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STEREO SOUND 8mm PROJECTOR

ELMO

GS-800

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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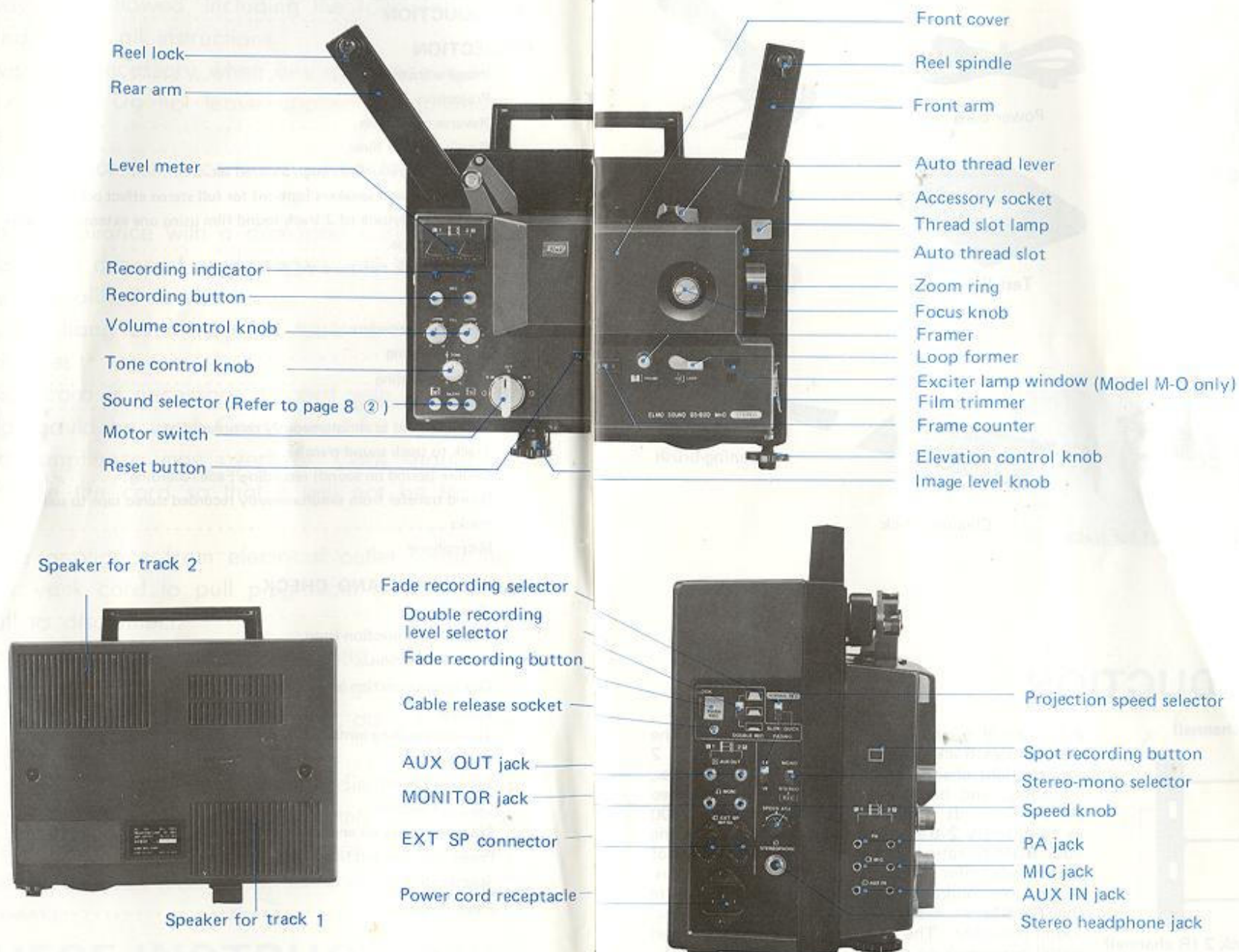
RECORDING

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NORMENCLATURE



ATTACHMENTS



Auto reel (800 ft/240 m)



Speaker connector



Connection cord MC-021 for track to track sound transfer



Power cord



Test film



Microphone



Earphone



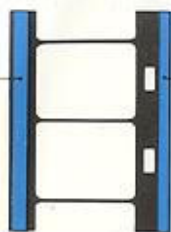
Cleaning stick



Cleaning brush

INTRODUCTION

Track 1 (L channel)



Track 2 (R channel)

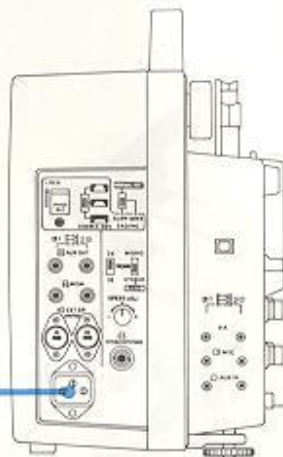
All Super 8 pre-stripped film has two tracks. The GS-800 uses track 1 for the left channel and track 2 for the right channel. Each channel has a pre-amp., main-amp. and built-in speaker for complete stereo performance. It is also possible to use the GS-800 as an ordinary 2-track sound projector when adding your BGM/narration/sound effect to the track 2 of pre-recorded film without affecting the simultaneously recorded sound on the track 1. You can operate the GS-800 as easily as you do the conventional sound projector. The GS-800 helps you to enjoy real sound movie making.

PROJECTION

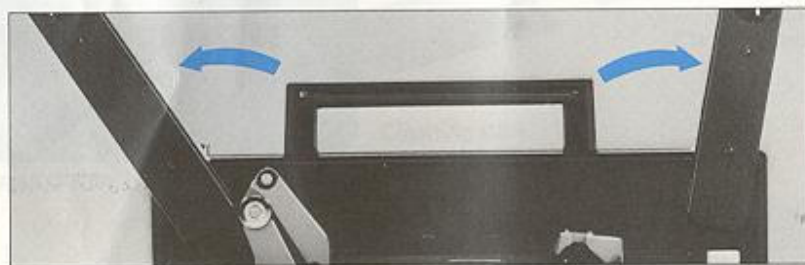
Image adjustment

Adjust the screen image before threading a film.

- 1 Plug in the power cord, then pilot lamp comes on.



- 2 Pull up both arms into position.



- 3 Advance the motor switch to "C".



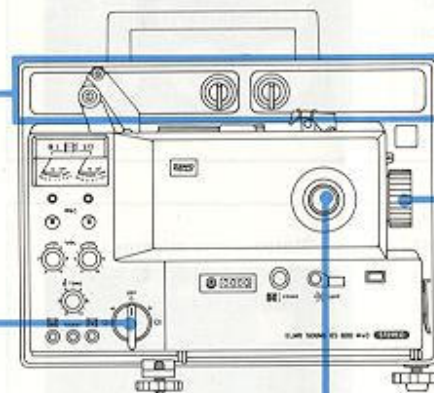
Motor switch

- 4 Adjust the height and inclination of picture with the elevation control knob and the image level knob respectively.

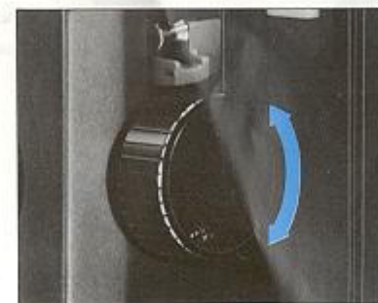


Image level knob

Elevation control knob



- 5 Adjust the picture size with the zoom ring.



Zoom ring

- 6 Adjust the focus with the focus knob so that the frame mask may be projected clearly.



Focus knob

- 7 After the adjustment, turn the motor switch back to "OFF".

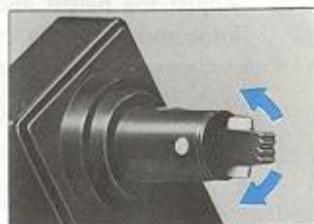
Projection

1

Place your reel with film on the front arm and take-up reel on the rear arm, and press the reel locks until reels are snugged against spindles.

Note:

Be sure to use the take-up reel supplied with the projector.



2

Select the sound mode by pushing the sound selector in accordance with the type of film to be projected. (M for magnetic sound film, O for optical sound film or SILENT for silent film.) Model M does not have optical sound reproduction facility.



3

Set the stereo-mono selector for STEREO or MONO in accordance with the sound film.



Speed knob
Projection speed selector

4

Select projection speed, either 18 or 24 fps.

Note:

1. Set the speed knob in the middle.
2. Standard speed for magnetic sound film is either 18 or 24 fps. Standard speed for optical sound film is 24 fps.

Be sure that the motor is off when changing projection speed.

5

Trim the end of the film leader with the film trimmer.

Note:

Locate a film perforation over the fixing pin and trim off the film end while pulling up the film.



Film trimmer

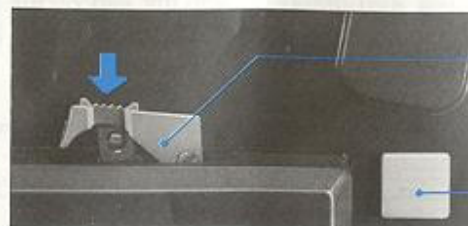
6

Advance the motor switch clockwise to "F".



7

Depress the auto thread lever until it locks.



Auto thread lever

Thread slot lamp

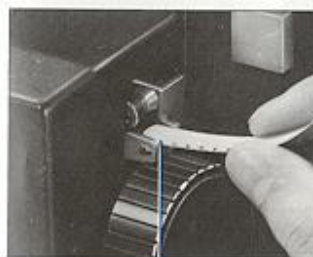
8

Insert the film leader into the thread slot as indicated by the red arrow.

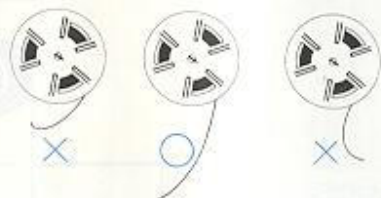
Note:

1. The film automatically threads and is attached to the take-up reel through the green film guide a few seconds after inserting.
2. If the take-up reel fails to catch the film, stop the projector once and wind the leader round the take-up reel manually.

Be sure to use the properly curled leader for sure threading.



Auto thread slot



9

Advance the motor switch further to "C" when the film leader is wound round the take-up reel.

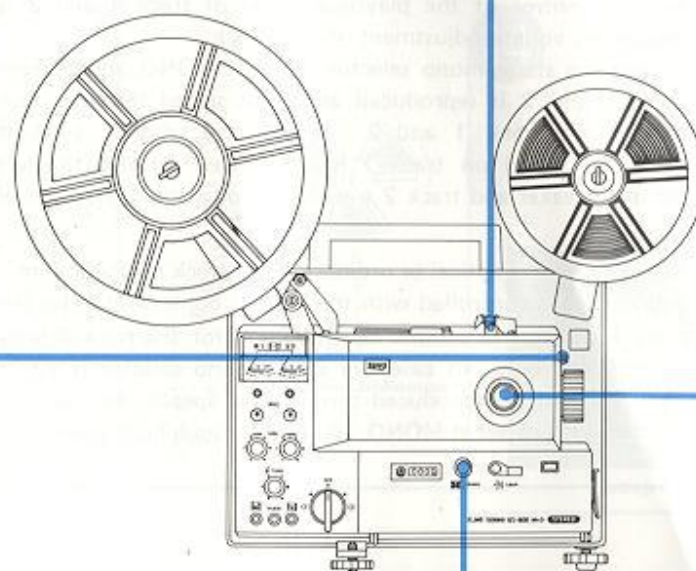


10

Adjust the focus with the focus knob.



Focus knob



11

If a frame line appears on the screen, eliminate it from the screen with the framer.



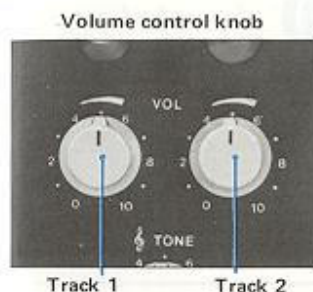
Framer

12

Adjust the playback level.

A. Reproduction of stereo magnetic sound film

Adjust the playback level of the left channel with volume control knob for the track 1, and adjust the level of the right channel with the volume knob for the track 2.



B. Reproduction of 2-track magnetic sound film

Balance control of the playback levels of track 1 and 2 is possible by volume adjustment of each track.

In case the stereo-mono selector is set at MONO, sound from track 1 and 2 is reproduced as mixed sound through both speaker for track 1 and 2. In case the selector is set at STEREO, sound on track 1 is reproduced through the left channel speaker and track 2 sound is through the right channel speaker.

C. Reproduction of optical or ordinary single track magnetic film

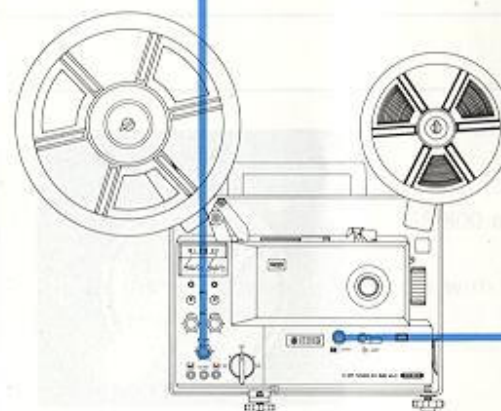
Sound level is controlled with the volume control knob for the track 1. Turn the volume control knob for the track 2 fully counterclockwise. In case the stereo-mono selector is set at Stereo, sound is reproduced through the speaker for the left channel. In case set at MONO, sound is through both speakers.

13

Adjust the tone with the tone control knob.



Tone control knob



14

If film loop is lost during projection, press down the loop former.



Loop former

Reverse projection

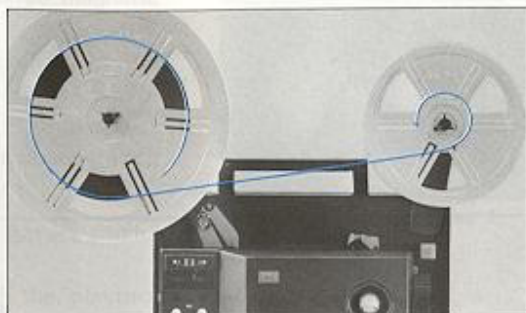
Advance the motor switch counterclockwise to "C" through "OFF" and "R".



Rewinding the film

1

After the projection, attach the end of the film to the front reel.



2

Advance the motor switch counter-clockwise to "R".



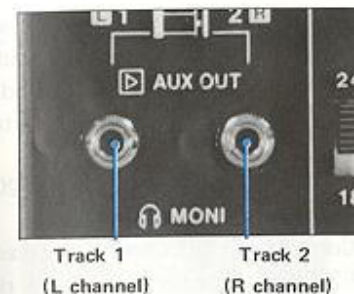
Motor switch

3

Set the motor switch back to "OFF" after rewinding is completed.

Reproducing sound through a stereo set

Connect the AUX OUT jack of the GS-800 with the AUX IN or PB (Playback) jack on a stereo amplifier by using the supplied adaptor plug MP-004. (Connect the AUX OUT jack of track 1 with left channel, and the track 2 with the right.)



Adjusting sound level:

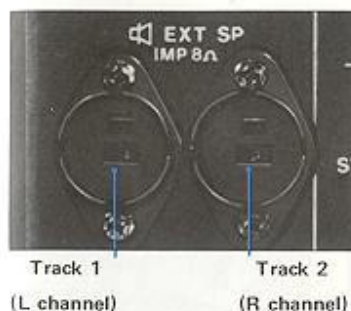
1. Adjust the playback level of the GS-800 to make the level meter swing around -10 (approx. -10dBs).
2. Adjust the sound level and balance with volume control and balance control of your amplifier respectively.

Using extension speakers (option) for full stereo effect projection

The GS-800 incorporates 2 speakers in its body to perform stereo sound projection by itself. But it is recommended to use a pair of extension speakers to obtain effective stereo performance.

Handy extension speakers ES-1200, ES-1000 and ES-500 are available.

Connect the left channel speaker line to the EXT SP 1 connector and the right speaker line to the EXT SP 2 connector.



Effective playback of 2-track sound film using one extension speaker

Set the stereo-mono selector at MONO, and connect an extension speaker line to the EXT SP connector of either track.

In this case, plug in the supplied speaker connector to the unengaged EXT SP connector and cut off the sound to be reproduced through the built-in speaker.

Adjust the playback level and balance of tracks 1 and 2 with the volume control knobs.



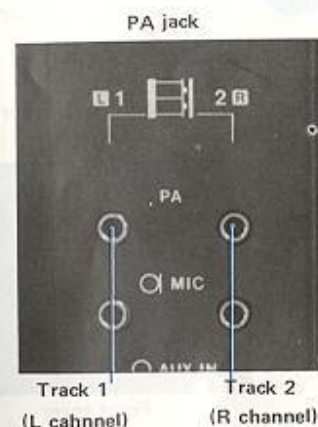
EXT SP connector

Public address

The GS-800 can be used as a public address system.

1

Plug the microphone to the PA MIC jack of either track.

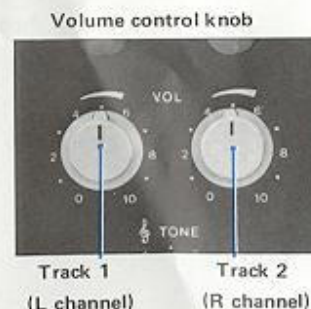


2

Turn the volume control knob for the track to get proper sound level.

Note:

In case stereo-mono selector is set at STEREO, the voice through the PA system is heard from the speaker for the track engaged by the microphone. In case set at MONO the voice is heard from both speakers.



Removing the film from the film path

1 Stop the projector by returning the motor switch back to "OFF".

2 Open the front cover.



Front cover

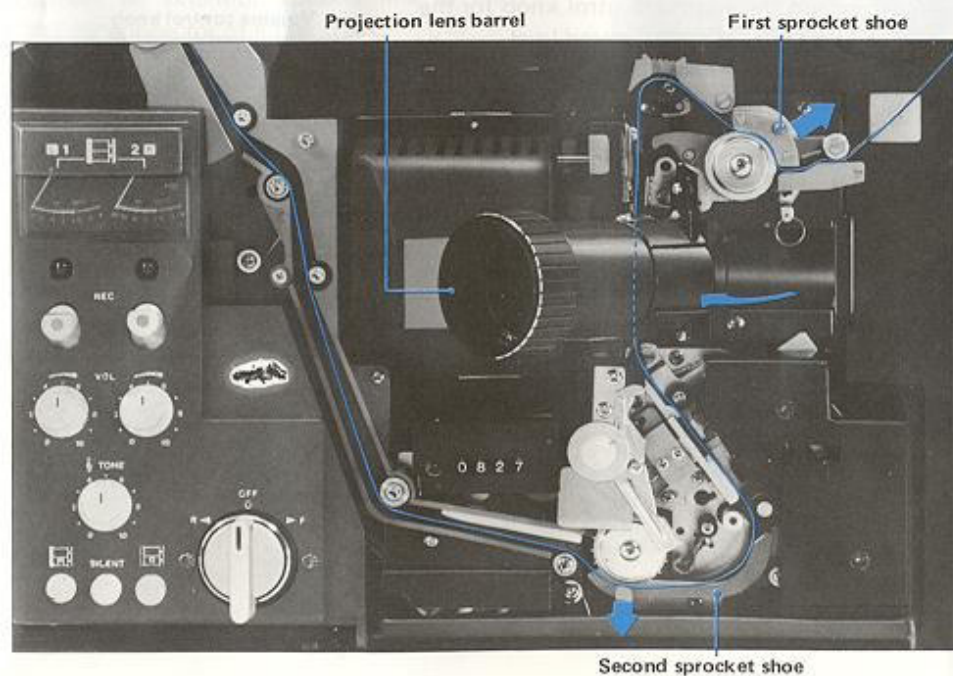
3 Slack off the film by turning the take-up reel counterclockwise.

4 Swing the projection lens away from the projector, holding the lens barrel.

5 Remove the film from the second sprocket by pressing the shoe downward.

6 Remove the film from the first sprocket by pressing the shoe upward.

7 Remove the film from the sound head part.



RECORDING

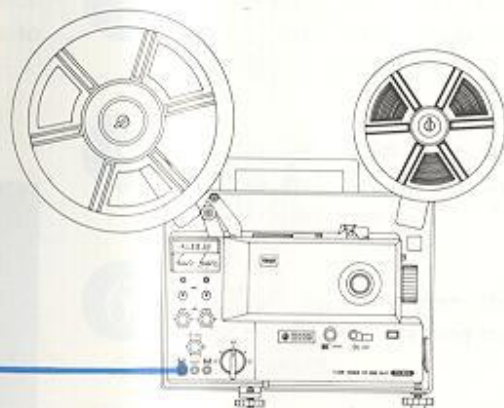
Recording procedure

1

Set the sound selector at "M".



Sound selector



2

Set the stereo-mono selector at STEREO.

Note:

Be sure to set the selector at STEREO always regardless of recording mode.



Speed knob

Projection speed selector

3

Set the projection speed selector at the desired position (18 or 24 fps).

Note:

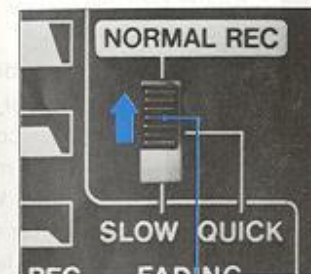
Be sure to set the speed knob in the middle.

4

Set the fade recording selector at NORMAL REC.

Note:

For double recording, see page 31.



Fade recording selector

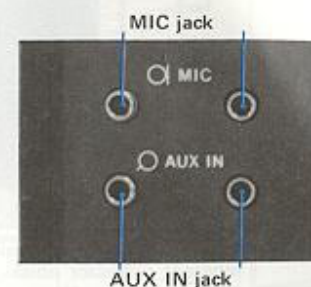
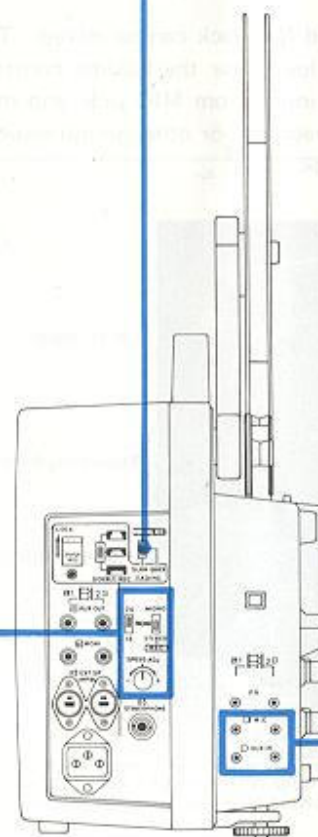
5

Connect the input lines.

- Connect tape recorder/mixer output to the AUX IN jack.
- Connect the microphone to the MIC jack.

Note:

When output level of mixer is low, connect it with MIC jack.



AUX IN jack

6

Adjust recording level.

- A. Input the sound.
- B. Adjust the recording level while depressing the record button.
 - a. Recording level setting

Adjust the recording level with the volume control knob so that the level meter needle may swing to 0 (100%) position at maximum. When unexpected over-level sound is supplied, built-in limiter circuit works to maintain optimum distortion free recording level.

The limiter works for the signals from both MIC and AUX IN jacks.

When the projector is set for recording, the recording indicator lights.

- b. Mixing

Sound from AUX IN jack and MIC jack can be mixed. To adjust the mixing recording level, use the volume control knob of the GS-800 for the input from MIC jack, and the output volume knob of tape recorder or other sound source for the input from AUX IN jack.



Note: To achieve the best possible quality recording with the least background and inherent projector noises, record at the lowest level and with the microphone as far away from the projector as possible.

7

A stereo headphone is recommended for monitor purpose.

(Applicable impedance: 8 or 16 ohms)

Plug the headphone to the STEREO PHONE jack of the GS-800.

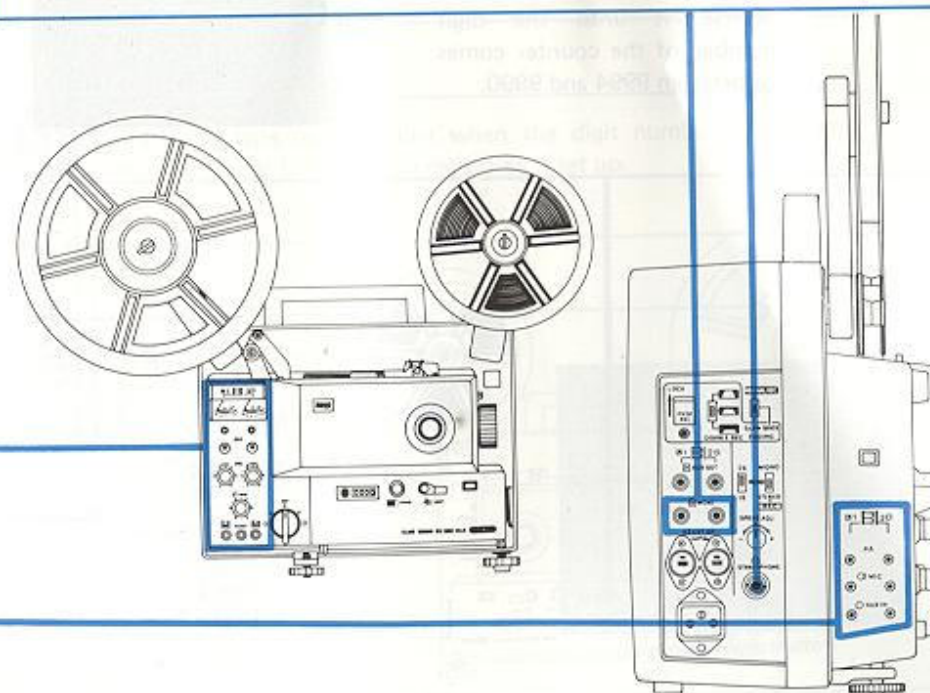
When using the supplied earphone, plug it to the monitor jack.



Stereo headphone jack



MONITOR jack



8

Set up the start position of the tape.

9

Load the film and start the projector.

A. As soon as the first frame appears on the screen, reset the film counter to zero (0000) by depressing the reset button.

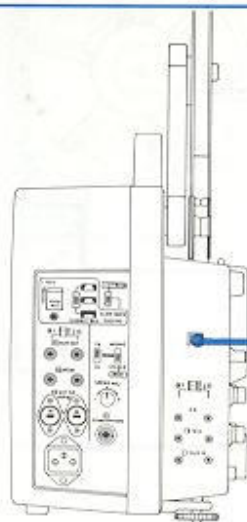
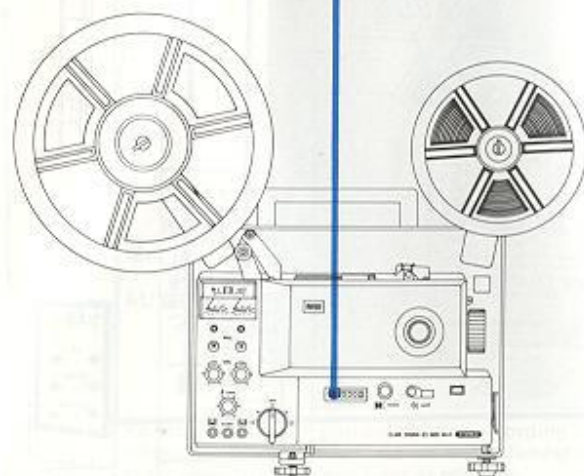
Reset button



Reversing



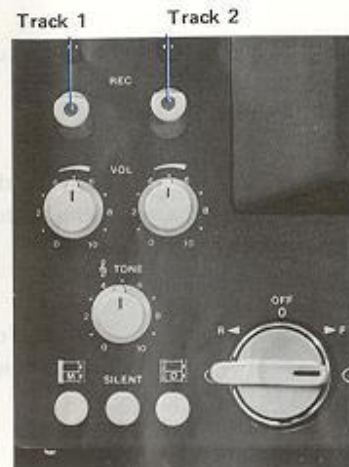
B. Stop the projector once, and reverse it until the digit number of the counter comes to between 9994 and 9990.



10

While depressing the recording button, advance the motor switch clockwise to "D" through "F".

Recording button



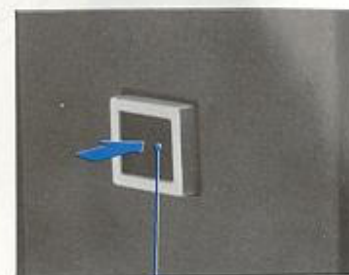
Motor switch

11

Start the tape recorder just when the digit number of the film counter comes to 0000, and recording is set up.

12

Stopping the projector releases the recording. To discontinue the recording without stopping the projector, depress the spot recording button.



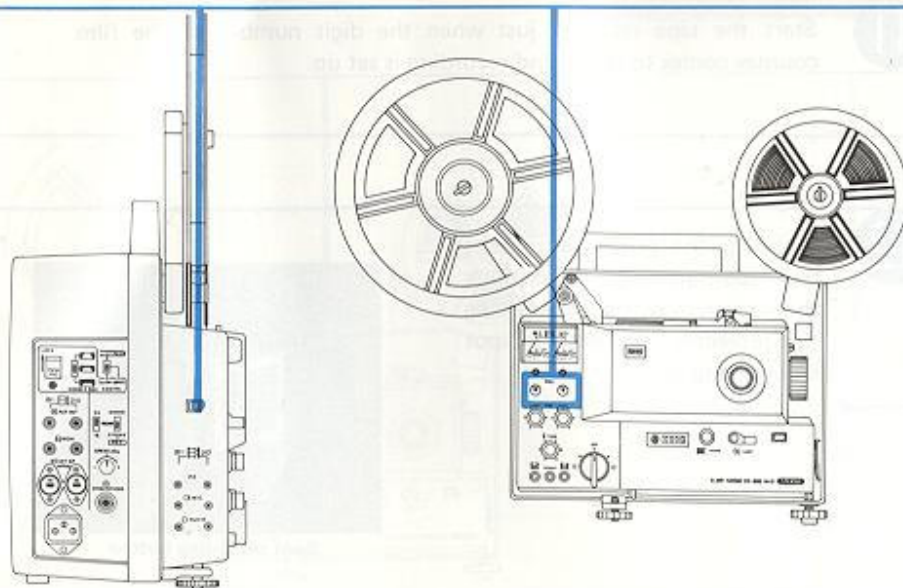
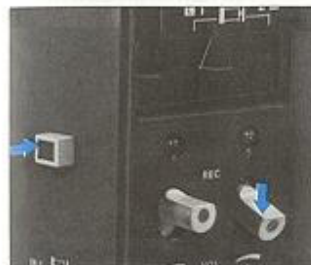
Spot recording button

Spot recording

1

To make spot recording without stopping the projector:

1. Depress the recording button, while depressing the spot recording button.
2. Release the spot recording button. Then the recording button is locked for recording.
3. To cancel recording, depress the spot recording button again or stop the projector.



Stereo recording

1

Use track 1 for the left channel sound and track 2 for the right channel sound.

2

Adjust the recording level of each track with the volume control knob of respective channel.

3

Start the projector while depressing both recording buttons for track 1 and track 2.

Note:

Make sure that the recording indicators of both channels light.

Recording button



Monoaural recording

1

For monoaural recording, use either track 1 or track 2.

2

For recording procedure, see "Recording procedure" on page 20. Adjust the level with the volume control knob for the track being recorded.

3

Make sure that the recording indicator lights while recording.

Recording indicator



Volume control knob

Adding sound to simultaneously recorded film

With the sound camera, sound is simultaneously recorded on track 1. Add your BGM/narration/sound effects on track 2 to accompany the original sound on track 1.

Note:

When adding sound with double recording facility, see "Double recording" on page 31.

1 Use jacks and control knobs for track 2.

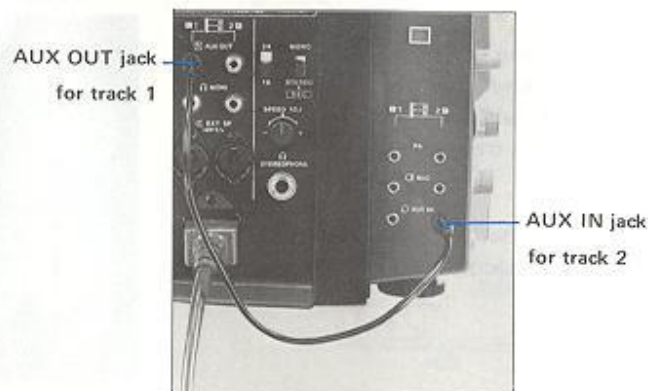
2 It is recommended to monitor the simultaneously recorded sound on track 1 through the stereo headphone or supplied earphone while recording sound on track 2.

Note:

Adjust the monitoring level of simultaneously recorded sound on track 1 with the volume control for track 1.

Track to track sound transfer

1 To transfer sound from track 1 to track 2, connect the AUX OUT jack for track 1 to the AUX IN jack for track 2 with supplied connection cord MC-021.



2 Start the projector and adjust the AUX OUT level of track 1 with the volume control knob of track 1 so that the level meter needle stays around 0 (100%).

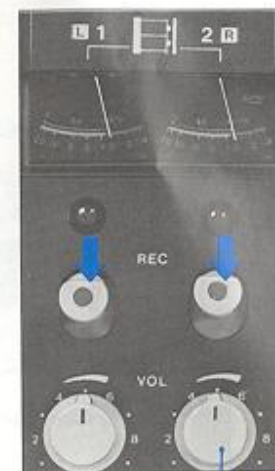


Volume control knob for track 1

3 Set the controls for track 2 to the recording, and start the projector. Adjust the recording level of track 2 with the volume control knob for track 2, and transfer sound from track 1 to track 2.

Note:

1. When the volume control knob for track 2 is turned too far, undesirable self oscillation may occur. (In this case, level meter swings extremely to the RH end of meter range.) Adjust the volume control so that the self oscillation will not occur.
2. Monitoring the sound being reproduced from track 1 and being recorded on track 2 is possible.



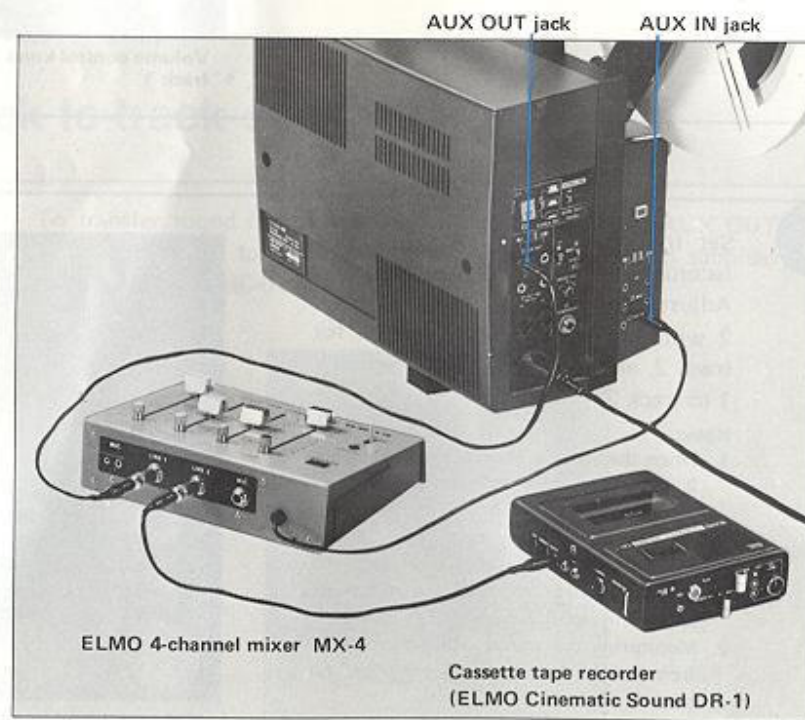
Volume control knob for track 2

4

To transfer sound from track 2 to track 1, connect AUX OUT jack for track 2 to AUX IN jack for track 1 with the supplied cord MC-021. Use the controls for recording for track 1.

■ Sound mixing during track to track sound transfer

Elmo 4-channel mixer MX-4 (option) is convenient for mixing sound during track to track sound transfer.



Double (sound on sound) recording/ Fade recording

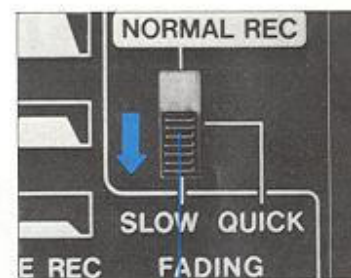
The GS-800 is equipped with automatic sound fade-in/out recording mechanism. With this facility, sound can be added over the recorded track without erasing the original sound. Selection of fading time is possible.

1

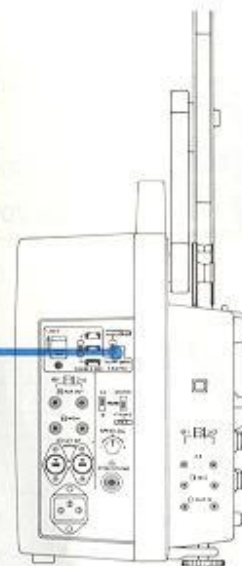
Set the fade recording selector at QUICK or SLOW.

At QUICK position, fading-in/out time is approx. 0.5 sec.

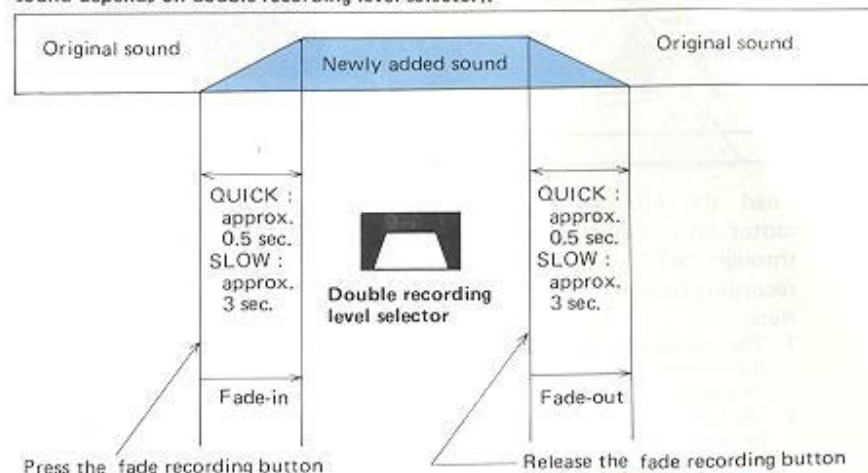
At SLOW position, fading-in/out time is approx. 3 sec.



Fade recording selector



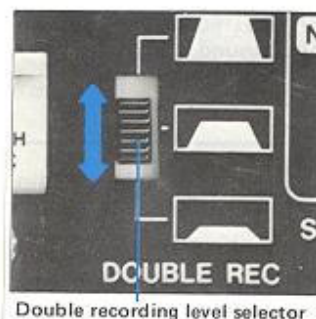
One case of double recording (Sound level ratio of original sound and newly added sound depends on double recording level selector).



2

Set the double recording level selector at the desired position. Sound level ratio during the double recording is as follows.

Selector	Original sound	Added sound
	0%	100%
	approx. 30%	approx. 70%
	approx. 70%	approx. 30%

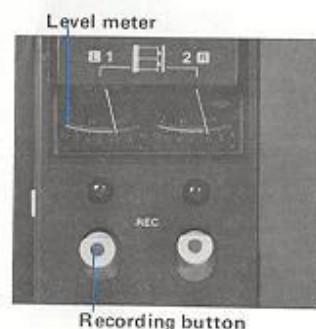


3

Connect the inputs and adjust the recording level while depressing the recording button.

Note:

1. Recording indicator does not light.
2. In case of double recording, recording level cannot be indicated on the level meter.

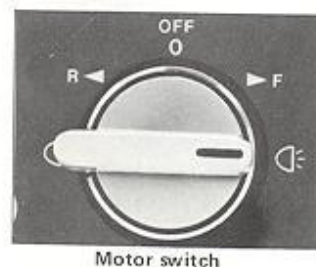


4

Load the film and advance the motor switch clockwise to "D" through "F", while depressing the recording button.

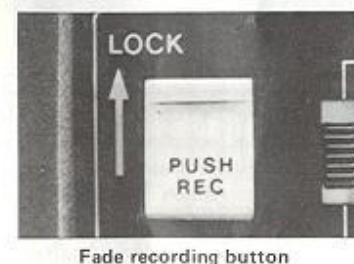
Note:

1. The recording indicator does not light even if recording button is depressed.
2. On this setup, original sound cannot be erased and newly adding sound cannot be recorded.



5

Depress the fade recording button just when the desired scene for double recording comes. The button is locked by pushing up while depressing. Automatic fading-in time is approx. 0.5 sec. at the QUICK position of the fade recording selector, and approx. 3 sec. at the SLOW position. Then sound to be added will gradually increases to the preset level with double recording level selector, and recording indicator increases its glow with the recording level.



6

To release the double recording/fade recording, depress the fade recording button downward. Then additionally recorded sound will gradually reduce and original sound will dominate. The fading-out time of added sound is approx. 0.5 sec. at the QUICK position of fade recording selector, and approx. 3 sec. at the SLOW position. Recording indicator will decrease its glow with the reduction of recording sound.



Fade recording button

7

Remote control of double recording/fade recording operation is possible with a cable release.

1. Attach the cable release to the cable release socket.
2. Double recording/fade recording is being done during the cable release is being depressed.
3. By setting the release free, double recording/fade recording is cancelled.






Cable release socket

Note:

1. It is recommended to use a camera cable release a little longer.
2. Cable release operation is applicable only for double recording/fade recording.

On any particular part of simultaneously recorded film, sound can be erased completely or its volume can be reduced with double recording mechanism.

- To erase the sound;
Setting double recording level selector at , make double recording without connecting any sound source.
- To reduce the sound volume partially;
Setting double recording level selector at  or , make double recording without connecting any sound source.

Sound transfer from simultaneously recorded stereo tape to sound tracks

Currently available Super 8 sound camera has no stereo recording facility. But GS-800 allows to make stereo sound film with picture-sound synchronization by transferring the stereo sound, which was recorded simultaneously with the picture by using an independent stereo tape recorder, from the stereo tape to sound tracks of film. When the sound to be recorded does not accord with the scene of movies due to the fluctuation and/or deflection of running speed of tape recorder or projector, use GS-800's projection speed control facility.

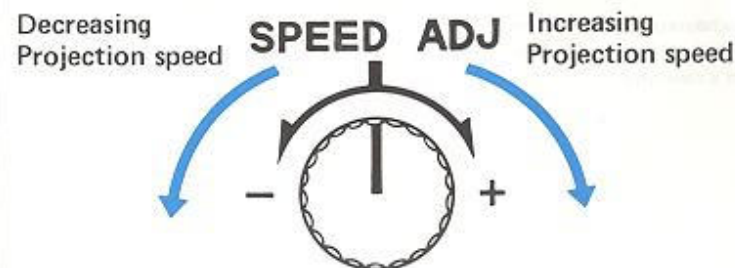
When transferring the sound from tape to sound tracks, adjust the speed with the GS-800's speed knob so that the picture may meet the scene.

Note:

1. Projection speed can be varied within \pm approx. 1 frame at 18 fps and within \pm approx. 2 frames at 24 fps.
2. For ordinary recording and playback, be sure to set the speed knob in the middle.



Speed knob



Microphone

Supplied microphone is high-performance electret condenser type, which requires one AA (or R6) battery for operation. Be sure to install the AA (or R6) battery before operation.

Note:

Unload the battery in case microphone is not used for a long time.

If an exhausted battery is kept in the microphone for a long period, battery fluid may leak out of the battery and damage the microphone.



● Installing battery

Turn the metal case of the microphone counterclockwise and pull out the inner body until the battery holder appears.

Load it with an AA (or R6) battery in accordance with the polarity indication.

Note:

The exhausted battery affects output level of the microphone. In such a case, replace it with a new one.

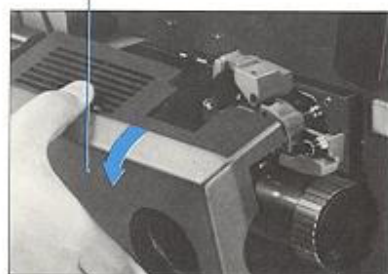


MAINTENANCE AND CHECK

Cleaning

To get maximum performance, regular cleaning is vital. When cleaning, be sure to set the motor switch at "OFF" and to disconnect the power cord.

- 1 Pull the top of the front cover toward you to open.

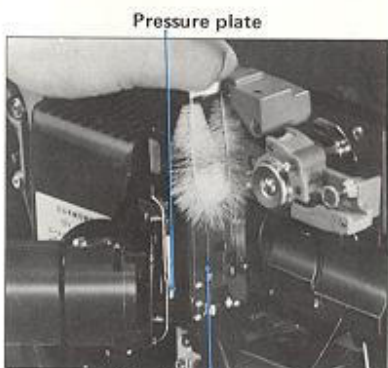


Front cover

- 2 Swing the lens away from the projector.



- 3 Gently clean the aperture and pressure plate with the brush supplied or soft lint-free cloth.



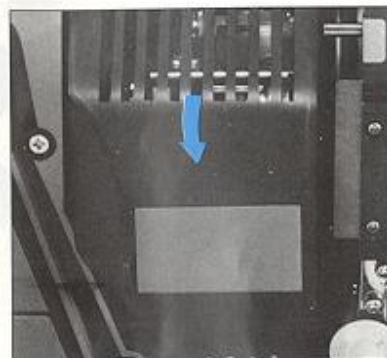
Aperture plate

Dust which adheres to the magnetic head surface may affect recording/playback performance. So clean the head surface gently by cleaning stick or soft cloth.

Replacing projection lamp

- Disconnect the power cord and set the motor switch to "OFF".
- Use 12V-100W halogen lamp with a cold mirror. (ANSI code EFP or equivalent.)
- It is recommended to prepare a spare lamp.

- 1 Remove the lamp cover by pulling toward you.

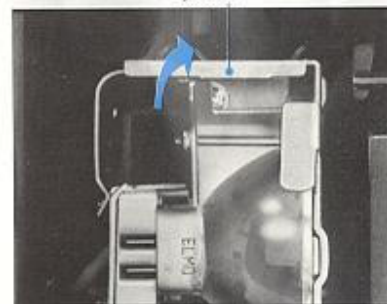


Ejector

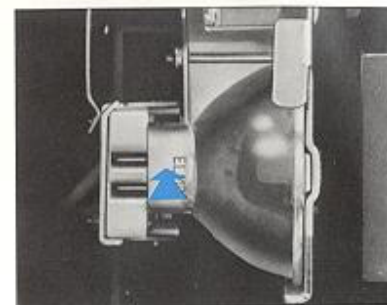
- 2 Swing up the lamp ejector, and the lamp will come away from the socket.

Note:

When replacing the lamp in a hurry during projection, be careful as the lamp may still be hot.



- 3 Push the lamp into the socket securely and swing down the ejector.



Voltage selection

Voltage can be adjusted to comply with electrical requirements of each country. (There is a single voltage model that complies with the electrical regulations and condition of each country.)

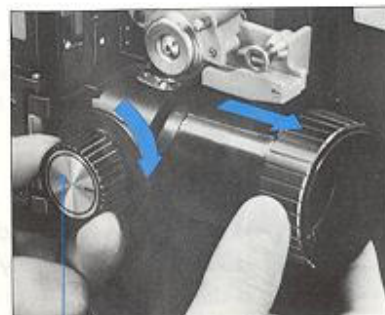
- 1 Disconnect the power cord.
- 2 Loosen screws and remove the rear cover.
- 3 Pull out the voltage selection plug. Align the notch with the required voltage and then insert the plug back into the socket so that the voltage can be read through the notch.

Note:

Projector sold in the USA is not designed for voltage alteration.

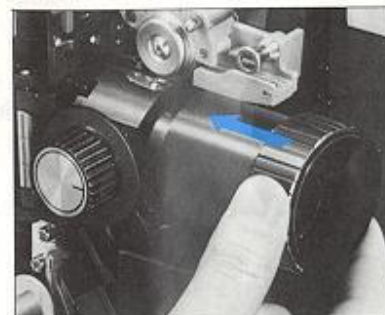
Changing projection lens

- 1 Turn the focus knob fully clockwise, and pull out the lens gently.



Focus knob

- 2 Turn the focus knob fully clockwise, while pulling focus knob towards you, insert the lens barrel into the sleeve until the lens is all the way in.



Storing

- 1 Make sure that the projector has cooled sufficiently.
- 2 Cover the projector with the supplied dust cover, and store it at the place free from moisture.

Trouble-shooting hints


■ Motor does not run

1. Is the power cord properly plugged in?
2. Does the fuse blow out?

■ Film does not thread properly

1. Is the film leader correctly trimmed?
2. Isn't the film extremely curled?
3. Is the auto thread lever set?

■ Projection lamp does not come on

1. Is the motor switch set at ?
2. Isn't the lamp itself defective?

■ Recording is not possible

1. Is the sound selector at M position?
2. Is the fade recording selector at NORMAL REC?

■ Playback is not possible

1. Is the sound selector at proper position (M for magnetic sound film or O for optical sound film)?
2. Isn't the volume control knob turned fully counterclockwise?
3. Isn't the exciter lamp for optical reproduction broken?

■ Stereo effect in playback is hardly obtained

1. Is the stereo-mono selector at STEREO position?
2. Is the volume control knob turned properly?
3. Is the connection of the extension speakers for the R channel and L channel correct?
4. Is the film a stereophonically recorded one?
5. Are the extension speakers connected at the proper polarity?

■ Double recording is not possible

1. Is the fade recording button depressed?
2. Is the double recording level selector set at proper position?

Accessories

● Elmo viewer type 100

With the viewer type 100, you can show your films under daylight condition. Use the GS-800 adapter to attach viewer to your projector.



● Continuous loop projection device EF-400

No rewinding necessary. When attached to your GS-800 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 400ft (120m) of film.



● Long-focus zoom lens

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

● Fast zoom lens

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



● **Extension speakers 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.



● **4-channel mixer MX-4**

For mixing sound from four separate sources onto one track.

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

Easily connects to tape recorder, record player and microphone.



● **Elmo rewinders**

Large reel capacity-1200ft (360m). Fast winding. One rotation of crank turns reel three times.



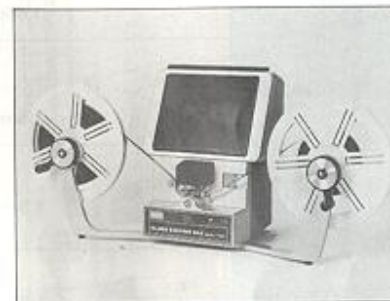
● **Sound editor 912/S**

Incorporates Super 8/Single 8 magnetic sound reproduction facility. Capable of flickerless projection at the constant speed of 18 and 24 fps. For editing convenience, possible to adjust projection speed at the range of 10-30 fps continuously. Large 120 x 90 mm built-in screen assures you bright and clear image projection.



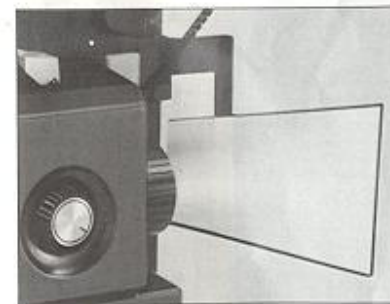
● **Editor 912**

Accepts both Super 8 and Regular 8 film. Includes sound monitor, film counter and film cleaner as optional attachments. 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.

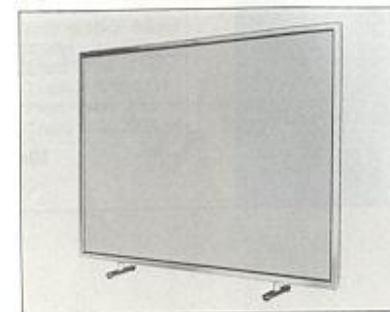


● **Translucent screens**









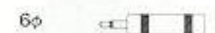
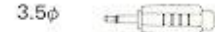

60 cm x 80 cm (23.6" x 31.5")

39 cm x 52 cm (15.4" x 20.5")

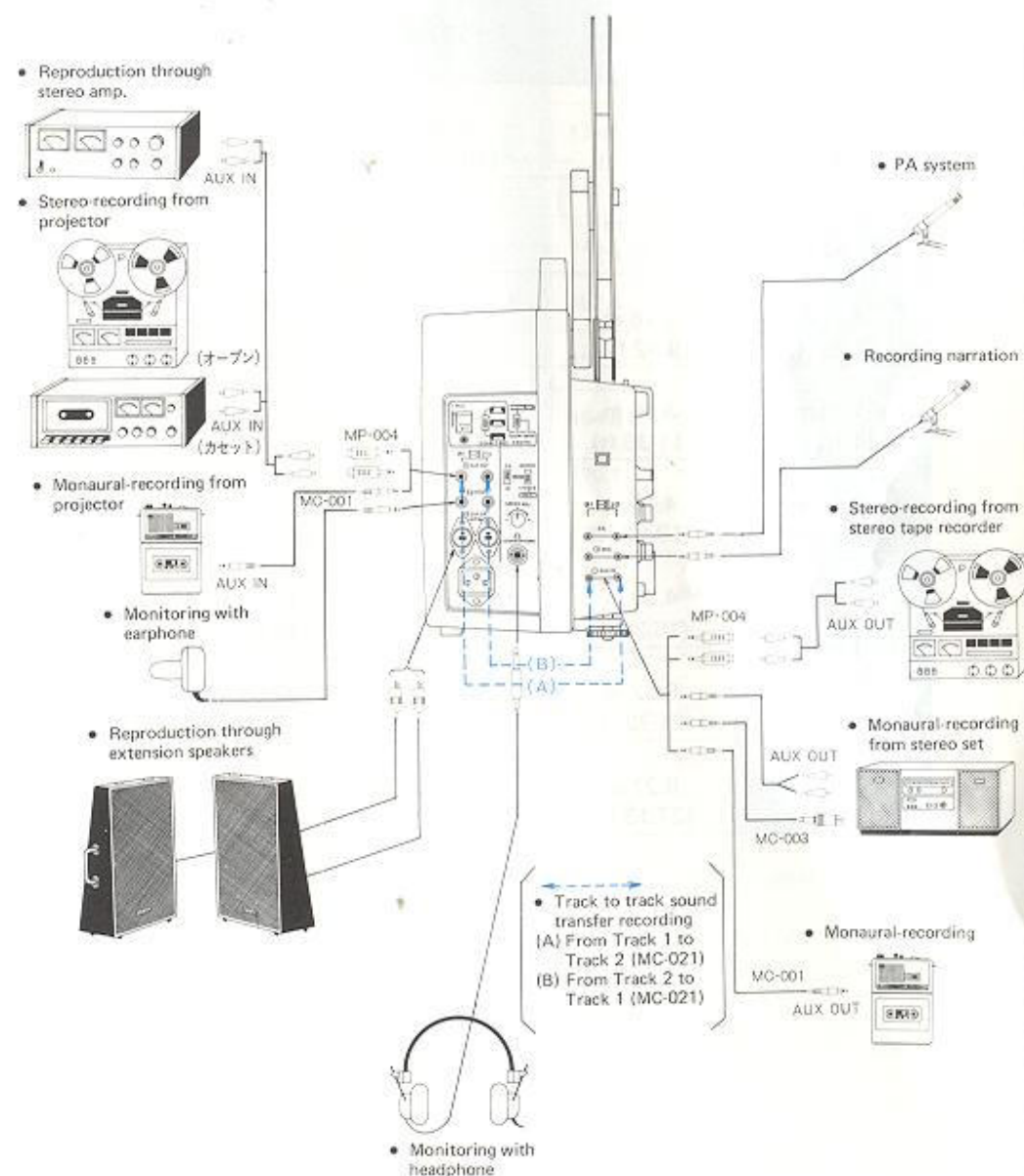
Special quality screens for rear projection under daylight condition.



Accessory cords

	Code No.	Specifications	Remarks
Connection cord	MC-001	 1.5m	1.5 m
	MC-002	 1.5m	1.5 m
	MC-003	 1.5m	1.5 m
	MC-004	 1.5m	1.5 m
	MC-006	 1.5m	1.5 m
	MC-009	 1.0m	1.0 mm From earphone or monitor jack to AUX IN input
	MC-010	 1.0m	From earphone or monitor jack to MIC input
Adaptor	MP-001	 6φ	
	MP-002	 3.5φ	
	MP-004	 Pin jack	
Speaker cord	SC-002	 10cm	10 cm For ST-800, ST-1200D, ST-1200HD, GS-1200

Cord connection



Projection distance and image size

Image size in width	Projection distance		
	f = 15 mm	f = 25 mm	f = 50 mm
70 cm (2.30 ft)	1.95 m (6.40 ft)	3.26 m (10.70 ft)	6.51 m (21.36 ft)
90 cm (2.95 ft)	2.50 m (8.20 ft)	4.17 m (13.68 ft)	8.34 m (27.36 ft)
1 m (3.28 ft)	2.78 m (9.12 ft)	4.63 m (15.19 ft)	9.26 m (30.38 ft)
1.25 m (4.10 ft)	3.46 m (11.35 ft)	5.77 m (18.93 ft)	11.55 m (37.89 ft)
1.5 m (4.92 ft)	4.15 m (13.62 ft)	6.92 m (22.70 ft)	13.84 m (45.41 ft)
1.8 m (5.91 ft)	4.98 m (16.34 ft)	8.29 m (27.20 ft)	16.58 m (54.40 ft)
2.4 m (7.87 ft)	6.62 m (21.72 ft)	11.04 m (36.22 ft)	22.08 m (72.44 ft)
3 m (9.84 ft)	8.27 m (27.13 ft)	13.79 m (45.24 ft)	27.57 m (90.45 ft)

Projection time and film length

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	21	128.0	420	96.0	315
2	12.2	40	9.1	30	22	134.1	440	100.6	330
3	18.3	60	13.7	45	23	140.2	460	105.2	345
4	24.4	80	18.3	60	24	146.3	480	109.7	360
5	30.5	100	22.9	75	25	152.4	500	114.3	375
6	36.6	120	27.4	90	26	158.5	520	118.9	390
7	42.7	140	32.0	105	27	164.6	540	123.4	405
8	48.8	160	36.6	120	28	170.7	560	128.0	420
9	54.9	180	41.1	135	29	176.8	580	132.6	435
10	61.0	200	45.7	150	30	182.9	600	137.2	450
11	67.1	220	50.3	165	31	189.0	620	141.7	465
12	73.2	240	54.9	180	32	195.1	640	146.3	480
13	79.2	260	59.4	195	33	201.2	660	150.9	495
14	85.4	280	64.0	210	34	207.3	680	155.4	510
15	91.4	300	68.6	225	35	213.4	700	160.0	525
16	97.5	320	73.2	240	40	243.9	800	182.9	600
17	103.6	340	77.7	255	50	304.8	1000	228.6	750
18	109.7	360	82.3	270	60	365.8	1200	274.4	900
19	115.8	380	86.9	285	70	426.8	1400	320.0	1050
20	121.9	400	91.4	300	80	487.8	1600	365.8	1200

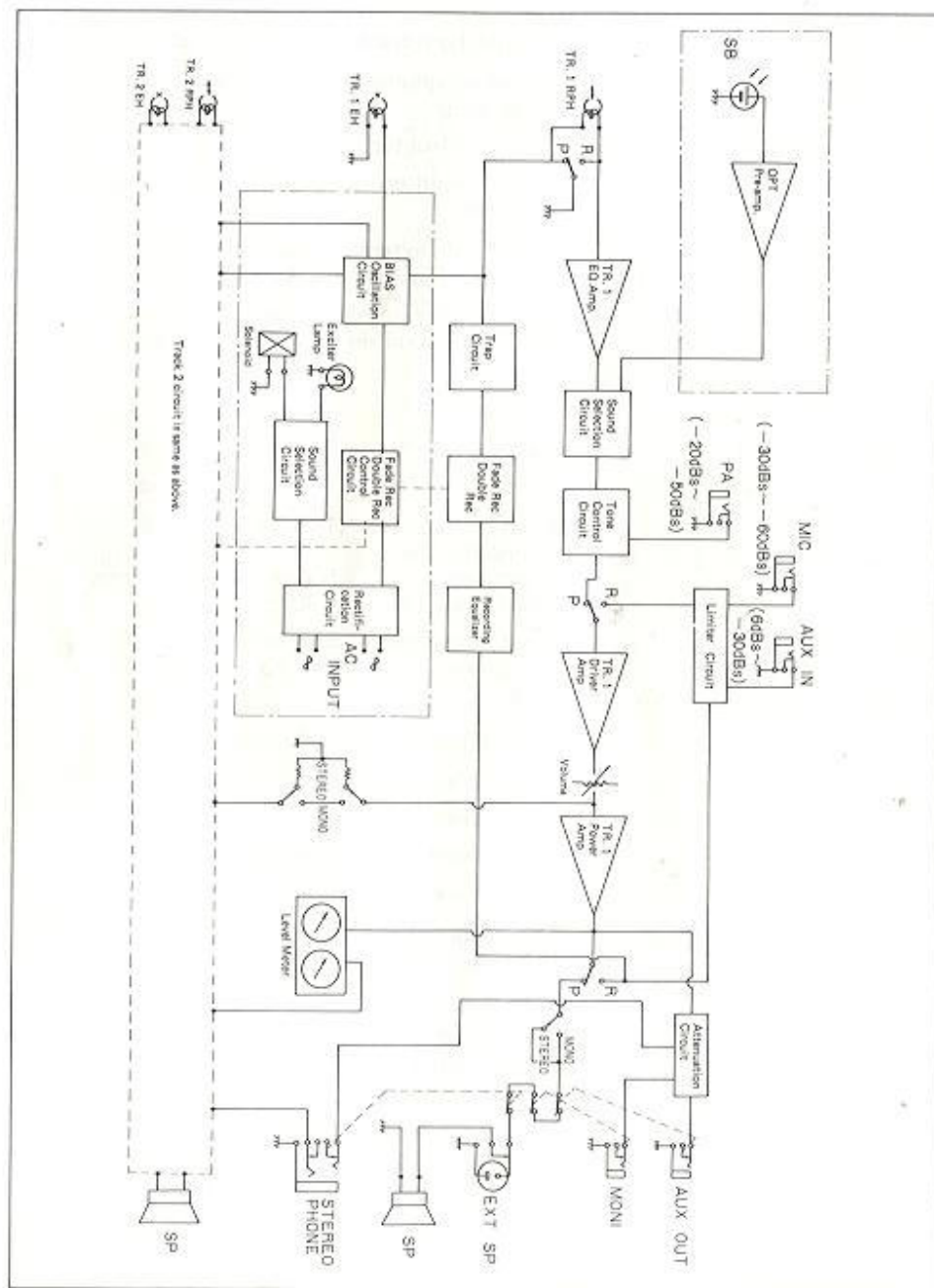
Specifications

Power source:	Single phase AC, 50/60Hz
Power consumption:	200W
Projection speed:	24 & 18 fps (Fine speed adjustment is possible.)
Film:	Super 8/Single 8 sound and silent films
Film loading:	Fully automatic
Reel capacity:	Max. 240m (800 ft)
Projection lamp:	12V-100W Halogen lamp with cold mirror (ANSI Code: EFP)
Projection lens:	F1.3 f = 15-25mm zoom lens
Motor:	Frequency generator servo DC magnet motor
Reverse projection:	Possible
Film rewinding:	High speed rewinding
Frame counter:	Built-in, one digit per 18 frames
Angle adjustment:	Up to 7° (Inclination adjustment is possible.)
Sound system:	Model M-0 . . .Magnetic and optical sound playback and magnetic recording Model MMagnetic playback and recording
Stereo recording/playback:	Simultaneous magnetic recording/playback of sound on track 1 (Main stripe) and on track 2 (Balance stripe) for true stereo sound is possible.
2-track recording/playback:	Simultaneous and individual recording/playback of sound on track 1 and/or track 2 is possible.
Track-to-track sound transfer:	Possible from track 1 to track 2 or vice versa.
Fade recording:	Auto fade recording is possible simultaneously or independently on track 1 and track 2 (Quick/Slow fading time selection is possible.)
Double recording:	Possible simultaneously or independently on track 1 and track 2 (Recording level of added sound can be adjusted in 3 steps.)
Spot recording:	Possible simultaneously or independently on track 1 and track 2.
Limiter recording:	Possible, limiter works for sound from both AUX IN and MIC.
Public address:	Possible through track 1/track 2 channel. (Applicable Mic. Impedance: 500 ohms — 10K ohms)

Monitoring:	Possible, both track 1 sound and track 2 sound.
Volume control:	Individual volume control of track 1 and track 2 is possible.
Tone control:	Treble control type
Amplifier:	Stereo amplifiers using 7 ICs, 5 transistors and 16 diodes.
Music power output:	8W x 2 with extension speakers (8 ohms) 4W x 2 with built-in speakers (16 ohms)
Continuous power output:	6W x 2 with extension speakers (8 ohms) 3W x 2 with built-in speakers (16 ohms)
Stereo-mono selection:	Possible
Recording indication:	2 LEDs
Level meter:	Stereo type
Input terminals:	
MIC (x2):	Input impedance . . .10K ohms Applicable Mic. Impedance500 ohms — 10K ohms Input level-30 ~ -60 dBs
AUX IN (x2):	Input impedance . . .50K ohms Input level6 ~ -30 dBs
Output terminals:	
AUX OUT (x2):	Output impedance . .600 ohms
MONITOR (x2):	Applicable earphone impedance8-16 ohms
STEREO HEADPHONE:	Applicable impedance8 or 16 ohms
EXT SP (x2):	Applicable speaker impedance8 ohms
Speaker:	Two speakers are built-in impedance . . 16 ohms
Recording/playback head:	2-track special alloy magnetic head (Alternating bias system)
Photo electric element:	Solar battery
Exciter lamp:	DC lighting system 4V-0.75A Halogen lamp
Microphone:	Electret condenser type Impedance: 600 ohms
Dimensions & Weight:	330 x 260 x 190 mm (13.0 x 10.2 x 7.5 in.) 9.4 kgs. (21 lbs.)

Specifications are subject to change without prior notice.

Block diagram



WARNING

THIS APPLIANCE MUST BE EARTHED

IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

Green and yellow	Earth
Blue	Neutral
Brown	Live

The appliance must be so operated that air flow to and from ventilation slots is not impeded.

— This warning is applicable for United Kingdom only. —