp defective?

Film does not thread automatically to the take-up reel.

- Is film leader correctly trimmed? (See page 12)
- Are the perforations on the leader damaged?
- Is the film leader spliced correctly?

Screen image out of focus.

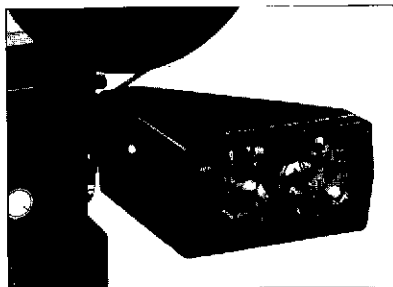
- Is the lens fitted correctly into the sleeve? (See page 22)

Either sound track fails to record or playback.

- Is the volume control turned up enough? (clockwise)
- Is the track selector at the correct position? (See page 5)
- Is the sound selector set correctly either at M or O.
- Is a fuse either in the amplifier or in the exciter lamp blown?

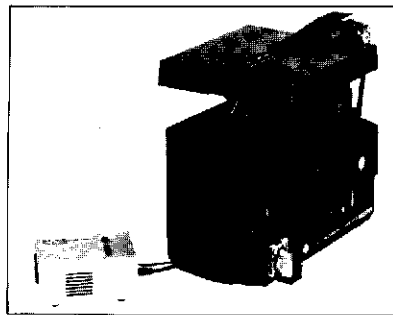
After checking the above items, if your trouble still persists, consult your nearest photo dealer or an authorized Elmo Service Centre.

Optional Accessories



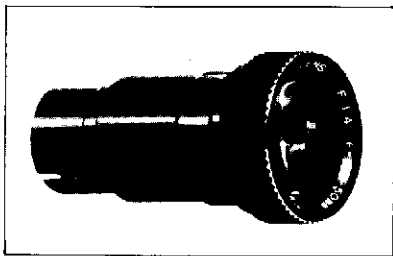
● Viewer type 100

With the viewer type 100, you can show your films under daylight conditions. Use the ST-600 adapter to attach viewer to your projector.



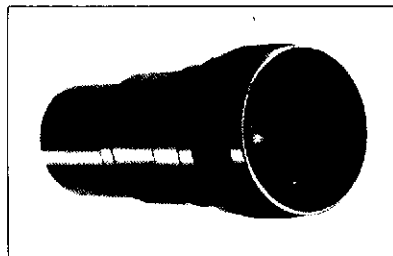
● Continuous loop projection device EF-400

No rewinding necessary. When attached to your ST-600 projector, EF-400 provides fully automatic and continuous projection. Equipped with loop-sensor and auto-stopper to automatically stop projection if the film breaks. Accepts up to 120m (400ft) of film.



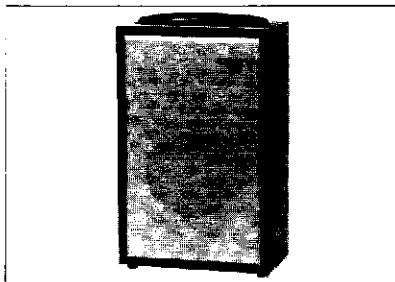
● Long-focus zoom lens

Sharp F1.4, 25-50mm long-focus zoom lens for projection in a large auditorium.



● Fast zoom lens

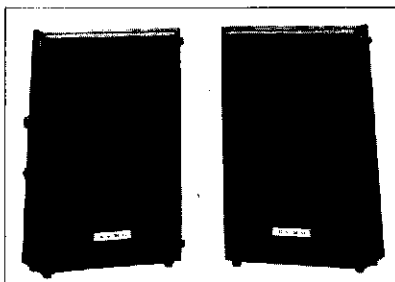
Exceptionally bright wide-angle F1.1, 12.5-25mm zoom lens.



● Extension speaker ES-650

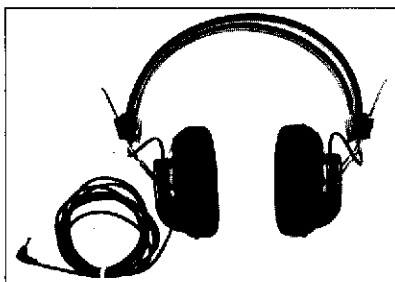
High-fidelity speakers mounted in wooden cabinet.

Rated input : 10W (max. 20W)



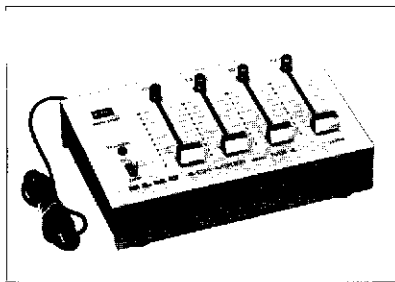
● Twin 2-way speaker

High performance extension speakers with a 10''(25cm) woofer and a horn type tweeter. Especially suitable for projection in a large auditorium. Stores conveniently in one portable case.



● Headset type EH-75

Includes switch to select impedance, either 16 or 600 ohms.

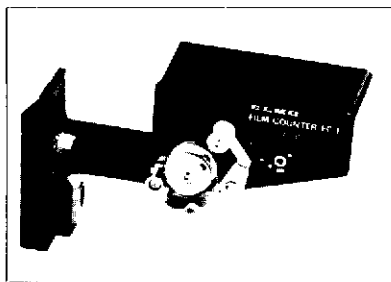


● 4-channel mixer type MX-4

For mixing sound from four separate sources onto one track.

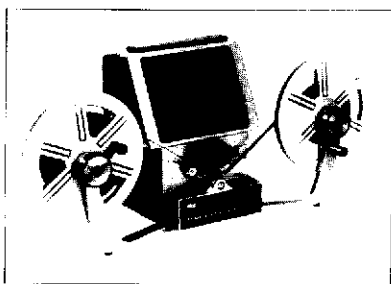
With this mixer you can perform professional fade-in, fade-out and overlapping.

Easily connects to tape recorder, record player and microphone.



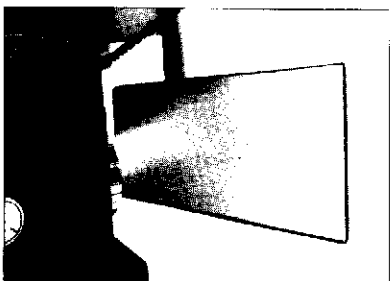
● Film counter FC-1

Elmo Film Counter, Type FC-1 is designed for counting advanced frames of film (one number per 18 frames). This Film Counter makes sound recording more convenient, and combined use of it and Elmo Viewer, Type 100 (Optional) makes film editing easier.



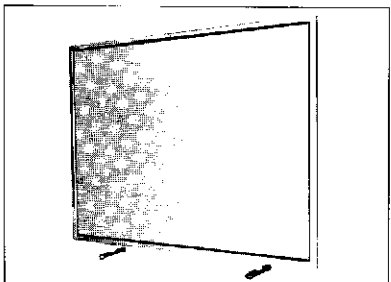
● Editor 912

Accepts both Super 8 and Regular 8 film. Sound monitor, film counter and film cleaner are optional. An easy-to-handle, quality editor with a large, bright screen for producing fine sound or silent film.



● Daylight projection mirror

This accessory mirror provides a clear projection image under daylight conditions when used with the special Elmo translucent rear projection screens.




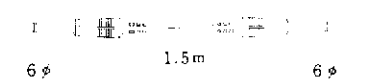
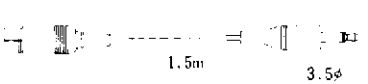
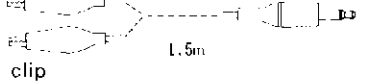
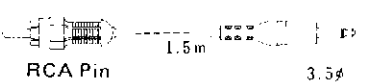
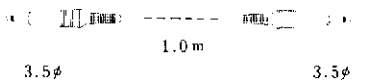
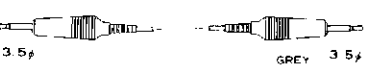


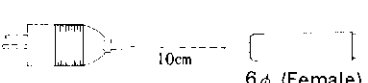
● Translucent screens

60 cm × 80 cm (23.6" × 31.5")

39 cm × 52 cm (15.4" × 20.5")

Special quality screens for rear projection under daylight condition.

● Accessory cords

	Code No.	Specifications	Remarks
Connection cord	MC-001	 1.5m 3.5φ 3.5φ	1.5m
	MC-002	 1.5m 6φ 6φ	1.5m
	MC-003	 1.5m 6φ 3.5φ	1.5m
	MC-004	 1.5m clip 3.5φ	1.5m
	MC-006	 1.5m RCA Pin 3.5φ	1.5m
	MC-009	 1.0m 3.5φ 3.5φ	1.0m From earphone or monitor jack to AUX IN input
	MC-010	 3.5φ GREY 3.5φ	From earphone or monitor jack to MIC input
Adaptor	MP-001	 3.5φ (Female) 6φ	
	MP-002	 6φ (Female) 3.5φ	
Speaker cord	SC-002	 10cm 6φ (Female)	10cm

Connection example

- Microphone



- Cassette tape recorder



Mini plug [MC-001]

Pin plug [MC-006]

- Television set
Radio etc.



Mini plug [MC-009]

- Stereo set



Pin plug [MC-006]

DIN plug [MC-003]

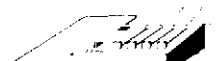
- Cassette deck



Pin plug [MC-006]

DIN plug [MC-003]

- Mixer



Mixer MX-4

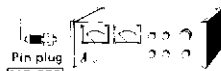
- Earphone (Monitor)



- Headset (Monitor)



- External amplifier



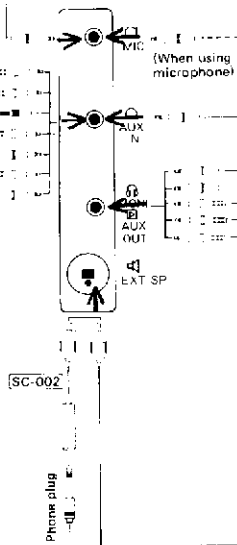
- Tape recorder



- External speaker



- External speaker



Projection Distance and Image Size

Focal length Distance	Wide 15mm Image size (cm)	Tele 25mm Image size (cm)	50mm (Optional accessories) Image size (cm)
1 m	26 x 35	15 x 20	7 x 10
1.5 m	39 x 52	23 x 31	11 x 15
2 m	52 x 70	31 x 42	15 x 20
2.5 m	66 x 88	39 x 52	19 x 26
3 m	79 x 106	47 x 63	23 x 31
5 m	133 x 178	79 x 106	39 x 53
10 m	266 x 356	160 x 213	79 x 106
15 m		240 x 320	119 x 160
20 m		320 x 428	160 x 213
30 m			240 x 320
40 m			320 x 428

Projection Time and Film Length

For Super 8/Single 8

Time (min.)	24 fps		18 fps		Time (min.)	24 fps		18 fps	
	m	ft	m	ft		m	ft	m	ft
1	6.1	20	4.6	15	19	115.8	380	86.9	285
2	12.2	40	9.1	30	20	121.9	400	91.4	300
3	18.3	60	13.7	45	21	128.0	420	96.0	315
4	24.4	80	18.3	60	22	134.1	440	100.6	330
5	30.5	100	22.9	75	23	140.2	460	105.2	345
6	36.6	120	27.4	90	24	146.3	480	109.7	360
7	42.7	140	32.0	105	25	152.4	500	114.3	375
8	48.8	160	36.6	120	26	158.5	520	118.9	390
9	54.9	180	41.1	135	27	164.4	540	123.5	405
10	61.0	200	45.7	150	28	170.7	560	128.0	420
11	67.1	220	50.3	165	29	176.8	580	132.6	435
12	73.2	240	54.9	180	30	182.9	600	137.2	450
13	79.2	260	59.4	195	31			141.8	465
14	85.4	280	64.0	210	32			146.3	480
15	91.4	300	68.6	225	33			150.9	495
16	97.6	320	73.2	240	34			155.5	510
17	103.6	340	77.7	255	35			160.0	525
18	109.7	360	82.3	270	40			182.9	600

[PROJECTOR]

Power Source	: Single phase AC 50/60Hz
Power Consumption	: 200W
Projection Speed	: 24 fps & 18 fps (Selector switch)
Motor	: DC Magnet Motor
Film	: Super 8/Single 8 Sound Film and Silent Film
Film Loading	: Automatic
Reverse Projection	: Possible
Reel Capacity	: 180 m (600 feet)
Manual unloading	: Possible

[LIGHT SOURCE]

Projection Lamp	: 12V-100W Halogen lamp with cold mirror (Code EFP)
Projection Lens	: F1.3, f = 15 – 25 mm zoom lens

[SOUND RECORDING & PLAYBACK]

Sound System	: Elmo sound system Two sound tracks capable of recording & playback with magnetic stripes and of optical playback (Model M-O)
Two-Track Recording	: Magnetic recording on both Tracks 1 and 2
Two-Track Playback	: Both tracks can be played back simultaneously or independently. Tracks can be mixed.
Automatic Recording (Limiter system)	: Possible through use of MIC jack
Spot Recording	: Possible using the Record Control button
Amplifier	: IC = 2 pcs, Transistor = 2pcs, Diode = 8 pcs
Amplifier Protective Circuit	: Built in
Output	: Max. 6W (8 Ohms)
Input jacks	: MIC (Microphone) (Input impedance : 500 Ohms – 10 K Ohms)
Output Jacks	: AUX. IN (Auxiliary) (Input impedance : 10 K Ohms)
	: EXT. SP (Extension Speaker) (Impedance : 8 Ohms)
	: MONI (Monitor) (Earphone impedance : 16 Ohms)
	: AUX. OUT (Auxiliary output) (Connected to MONI jack)
Recording/Playback Head	: Special alloy magnetic head (Alternating bias system)
Erasing Head	: Ferrite Magnetic Head (Alternating erase system)
Photoelectric Element	: Solar Battery (Model M-O)
Exciter Lamp	: 4V-0.75A Direct-current lighting (Model M-O)
Speaker	: Built-in 5" (12.5 cm) dynamic speaker
Microphone	: Dynamic type (Impedance : 500 Ohms)
Level Meter	: Built-in
Recording Indicator Lamp	: Light-Emitting-Diode

[ATTACHMENT]

	: Auto reel 180 m (600 feet)
	: Power cord
	: Microphone set
	: Earphone
	: Dust cover
	: Aperture cleaning brushes

* Specifications are subject to change without prior notice.



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