Film-Tech

The information contained in this Adobe Acrobat pdf file is provided at your own risk and good judgment.

These manuals are designed to facilitate the exchange of information related to cinema projection and film handling, with no warranties nor obligations from the authors, for qualified field service engineers.

If you are not a qualified technician, please make no adjustments to anything you may read about in these Adobe manual downloads.

www.film-tech.com

INSTRUCTIONS

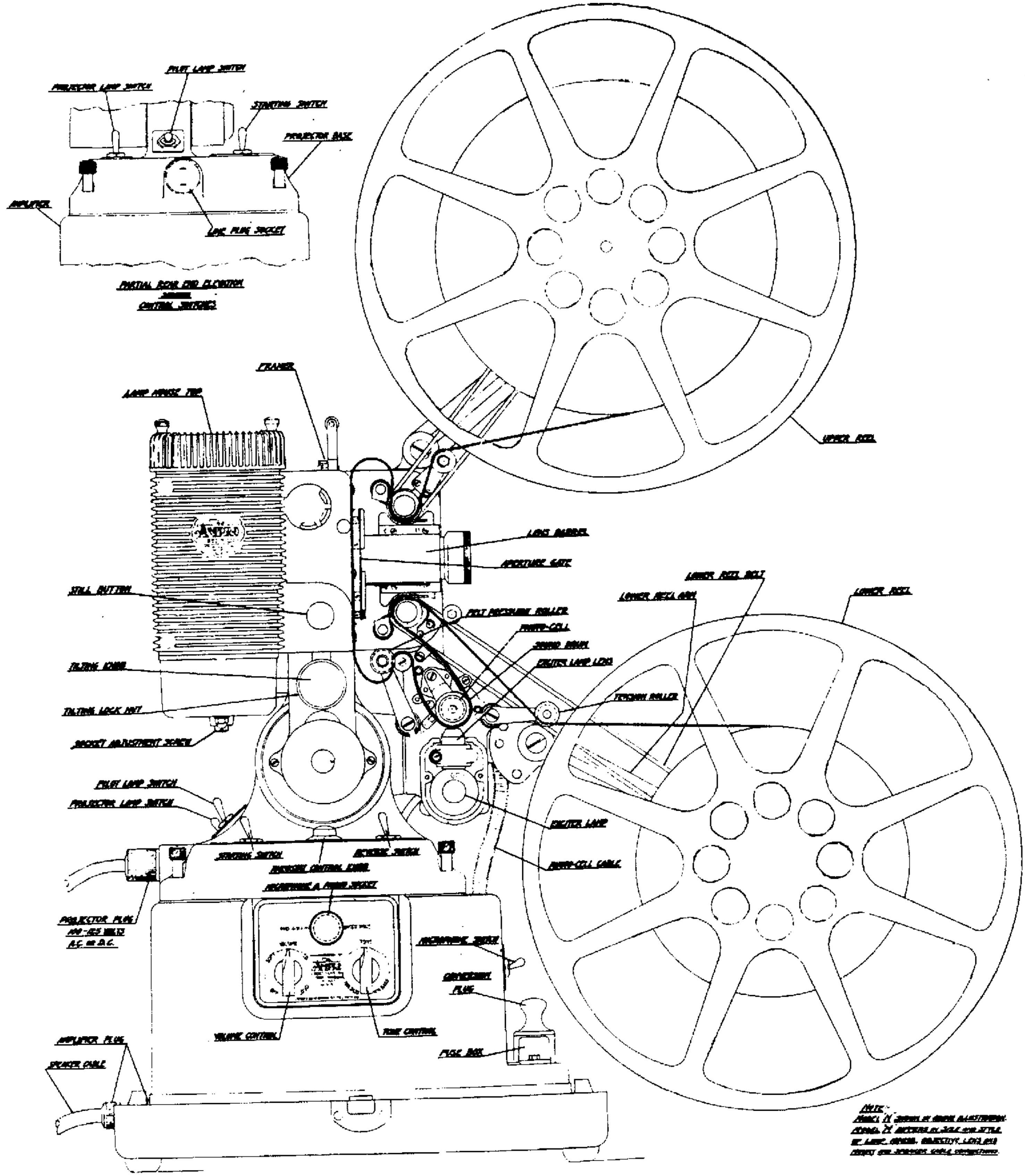
for

AMPROSOUND PROJECTORS

MODEL M - JUNIOR AMPROSOUND
MODEL N - SENIOR AMPROSOUND

The AMPRO CORPORATION
9839-51 NORTH WESTERN AVENUE
CHICAGO

FOURTH EDITION


PILOT LAMP SWITCH
PROJECTOR LAMP SWITCH
STARTING SWITCH
PROJECTOR BASE
AMPLIFIER
LINE PLUG SOCKET
PARTIAL REAR END ELEVATION
CONTROL SWITCHES
FRAMER
LAMP HOUSE TOP
UPPER REEL
LENS BARREL
APERTURE GATE
LOWER REEL BELT
LOWER REEL ARM
LOWER REEL
STILL BUTTON
PHOTO-CELL
SOUND DRUM
EXCITER LAMP LENS
TENSION ROLLER
TILTING KNOB
TILTING LOCK NUT
SOCKET ADJUSTMENT SCREW
PILOT LAMP SWITCH
PROJECTOR LAMP SWITCH
EXCITER LAMP
PHOTO-CELL CABLE
STARTING SWITCH
REVERSE SWITCH
REVERSE CONTROL KNOB
MICROPHONE & PHONO SOCKET
PROJECTOR PLUG
A.C. or D.C.
MICROPHONE SWITCH
CONVENIENCE PLUG
VOLUME CONTROL
TONE CONTROL
FUSE BOX
AMPLIFIER PLUG
SPEAKER CABLE
NOTE:

DIRECTIONS FOR OPERATING MODELS M & N AMPROSOUND PROJECTORS

In case of Trouble Refer to Concentrated Table on Page 8.

SETTING UP

LOCATION - Set projector on table commanding the screen, and speaker by screen. REMOVE COVER and all loose accessories from speaker case, because these seriously affect the sound. In rooms with good acoustics OPEN THE INSIDE DOORS on the rear of the speaker. CLOSE THESE DOORS in rooms with poor acoustics. Closing the doors cuts out the "boom" effect and crispens up the speech. A test should be run in each room to determine the position of the doors and the tone control. Also see paragraph 8 page 10. Operate THE LOWER REEL ARM in the upper position for 400' reels and the lower position for 1600' reels. Check the position of the REVERSE SWITCH and REWIND LEVER before starting.

CONNECTION - Connect the speaker to the amplifier. The cable can be "plugged in" to either jack on the speaker. The extra jack is for connecting a second speaker. To operate a second speaker connect the standard cord (normally used for one speaker) between the two speakers, using one of the two jacks on each speaker. Connect a special cord with a short plug on one end between the amplifier and the remaining jack on either speaker. This short jack automatically connects to a different contact in the amplifier which gives the proper match for two speakers. Do not use this short plug except with two speakers.

CURRENT - Projector and amplifier 100-125 volts A.C. or D.C.

For A.C. the conversion plug on front of the amplifier must be in the A.C. position, conversely, for D.C. it must be in the D.C. position. On D.C. there may be no sound and exciterlight, in which case, turn the plug around in the power line cord, so as to polarize the current. This is not necessary on A.C.

OPERATING

SPEEDS - On the operating panel of the projector will be found two switches and the rheostat control for motor speed. These switches are clearly marked, one of them being the STARTING SWITCH and the other is used for reversing and rewinding. When preparing to run a picture, the RHEOSTAT CONTROL KNOB should be turned anti-clockwise as far as No. 11 on Name Plate, which is the correct position for running sound film at twenty-four frames per second. In this position an electrical governor is operative to maintain constant speed. Never run sound pictures except with the RHEOSTAT CONTROL KNOB turned as far as it will go anti-clockwise, except on D.C. where the line voltage is high. See paragraph 12 on page 12. Never run sound film with the motor in reverse as

this is liable to tear film. When running silent pictures, the RHEOSTAT CONTROL KNOB can be turned clockwise until the desired speed is reached. It is possible to obtain a variation from twelve to twenty-four frames per second by means of this RHEOSTAT CONTROL KNOB.

AMPLIFIER - Current to the amplifier is controlled by three switches. One switch is operated by the VOLUME control knob. Turn this knob all the way counter-clockwise and a click will be heard. The switch is now in the "OFF" position. It can be turned "ON" by rotating the knob clockwise until the click is again heard. Further rotation clockwise will increase volume. This switch controls the current feeding the filaments only of the tubes in the amplifier. The other switch is the STARTING SWITCH in the operating panel of the projector, and this switch controls the plate voltage of the tubes and the motor. A third switch permits operation of microphone without running projector. Be sure that this switch is in correct position as indicated on name plate. All switches must be "ON" before sound can be obtained, when using sound film. If the EXCITER LAMP should be burned out a new lamp should be inserted. However, before determining that the exciter lamp is burned out, make sure that all connections have been properly made.

CAUTION - Always keep the switch operated by the VOLUME control knob in the "OFF" position except when running a picture. It should also be turned "OFF" while connecting or disconnecting the SPEAKER CABLE or the PHOTOCELL CABLE.

SOUND CONTROLS - VOLUME is controlled by means of the VOLUME control knob. Rotating it clockwise increases volume and vice versa. Never turn up volume so high that blasting in speaker is heard. Best results are obtained by turning volume down slightly below the point where this blasting is evident.

TONE is controlled by the TONE control knob. When the Tone control knob is turned counter-clockwise as far as it will go, none of the sound frequencies are cut off. As it is rotated clockwise, it cuts off the lower sound frequencies progressively. Start in the extreme counter-clockwise position and adjust clockwise until the best tone results are obtained to suit the room. It will generally be found that for musical reproduction the best results are with the knob in the extreme counter-clockwise position, while for voice reproduction the knob should be turned clockwise until the sound suits the acoustical condition of the room.

MICROPHONE OR PHONOGRAPH - Unscrewing the cap covering the microphone and phonograph socket permits insertion of either microphone or phonograph plug. VOLUME and TONE controls for either are the same as when running sound film. Always disconnect microphone or phonograph and replace cap when running sound

pictures, as otherwise the sound will be materially diminished. A microphone or phonograph is intended for accompanying silent film.

When using the Microphone, if the loud speaker is close to it, a howl or whistle is liable to be heard. This is caused by an acoustical feed-back between the Microphone and the Loud Speaker. In such cases, turn down the Volume Control until the feed-back noises stop and talk very closely into the Microphone. It will also help to place the Loud Speaker so that it is not directed towards the Microphone. For more detailed information concerning Microphone Use see paragraph 9, page 11.

THREADING PROJECTOR - If the following procedure is followed, it will be found that the threading is extremely simple. It is the same as threading a standard silent AMPRO, except that one extra loop is required to take care of the sound drum. Consult threading diagram.

1 - Thread film around upper sprocket. Close sprocket shoe.

2 - Thread film through aperture, allowing loose end of film to curl above the fly wheel bracket. Close pressure pad. Be sure the film is all the way down in groove of aperture plate.

3 - Move felt retaining roller to left and thread the film around roller. Felt retaining roller has knurled handle by which it is moved. Leave small loop under felt retaining roller.

4 - Draw film around sound drum and thread through lower sprocket. Close lower sprocket shoe. The curved gates on each side of the sound drum will guide the film into its proper place.

5 - Thread film on lower reel, first passing it under tension roller. This tension roller serves as a shock absorber to avoid strain on the film when starting.

6 - Lower reel arm has two positions. The upper position is to be used for 400' reels and the lower position for 1600' reels. This automatically gives the correct tension on the take-up reel for each size.

Be sure that the loops allowed are the same as indicated in the threading diagram. The upper loop should be large enough to permit the insertion of two fingers within it. The lower loop, under the felt roller, should be such that the lowest point of the

film is about 1/4" below the lowest point of the felt roller. If this loop is too short, some of the vibrations of the intermittent movement might be transmitted to the film, and thus impair the quality of the sound. On the other hand, if the loop is too long, the sound will not be in synchronism with the picture. A few trials will indicate the size of the loop best suited.

It is suggested that after threading the projector the hand knob on the rear be turned, so that it can be noted whether or not the threading is correct. A few turns by hand before turning the switch on will usually indicate any errors.

On the end of the LOWER REEL ARM a shifting lever will be found. When projecting a picture, this lever should be turned clockwise as far as it will go, viewed from the operator's position. This lever is turned counter-clockwise only when rewinding film. Its purpose is to shift the lower reel belt onto a loose pulley when rewinding film. However, when projecting a picture, the lower reel will not turn unless the shifting lever is turned clockwise as far as it will go, so that the LOWER REEL BELT can engage the lower reel pulley which rotates the lower reel.

ADJUSTMENTS - The projector is started with the STARTING SWITCH located on the control plate of the projector. The LENS is focused by rotating it in the LENS BARREL. The TILTING KNOB permits easy finding of the screen. The TILTING LOCK NUT can be used to lock the projector into position after it is tilted. The FRAMER, just underneath the handle, can be adjusted to compensate for improperly printed film. The VOLUME CONTROL KNOB is moved clockwise until the proper volume is obtained, and if required, the TONE control knob is adjusted to a suitable position.

REWINDING - For rewinding pass the film directly from the LOWER REEL to the UPPER REEL without threading it through the projector, rotating the shifting lever at the end of the LOWER REEL ARM anti-clockwise as far as it will go. Switch the projector in reverse and turn on the STARTING SWITCH--then depress the rewind button which projects through the rear cover of the projector. When the blimp is used it will be necessary to reach around the projector in front of the projection lens in order to reach this button. Should the speed of the rewind be too fast, turn the SPEED CONTROL KNOB clockwise until the desired speed is reached. When rewinding 1600 foot reels, it is advisable to slow down the rewind by this means after most of the lower reel has been unwound in order to decrease its spinning speed.

<u>After rewinding be sure to move the shifting lever clockwise as far as it will go and throw the REVERSE SWITCH into a forward position so that the projector is ready for projecting the next reel</u>.

CARE AND MAINTENANCE

LUBRICATION - Oil central oil well every time projector is used. Place nozzle of oil cap in central oil well and give one firm squeeze only of sides of can. Other points can be oiled every time projector lamp is replaced. Oiling is very important. For complete details see paragraph 20, page 13. Use only "AMPROIL". No other oil should be used for lubricating the projector.

CLEANING - THE APERTURE GATE, the SOUND DRUM, all rollers and sprockets should be kept clean at all times. Use the cleaning brush furnished as standard equipment. To clean the aperture of lint and other dirt which will accumulate, remove the projection lens and use the cleaning brush through the lens mount to reach the aperture opening. Keeping lenses clean will assure brilliant pictures on the screen. The projection lens should be wiped frequently, both on the rear as well as on the front lenses.

The CONDENSER LENSES AND REFLECTOR should be cleaned occasionally. These are mounted in the VENTURI TUBE which can be removed by taking out the two screws projecting through the LAMP HOUSE. See paragraph 26, page 14.

The EXCITER LAMP LENS should be cleaned occasionally by means of the CLEANING BRUSH. Do not change the adjustment of this lens as this is carefully done at the factory.

PROJECTOR LAMP REPLACEMENT - The projector lamp used in the AMPROSOUND PROJECTORS are of a standard prefocused type and can be obtained from any dealer handling Mazda lamps. To remove the lamp, first take off the LAMP HOUSE TOP. Then remove the metal cap which fits over the bulb. To remove the bulb press down slightly and turn to the LEFT as far as it will go, which releases the bayonet socket so that the bulb can be pulled out. It will be noted that the base of the bulb has two flanges, one of which is wider than the other. When a new bulb is inserted be sure that the flanges fit down into the slots of the socket. Press the bulb down slightly and turn it to the RIGHT as far as it will go. Be sure that there is clearance between the lamp and the metal housing around it to insure proper ventilation. The entire socket can be adjusted laterally by means of a small screw underneath the lamp house. The screw is slotted so that it can be rotated by means of a small coin.

EXCITER LAMP REPLACEMENT - Unscrew the thumb nuts and remove EXCITER LAMP COVER, press the lamp down, turn it to the LEFT and remove. A new lamp is then inserted. Be sure that the lamp is clean before using and that it is turned all the way to the RIGHT, so that the three pins in the socket are properly seated in the prefocused ring of the exciter lamp.

FUSE - The fuse is mounted in convenient position, next to the conversion plug, so that it can easily be replaced. Do

not use fuses of higher capacity than indicated on the name plate, as otherwise amplifier is subject to damage in case of overload. A 1.5 amp. fuse should be used.

TUBES AND LAMPS - The following tubes are used in the amplifier: (Sylvania tubes are recommended for these high gain currents)

2 - Rectifier tubes #25 Z 6 G
2 - Power Output tubes #25 L 6 G

1 - Voltage amplifier tube #6 S 7 G
1 - Driver tube #6 C 8 G

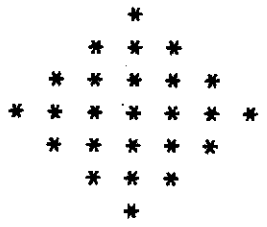
All tubes ending with the letter "G" can be substituted by metal tubes. The metal tube number is the same as the glass tube number, except that the "G" is omitted. For replacement of tubes see paragraph 32, page 15.

The exciter lamp is specified as follows:

7 Volt . 2 amp. with prefocused collar.

The prefocused collar eliminates any necessity for adjustments when exciter lamps are replaced. The average life of an exciter lamp will be between 30 and 50 hours. An extra exciter lamp should always be carried. For replacement of exciter lamp see paragraph 39, page 15.

The photocell used is known as CF No. 20. It is easily replaceable by unscrewing the knurled collar at its socket. Photocells have a very long life and rarely require replacement.



TROUBLES - THEIR LOCATION AND CORRECTION

The following paragraphs have been prepared to aid in the discovery and correction of the more common difficulties whereby the operation of the equipment is impaired. On the next page will be found a summary of the symptoms of these difficulties. The numbers opposite the symptoms refer to the paragraphs describing the causes of these symptoms and how to correct them.

Note that the trouble described in the first fifteen paragraphs are due to operating conditions and are not the fault of the equipment. It is suggested that these fifteen paragraphs be carefully read and the items checked. Otherwise the equipment is likely to be unfairly blamed.

After being sure that all of the operating conditions are correct, the trouble can then be located by observing the symptoms and referring to the respective paragraphs pertaining to them.

Most of the troubles found in the field can be quickly corrected, provided they can be located. It is the purpose of the following pages to enable the user to do this and thus avoid a break-down in the performance.

Should the equipment still not operate correctly after a review of the symptoms and the attempt to correct them, it is suggested that the equipment be sent to the nearest dealer or to the factory service station.

SUMMARY OF TROUBLES AND CORRECTIONS

SYMPTOMS	DESCRIPTIONS AND CORRECTIONS (Numbers refer to paragraphs on following pages) (Most important items marked**)
Troublesome operating conditions -- (No fault of the equipment)	1*,2,3**,4*,5*,6**,7,8**,9, 10,11,12,13,14,15,20*,21**, 22,27,50
Intermittent or Picture Trouble ---	6,7,13,20*,49
Noisy Gear Mechanism ----------	20
Tight Mechanism ----------	20*, 51
Unsteady for Sound ----------	1*,2,6**,7,12,13,15,16,17,18, 19,20*,21**,22,24
Still Pictures ----------	20,22
Belt Shifter ----------	23
Take-up ----------	23,24
Speed Rheostat ----------	Replace
Switches ----------	Replace
Poor Illumination ----------	1*,6,15,25,26,27*,28,50
Bulge on Glass of Picture Lamp ----	2,29
Poor Picture Definition ----------	6,26,27,50*
Color on Screen ----------	25,26,27,28*,50
Dead Amplifier ----------	3,4,5,10,11,30,31,32***,33,34*, 36,37,38*
Amplifier Hum ----------	2,16,30,31,32**,33,34*,35,43
Low Volume ----------	1,31,32**,33,34*,35,37,39*,40
Amplifier Noisy ----------	1,6*,8,9,16,30,31,32**,33,34, 35,36,41,42,43,44,45,48
Exciter Lamp Burn Outs ----------	2,31,32**,34,35*,37,46
Poor Quality Sound ----------	1*,2,4*,6**,7,8***,9,12*,13, 16,17,18,19,20*,21**,22,24,30, 31,32**,33,34,35,39,40*,41,43, 44,45,46
Miscellaneous ----------	47,48

(1) LOW LINE VOLTAGE (BELOW 100 VOLTS)

Symptoms: Unsteady Sound - Slow Motor - Low Volume - Poor Pictures

This is frequently due to using extension power cords made of too small a wire for this type of service. Such cords may lose from 10 to 30 volts because the wires are not heavy enough for the load. The extension cord should consist of #12 wire or heavier to prevent this trouble; and to insure best results, an extra 50' extension cord (securable from the company) should be carried.

(2) HIGH LINE VOLTAGE (ABOVE 120 VOLTS)

Symptoms: Bright Pictures and Short Lamp Life - High Volume and High Amplifier Hiss - Bright Exciter Lamp and Short Lamp Life - Unsteady Sound or Run-Away Motor

Privately owned power plants, especially DC, often fluctuate a great deal. A short duration surge may do the damage as when an elevator is thrown off the line causing a momentary high peak current.

(3) MICROPHONE SWITCH "ON"

Symptoms: Exciter Lamp does not light - No sound from film

(4) AC-DC PLUGGED IN WRONG POSITION

Symptoms: If plugged in for DC and used on AC, there will be a loud hum and garbled up sound - If plugged in for AC and used on DC, there will be no sound and dim exciter lamp.

Always check the correct position of this plug.

(5) WRONG POLARITY OF LINE CORD ON DC

Symptoms: No sound - No Exciter Lamp

Be sure you reverse the polarity of line cord. This is accomplished by pulling out the line plug, turning it a half circle (180°) and then re-inserting it. Many operators pull it out and somehow get it back in the wrong way again.

(6) DEFECTIVE FILM OR DIRTY FILM

Symptoms: Poor quality sound or Low volume - Blurred Picture - Jumpy Picture - Loss of Loop

A defective or damaged film (poor sprocket holes, damaged emulsion, etc.) will cause loss of loop or jumpy picture and unsteady sound. Dirty film will cause both unsteady sound and blurred pictures. Clean by using two powder puffs, one moistened with carbon tetrachloride; remove excess moisture with dry powder puff. Check machine with films of known high quality.

(7) GREEN OR FRESH FILM

Symptoms: Film slap - Jumpy Pictures - Unsteady Motor - Unsteady Sound

Extremely fresh film may cause emulsion to apply itself to the film shoes. Continued use will finally harden the emulsion until it carbonizes. This may cause serious damage or severe scratches to the film. It may actually slow down the mechanism and give unsteady sound and even damage the sprocket holes. Green film is generally noticeable because of excessive film slap. If this actually occurs stop the machine immediately and clean the gate. It is a good investment to have the film waxed by a film library before using. It has been definitely proven that this prolongs the life of the film considerably.

(8) POOR ROOM ACOUSTICS

Symptoms: (a) In live rooms, poor intelligibility of speech and considerable reverberation - (b) In dead rooms or open air, lack of volume and lack of life to music

Difficult acoustical problems often arise in the field and a great deal of engineering is generally required to get best results for permanent installations. The best equipment cannot produce perfect sound without perfect acoustical conditions.

(a) Rooms with hard walls are very live. The sound leaves the front and the rear of the loud speaker and diverges in all directions. It reflects from the hard walls like an echo. The sound coming from all directions arrives to the listener at different times and this great confusion makes the speech hard to distinguish. Sometimes it will help to move the loud speaker into the first row of the audience, but in general there is a better way and that is to use the Ampro torpedo horn. This is a directional aluminum horn equipped with a 12" auditorium speaker. It should be located high above the screen and directed towards the rear of the room. Thus, it will shoot the sound over the audience in front and send it directly to those in the rear. This speaker has no back or side waves. All the sound is directed down on the audience. The audience forms a broken up surface, which is very disturbing, so if all the sound can be directed on them, the echo effect will be eliminated.

(b) Some rooms are acoustically very dead (those with thick rugs, heavy drapes and many broken up surfaces). Open air is acoustically the deadest of all. The intelligibility is always very good in dead rooms, except if there is a noticeable lack of volume and also lack of life to the music. If you take a machine from a live room to a dead room, you may be under the impression that something has happened to the volume. The same is true in the open air. A booster amplifier is strongly recommended for open air performances, expecially when there is sound interference from street cars or automobiles. The torpedo horn will also help here because it has the ability to direct or throw all the sound energy towards the audience. In very dead parlors it may be necessary to pull back some of the drapes, etc. in order to improve the liveness of the room.

(9) MICROPHONE FEED BACK

Symptoms: The loud speaker will howl when microphone volume is raised

This is an acoustical problem and is not a fault of the equipment. The sound from the loud speaker hits the microphone and is amplified to a louder sound which also goes from the loud speaker to the microphone. Thus, there is a continuous circulation of sound which soon comes up to a howl. The trouble can be helped by shielding the microphone from the loud speaker or by moving the loud speaker so that the sound is directed away from the microphone. The torpedo horn is best here also, because the microphone can be located back of the horn where it will be relatively free from the stray sound. However, there is always a limit and all systems will feed back at some level. When everything has been arranged as best possible, it will be necessary to reduce the volume to where the feed back bowl stops and possibly have the subject stand closer to the microphone.

Following is an example of a procedure to use when there is a microphone feed back. The system is turned on and the volume raised until there is feed back. First, try moving the speaker on one side of the stage and the microphone on the other. Try to move the speaker around the corner of the stage and the microphone towards the back so that there is a corner of the stage between the microphone and the loud speaker. In a case like this, it would be best to employ a second speaker on the other side of the stage. The torpedo horn will be much the best. It can be located above the proscenium of the stage. In this case the proscenium shields the microphone from the loud speaker. In addition, the sound is all directed at the audience which is sound absorbing, and there will be very little energy reflected back to the microphone. After everything has been done to bring the microphone and the loud speaker as far apart as possible, next rotate the microphone and possibly move it a few feet so that the deadest position is located. Nothing more can be done with the equipment. If there is not sufficient volume, it will be necessary to have the subjects stand closer to the microphone or to speak louder.

(10) NO SPEAKER CONNECTION

Symptoms: No Sound - Exciter Lamp Dim

Do not assume your assistant has made the proper connection. First check that all connections are properly made and that all plugs are down in their sockets as far as they will go.

(11) ATTEMPTED TO OPERATE BOOSTER AMPLIFIER ON DC

Symptoms: No sound - Blows Fuse on Booster

When a booster amplifier is used, it can only be operated on an AC power line. When used on DC, it must be operated from 125 watt (or greater) convertor. If no convertor is available, it will be necessary to omit the booster and put on the show with an AC-DC amplifier of the Model "M" or "N".

(12) EXPECTED THE PERFORMANCE ON DC TO EQUAL THAT ON AC

It should be realized that the amplifier and the governor performance are inherently better when operated on AC. The plate voltage on AC is twice as high. The quality is the same but the power output is less on DC. The motor, on the other hand, is as powerful on 90 volt DC as on 115 volt AC. The extra power is handled by the governor, but it puts unnecessary load on the governor contacts and causes them to become dirty prematurely. Therefore, in order to reduce this extra load, turn the speed rheostat back part way, but only about half as far as for showing silent pictures. You can easily detect a change in motor speed. Be sure not to turn back the control too far so that the machine slows down or gives unsteady sound. Even with the rheostat properly adjusted, the DC still has a tendency to dirty the contact points on the governor. If the points are cleaned, it may be necessary to re-set the speed.

(13) FAULTY THREADING

Consult film threading diagram and threading instructions. Check particularly for correct loops on each side of intermittent. The bottom loop must be just right for the synchronism of the sound and picture. A longer top loop is permissible. See that the aperture plate is properly closed. Check for the correct threading by snapping motor "ON" and "OFF" so that it stops in about two or three frames, or move film slowly with hand control on the rear of machine. This precaution allows you to inspect the film again to see that it is properly seated in the aperture gate and that the loops are of correct length.

(14) POOR CONTACT IN AC LINE CORD

Symptoms: The sound and the exciter lamp fade in and out

This can be due to the line cord making poor contact with the socket in the wall. It can also be due to the extension cord making poor contact at either end.

(15) POOR PROJECTION SCREEN OR TOO LIGHT A ROOM

Every effort should be made to ensure a room as dark as possible when projecting pictures. Stray artificial light will have a much smaller bad effect than natural light. The screen should not be dirty as otherwise considerable loss of illumination will result.

(16) DIRTY POINTS OR DIRTY SLIP RINGS ON SOUND GOVERNOR

The contacts should be cleaned with sand paper or spark plug files. It will also be necessary to adjust the speed. The speed of the hand control (knurled bakelite knob on rear) should be 1440 R.P.M. The film sprocket should travel 180 R.P.M. Sound speed is 24 frames per second. If a speed counter is not available, a mark on the sprocket can be counted or a loop of film can be timed.

It is a good idea to keep the slip rings on the rear of the governor highly polished. Check that the two carbon brushes that contact the slip rings are free to move in and out in their sockets. The governor should be on the shaft so that about 1/8 of an inch of the brushes stick out of the holder.

(17) DIRT IN SOUND FLYWHEEL BALL BEARINGS

(18) EXCESS OIL RAN DOWN ON MOTOR AND AMPLIFIER

(19) DEFECTIVE BELTS

The rubber belt on the motor should run smoothly and be free from irregularities. The take-up belt or reel should run smoothly.

(20) LACK OF OIL

Symptoms: Noisy Intermittent - Jumpy Picture - Slow Mechanism - Squeaky Bearings

When the damage is done, it is too late to correct in the field; consequently, the projector should be oiled at frequent intervals. Form the habit of oiling every time you set up the machine for operation. Oil as follows:

Use the Ampro oil-can supplied with the machine. Use only Amproil (others gum up in time). Turn up the oil-can and press until oil flows. (check that it has oil). Put the end of the oil-can into the main oil-cup and give one complete squeeze only on the side of the can.

Caution: Do not give more than one squeeze. Do not run the machine while oiling. Allow one-half minute for oil to run down before starting the machine. Oil at the beginning, instead of at the finish of the show. Sometimes extra oil is advisable on the intermittent cams. Take off the front cover of the lamp house and add a few drops to the moving parts. This is generally not necessary unless still pictures have been shown for a long time, or possibly in the case of a machine which has been insufficiently oiled. The sprockets, reel spindles, still clutch, etc., need be oiled only occasionally. It might be well to form the habit of oiling these after every projection lamp has burned out. Be sure your oil is absolutely clean. Squirt out and throw away the first drop each time you use the oil-can to remove dirt.

(21) SPEED RHEOSTAT TURNED FOR SILENT FILM

The operator forgot to advance speed rheostat after showing silent pictures. For sound, this rheostat should be turned to maximum (clear around past the word "Fast") except on DC. (See Section 12).

(22) STILL BUTTON TURNED ONLY HALF WAY "ON" OR "OFF"

Be sure to turn the button the maximum amount in either direction. Half way will wear out the clutch and even stall the motor. Sometimes this button gets turned when the machine is not being used. Check when starting that it is set for maximum counter-clockwise for movies and maximum clockwise for stills.

(23) DAMAGED IN SHIPMENT

Bent against end of carrying case or some other cause. Replace with new lower reel belt.

(24) LOOSE TAKE-UP BELT

Sometimes the take-up belt wears smooth and should be shortened about one-half inch. The joint in this belt unscrews. Cut off the large end. Twist belt counter clockwise before attempting to connect together again so that when released, the twist clockwise tends to screw the belts together.

(25) CRACKED CONDENSOR LENS

When a machine is carried in freezing weather, it should be run about five or ten minutes with the amplifier "on" before the lamp is turned on. This thaws out the electrolytic capacitor in the amplifier and takes the chill and the vapor from the lens.

(26) DIRTY CONDENSOR LENS

An operator should always check that he has the brightest possible picture. It is advisable to clean the condensor lens as well as the projection lens. To clean the condensor lens, remove the lamp and then the venturi tube which holds the condensor lens. This tube is held in the machine by the two oval head screws on the rear of the lamp house.

(27) OLD LAMP OR WRONG VOLTAGE FOR LAMP

Brightest illumination is always obtained from a new lamp. They will always lose efficiency as they are used. The guaranteed voltage life of the picture lamp is twenty-five hours. Always use a lamp of the correct voltage rating for your line.

(28) PICTURE LAMP OUT OF FOCUS

Run the machine with light focused on the screen without film and adjust the center nut on the bottom of the lamp house until best condition exists. Adjustments can be made with a coin.

(29) OVERHEATED PICTURE LAMP

A great many lamps bulge because the glass is soft. Others, because the lamp is loose in the base and allows it to lean over against the lens on the venturi tube. The operator can do a lot to prevent overheating. The damage is generally done when a hot machine is stopped. The motor and fan are generally stopped before the machine has cooled down. At the end of each film the light should be switched "off" before the machine is stopped. A few seconds will do a lot of good. If the lamp is switched "off" at the end of a picture, the machine will be cooled by the time a 3 ft. leader has run through. Operation of the motor at extremely slow speeds will cause the lamp to overheat.

(30) BROKEN WIRE OR PHOTOCELL CABLE

(31) DAMAGED SPEAKER CABLE

Check particularly those cords which have been altered or repaired by customer.

(32) DEFECTIVE OR DAMAGED TUBES

The tube situation is particularly annoying, not because there are many failures, but because when one does fail, it seems to be so baffling. The tubes are all in series so if one burns out, none will light. If the cathode of one of the tubes shorts, some of the tubes will light up when one of the switches are "off", but will go out when the switches are "on". Any unnatural behavior of the tubes when the switches are thrown, is sure to be a shorted cathode. Sometimes a tube will be damaged so that it draws excessive current and causes the exciter lamp to burn out. The exciter lamp is operated from pure DC, the same as the amplifier tubes. Thus, a bad tube can make the exciter lamp current high or low. Tube testers are not always dependable for this type of test. The best way is for each service point to have a complete set of extra Sylvania tubes. Put in the complete set and if they work, replace the old ones one at a time, until the defective one is found.

(33) DEFECTIVE OR BROKEN PHOTOCELLS

(34) TUBES PARTLY OUT OF SOCKETS

(35) WRONG TUBES OR TUBES IN WRONG SOCKETS

(36) TUBES OR PHOTOCELL MISSING

(37) BURNED OUT 2000 OHM RESISTOR

This resistor is the red one close to the speaker plug on the under side of the amplifier. On all but a few of the early models, two resistors were employed to stand the over-load which occurs in the event that the amplifier is operated without the speaker field for a long period.

(38) BURNED OUT FUSE

Never replace with anything but a 1½ amp. size fuse. Remove power cord before replacing fuse.

(39) EXCITER LAMP IN SOCKET BY ONE POST

Be sure that the exciter lamp is over all three of the little posts in the shell of the socket.

(40) DIRTY SOUND OPTICAL SYSTEM

This is termed "sound lens" on the threading diagram. Clean this optical system with dry cotton on the end of a toothpick. You can use carbon tetrachloride on the cotton.

Caution: Do not change the adjustment or the focus of this sound optical system.

(41) NO CAP ON MICROPHONE SOCKET

(42) FIBRE GROMMET AROUND PHOTOCELL CABLE SLIPPED UP CABLE

(43) KNURLED SCREWS HOLDING THE AMPLIFIER TO THE PROJECTOR LOOSE

(44) PHOTOCELL CABLE TOUCHES ONE OF THESE KNURLED SCREWS

(45) PIECE OF DIRT STUCK OVER EDGE OF SOUND DRUM

Revolve the flywheel without film, with mechanism running, and if there is a click in the loud speaker with every revolution of the drum this click is due to some foreign element overhanging the edge of the drum. Remove particle carefully with a toothpick so as not to injure or scratch the sound drum. Do not remove the sound drum from the projector.

(46) WRONG RESISTANCE SPEAKER FIELD

Old type speaker was mixed with new type amplifier. All speaker fields, even the old 410 ohm field type, should be changed to 630 ohms. To do this, insert a 200 or a 250 ohm resistor in series with the yellow field lead in the rear of the loud speaker. This higher resistance reduces the lamp current and at the same time does not reduce the volume.

(47) LOOSE SET SCREW ON VOLUME CONTROL KNOB

(48) LOOSE SPEAKER OR MICROPHONE RECEPTACLE

(49) DIRT SUCKED THROUGH FAN INTO MECHANISM

(50) DIRTY OR DEFECTIVE PROJECTION LENSES

The projection lens must be kept spotlessly clean on both ends. In time the inside of the lens will become dirty or foggy. Take the lens apart and clean with carbon tetrachloride. The inside of the lens barrel must be entirely black.

Caution: Do not get the lens replaced backwards. There will be circles and all other forms of "halo" on the screen if one of the lenses is reversed.

(51) REAR BEARING OUT OF ALIGNMENT

If the rear cover over the gear mechanism has been removed, the bearing on the rear shaft must be lined up until the machine is absolutely free before tightening the rear cover screws.

SCREEN TABLE

Upper Dimension is Height of Picture

Lower Dimension is Width of Picture

Proj. Lens Focal Length	Distance From Screen in Feet																				
	2'	3'	4'	5'	6'	6'	8'	10'	12'	15'	20'	25'	30'	35'	40'	45'	50'	60'	75'	100'	125'	150
3/4"	0'9"	1'2"	1'6"	1'10"	2'3"	2'8"	3'0"	3'9"	4'6"	5'7"	7'6"	9'4"										
	1'0"	1'6"	2'0"	2'6"	3'0"	3'6"	4'0"	5'0"	6'0"	7'6"	10'0"	12'6"										
1"	0'7"	0'10"	1'1"	1'5"	1'8"	2'0"	2'3"	2'10"	3'4"	4'3"	5'7"	7'0"	8'6"	9'9"								
	0'9"	1'2"	1'6"	1'11"	2'3"	2'8"	3'0"	3'9"	4'6"	5'8"	7'6"	9'4"	11'4"	13'1"								
1½"		0'7"	0'9"	0'11"	1'1"	1'4"	1'6"	1'10"	2'3"	2'10"	3'9"	4'8"	5'7"	6'7"	7'6"	8'4"	9'4"					
		0'9"	1'0"	1'3"	1'6"	1'9"	2'0"	2'6"	3'0"	3'9"	5'0"	6'3"	7'6"	8'9"	10'0"	11'2"	12'6"					
2"								1'4"	1'8"	2'1"	2'10"	3'6"	4'1"	4'10"	5'6"	6'3"	7'0"	8'4"	10'5"	14'0"	17'10"	21'(
								1'10"	2'3"	2'10"	3'9"	4'8"	5'6"	6'6"	7'5"	8'5"	9'4"	11'2"	14'0"	18'9"	23'5"	28'1
2½"								1'2"	1'4"	1'7"	2'3"	2'10"	3'4"	3'11"	4'6"	5'1"	5'7"	6'9"	8'5"	11'2"	14'0"	16'9
								1'6"	1'9"	2'1"	3'0"	3'9"	4'6"	5'3"	6'0"	6'9"	7'6"	9'0"	11'3"	15'0"	19'8"	22'5
3"												2'4"	2'10"	3'3"	3'9"	4'3"	4'8"	5'7"	7'0"	9'4"	11'7"	13'1
												3'1"	3'9"	4'4"	5'0"	5'8"	6'3"	7'6"	9'4"	12'6"	15'7"	18'8
3½"												2'0"	2'4"	2'10"	3'2"	3'6"	4'0"	4'8"	6'0"	7'11"	9'11"	11'11
												2'8"	3'2"	3'9"	4'3"	4'10"	5'4"	6'3"	8'0"	10'8"	13'4"	16'0
4"												1'9"	2'1"	2'2"	2'10"	3'2"	3'6"	4'1"	5'3"	7'0"	8'8"	10'5
												2'4"	2'10"	3'3"	3'9"	4'3"	4'8"	5'6"	7'0"	9'4"	11'8"	14'0

PROJECTION LENSES

Two types of projection lenses are furnished with AMPRO Precision Projectors, standard lenses and super-lenses. The standard projection lenses are 1" in diameter. The super-lenses are 1 3/16" in diameter and transmit more light on the screen because they are larger and faster.

Standard projection lenses of various focal lengths are interchangeable with each other, but are not interchangeable with super-lenses because of the difference in diameters. This is also true of super-lenses, which are interchangeable with each other, but not with standard lenses.

It is recommended that lenses be kept clean, particularly the glass lens which is nearest to the film. This lens will materially reduce illumination if it is cloudy.

TABLE OF LENSES

STANDARD LENSES

1"	E.F.	$ 8.50 Ea.
1½"	E.F.	8.50 Ea.
2"	E.F.	8.50 Ea.
2½"	E.F.	12.50 Ea.
3"	E.F.	12.50 Ea.
3½"	E.F.	12.50 Ea.
4"	E.F.	12.50 Ea.

SUPER LENSES

¾"	E.F.	$12.00 Ea.
1"	E.F.	12.00 Ea.
1½"	E.F.	12.00 Ea.
2"	E.F.	12.00 Ea.
2½"	E.F.	16.00 Ea.
3"	E.F.	16.00 Ea.
3½"	E.F.	16.00 Ea.
4"	E.F.	16.00 Ea.

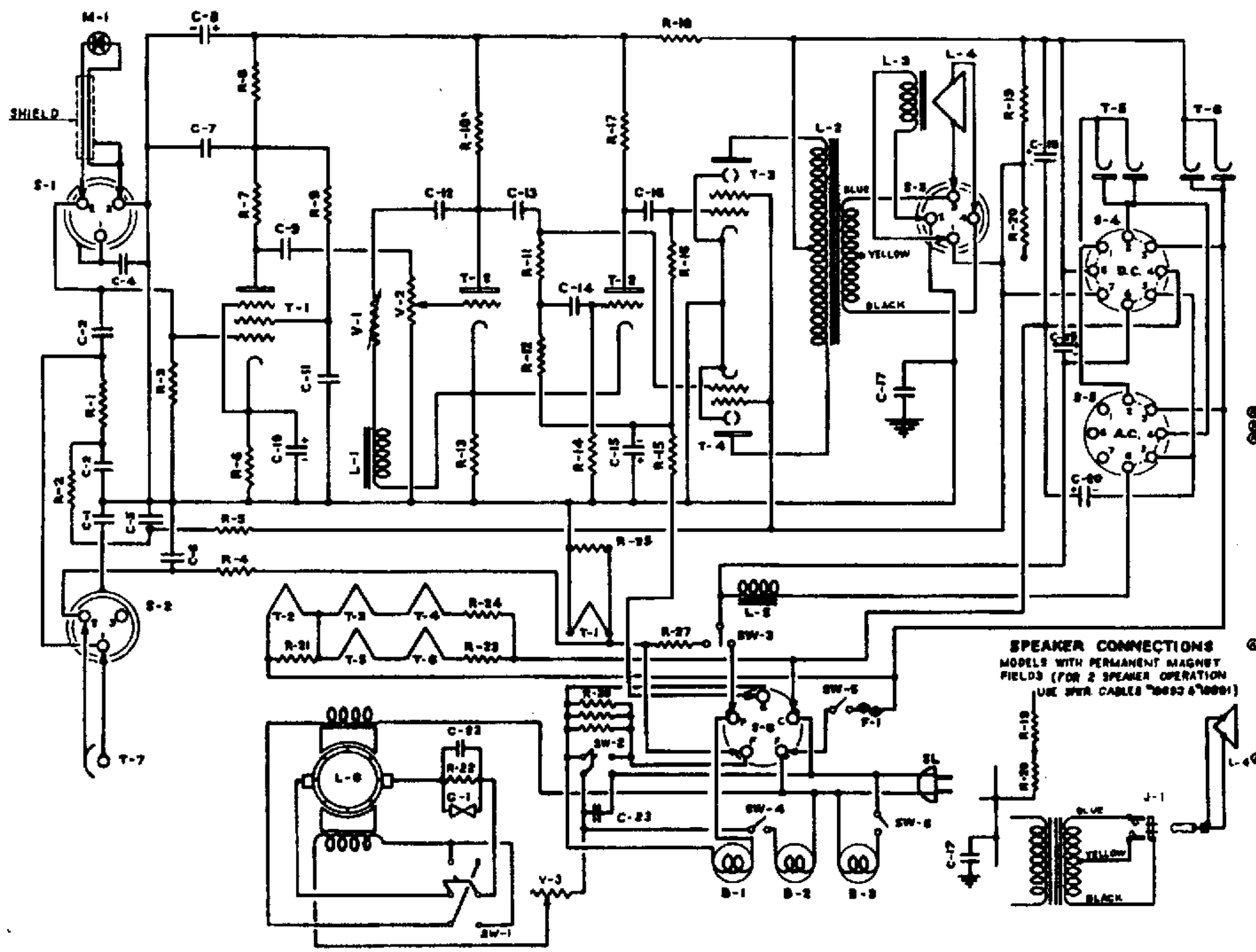
PROJECTION LAMPS

Any AMPRO Precision Projector can use any lamp not exceeding in wattage the highest wattage lamp for which it is designed, without any adjustment in the projector whatsoever. Thus, the 1000 watt AMPRO Precision Projector can use the 750 watt or the 500 watt lamps as desired.

When purchasing lamps best results are obtained when using lamps having the same voltage as the current in the line. Since most outlets have 115 volt current, a 115 volt lamp is commonly used. However, all projection lamps can be obtained in 105,110 and 120 volt types also. If a lamp is burned at a voltage higher than rated, more illumination will be obtained, but the life of the lamp will be shortened. On the other hand, if the lamp is used on a lower voltage than rated, less illumination will be obtained, but longer life will be gained. All projector lamps are rated at 25 hours active life.

Projection Lamps used in Ampro Projectors are of the standard pre-focused, medium base, type obtainable.

The AMPRO CORPORATION
2839-51 NORTH WESTERN AVENUE
CHICAGO



MARK	DESCRIPTION	PART NUMBER
B-1	EXCITER LAMP 7V-2A	17673
B-2	PROJECTION LAMP	
B-3	PILOT LAMP	1671
C-1	0.1 MFD.	17816
C-2	.05 MFD.	17816
C-3	.001 MFD.	17815
C-4	.1 MFD.	17816
C-5	.05 MFD.	17818
C-6	.25 MFD.	17820
C-7	.25 MFD.	17520
C-8	4.0 MFD	17812
C-9	.005 MFD.	17814
C-10	10.0 MFD.	17813
C-11	.05 MFD.	17816
C-12	.1 MFD.	17786
C-13	.1 MFD	17730
C-14	.05 MFD.	17816
C-15	16.0 MFD	17812
C-16	.1 MFD	17750
C-17	.01 MFD.	17819
C-18	50.0 MFD.	17810
C-19	25.0 MFD	17811
C-20	50.0 MFD.	17810
C-22	.5 MFD	17522
C-23	.25 MFD	17523
F-1	FUSE 15 AMP	17879
G-1	GOVERNOR	1711
J-1	JACK - "UTAH" 300-B	18087
L-1	30GOT (CT)	17881
L-2	3000 Ω TO 15 Ω	17878
L-3	630 Ω FIELD	17813
L-4	15 Ω VOICE	17613
L-5	55 Ω	17688
L-6	MOTOR	1710
M-1	MICROPHONE	17818

MARK	DESCRIPTION
R-1	10 MEGS
R-2	2 MEGS.
R-3	2 MEGS
R-4	2 MEGS.
R-5	1 MEGS
R-6	500 OHMS
R-7	150,000 OHMS
R-8	20,000 OHMS
R-9	1 MEG.
R-10	50,000 OHMS
R-11	50,000 OHMS
R-12	4,000 OHMS
R-13	500 OHMS
R-14	30,000 OHMS
R-15	1,000 OHMS
R-16	50,000 OHMS
R-17	50,000 OHMS
R-18	10,000 OHMS
R-19	700 OHMS
R-20	700 OHMS
R-21	30 OHMS
R-22	30 OHMS
R-23	137 OHMS
R-24	280 OHMS
R-25	165 OHMS
R-26	150 OHMS
R-27	25 OHMS
S-1	"MIC" SOCKET
S-2	P.E.C. SOCKET
S-3	SPEAKER SOCKET
S-4	D.C. SOCKET
S-5	A.C. SOCKET
S-6	PROJECTOR SOCKET
SL	LINE SOCKET
SW-1	REVERSING SWITCH
SW-2	PROJECTOR "OFF-ON"
SW-3	MICROPHONE SWITCH
SW-4	PILOT LAMP SWITCH
SW-5	AMPLIFIER SWITCH
SW-6	PROJECTOR LAMP SW.
T-1	6S7 G
T-2	6C6 G
T-3	25L6G
T-4	25L6G
T-5	25Z6G
T-6	25Z6G
T-7	CE. 20
V-1	TONE CONTROL
V-2	VOLUME CONTROL
V-3	SPEED CONTROL

NOTE: THIS DRAWING SUPERSEDES DRG. Nº 10501 DATED 9-15-36

ENGINEERING DEPT
THE AMPRO CORPORATION
CHICAGO
REVISIONS

TITLE SCHEMATIC WIRING DIAGRAM
DEVICE AMPRO SOUND PROJECTOR MODELS "M" & "N"
DATE JULY 31, 1937
SCALE:
ENGINEER:- A. SHOUP
DRG. Nº
DRAWN BY:- P. KARR, G. KALLAL
CHECKED BY: R.N.
D-10501