

**AMPEX**

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**Model AG600 B**  
**Recorder/Reproducer**  
Operation and Maintenance Manual

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# SAFETY & FIRST AID

Because personnel working with electronic equipment are exposed to the hazard of high voltage, it is imperative that all safety regulations be consistently observed, and that each individual has a clear understanding of basic First Aid methods.

The following typical hazards must be avoided at all times:

**1** Do not attempt adjustment of unprotected circuit controls, or lead dress while the power is ON.

**2** Do not change heavily loaded or overheated components without due precaution to avoid burns.

**3** Do not assume that no dangerous voltage is present when the power is OFF. Charged capacitors may retain dangerous voltages for long periods, and should be discharged through a suitable resistor before any circuit points are touched.

**4** At all times avoid placing any parts of the body in series between ground and circuit points, whether or not power is ON.

**5** Do not assume that solid-state circuits and semiconductor cases carry only low voltages.

V 0 8 6 3 3

For their own protection, and the protection of others, all electronic personnel should become thoroughly familiar with the approved First Aid treatment of burns and shock. There are three principal degrees of burns, recognizable as follows:

1. A first degree burn reddens the skin
2. A second degree burn blisters the skin
3. A third degree burn chars the flesh and frequently places the victim in a state of shock accompanied by respiratory paralysis.

Respiratory paralysis in the victim can cause death within seconds, by suffocation. For this reason it is imperative that the approved method of artificial respiration be initiated immediately and continued until the victim's breathing is normal.

A muscular spasm or unconsciousness may render the victim unable to free himself of the electric power. If this is the case, turn the power OFF immediately.

## CAUTION

DO NOT TOUCH HIM, OR YOU MAY SHARE HIS PREDICAMENT.

If the power cannot be turned OFF immediately, very carefully loop a dry rope, article of clothing, length of strong cloth, or a rolled-up newspaper around the victim and pull him free of the power. Carefully avoid touching him or his clothing.

The moment he is clear of the power, place him in a reclining position, cover him with a blanket (or newspapers) to keep him warm, and begin artificial respiration. At the first opportunity, enlist help in the summoning of a doctor. If a doctor cannot be summoned, transport the victim to the doctor, infirmary, or hospital. Be sure that the victim is kept well covered and warm while awaiting professional aid and treatment.

# COMMUNICATING WITH AMPEX

## SERVICE INFORMATION AND PARTS

FIELD ENGINEERING BULLETIN SERVICE (See note below)

Ampex provides a continuous technical support program for its products. This program is partially implemented through field engineering bulletins, which are published by the Ampex Technical Support Group. Approved modifications, information on special tools and accessories, and improved operating and maintenance techniques are typical of the information distributed in these bulletins.

If the installation of your system or accessory was supervised by an Ampex Field engineer, you will be sent these bulletins automatically. If this is not the case, contact the nearest Ampex field office or write to:

Ampex Corporation  
Audio Technical Support Group  
401 Broadway  
Redwood City, California 94063 USA

SERVICE AND REPLACEMENT PARTS (See note below)

For service and replacement parts, contact your nearest Ampex field office. If the installation of your system or accessory was supervised by an Ampex field engineer, you will be sent information regarding the location of the nearest field office. Alternatively, write to the Technical Support Group at the address shown above.

### NOTE

In order for the technical support program to function properly, the user must ensure that his communication is addressed to the proper department, and that it includes the following information, most of which can be obtained from the system identification nameplate on the equipment.

1. System name
2. Model number (including revision number)
3. System number
4. Serial number
5. Power requirements
6. System modifications and special accessories
7. Date of purchase
8. Name and address of your organization
9. Job function to which communication should be addressed
10. Physical location of equipment

# COMMUNICATING WITH AMPEX

## INSTRUCTION MANUAL CHANGES

Another part of the Ampex program of technical support for its products is the continuous revision and modification of instruction manuals as the equipment is improved or modified. In order to ensure that you always receive this information, write to:

Ampex Corporation  
Audio/Video Technical Publications Department  
401 Broadway  
Redwood City, California 94063 USA

### NOTE

In order to be sure that you always receive information applicable to your equipment, please include the following information when you write to us:

1. System name
2. Model number (including revision number)
3. Serial number
4. Power requirements
5. System modifications and special accessories
6. Approximate date of purchase
7. Name and address of your organization
8. Job function to which communication should be addressed

## WARNINGS AND CAUTIONS

### SUMMARY

The following general Warnings and Cautions must be adhered to during applicable handling, operation, and maintenance procedures. The Warnings and Cautions are repeated in this manual wherever they specifically apply; those that apply only under isolated conditions are in the text where applicable.

### WARNINGS

- 1) Avoid body-contact with high-voltage circuits when energized; or serious injury could result.
- 2) Use only insulated tools to adjust potentiometers; or high-voltage shock can result.

### CAUTIONS

- 1) Do not use pressurized air for cleaning; or dirt can be forced between bearing surfaces.
- 2) When the flutter-test tape is on the equipment, do not initiate the record mode; or the tape will be erased.
- 3) When cleaning the heads, use only the recommended solvent to avoid damaging the heads. Keep solvent off of plastic finishes and the capstan idler tire. Do not use metal tools which might scratch the heads.
- 4) Do not use head-cleaning solution on idler rubber tire or capstan; it will cause tire damage and tape slippage if applied.

5) International models have a 115 or 230 volt selector switch on the rear panel. This switch must be set to the line voltage, or extensive equipment damage can result.

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## SECTION 1

## DESCRIPTION

1.1 SYSTEM

1.2 The Ampex Model AG-600B Magnetic Tape Recorder/Reproducer (Figure 1-1) consists of a compact tape transport and one (for single-track) or two (for two-track) compact electronics processing units adaptable for either studio or portable use. The tape-drive system features a hysteresis-synchronous, two-speed, low-heat motor for smooth and efficient tape movement. The electronic circuits are all solid-state, to ensure high-level performance and dependability. The tape transport uses 1/4-inch tape on reels up to seven inches in diameter.

1.3 The AG-600B Recorder/Reproducer is available either in a Domestic type (105-125 volts, 60 Hz), or an International type (115 or 230 volts, 50 Hz). It may be purchased mounted in a portable case or unmounted (for mounting, with rack adaptors, in standard 19-inch racks).

1.4 TAPE TRANSPORT (Figure 1-2)

1.5 The tape transport provides two tape speeds (3-3/4 and 7-1/2 inches-per-second), and has a counter to indicate tape position.

1.6 All tape transport components are secured on two rigid castings to ensure precision tape handling. A drive clutch and two-speed drive motor (with a flywheel) ensures smooth tape handling.

1.7 Tape speed is selected by a two-position SPEED/EQUALIZATION switch on the electronics unit(s). Electronic equalization

is automatically switched according to the speed selected.

1.8 Two switches, at the transport lower right, select operation modes: RECORD or PLAY; and REWIND or FAST FWD.

1.9 ELECTRONIC ASSEMBLY (Figure 1-3)

1.10 One-channel equipment has one main electronic assembly, and two-channel equipment has two electronic assemblies-- a master and a slave. The two electronic assemblies are identical except that power is connected to the slave through the master.

1.11 The two types of the master electronics assembly are Domestic, which requires line power of 105-125 volts at 60 Hz; and International, which has a switch to select either 115 or 230 volts at 50 Hz. Each type uses the same slave electronics assembly to adapt it for two-channel operation.

1.12 Each electronics assembly has two record-input connectors, so that two sound sources can supply the recorder. A dummy plug for either input receptacle is required when recording only from the other line. A microphone preamplifier is provided so that either input can be fed from a microphone.

1.13 Selector switches for the two tape speeds (with equivalent equalization), OUTPUT, RECORD, and RECORD LEVEL, are provided on the front panel.

1.14 HEAD ASSEMBLIES (Figure 1-4)

1.15 Head assemblies for single-channel operation may be either full-track or half-

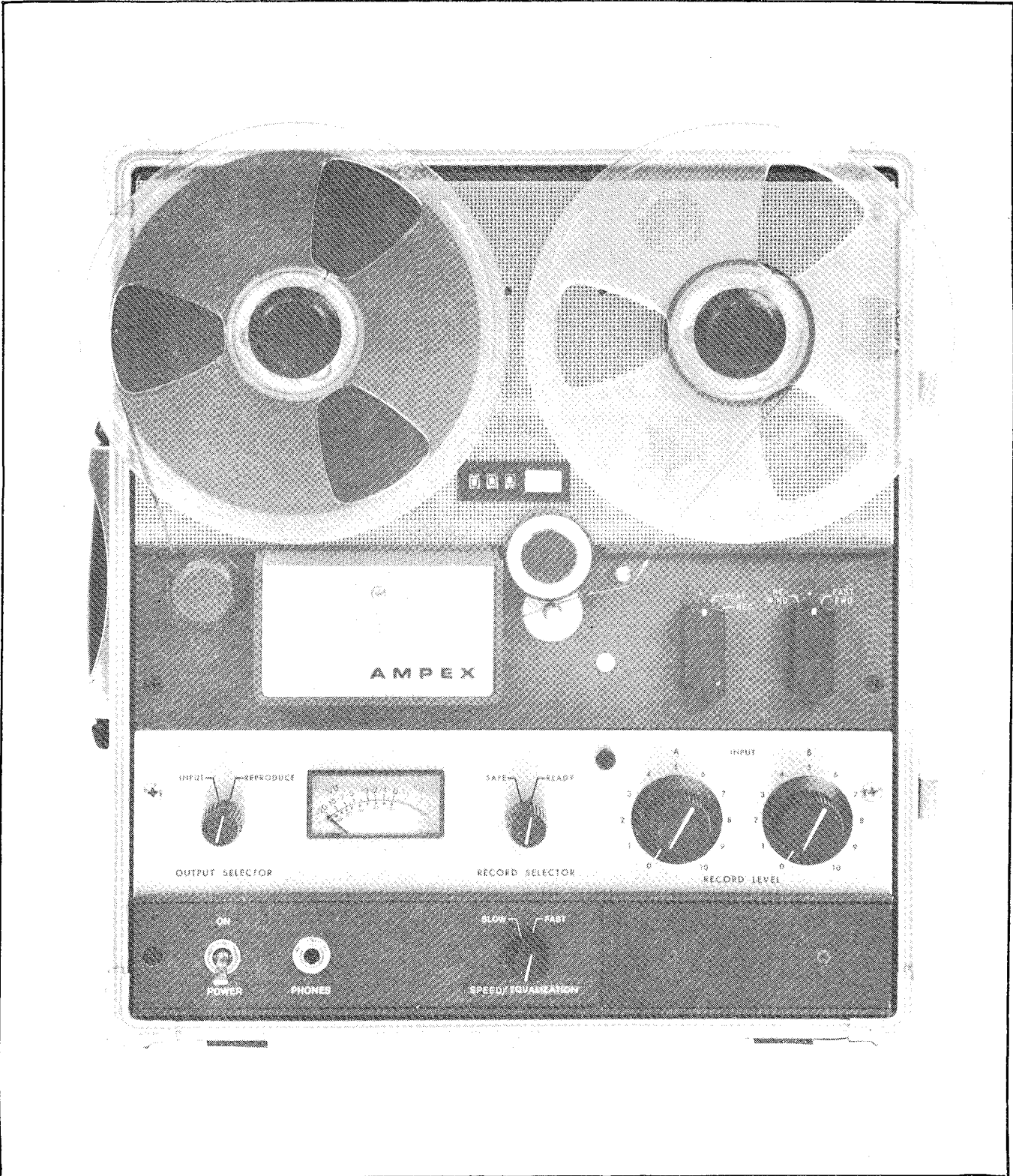


Figure 1-1. AMPEX AG-600B Recorder/Reproducer

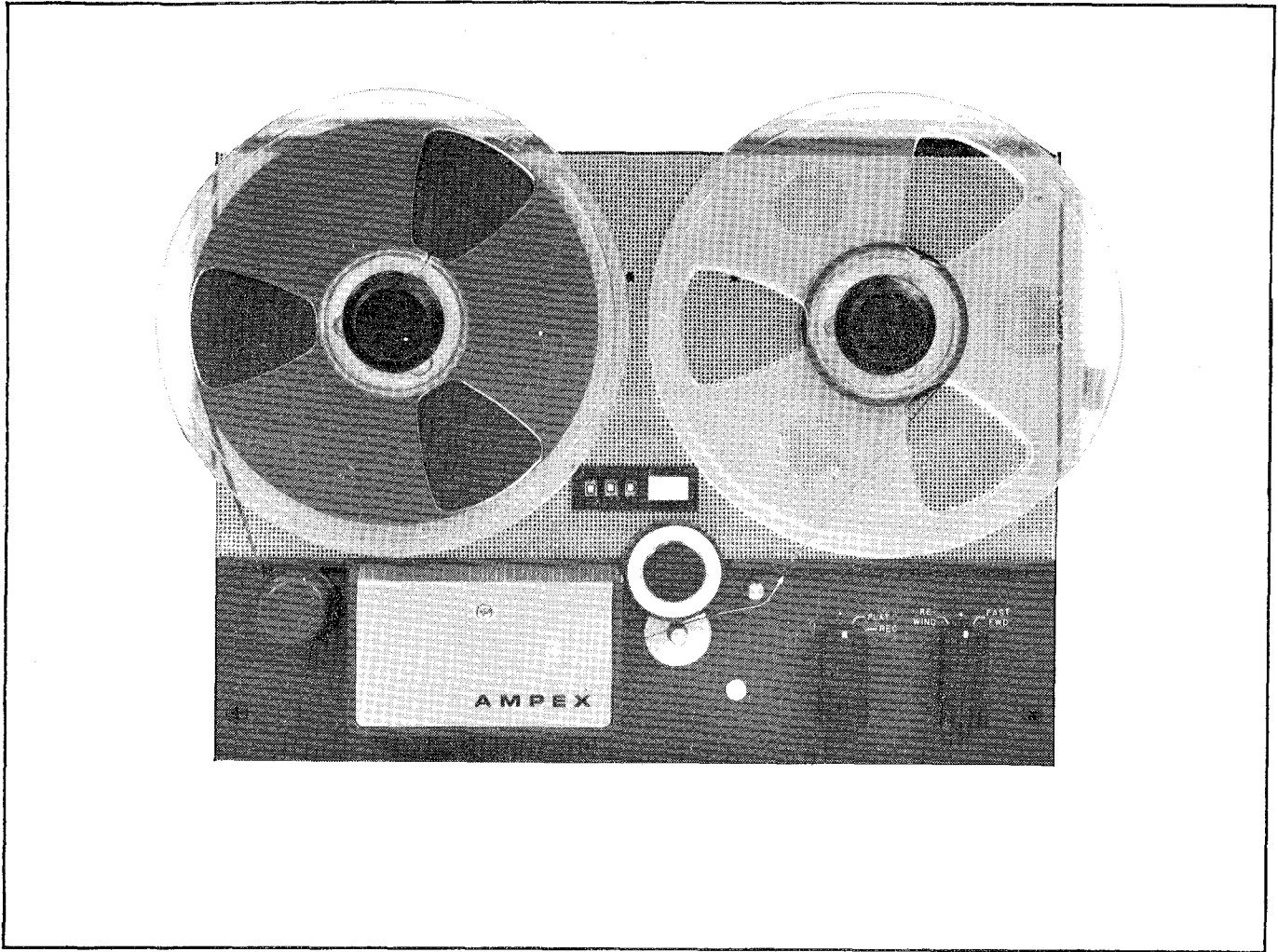


Figure 1-2. Tape Transport

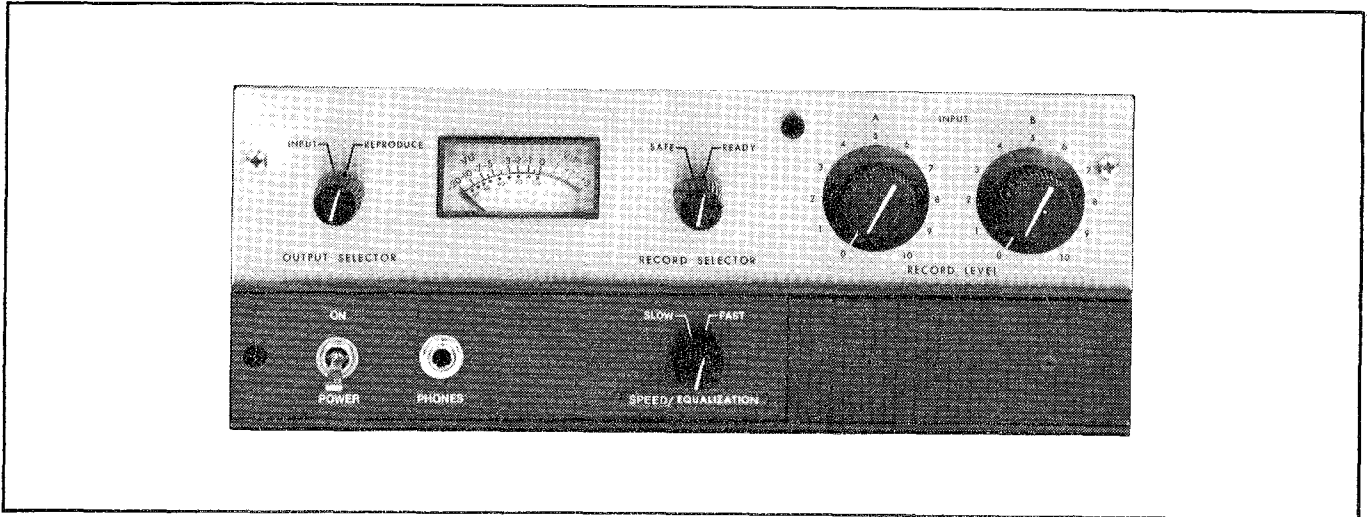


Figure 1-3. Electronic Assembly



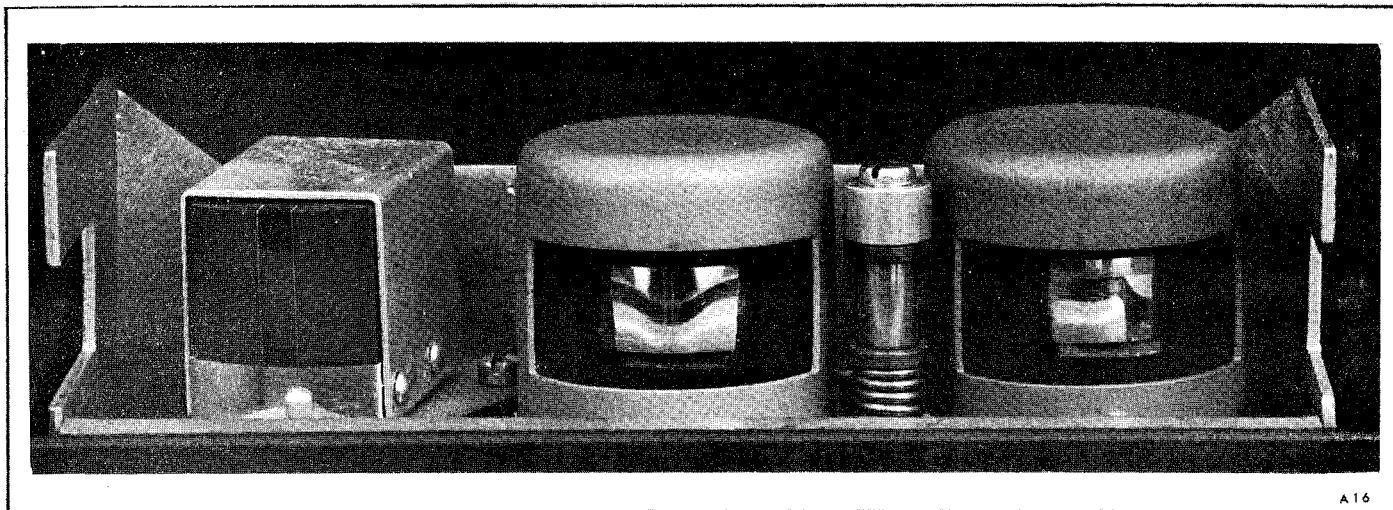


Figure 1-4. Typical Head Assembly

track. Heads for two-channel operation can be either standard two-track or quarter-track.

NOTE

The half-track heads are constructed as two-track heads, but only one head in each stack is connected for use.

1.16 ACCESSORIES (See Table 1-1)

1.17 AMPLIFIER/LOUDSPEAKER

1.18 Ampex Amplifier/Loudspeaker, Model AA-620, combines a 15-watt solid-state power amplifier with a dual loudspeaker for a professional-quality unit. It can be purchased in a carrying case if desired. For loudspeaker specifications, see Table 1-2.

1.19 MIXER

1.20 Ampex Mixer, Model AM-10, mixes one to four microphone inputs and two line inputs, and switches them between the two channel outputs. If more inputs are required, mixers may be coupled together to obtain the required total. Each input has a separate level control, and both output channel levels are controlled simultaneously by a master-gain control. Each microphone

input incorporates a plug-in preamplifier printed-circuit board, and each output has a similar plug-in mixer and line amplifier board.

1.21 METER PANEL

1.22 A two-channel meter panel, 4010098, is available for use with the AM-10 Mixer to provide a separate VU meter indication of each mixer output. A three-position switch sets the meters for a +4 dB, +8 dB, or +12 dB output.

1.23 INPUT TRANSFORMERS

1.24 For recording from an unbalanced line, the dummy plugs are used. For balanced-line recording, two input transformers are available to replace the dummy plugs.

1.25 Transformer 4580200-01 is a balanced-bridging transformer with unity gain and an input impedance of 20,000 ohms. The other transformer, 4580200-02, is a balanced-matching transformer, which provides a 14 dB gain and an input impedance of 600 ohms.

1.26 MICROPHONE PREAMPLIFIER

1.27 One microphone preamplifier, 4010066, is supplied for each electronic

Table 1-1. Accessories

| DESCRIPTION  | AMPEX MODEL or PART NO. |
|--|-------------------------|
| Mixer (for up to 4 microphone, and 2 line, inputs)             | Model AM-10             |
| Microphone Preamplifier  | 4010066                 |
| Microphone, 50-15,000 Hz                                       | Model 655AL             |
| Microphone, 60-15,000 Hz                                       | Model 656AL             |
| Head Demagnetizer  | Model 820               |
| Phonograph Preamplifier, RIAA                                  | 4010097                 |
| Meter Panel, VU  | 4010098                 |
| Amplifier/Loudspeaker  | Model AA-620            |
| Input Transformer, Balanced-Bridging<br>(20,000 ohm impedance) | 4580200-01              |
| Input Transformer, Balanced-Matching<br>(600 ohm impedance)    | 4580200-02              |
| Reel, 7-inch, Small Hub (Spare)                                | 4690069-10              |
| Hardware Kit, Mounting   | 4010897-02              |

Table 1-2. AA-620 Loudspeaker Specifications

| CHARACTERISTIC                                     | REQUIREMENT  |
|--|--|
| <u>Overall Frequency Response</u><br>(in free air) | Essentially flat acoustically.<br>Range better than 65 to 10,000 Hz. |
| <u>Signal-to-Noise Ratio</u>                       | Amplifier noise, including hum,<br>80 dB below rated output.         |
| <u>Distortion (amplifier)</u>                      | Total harmonic distortion less<br>than 1% at full rated output.      |

assembly. If it is desired to record two inputs from microphones, another preamplifier is available as an accessory.

1.28 The preamplifier is wired so that a variable-gain control may be inserted between the two stages. When used with Ampex recorders (Models AG-440, AG-500, or AG-600), the record level control on the equipment is so connected, making the preamplifier a variable-gain device that accommodates a wide variety of professional-quality microphones.

1.29 The unit can be used to drive any amplifier with a 100,000-ohm input impedance, at a 0.1-volt rms level. When so used, the signal input is connected across pins 4 and 8, the unbalanced output is taken across pins 7 and 2 (ground). Power (+24 volts dc) is connected to pin 5 (with pin 2 again ground). The previously mentioned variable-gain control (100,000 ohms) is connected across pins 3 and 6. Pin 1 is connected to the case of the unit, and should also be grounded.

#### 1.30 PHONOGRAPH PICKUP PREAMPLIFIER

1.31 An accessory RIAA phonograph preamplifier, 4010097, is available that allows

the line-input signal to be taken directly from a magnetic pickup. Crystal or ceramic pickups may be used if they are loaded with a 1,500-ohm resistor. The preamplifier operates directly from the pickup; if the phonograph signal has already been amplified, install the dummy plug instead of the preamplifier.

#### 1.32 MICROPHONES

1.33 Two optional Ampex dynamic microphones are available: Model 655A L, "Omnidirectional", and Model 656A L "Cardioid". Both microphones are equipped with a 25 foot two-conductor shielded cable with standard audio 3-pin female plug (Cannon type XLR3-11C) at microphone mating end, and a 3-pin male plug (Cannon type XLR3-12C) at the other end.

1.34 The Model 655A L microphone has an omnidirectional polar pickup pattern and may be used in the vertical position in the center of a group of performers, as well as in the conventional 'tilted' position. The Model 656A L microphone has a cardioid single-direction pickup pattern to minimize undesired peripheral sounds and to avoid "feedback" from any loudspeakers in the system.

Figure 1-5. Deleted

1.35 Model 655AL (Omnidirectional) has a frequency response of 50 to 15,000 Hz. Model 656AL (Cardioid) has an average front-to-back discrimination of 20 dB and frequency response is 60 to 15,000 Hz.

1.36 Both microphones provide an output level of -56 dBm and have a fixed output impedance of 200 ohms.

1.37 Paragraph Deleted

1.38 Paragraph Deleted

1.39 HEAD DEMAGNETIZER

1.40 Demagnetization of the erase, record or reproduce head is easily accomplished

with the Ampex Model 820 demagnetizer accessory.

1.41 RACK MOUNTING ADAPTERS

1.42 Rack mounting adapters are available for mounting the equipment in standard 19-inch racks. Rack adapter 4010078 is for one-channel equipment, and rack adapter 4010079 is for two-channel equipment.

1.43 SPECIFICATIONS

1.44 Requirements of significant parameters of the AG-600B Recorder/Reproducer are given in Tables 1-3 through 1-6.

Table 1-3. AG-600B System Specifications

| CHARACTERISTIC            | REQUIREMENT  |
|---------------------------|--|
| <u>Power Requirements</u> | Domestic: 105-125 volts ac, 60 Hz<br><br>International: 105-125 volts ac, 50 Hz; or<br>220-240 volts ac, 50 Hz<br>(selected by switch)   |
| <u>Power Consumption</u>  | Line power 115 volts ac, 50 or 60 Hz -<br>One channel: 0.5 ampere<br>Two channel: 0.5 ampere<br><br>Line power 230 volts ac, 50 Hz -<br>One channel: 0.3 ampere<br>Two channel: 0.3 ampere |

Table 1-4. Tape Transport Specifications

| CHARACTERISTIC             | REQUIREMENT   |
|----------------------------|---|
| <u>Magnetic Tape</u>       | Specifications are based on the use of professional-quality magnetic tape Ampex No. 631, or equivalent.   |
| <u>Tape Width</u>          | 1/4-inch, either 1 mil or 1-1/2 mil base  |
| <u>Reel Size</u>           | 7-inch EIA or 5-inch  |
| <u>Tape Speed</u>          | 3-3/4 and 7-1/2 ips   |
| <u>Flutter and Wow*</u>    | 7-1/2 ips: 0.15% rms<br>3-3/4 ips: 0.18% rms  |
| <u>Tape Speed Accuracy</u> | 7-1/2 ips: ±0.25%<br>3-3/4 ips: ±0.4%   |
| <u>Fast Winding Time</u>   | 60-Hz equipment: Approximately 90 seconds at <u>fast</u> speed; 180 at <u>slow</u><br><br>50-Hz equipment: Approximately 108 seconds at <u>fast</u> speed; 216 at <u>slow</u> |

\*Using Ampex standard flutter test tape, and measured in accordance with ASA Standard Z57.1-1954 to include all components between 0.5 and 200 Hz.

Table 1-5. Electronic Assembly Specifications

| CHARACTERISTIC                      | REQUIREMENT   |
|-------------------------------------|---|
| <u>Magnetic Tape</u>                | Specifications are based on the use of professional-quality magnetic tape Ampex No. 631, or equivalent.     |
| <u>Overall Frequency Response</u>   | 7-1/2 ips: ±2 dB at 60 to 10,000 Hz<br>+2-4 dB at 30 to 15,000 Hz<br><br>3-3/4 ips: ±2 dB at 50 to 7,500 Hz |
| <u>Output Level Before Clipping</u> | +24 dBm   |
| <u>Even-Order Distortion</u>        | Less than 0.4% second harmonic distortion of a 500-Hz signal recorded at normal operating level.            |

Table 1-5. Electronic Assembly Specifications (Continued)

| CHARACTERISTIC               | REQUIREMENT  |               |       |
|------------------------------|--|---------------|-------|
| <u>Signal-to-Noise Ratio</u> |  |               |       |
| <u>Tape Speed</u>            | <u>Head</u>  |               |       |
| <u>Equalization</u>          | <u>Signal-to-Noise</u>   |               |       |
| 3-3/4 ips                    | Full Track   | 120 microsecs | 55 dB |
| 3-3/4 ips                    | Half Track,<br>2-Track, or<br>Quarter Track                          | 120 microsecs | 50 dB |
| 7-1/2 ips                    | Full Track   | NAB           | 60 dB |
| 7-1/2 ips                    | Half Track,<br>2-Track, or<br>Quarter Track                          | NAB           | 55 dB |
| 7-1/2 ips                    | Full Track   | CCIR          | 57 dB |
| 7-1/2 ips                    | Half Track,<br>2-Track, or<br>Quarter Track                          | CCIR          | 52 dB |
| <u>Input Impedance</u>       | With dummy plug: 100,000 ohms, unbalanced                            |               |       |
|                              | With balanced-bridging transformer: 20,000 ohms, balanced            |               |       |
|                              | With balanced-matching transformer: 600 ohms, balanced               |               |       |
| <u>Input Sensitivity</u>     | Signal levels as low as -18 dBm will provide normal operating level. |               |       |
| <u>Output</u>                | Nominal +4 dBm output into 600-ohm line, isolated from ground        |               |       |

Table 1-6. Microphone Preamplifier Specifications

| CHARACTERISTIC               | REQUIREMENT                                  |
|------------------------------|--|
| <u>Gain</u>                  | At least 57.5 dB                             |
| <u>Frequency Response</u>    | ±1 dB, 50 Hz to 15,000 Hz (500 Hz reference) |
| <u>Output Clipping Level</u> | Not less than 2.5 volts rms                  |
| <u>Signal-to-Noise Ratio</u> | Not less than 55 dB at maximum gain          |

Table 1-7. Accessory Microphone Specifications

| Model              | 655A L "Omnidirectional"   | 656A L "Cardioid"  |
|--------------------|--|--|
| Type               | Moving-Coil Dynamic  | Moving-Coil Dynamic  |
| Frequency Response | 50 to 15,000 Hz  | 60 to 15,000 Hz  |
| Output Impedance   | 200 ohms (Fixed)   | 200 ohms (Fixed)   |
| Output Level       | -56 dBm/10 dynes/cm <sup>2</sup>                                 | -56 dBm (re: 10 dynes/cm <sup>2</sup> )                          |
| Pickup Pattern     | Omnidirectional  | Cardioid   |
| Dimensions         | 1-1/2" diameter tapering to 3/4" handle, 6-1/2" long (less plug) | 1-3/4" diameter tapering to 3/4" handle, 6-1/2" long (less plug) |
| Weight             | 6-3/4 oz. (without cable and plug)                               | 8 oz. (without cable and plug)                                   |