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PROJECTIONIST'S GUIDE

Automated Theatres

16mm. Projector Systems

CAMERON PUBLISHING COMPANY
Established 1915
CORAL GABLES, FLORIDA, U. S. A.

AUTOMATIC MOTION PICTURE PROJECTION SYSTEM

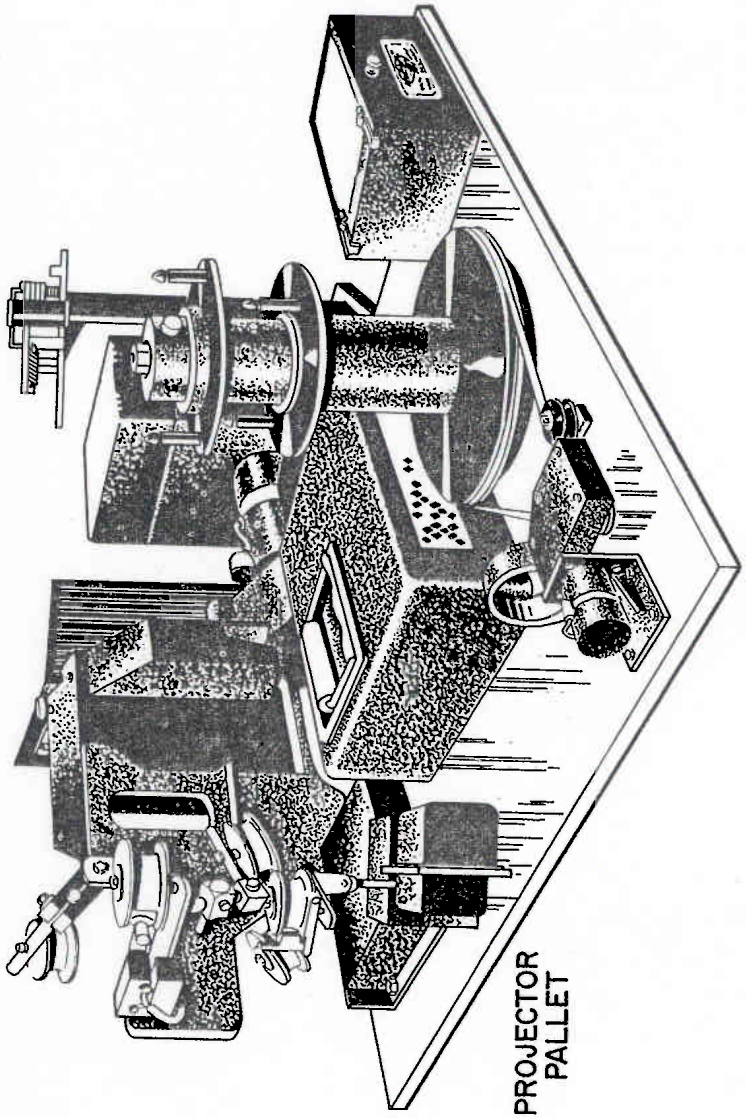
The equipment to be used by the Trans-Lux INFLIGHT Corporation in the many new theaters they intend opening throughout this country and Canada will be Sixteen Millimeter. This is necessary because of operating costs, this will permit use of sixteen millimeter film prints as against the 35mm or larger prints, the smaller prints costing only a fraction of the cost of the larger width films.

The new theaters are to be built in areas which are not populous enough to financially support the conventional motion picture theater with its heavy overhead.

INFLIGHT already has a few of these theaters in operation, one of them in Bartow, Florida.

The use of the sixteen millimeter film will necessitate that the seating capacity in these theaters be kept under 400, thus permitting the use of a small screen.

We understand that the screen will be some 25 feet in width, as against the huge 85 feet wide screens used in the D–150 systems. However, the smaller screen and the much shorter "projection throw" should result in a very satisfactory screen picture.



THEATRE AUTOMATION

A word about the Hokushin projector also covered in this booklet. This too is a sixteen millimeter Automatic sound projector, it is made in Japan, and is now used throughout the world in TV work, with some modification it could be converted into a projector for use in these new small theaters, some thought along these lines is now being given to this.

The Horston Professional 16 mm projector with the new XeTRON arclamp, and handled by Carbons Inc. could also be used in this type of theater.

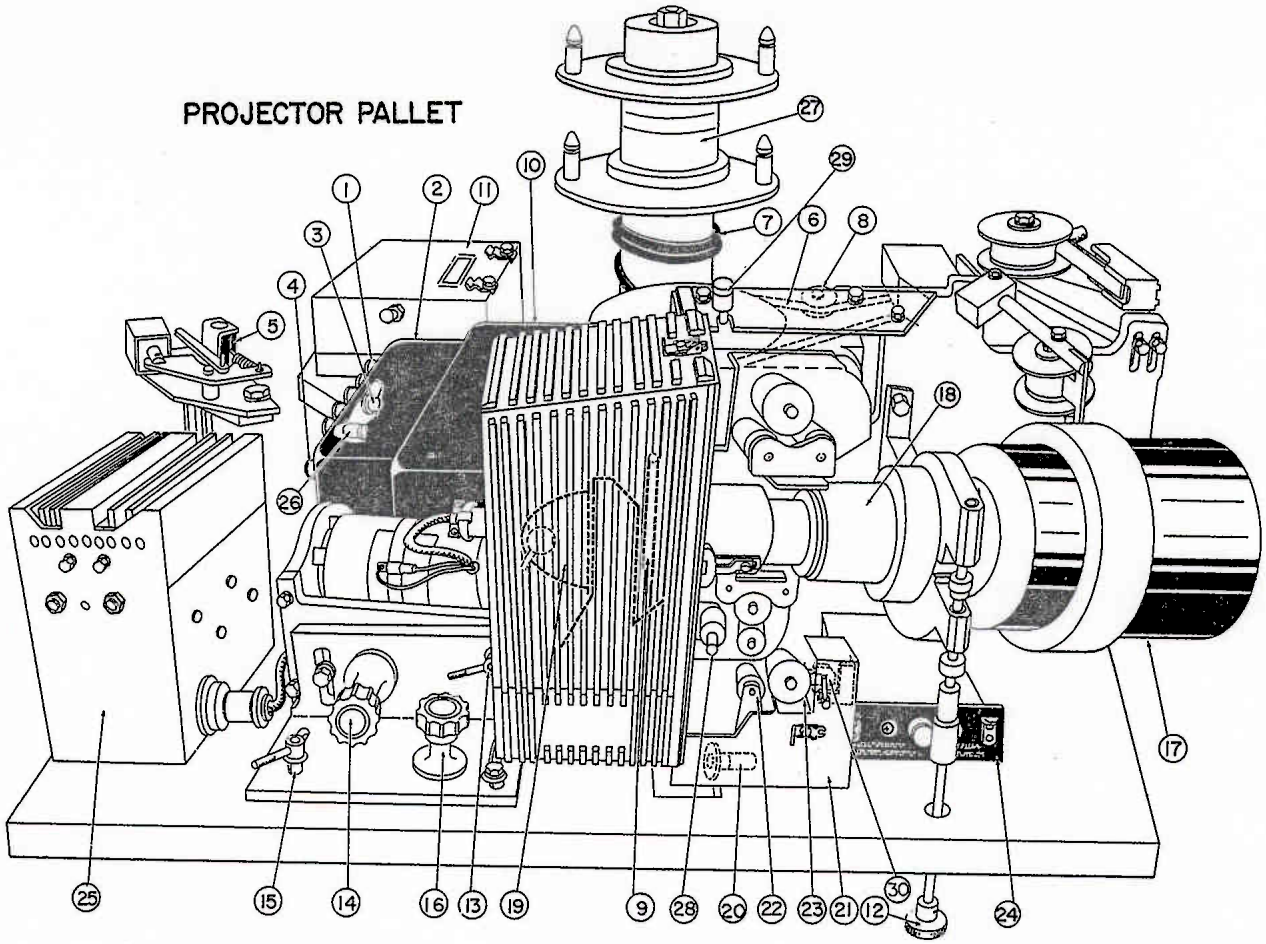
The projector used would have to be capable of running a three hour continuous show without any projectionists care or attention, after the reels of film have been pre-set. This is necessary so as to allow the projectionist to be available to carry on the other duties connected with the running of these "ONE MAN THEATERS."

INFLIGHT MOVIES

The INFLIGHT movie system has been used for several years by the transcontinental airlines for the showing of motion pictures to passengers while the airplane is in flight.

The equipment on these planes consists of a projector or pallet base, on which the projector and associated equipment is mounted, a motion picture screen, a control panel and an individual audio control box, placed at each passengers seat.

This control box allows each passenger who desires to watch the picture, to control the sound volume coming to his ears through ear-sets.



Projector Pallet

1	CIRCUIT BREAKERS (5)	16	HORIZONTAL ADJUSTMENT KNOB
2	ELECTRICAL CONTROL BOX	17	CINEMASCOPE PROJECTION LENS
3	START BUTTON	18	PROJECTION LENS
4	STOP BUTTON	19	PROJECTOR LAMP
5	FEED REEL BRAKE	20	EXCITER LAMP
6	TAKEUP BELT	21	EXCITER LAMP COVER
7	SPARE TAKEUP BELT	22	SOUND TENSION ROLLER
8	IDLER PULLEY	23	SOUND DRUM
9	PROJECTOR DRIVE BELT	24	PRE-AMPLIFIER (IR 4000 only)
10	LAMP HOUSING	25	AMPLIFIER
11	SPARE PARTS COMPARTMENT	26	WARNING INDICATOR
12	FOCUSING KNOB	27	CAPSTAN
13	VERTICAL LOCK	28	LOOP SETTER
14	VERTICAL ADJUSTMENT KNOB	29	FRAME ADJUSTMENT KNOB
15	HORIZONTAL LOCK	30	MAGNETIC PICKUP HEAD (IR4000 only)

A special projector had to be designed and built for installation in the plane, space in trans-continental aircraft is valuable, and the type of projectors then available could not be installed in the planes. A projector had to be built so that it could be fitted into existing space on the plane and would not interfere with passengers seating arrangements, would not block passageways or take up space required for other necessary equipment.

Then again the projector had to be constructed so that it could supply three hours of continuous programing without any attention from anyone, from the time the picture program was started until the end of the film performance.

INFLIGHT came up with such a projector, a projector different in design and construction from any other projector, a projector that required only someone to push a button to start it running, then forget about it for the following three hours.

They were able to do this by arranging to have the complete film program of up to three hours, made up on a single feed reel, by eliminating the use of a carbon arc and using a light source that could run the full three hours of performance time, without any attention.

The INFLIGHT motion picture projection system is completely automatic, it is serviced, adjusted and tested by ground personnel before each flight. The responsibility of the flight crew is limited to adjusting the motion picture screens on which the pictures are projected and to the starting and stopping of the equipment at the beginning and end of the film performance.

When the end of the film passes the upper micro-switch, the projector will automatically switch off and the warning light on the control panel will be illuminated.

DESCRIPTION OF PROJECTOR PALLET.

The projector pallet consists of a projector, one film feed reel, one film take-up reel, a sound pre-amplifier, a sound power amplifier, lamp power supply, electric control box, controls, safety devices and spares compartment, all of which are assembled together and mounted on an aluminum honeycomb base.

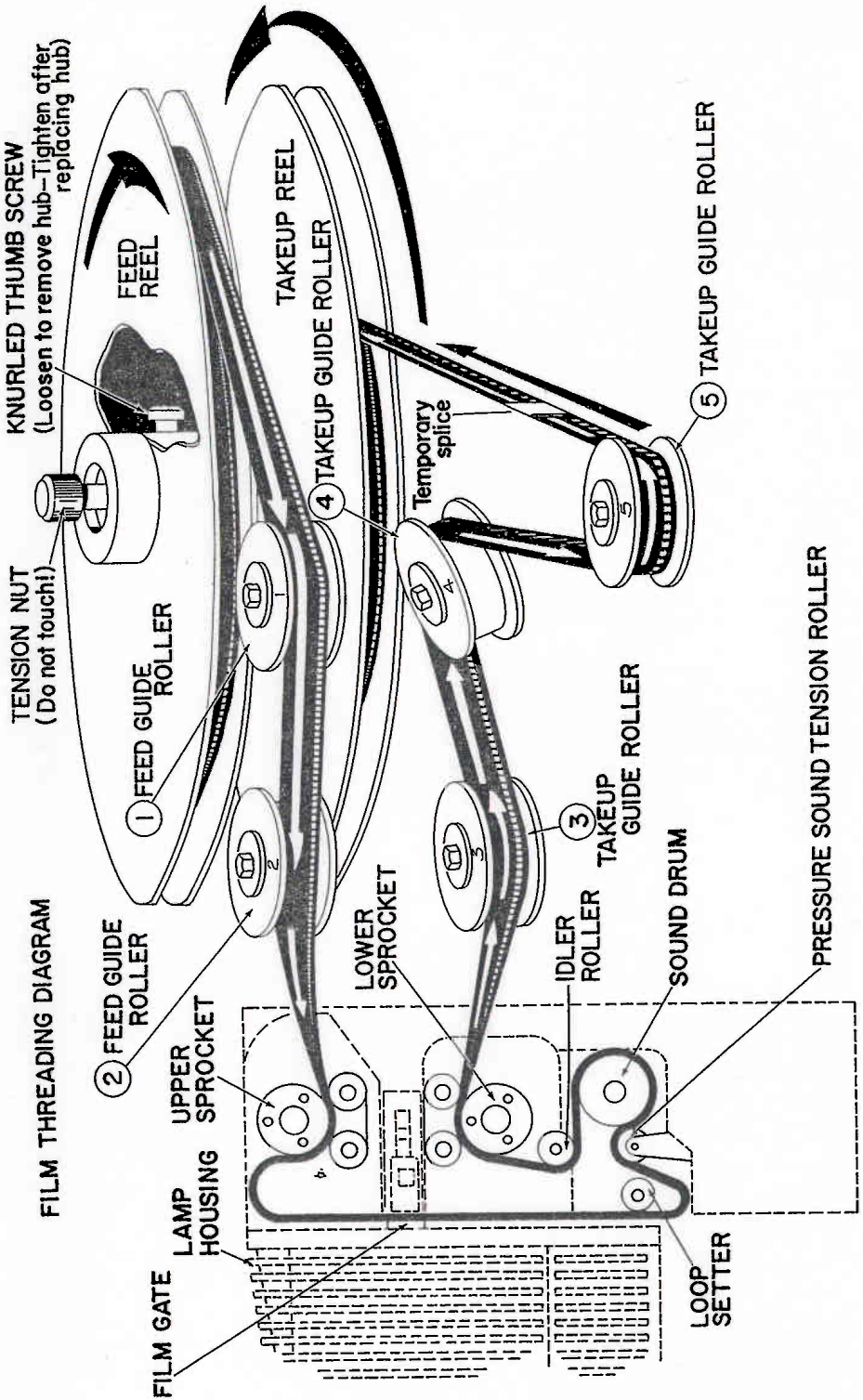
There are two INFLIGHT systems. Model 1R-3000 and the Model 1R-4000. The Model 1R-3000 has provisions for a single (optical) sound track. The Model 1R-4000) has provisions for two (Optical and Magnetic) sound tracks.

The Model 1R-3000 does not contain a seperate sound pre-amplifier unit. Both the pre-amplifier and the power amplifier are contained in one unit.

The Projector Pallet with its associated equipment may be seen in the illustration.

Each Pallet is completely enclosed in a fire resistant projector pod or covering. Located on the electric control box are the necessary circuit breakers, the START and STOP button controls, and indicators for the operation of the equipment.

These consist of three 2-amp 115 Volt, three phase AC, one 4-amp 28 Volt DC, one (7.5 amp on Model 1R-3000, 10 amp on Model 1R-4000) projector lamp circuit breakers, One Start button, one Stop button and a Warning indicator.



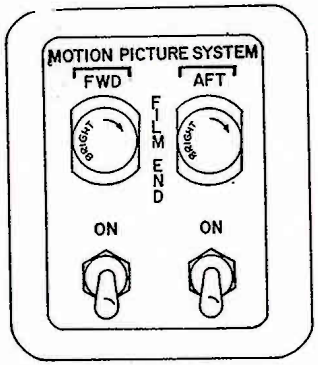
The warning indicator shows when the projector has switched itself off. During normal operation the warning light will be off.

Contained in the Spares Compartment, is a new projector lamp, an exciter lamp, an exciter lamp puller, a projector drive belt and a spare take-up belt.

Also placed around the film reel capstan is an additional spare take-up belt available should a take-up belt need replacing.

The 28-volt DC and each phase of the 115-Volt circuits supplied to the projector pallet is protected by a seperate circuit breaker.

In addition, the projector lamp circuit is protected by a seperate circuit breaker. This circuit breaker is rated at 7.5 amps for the Model 1R-3000 and 10 amps for the Model 1R-4000. These five



CONTROL PANEL

circuit breakers are located on the electric control box.

REPLACEMENT OF PROJECTOR LAMP

Do not touch lamp until cold. Wait approximately one minute after lamp is extinguished.

Do not touch the inside surface of the reflector, or the arc tube inside the reflec tor.

Be certain that the lamp is properly seated in its mount before closing the cover.

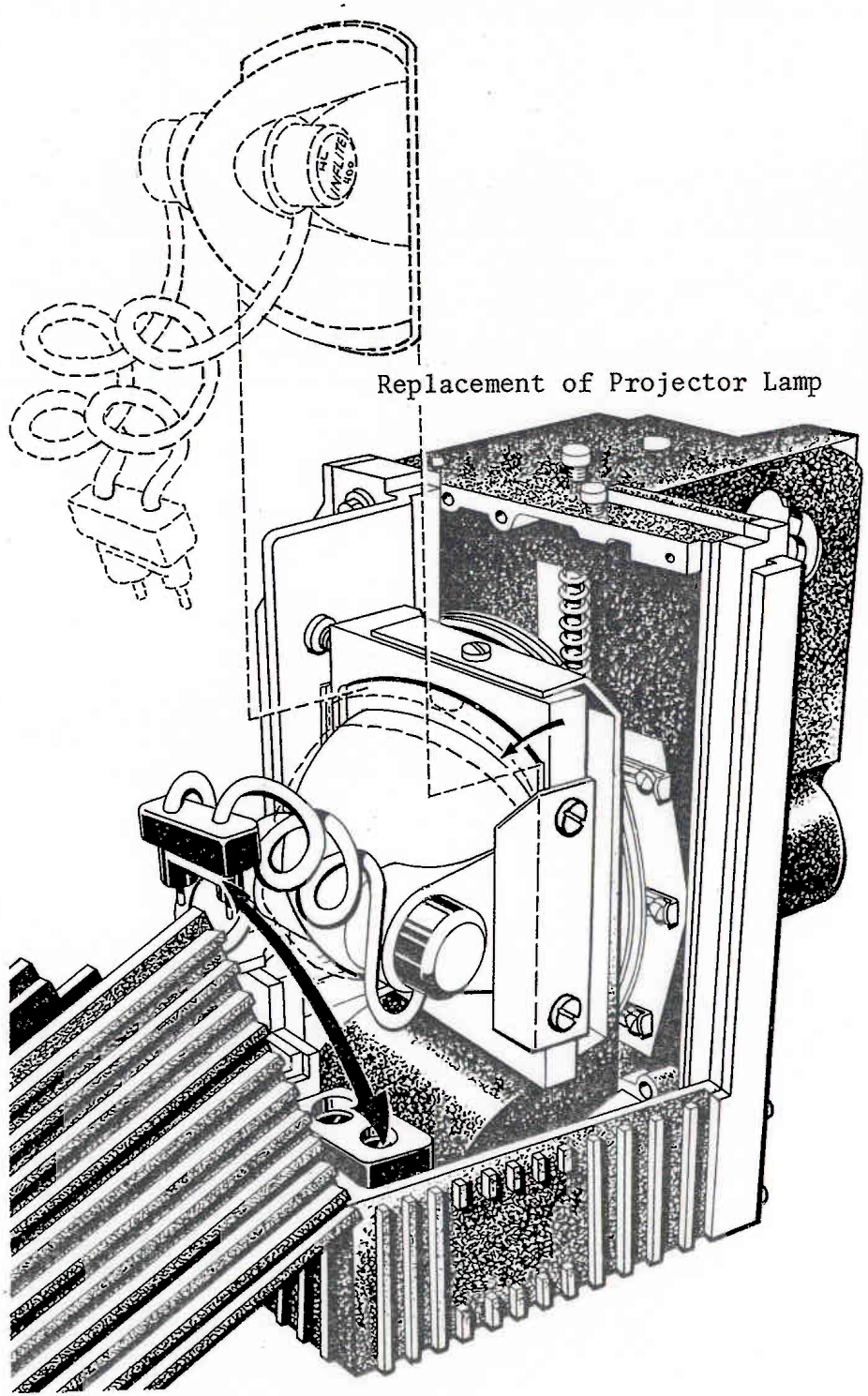
TO REMOVE THE LAMP.

Lightly grasp the lamp by the two ceramic caps.

Tilt the top of the lamp approximately 1/8" until it clears the bracket, then lift upward about 3/8"

Grasp the connector in the other hand and simultaneously withdraw the plug and lamp.

To insert a new lamp reverse this process.



Replacement of Projector Lamp

A microswitch bearing directly onto the film, between the feed film reel and the projector aperture, automatically shuts down the projector if the film should break or become excessively slack at that point.

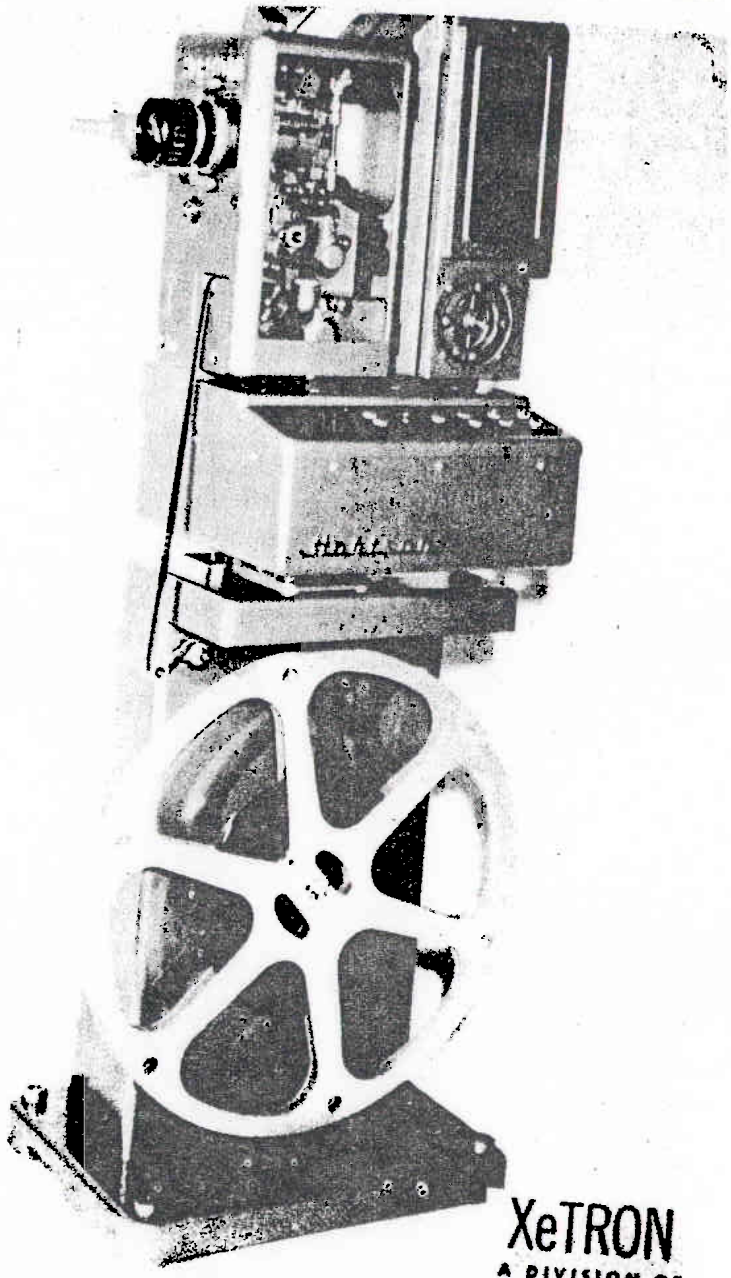
Thermal switches are installed on the projector drive motor, take-up motor, and in the ballast power supply, these automatically shut down the projector if either of these motors or the ballast power supply overheats.

The power amplifier located on the projector pallet is wired so that the Aircraft P.A. priority system will automatically override all movie audio in case this is ever necessary.

The above information covers the projector as installed in aircraft, we understand that the same type projector is to be used in the new AUTOMATED Theaters, however there is a possibility that some changes may be made. The projection equipment was built to conform with the space available for its installation in the aircraft, in the theater installation greater space will be available, so some modifications may be made, however this will not alter the working principle of the projector itself.

We are indebted to INFLIGHT Corp., The Hokushin Electric Works and Carbons Inc. for their cooperation and the use of data and illustrations.

THEATRE AUTOMATION



XeTRON/HORTSON PROFESSIONAL 16mm.

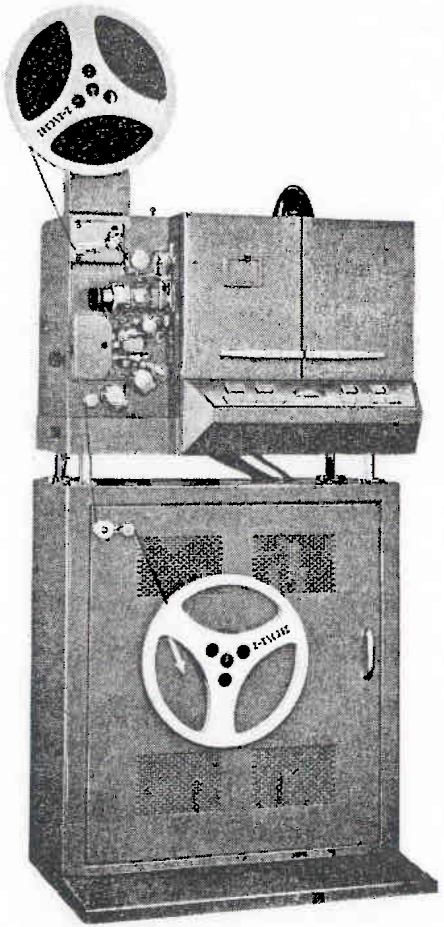
HOKUSHIN
AUTOMATIC 16-mm FILM PROJECTOR

Now, HOKUSHIN has completed an up-to-date projector, HOKUSHIN Automatic 16-mm Film Projector, Model TC-510D, by introducing various automatic mechanisms in its operational units.

This new projector, Model TC-510D, has the following improvements and additional features compared with the projector heretofore in use.

1. Automatic stop at a predetermined frame position.
2. Automatic stop at the end of the film.
3. Automatic replacement of projection lamp.
4. Automatic replacement of exciter lamp.
5. Automatic restoration of film loop.
6. Automatic control of external apparatus (Cue-signal).
7. Quick-starting.
8. Reverse operation.
9. One-touch switching and remote switching for optical and magnetic sound reproduction.
10. Alarm for film cut.
11. Remote operation.
12. Low-inertia drive-motor (current, approx. 3.5A).
13. Level matching for optical and magnetic sound reproduction.
14. Sound-system check circuit.
15. Improvement in sound signal-to-noise ratio.
16. Quiet operation.
17. Overall use of semi-conductors.
18. Easy operation.

There are two types, Model TC-510D and Model TC-510D-25. The former is of the 2–3 pulling-down intermittent projection type and the latter is of the regular interval pulling-down intermittent projection type designed for use with the European system of 25 frames per second.



Model TC-310D

Automatic Stop

The projector can be stopped automatically at a predetermined film position.

The stop-signal detector is provided at the place 6 frames above the film aperture on the sound track side.

When the metallic foil fitted on the film passes this place, a stop-signal is issued. By this electric signal, electromagnetic brake is applied on the drive-motor.

When the frame counter mechanism has rotated the number of times as many as the predetermined number of frames, the main motor is clutched by the action of the DC current and as a result the projector is stopped at a position which permits still projection. This frame counter is provided with mechanisms for forward and reverse operations.

Since the detector and frame counter circuits use high-sensitivity semi-conductors, their precision is insured.

When the film runs out, the projector stops automatically.

The detector, which functions to stop the projector, is provided below the upper reel arm. When the film passing between the rollers runs out, the detector issues a stop-signal.

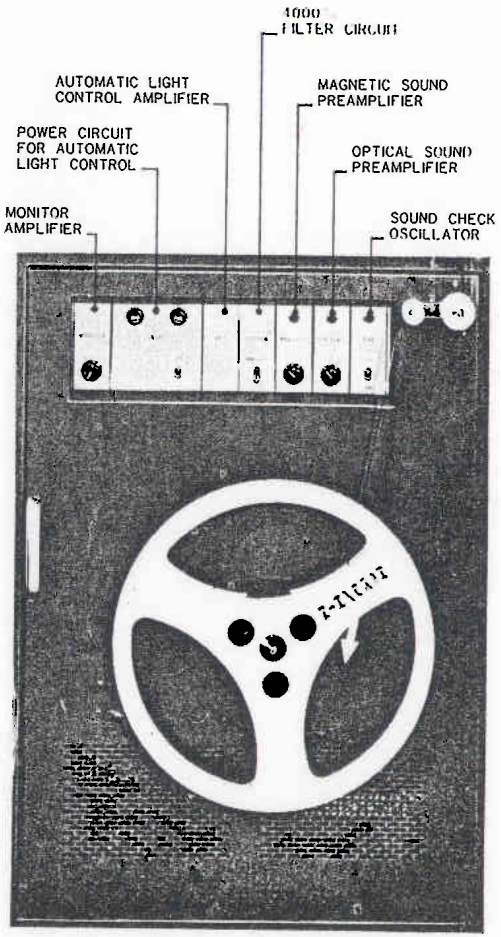
By this electric signal, the projector is stopped automatically

Quick-starting

Both picture and sound are stabilized in less than second after the starting of the projector.

For driving, a low-inertia DC-exciting synchronous

motor is used. Further, by the use of a ball clutch, the sound drum is made to operate forced rotation.

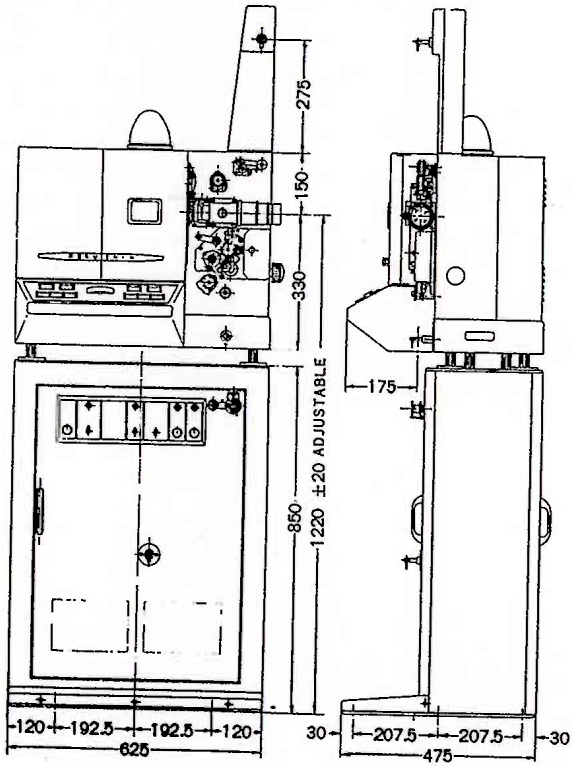


PEDESTAL

Reverse Operation

By operation of push-button switches, "FORWARD," "STOP" and "REVERSE," the projector can be switched easily from forward to reverse operation or vice versa.

Damages that would be caused on the film by the run-out of the lower loop or shock are completely prevented.



DIMENSIONS OF PROJECTOR (mm)

THEATRE AUTOMATION

Automatic Light Control

Light intensity is automatically controlled in accordance with variation in film density.

The photosensitive element is provided at the place 4 frames above the aperture and measures the light intensity. In accordance with the difference between the measured light intensity and the preset light intensity level, the servomotor causes the neutral density filter to rotate and thereby the light intensity entering the vidicon camera is maintained constant automatically. The operational response time is less than 0.5 second.

One-touch Switching and Remote Switching for Optical and Megnetic Sound Reproduction

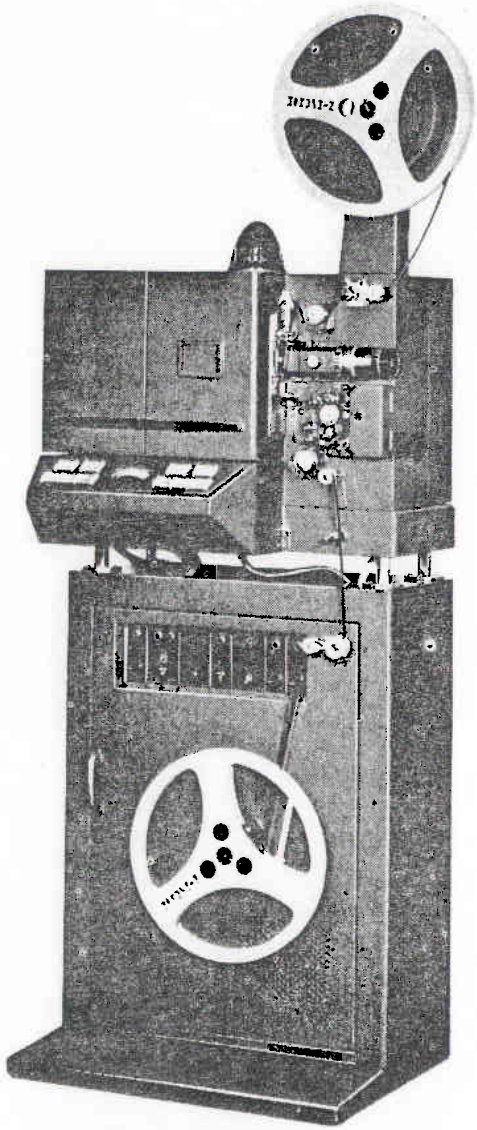
By single operation of push-button switch "OPTICAL-MAGNETIC" on the main control panel of the projector, the sound head unit and the amplifier circuit are switched simultaneously from optical to magnetic or vice versa and at the same time the indicator lamp on either side of push-button switch "OPTICAL" or "MAGNETIC" is lit.

In a similar manner, switching from optical sound reproduction to magnetic or vice versa can be operated by the remote control switch.

Automatic Replacement of Exciter Lamp

Should the exciter lamp fail during the projection, it is replaced with a spare lamp ready for working in less than 1 second.

If the spare lamp is broken, this is indicated by the flickering light of push-button switch "EX. LAMP CHECK" on the main control panel.



Model TC-510D

The operation of the lamp replacement mechanism can be checked by means of the same push-button switch.

Automatic Replacement of Projection Lamp

Should the projection lamp fail during the projection, it is replaced with a spare lamp ready for working in less than 1 second.

If the spare lamp is broken, this is indicated by the flickering light of the push-button switch "PROJ. LAMP CHECK" on the main control panel.

As soon as the lamp is automatically replaced, the lamp operation hour meter makes a new start.

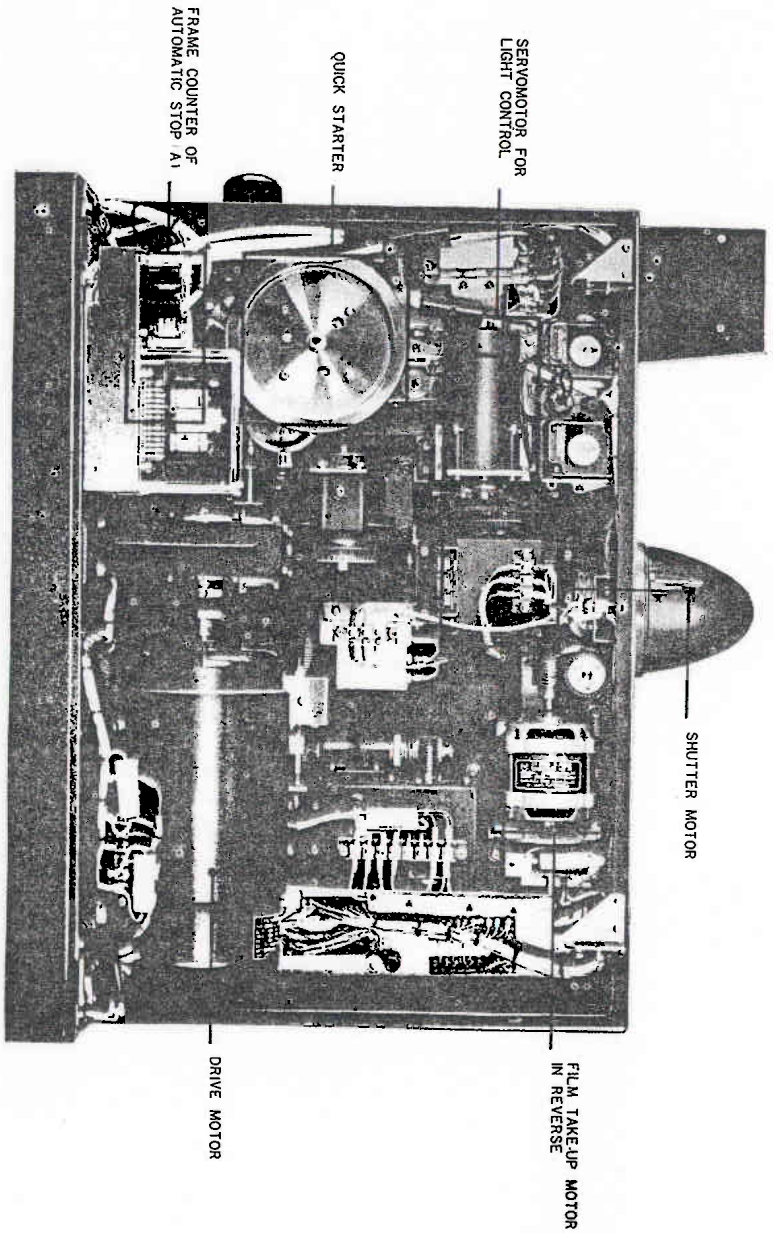
The operation of the automatic lamp replacement mechanism can be checked by means of push-button switch "PROJ. LAMP CHECK" on the main control panel. When a bulb is broken and the filament is short-circuited, since each bulb is connected with a quick-break fuse, no hazard will occur.

Automatic Film Loop Restoration

If pictures fleet during the projection as the lower loop runs out, the lower loop is automatically restored. This operation continues until the loop is restored to its correct size.

Automatic Control of External Apparatus (Cue-signal)

The cue-signal detecting unit is of the same structure as that of the stop-signal detecting unit. It is provided at the place 6 frames above the film aperture on the perforation side.



When the metallic foil fitted on the film passes this detecting unit, a electric signal is issued. By this signal, external apparatus such as dunning, slide and opaque projectors are controlled.

Alarming When the Film is Cut

When the film is cut during the projection, the supporting arm of the damping roller is lifted upward and the microswitch closes circuit, thereby the alarm lamp on the upper side of the projector is flickered.

At the same time, this is indicated by the flickering light of push-button switch "ALARM RESET" on the main control panel.

These alarming operations can be stopped by pushing push-button switch "ALARM RESET."

Plug-in Amplifiers

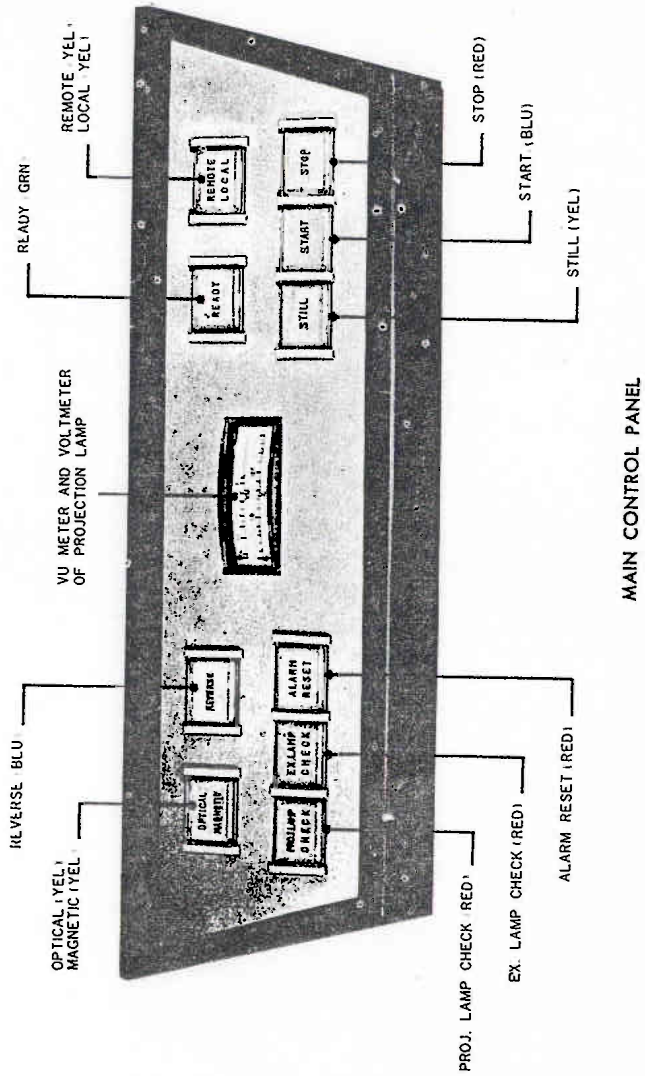
Such amplifiers and relay circuits as monitor amplifier, amplifier for automatic light control, relay circuit for automatic exciter lamp change, checking signal oscillation circuit, relay circuit for 4000% high-cut filter, pre-amplifiers for magnetic and optical sound reproduction are removable for easy maintenance.

Intermediate Takeup Reel for Little Capacity

To save time, two takeup reel shafts are provided. One is for large capacity up to 1,200 meters (4,000 feet), the other for little capacity up to 120 meters (400 feet).

Remote Operation of the Projector

By means of the remote switches, remote operation can be made for start, stop and reverse, change-over from optical to magnetic sound reproduction and vice versa.



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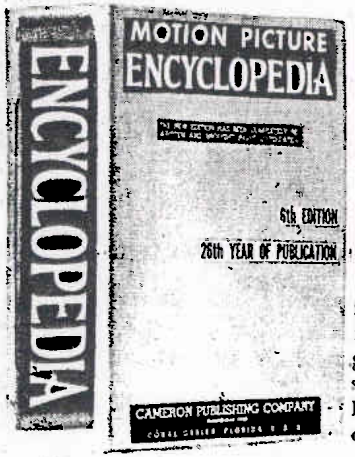

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FILM NEWS, New York City

SOUND MOTION PICTURES is an encyclopedia of information covering shooting, editing and laboratory work. It covers recording and reproduction of sound motion pictures as thoroughly as any studio technician may desire, yet gives the 16 mm users the specific data they need. The book will be worth many times its cost to those having any remote connection with motion pictures and television."