

Film-Tech

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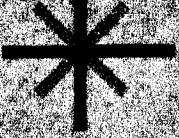
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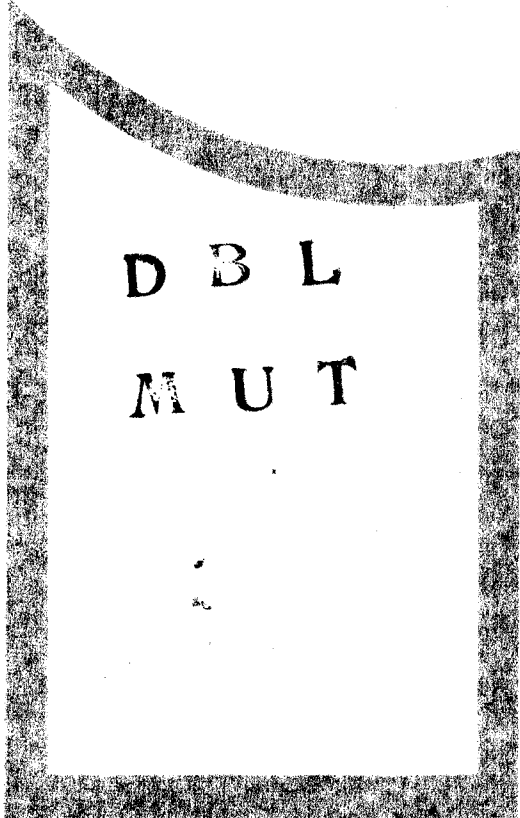
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E P R A D

PRODUCTS OF EPCORATION



1-800 537 - ~~4780~~
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DBL
MUT

- OPERATION
- INSTALLATION
- SERVICE

MANUAL

CAUTION

USE ONLY CLEAN, DRY
CLOTH TO CLEAN LENS.
DO NOT USE CLEANERS
OR CLEANERS.

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E P R A D

INCORPORATED

MANUFACTURER OF ELECTRO MECHANICAL, ELECTRONIC DEVICES AND AUTOMATION

FOR THEATRES, RESTAURANTS, SCHOOLS, HOSPITALS, INDUSTRY



SIMPLIFIED OPERATING INSTRUCTIONS FOR

EPRAD DOUBLE MAKE-UP TABLE

(DBL - MUT)

INTRODUCTION

EPRAD DOUBLE MAKE-UP TABLE

(DBL - MUT)

The EPRAD Double Make-Up Table (DBL-MUT) is designed to be used in any of three distinct modes of operation:

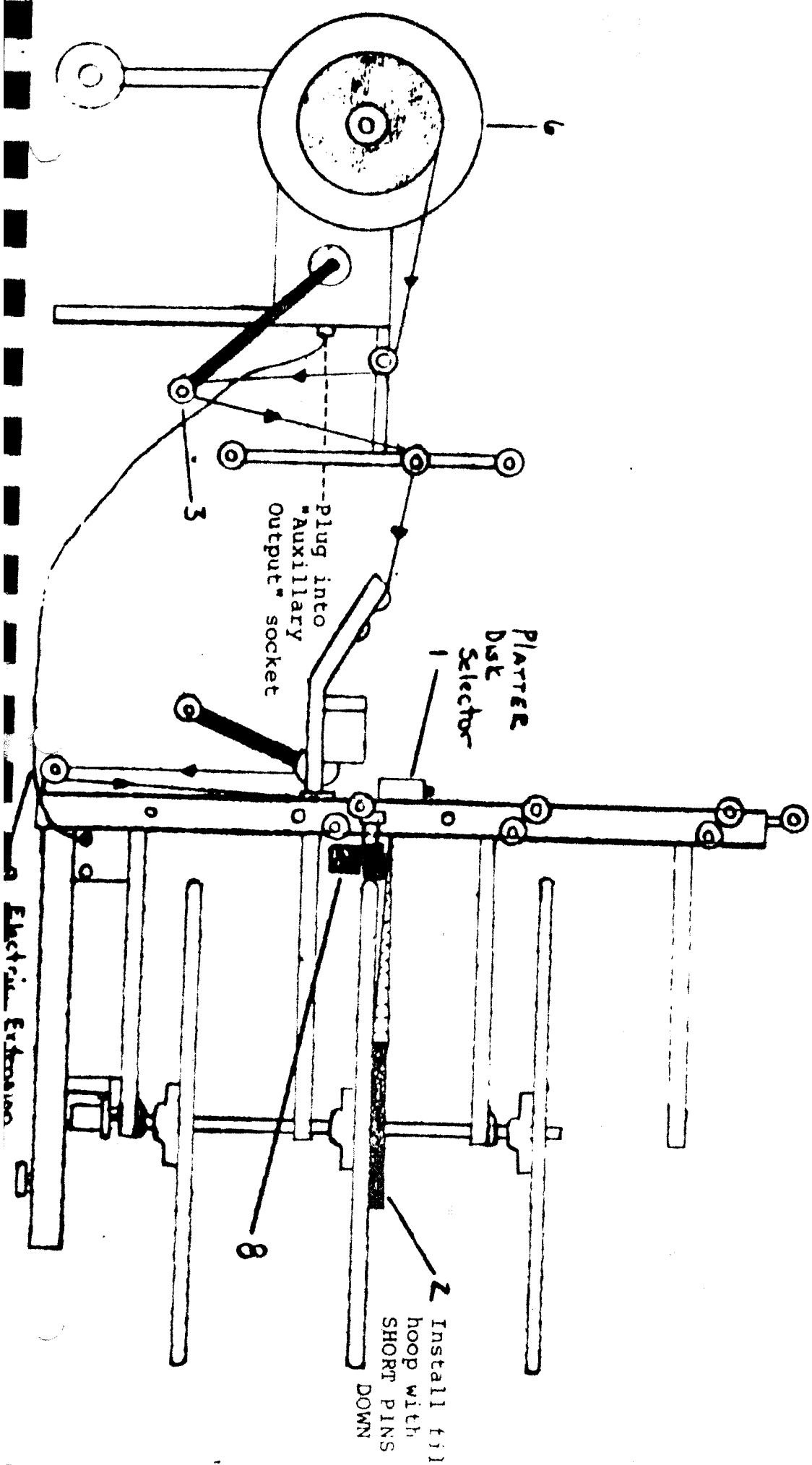
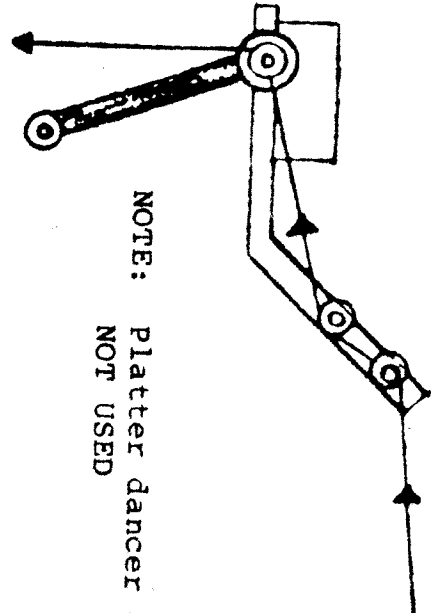
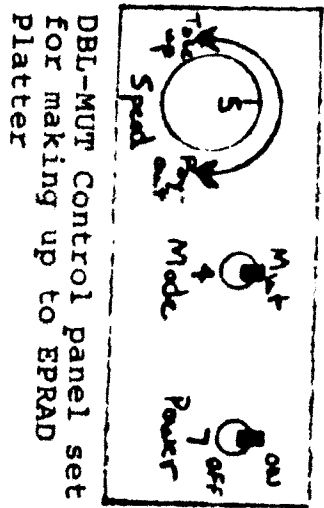
- 1) Make-up bench for use with the EPRAD Heavy Duty Platter.
- 2) Free-standing large reel film transport used with a conventional pedestal or console installation for a single-projector booth.
- 3) Rewind bench featuring both pay-out and take-up motor control for gentle film handling.

Reels of any size from the 2000 ft. capacity shipping reel to large reels up to 48 inches outside diameter can be used. (It is recommended that a maximum reel size of 46" be used.) The DBL-MUT is equipped with interlock switches to shut down the unit in the event of a film break. When used as a large reel transport, the projector motor can be interconnected to the interlocks; it too will then shut down on a film break.

INSTALLATION

- 1) Unpack DBL-MUT from crate. Report any damage to shipper AT ONCE.
- 2) Mount roller arms to front handle with hex-head $\frac{1}{4}$ -20 bolts furnished.
NOTE: The longer roller arm mounts on the RIGHT side (as viewed from the control panel). Tighten firmly with $\frac{7}{16}$ inch wrench.
- 3) Plug into 115 V.AC grounded outlet.
- 4) Locate the $\frac{5}{16}$ inch shaft adaptor assembly (packed with the mounting hardware) and clip it to the front of the unit.

FIGURE 1



MODE I - Make-up table for EPRAD Heavy Duty Platter

In making up a show on the EPRAD Heavy Duty Platter, the DBL-MUT can transport the film either from the shipping reels or from pre-spliced house reels. Some operators find it convenient to double or triple the 2000 ft. shipping reels onto larger house reels prior to the time they actually change shows. Of course, if the print is received in "heads up", it can be run directly off the shipping reels onto the platter.

Note that in this mode, only the LEFT motor of the DBL-MUT is used (LEFT as viewed from the control panel).

If the 5/16 inch shaft extension is to be used, loosen both wing nuts holding the left motor (the wing nuts are located under the MUT directly below the motor) and slide the motor back on its slots until it stops. With the motor recessed in this manner, the small reel on the shaft extension will fall in line with the correct film path.

Connect the rim drive extension cord (Fig.1, #9) to the "Auxillary Output" socket on the DBL-MUT. Thread according to Fig. 1, remembering to keep the sound track UP on the platter disk.

Center the DBL-MUT dancer arm to its "click" position and make sure that the SPEED control knob is at OFF. Place both toggle switches in the UP position.

Make-up in the manner outlined in the Platter Manual.

In this mode, the speed of the platter disk is determined by the rim drive motor being driven manually with the SPEED control knob on the DBL-MUT. The speed of the reel is governed automatically by the dancer arm on the DBL-MUT. In this manner, the film on both the platter disk and the supply reel cannot either gain or fall behind.

To aid splicing in frame, a splice light is mounted on the top working surface of the DBL-MUT. It is controlled by a switch located on the face panel nearest the roller arms.

CAUTION

USE ONLY CLEAN, DRY
CLOTHS TO Wipe
DO NOT TOUCH
OR OIL THE

Projection Mode

NOTE: Film threads from TOP of reel

PAY OUT

TO PROJECTOR

...Set upper roller to accomodate swivel roller on upper reel arm above projector

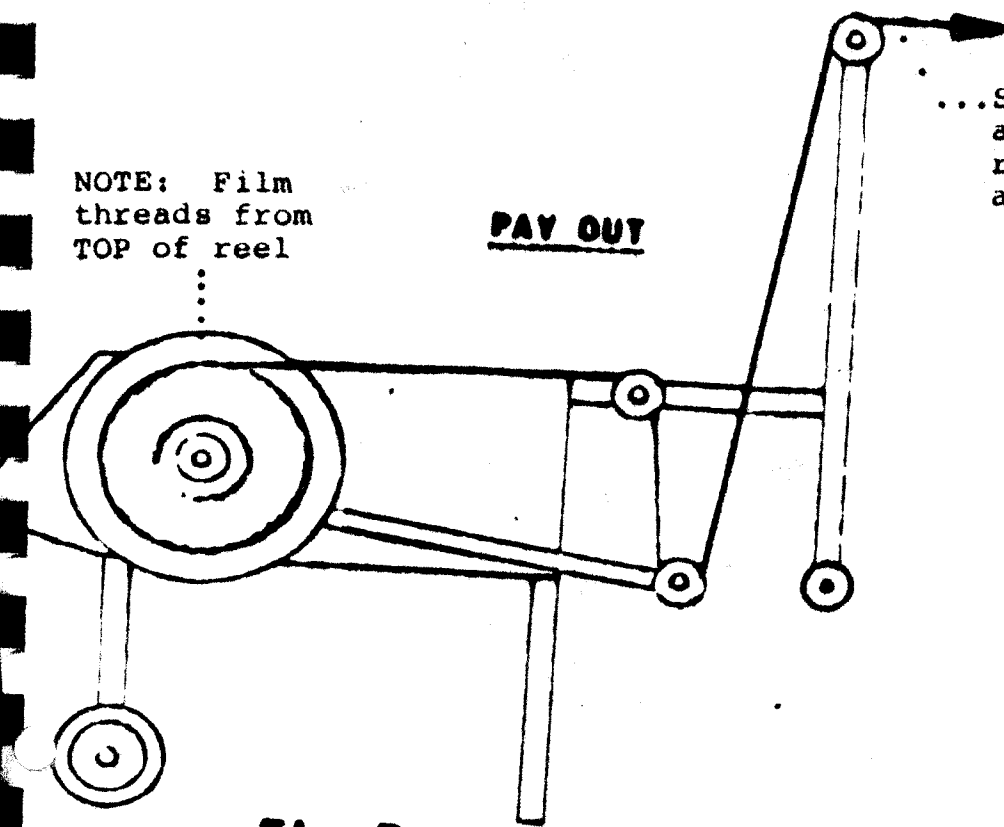


Fig. D

RIGHT SIDE

CONTROL SETTINGS

SPEED ... OFF
 MODE ... RUN
 POWER ... ON

TAKE UP

Note take-up to TOP of reel

FROM PROJECTOR

Set lower roller to accomodate swivel roller on lower reel arm below the soundhead

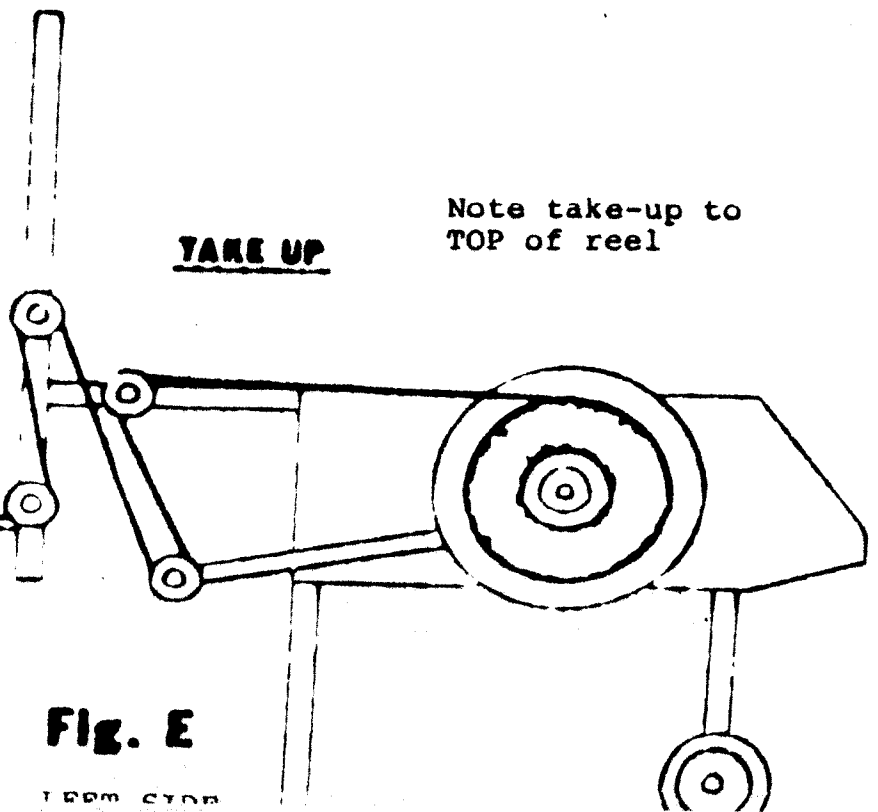


Fig. E

LEFT SIDE

MODE II - Large Reel Film Transport

While normally used as the sole film transport unit in single projector booths so equipped, the portability of the DBL-MUT lends itself well as a "back-up" transport in multiplex theatres with more than one transport device. If a platter or other type of fixed film transport should ever fail, the DBL-MUT can be wheeled into the booth affected and serve as the transport unit while the fixed unit is under repair.

Set-up as a large reel transport is as follows:

- 1) Roll into position with roller arms nearest projector.
- 2) Screw down leveling pads at front wheels and lock in place.
- 3) Place reel, heads up, on right motor shaft. Note this is the side with the TALL roller arm. Lock the reel in place with the reel retainer.
- 4) Thread as illustrated in Fig. "D".
- 5) Thread projector according to manufacturer's instructions.
- 6) Return to MUT and thread as illustrated in Fig. "E".
- 7) Starting procedure:
 - a) Mode switch - "RUN"
 - b) Speed control - "OFF"
 - c) Rotate reels by hand to bring both dancer arms to their center "click" position.
 - d) Power switch - "ON" (power indicator will light)
- 8) Start projector motor (this may be done manually, remotely, or automatically).

At this point, the DBL-MUT will automatically pay out film from the right reel at a speed determined by the projector, and the left reel will take up the film as it leaves the sound-head. At the end of the reel, the right dancer arm will drop, shutting off the MUT, and, assuming the projector interlock is interconnected, the projector motor.

To interconnect the projector motor to the DBL-MUT interlock circuit, procede as follows:

- 1) Run a two-conductor cable (at least 16 ga.) between the projector and the MUT.
- 2) Connect the leads (usually white and black) to terminals "X" and "Y" in the plug furnished for "Interlock Output" on the face panel of the MUT opposite the control panel.
- 3) Lift ONE SIDE of the AC line off its motor terminal and splice it to one lead of the two-conductor cable.
- 4) Connect the other lead of the two-conductor cable to the disconnected AC motor terminal.

Make sure the twist-lock connection to the MUT is firm.

Reel To Reel Rewind

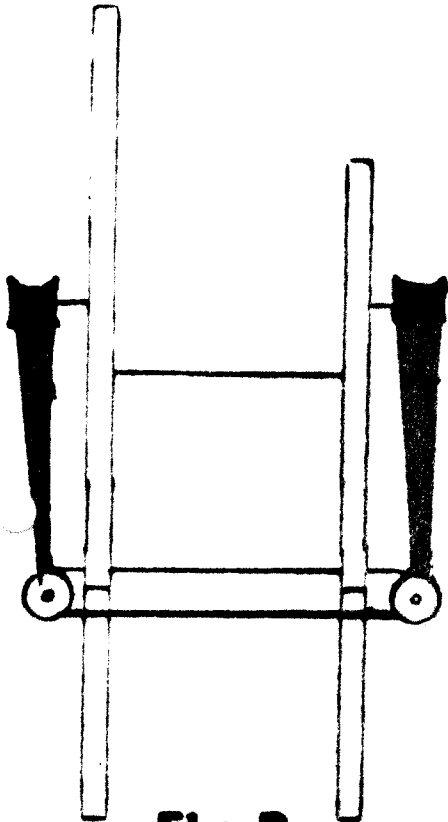


Fig. B
FRONT

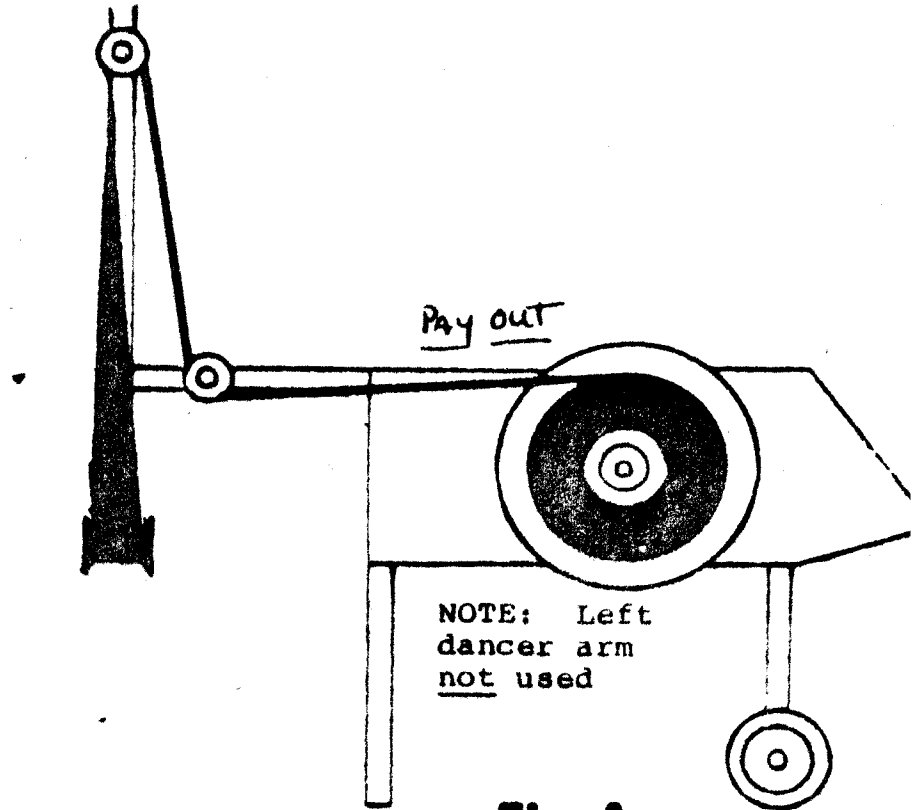


Fig. A
LEFT SIDE

Both PAY-OUT and TAKE-UP
to TOPS of reels

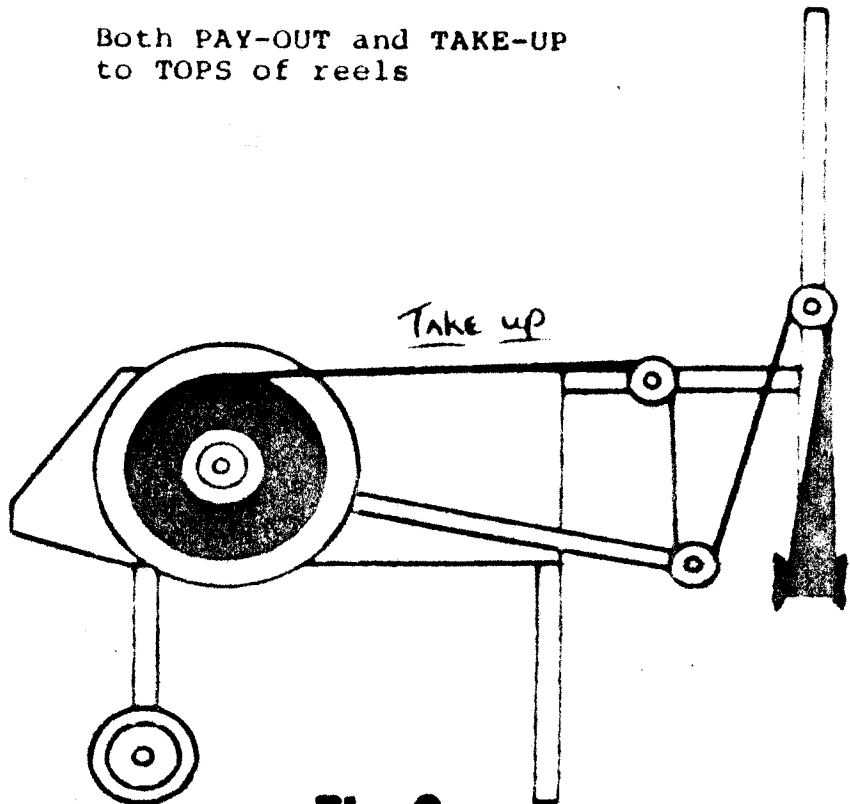


Fig. C
RIGHT SIDE

CONTROL SETTINGS

SPEED --- OFF*
MODE --- REWIND
POWER --- ON

*for threading

MODE III - Rewind Bench

In addition to rewinding operations in the course of make-up onto large reels, the rewind mode is necessary at the conclusion of every show using the DBL-MUT as a film transport.

Set-up for reel-to-reel rewind is as follows:

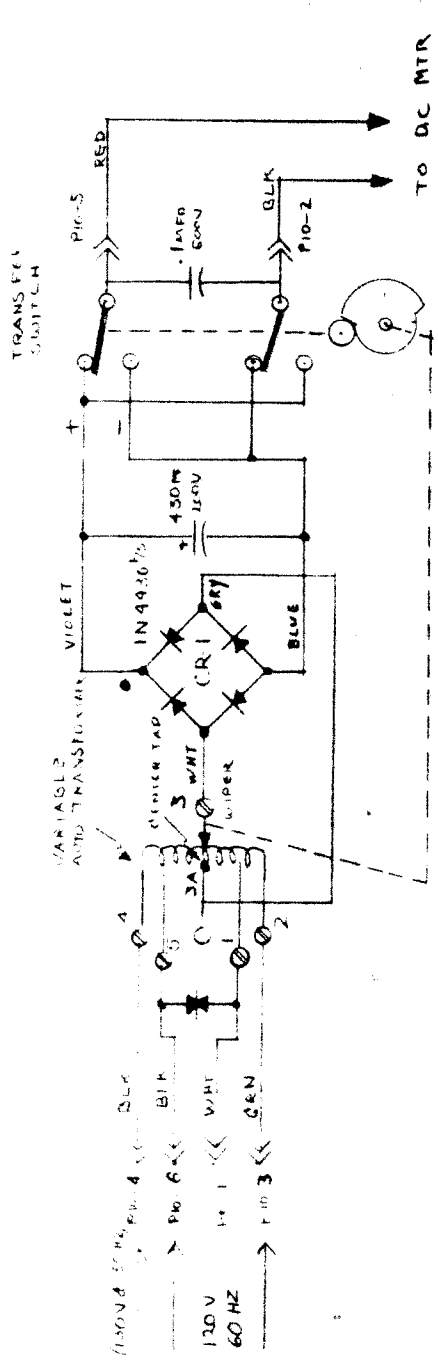
- 1) Power switch - "OFF"
- 2) Mode switch - "REWIND"
- 3) Speed Control - "OFF"
- 4) Thread the MUT as illustrated in Fig. "A", "B", and "C". It is also recommended to lower the uppermost roller on the tall roller arm to the same height as that on the short arm.
- 5) Rotate the right reel by hand to bring the dancer arm to the center "click" position.
- 6) Turn the power switch "ON".
- 7) Set direction (i.e. right to left is "Take-up") and speed with SPEED control knob. Increase speed slowly to avoid rapid rise or fall of the dancer arm.

If a tighter film wrap is desired, move the dancer arm weight down the arm toward the roller.

In this mode, the speed of the left reel is controlled manually with the SPEED control knob, and the right reel is governed automatically by the right dancer arm. The MUT will shut down when rewind is complete.

Note that the DBL-MUT in rewind mode is bi-directional through rotation of the SPEED control knob alone. This is convenient when looking for damaged frames, misframes, etc.

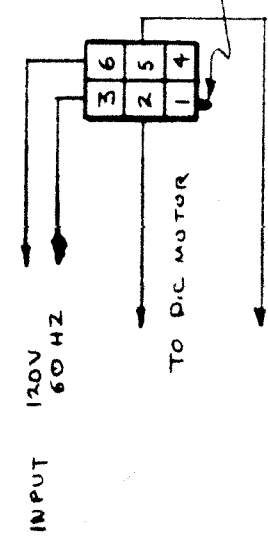
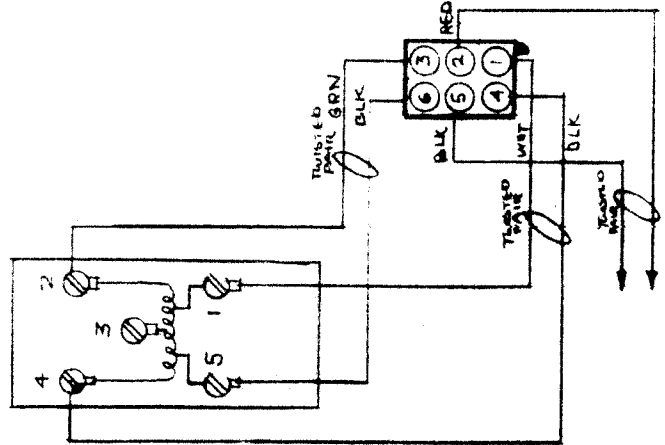
At higher speeds it is important to watch the position of the dancer arm; if it rises too high, it may jam against the fixed guide roller on the MUT frame and break the film, or if it falls too low, it may actuate the interlock switch and shut down the unit.



- SWITCH & CAM ADJUSTMENT**
1. SWITCH TRANSFERS D.C. POLARITY AT ZERO VOLTAGE POINT
 2. ALIGN WIPER WITH CENTER TAP
 3. ADJUST CAM SO SWITCH JUST OPERATES AT THE RISE
 4. TIGHTEN HUB SET SCREWS

PLUG P-10
(MALE) - PLATED AND MUT
(FEMALE) - SWORD

HIGH VOLTAGE OPERATION
NORMAL: A.C. POWER COMES IN ON PIN 3 & 6 OF P10 PLUS
D.C. OUTPUT IS ON PIN 2 & 5
IF LINE VOLTAGE IS HIGHER THAN 175 VOLTS OR THE SUPPLY IS BEING USED ON 50 HZ - TO KEEP TRANSFORMER FROM OVER HEATING INTERCHANGE PIN 4 AND PIN 6 IN P10



TITLE SERVO POWER SUPPLY WIRING	
DEC 1 DRAWN 6-75	DATE 7-20-71
ASSEMBLY NO 402577020	DWG NO 402577-2
FRMCT 	SCALE
CHECKED 	ANGLE
MATERIAL 	FINISH
NO	ECN
DATE 3-15-77	BY GDR/BJJ
CHANGE 	

SERVO POWER SUPPLY (70140)

Servo motors on the DBL-MUT are controlled by three separate servo power supplies. The left and right supplies regulate the speed and direction of rotation of the reel drive motors as governed (via the roller chain hook-up) by the position of the dancer arms. The "make-up" servo power supply (marked SPEED on the control panel) is operated manually and used in platter make-up and rewind modes.

A bridge rectifier in the power supply (see drawing 40297-2) provides the DC current used by the servo motors. Motor speed is determined by the variable transformer. The direction of motor rotation is controlled by the transfer switch.

The wiper of the variable transformer, when set directly on the center tap winding, is at its lowest output; that is, at this point the servo motors are stationary. As the wiper moves higher on the windings, output increases, and the motor picks up speed.

The variable transformer shaft is linked mechanically to the wiper plate. The cam mounted on the end of the shaft is factory pre-set to either engage or release the transfer switch as soon as the wiper begins moving up the windings. Actuating the transfer switch reverses the polarity of the power supply, and therefore reverses the motor rotation. Note that at the point of this transfer, the wiper is at its lowest ("null") voltage.

When the DBL-MUT is at rest with the servos powered, the dancer arms remain in their center ("click") positions. Here, the wipers are on the "null" point, and the motors are stationary. When the dancer arm is raised, the chain-to-sprocket connection causes the wiper to move up the windings, and the motor pays out film. Likewise, when the dancer arm lowers, the wiper moves down the windings, causing the motor to take up film.

The cam action on the transfer switch at the "null" voltage point makes the motors immediately reversible.

Oscillation of the dancer arm, particularly at start-up, usually indicates that the cam is out of adjustment to the transfer switch; that is, there is voltage on the motor at the transfer of polarity. This is corrected by loosening the hub set screws in the wiper plate and re-aligning the cam to the transfer switch as illustrated on drawing 40297-2.

Oscillation of dancer arm will also be caused by chain being loose.

All three servo power supplies are wired identically and are completely interchangeable. Since no more than two power supplies are used simultaneously in any mode, the unused supply is immediately available as an emergency replacement.

The large light bulbs mounted inside the DBL-MUT act as dynamic brakes for the servo motor circuit. In the event of a film break or any power failure, the bulbs drain off the motor current and "brake" the reel much more rapidly than allowing the motor to "flywheel" to a stop.

The bulbs also aid in stabilizing the DC output to the motors assuring smooth start-up and steady continuous operation. For this reason, the bulbs should be checked if slight dancer arm oscillation occurs; they may be burned out or loose in their sockets.

While the servo system will operate with the bulbs missing entirely, it is advisable to maintain them for the reasons given above.

The servo power supplies are fused at 5 amps, and the only time the motors approach this limit is at start-up. If the fuse fails, look for a short circuit or an overload (i.e. attempting to start the motor when the reel is obstructed from rotating), but DO NOT OVERFUSE. Replace fuses ONLY with the type indicated.

The gear motors used in the reel drive system require no lubrication, but the brushes should be checked semiannually. To assure long motor life, the servo power supplies furnish a maximum of 90 V.DC, while the motors are rated at 115V.DC.

TROUBLE SHOOTING

Reel Drive Motor Does Not Operate

- Check the 5 amp "Servo" fuses.
- Is the mode switch in the correct position? For example, if in REWIND, the left dancer arm will not control the left reel.
- Is the actuator on the interlock switch bent? Only the metal plate mounted on the dancer arm sprocket should touch the switch actuator.
- If the ballast bulb lights, but the motor does not run, suspect a faulty motor.

Motor Runs Wide Open

OR

Motor Runs Only One Direction

- The cam on the servo power supply is either loose, broken, or misadjusted to the point where it is not contacting the transfer switch. If broken, replace with cam and shaft assembly #40850. If loose or misadjusted, refer to drawing 40297-2 and reposition as illustrated.

Dancer Arm Drops When Power Is Applied

- Is the film threaded from the TOP of the reel?
- Is the mode switch in the correct position?

Dancer Arm Oscillates

- Is the dancer arm chain tight? If not, loosen the three servo power supply mounting screws and move the power supply along its slots until chain is tight. Tighten screws.
- Is the servo power supply cam positioned correctly?
- Is the ballast bulb burned out?
- Does the dancer arm bind on its shaft for any reason? If so, dismount the arm, re-polish the shaft (with fine sandpaper or emery cloth), oil lightly, and replace the arm.

Film Breaks At Start Of Rewind

- Is the SPEED control knob at OFF position before the power to the unit is turned on?
- Is the speed increased gradually?

Interlocks Fail To "Clear"

- Check the $\frac{1}{2}$ amp fuse.
- Are the relay contacts clean? To clean, disconnect the MUT from power, and pass a clean piece of typing paper between the relay contacts while applying light finger pressure to the top contact.

TECHNICAL NOTE
for
DBL-MUT OPERATORS

Because of warping and/or spreading of 48 inch reels during high-speed rewind, a few precautions should be taken to ensure proper clearance between the reel and the dancer arm.

First, the "ounce of prevention"--when storing large reels off the MUT, do not lean them against a wall letting them sit on the floor. Whether they are empty or full, they can take a "set" which is nearly impossible to remove.

If it is necessary to store the reels off the MUT, hanger shafts of $\frac{1}{4}$ inch steel should be provided on the booth wall, and reels can be hung from any of the core holes.

Second, the "pound of cure":

1. Loosen all four wing nuts on the motor mounting plates. These nuts are located under the MUT and are customarily loosened for sliding the motors in and out to accommodate either "house" reels or "shipping" reels.
2. Place a large reel (36 - 48 inch outside diameter) on one of the motor shafts and clamp in place with the reel retainer.
3. Holding the reel BY THE CORE, cock the entire motor assembly so the reel is at the point farthest away from the dancer arm. The slotted motor base plates allow enough tolerance to provide considerable adjustment.
4. Re-tighten the motor; repeat operation on other motor.

If viewed from above, the reels would appear closer together at the control panel end of the MUT, and farther apart at the roller post end.

5. Re-set the stationary film guide roller mounted behind the roller posts so the film lightly rubs the OUTSIDE edge of the large reel. Do not let this roller "freewheel" along the shaft allowing it to find its own center; set it as per above and keep it in place with the adjustable collars.

While this usually guarantees adequate clearance between the reel and the dancer arm, the reel can be spaced out farther still by shimming it off the drive dog with $\frac{1}{4}$ inch flat-washers.

Tom Zunk
Manager, Quality Assurance
EPRAD, Inc.

NATIONAL ASSOCIATION OF THEATRE OWNERS INC.

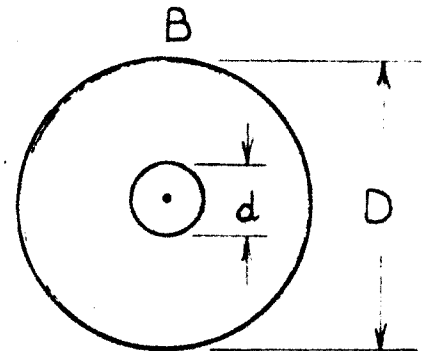
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THE DETERMINATION OF THE AMOUNT OF FILM ON ANY REEL

With the advent of the pocket size electronic calculator, many calculations which were once tedious now become simple.

The following simple formulas give you answers correct within a few percent.

$$f = (D^2 - d^2) 10.56$$
$$t = \frac{(D^2 - d^2)}{8.5}$$



WHERE: f is feet of film
t is time in minutes
D is large diameter of film
d is small diameter of film
or hub diameter

This is based on film and air averaging .00625 inches per layer, which proves out to be quite accurate for film that's been run through a projector more than once or twice.

EXAMPLE: A certain reel has a diameter of 20 inches and a 5 inch hub.

$$f = (20^2 - 5^2) 10.56 = (400 - 25) 10.56 = 3960 \text{ ft.}$$
$$t = \frac{(20^2 - 5^2)}{8.5} = \frac{400 - 25}{8.5} = 44 \text{ Min.}$$

By means of the above, any platter, or any reel size can be converted to feet or minutes.

Another interesting approximation is that 1 hour worth of film weighs approximately 25 pounds.

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A further interesting approximation is that the playing time in minutes of one inch of film added onto a reel is approximately equal to the radius of the beginning of the new addition.

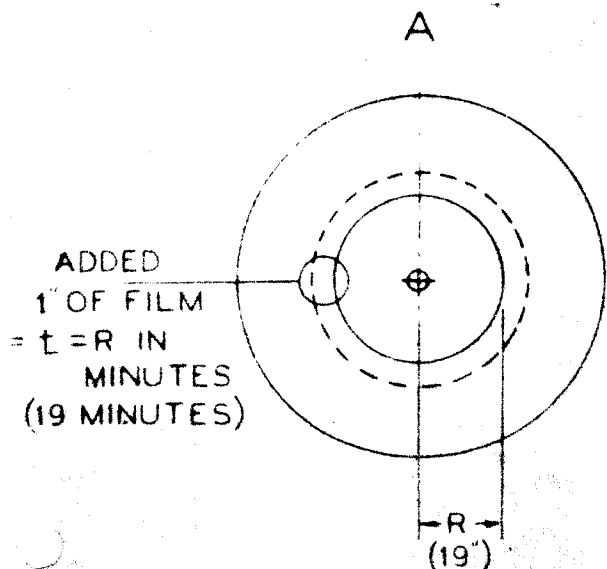
EXAMPLE: A The radius of a certain reel is 19 inches.
 The next inch (making a 20 inch radius)
 will contain about 19 minutes of film.

EXAMPLE: A hub is 5 inches in diameter, or $2\frac{1}{2}$
 inches in radius. The first inch of
 film on the hub will run for approxi-
 mately $2\frac{1}{2}$ minutes.

This may be confirmed by the above formulas.

Al Boudouris

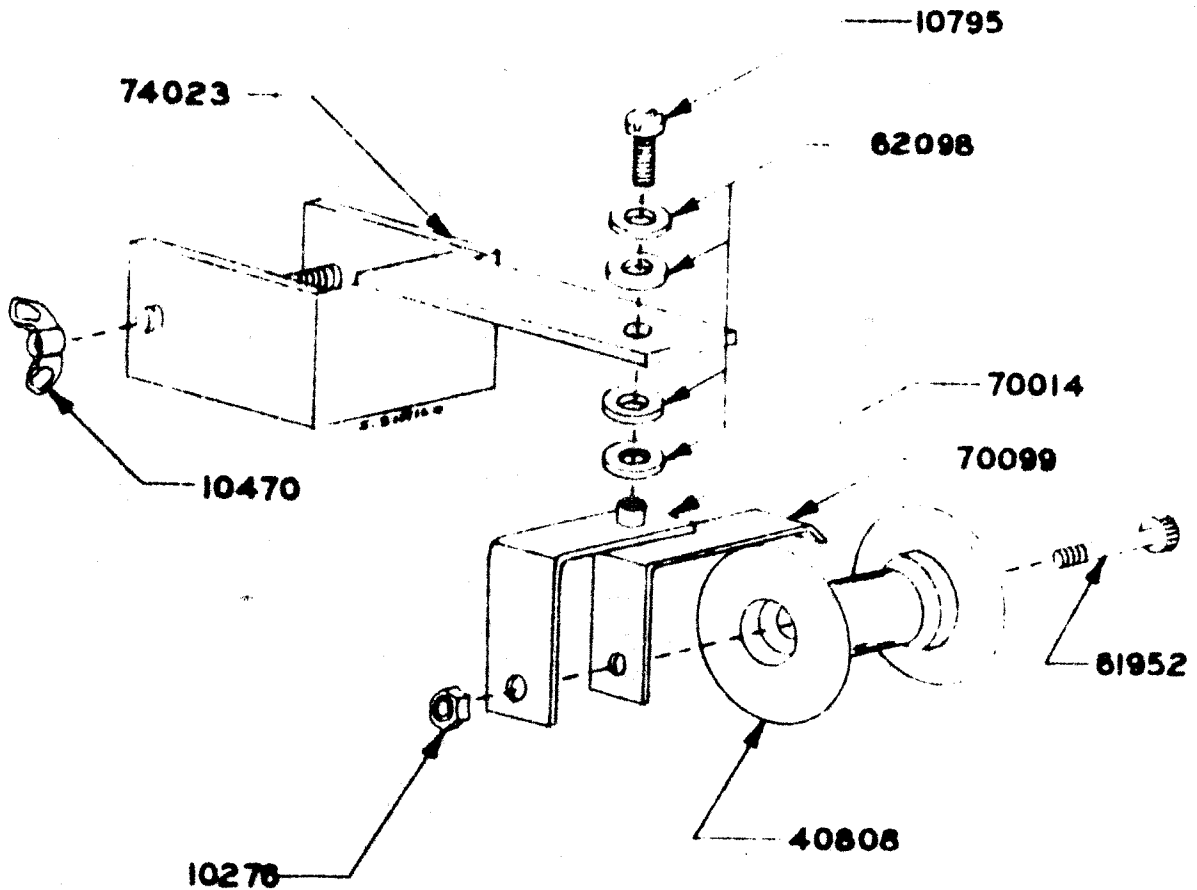
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Chairman
Technical Advisory Committee
Vice President, NATO



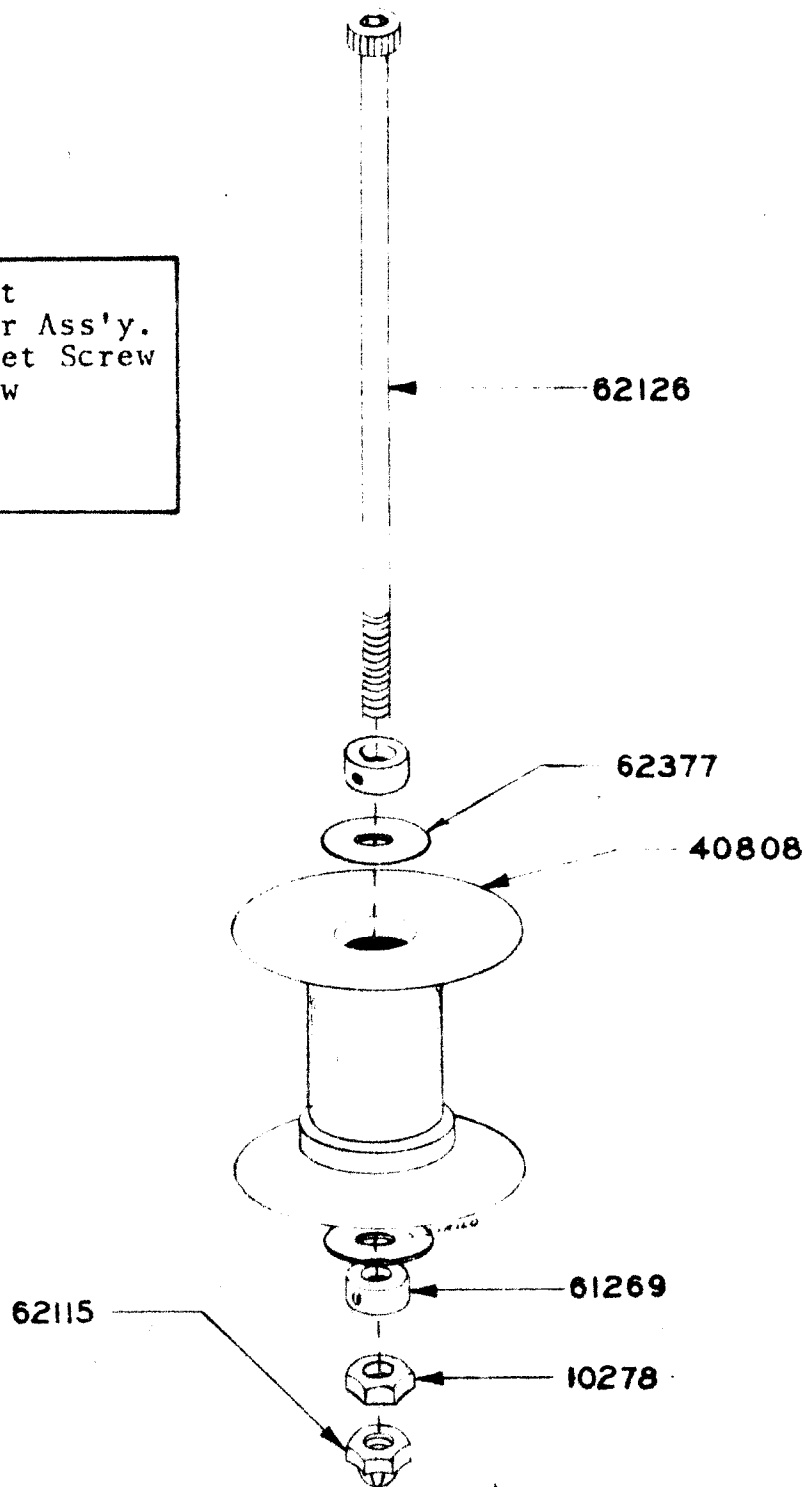
11-4-76

**N2 74008
ADJ. GUIDE ROLLER
ASSEMBLY**

- | | |
|-------|---|
| 10276 | #10-24 Nut |
| 10470 | #10-24 Wing Nut |
| 10795 | #10-32x $\frac{1}{2}$ Screw |
| 40808 | Large Roller Ass'y. |
| 61952 | $\frac{1}{4}$ x $1\frac{1}{2}$ Shoulder screw |
| 62098 | Flat Washer |
| 70014 | Short Roller Ass'y. |
| 70099 | Film Retainer Brkt. |
| 74023 | Roller Brkt. Adj. |

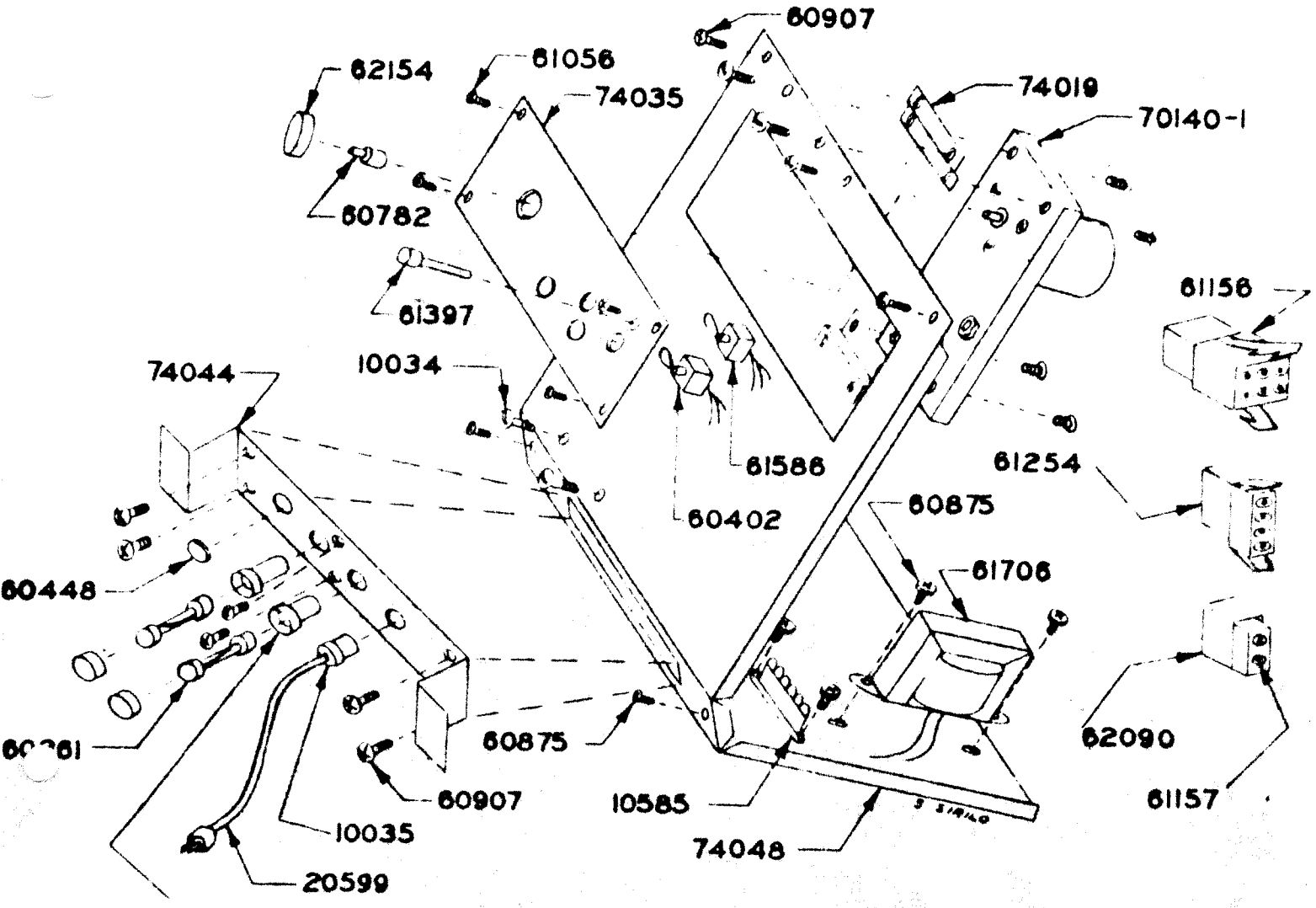


- | | |
|-------|-----------------------|
| 10278 | 1/4" Steel Nut |
| 40808 | Large Roller Ass'y. |
| 61269 | 1/4" Collar Set Screw |
| 62126 | 1/4-20x5 Screw |
| 62377 | Felt Washer |

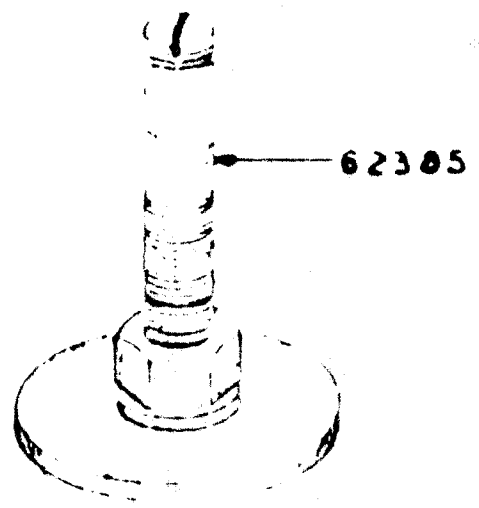
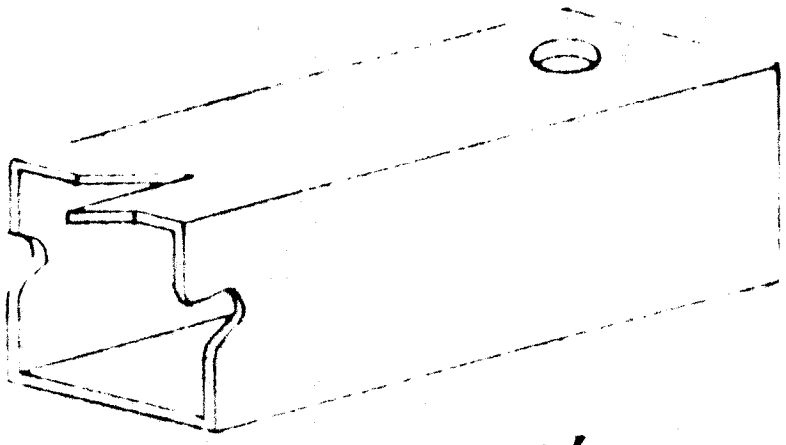
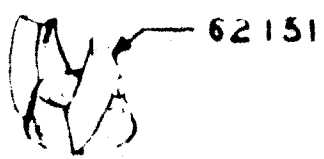


NR 74057
 M.U.T. BACK PANEL
 ASSEMBLY

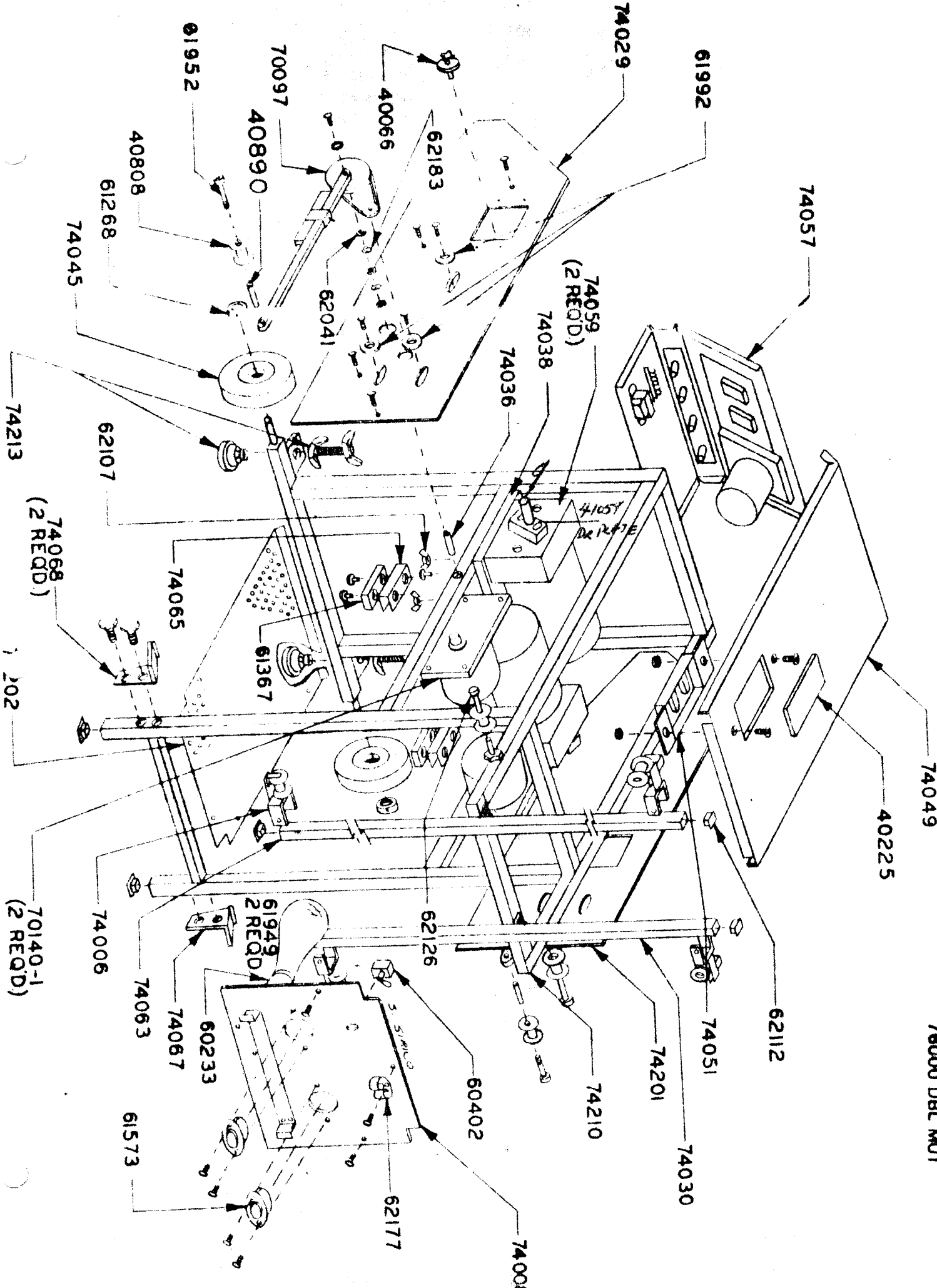
10034	#10-32x3/4 Screw	61397	Neon Lamp (Round)
10035	Strain Relief	61586	Switch 4PDT
10585	Terminal Strip	61706	Transformer
20599	C7HH SC 150v Molded	62090	Amp Connector Socket
60261	5 amp fuse	62154	367-1 Mallory Knob
60402	Toggle Switch w/lever SPST	70140-1	Servo Power Supply
60448	Chrome Hole Plugs 1/2"	74019	Power Supply Brkt.
60782	1/4" dia. x 4" lg. shaft ext.	74035	Control Plate Silk
60858	Little Fuse-Indicator Fuseholder	74044	Fuse Panel Silk Sc.
60875	#6-32x1/4" Pan Hd.	74048	Front Mtg. Panel
60907	#8-32x1/4" Phil. Pan		
61056	#4-40x1/2 PH Pan Hd TT. CR		
61156	Connector Block (Female)		
61157	Connector Socket Pins		
61254	Amp Socket. 4P		



2151 WING NUT
2 05 LEVELING STUD



76000 DBL MUT



40066 Reel Retaining Plate Assembly
40225 Film Splicing Window Assembly
40808 Large Roller Assembly
40890 Space-Stand Off
60233 Socket Standard Porcelain

60402 Toggle Switch SPST
61268 $\frac{1}{2}$ " Setscrew Collar
61367 Micro Switch
61573 Twist Lock Socket
61949 Light Bulb 2000

61952 Shoulder Bolt $\frac{1}{2}$ x $1\frac{1}{2}$
61992 $\frac{3}{4}$ x $\frac{7}{32}$ Washer
62041 Flat Washer
62107 $\frac{3}{8}$ -16 Wing Nut
62112 Cap Lug

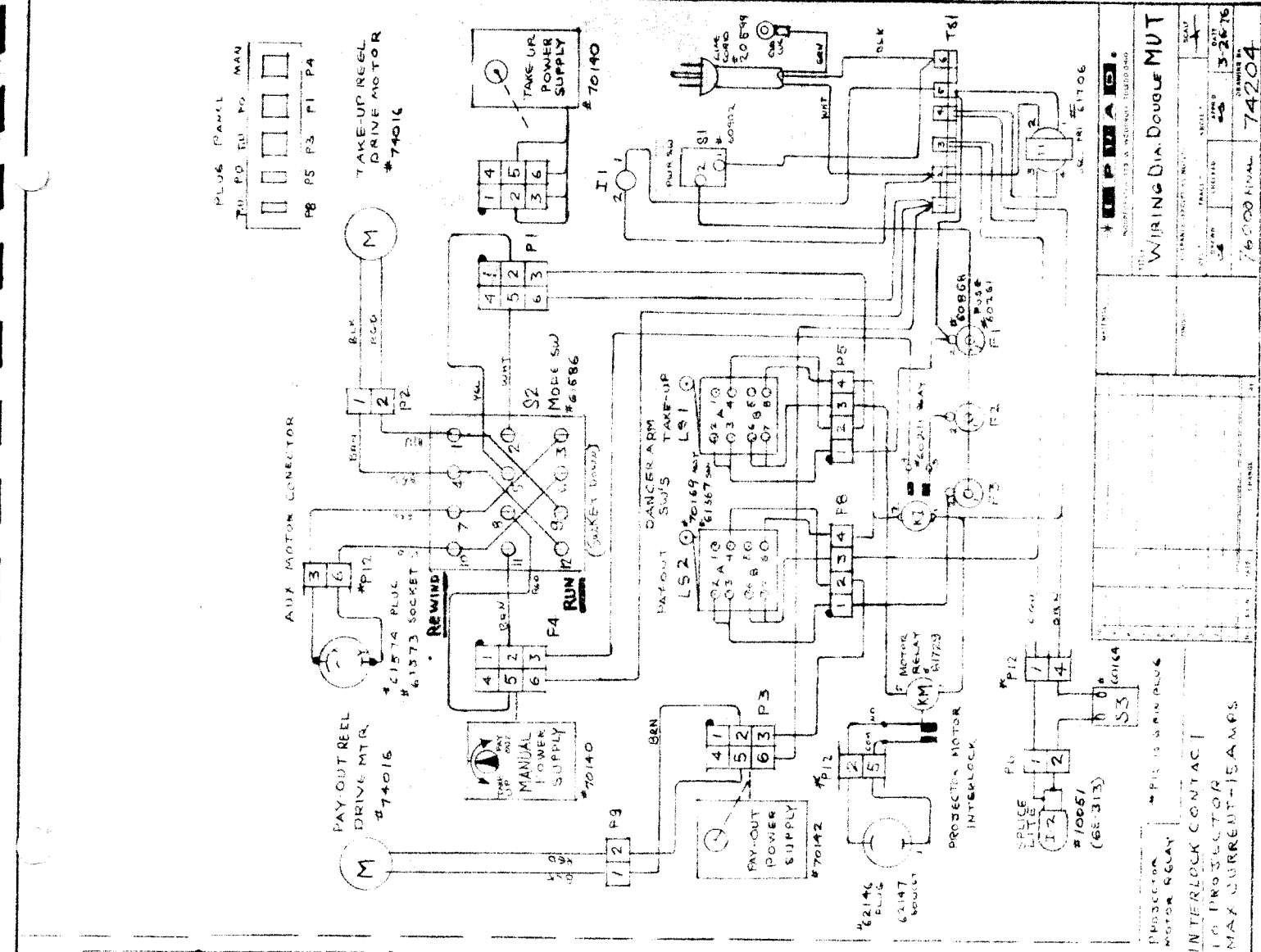
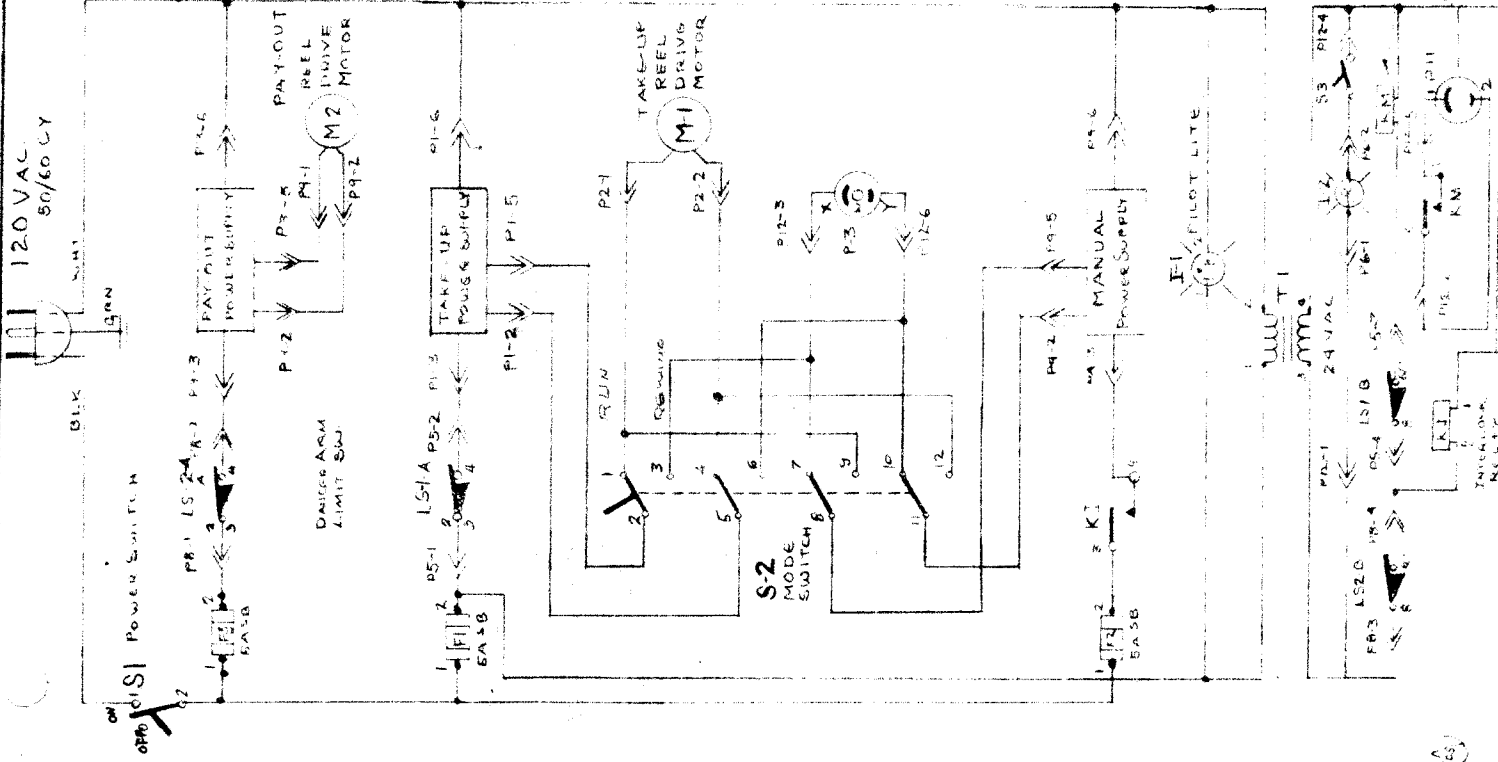
62126 $\frac{1}{2}$ -20 x 5 Screw
62177 Grip Clip
62183 Wave Washer
70097 Dancer Arm Assembly
70140-1 Servo Power Supply Assembly

74006 Adjustable Guide Roller Assembly
74008 Front Panel Assembly
74029 Right Side Panel
74030 Front Post Arm Assembly
74036 Dancer Arm Shaft

74038 Motor Base Plate
74045 Wheel, Painted
74049 Top Mounting Panel
74051 Film Splice Light Assembly
74057 Back Panel Assembly

74059 Drive Motor Assembly
74063 Front Post Arm Assembly
74065 Shut Down Switch Bracket
74067 Dancer Arm Stop Assembly
74068 Dancer Arm Stop Bracket

74201 Double NUT Left Side Panel
74202 Bottom Screen
74210 Frame Assembly
74213 Leveling Stud Assembly



WIRING DIA. DOUBLE MUT

76000 RVAL 74204

3-26-76

INTERLOCK CONTACT 1 TO PROTECTOR MAX CURRENT-15 AMPS

PROTECTOR MOTOR RELAY

PROTECTOR INTERLOCK

PROTECTOR MOTOR RELAY

PROTECTOR INTERLOCK

PROTECTOR MOTOR RELAY

PROTECTOR INTERLOCK

GUARANTEE

ALL MERCHANDISE SOLD BY EPRAD, INC. IS GUARANTEED TO BE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIAL FOR ONE (1) YEAR FROM DATE OF SHIPMENT FROM EPRAD, SUBJECT TO THE FOLLOWING:

After inspection at Toledo, Ohio, or at such other point designated by us in writing, it is disclosed to our satisfaction such merchandise or workmanship is defective, we at our option shall replace, repair, or issue an appropriate credit in an amount to be determined by us. Our findings shall be final and binding on the purchaser.

Transportation charges both to and from **EPRAD** shall be paid by the purchaser.

We shall in no event be liable for consequential or indirect damages of any nature whatsoever.

No express, implied or statutory guarantee other than herein set forth is made or authorized to be made by us.

Without limiting in any way the foregoing provisions the **GUARANTEE DOES NOT COVER:**

1. Merchandise that has become inoperative because of: (a) misuse, (b) negligence, (c) lack of preventive maintenance, (d) accident or any other casualty, (e) wear occasioned by use, (f) being repaired or altered outside of our Toledo, Ohio, factory, or any **EPRAD** factory branch in any way which, in our judgment, affects its condition or operation.
2. Labor and incidental costs occasioned by removal, replacement or repair of merchandise (other than by **EPRAD**) unless we have given previous specific written or telegraphic authorization.
3. Merchandise sold by us which has been manufactured by another company. This merchandise is subject and limited to the guarantees of such manufacturers. **EPRAD** can only make good on this merchandise to the extent that the original manufacturer stands behind the product.
4. Cost of repair or replacement of merchandise determined by **EPRAD** not to be defective.

E P R A D

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