

INSTALLATION

NOTE

Before operating the equipment read this SECTION and SECTION 4, OPERATION.

GENERAL

The 351 Series equipment is shipped mounted in consoles or portable cases after a thorough inspection and performance check at the factory. In the event that the equipment is requested disassembled, for customer rack mounting, all assembly hardware is provided.

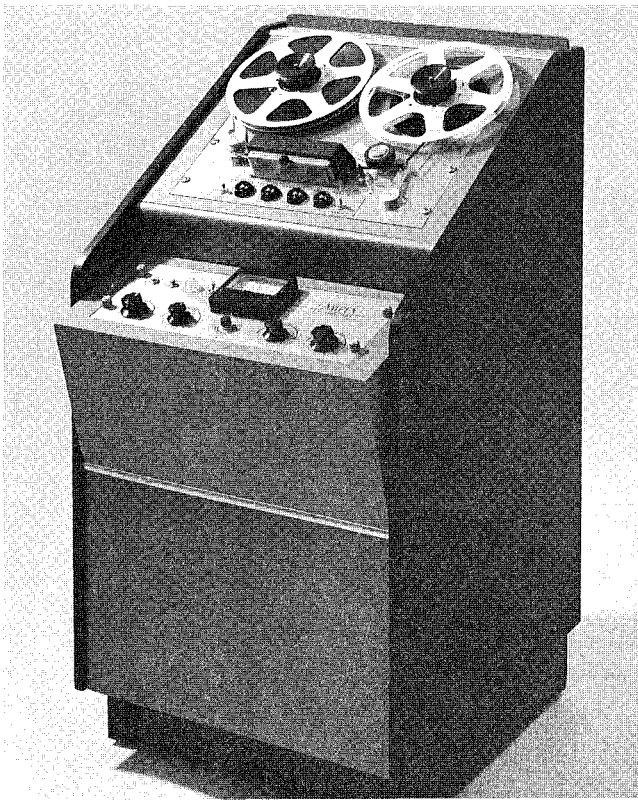
INTERCONNECTING

See the appropriate interconnecting diagrams at the back of this section.

MOUNTING**Console Models**

To assemble the console model proceed as follows:

- Step 1:* Install the tape transport in the cabinet frame, securing the 8 oval-head screws and finishing washers.
- Step 2:* Place the two springs in the holes for the electronic assembly cabinet frame.
- Step 3:* Attach the two rails to the electronic assembly using the number 8 screws.
- Step 4:* Slide the cabinet back panel up and out to allow connecting of the a-c power cable and plug the input cable and the output cable into their receptacles on the back of the electronic



Ampex Series 351 Recorder/Reproducer—¾ View

backs of each case. To set up the equipment follow these steps:

- Step 1:* Arrange the cases so that the mechanical assembly case is to the right of the electronic assembly case.
- Step 2:* Unlatch and remove the top cover and the side access door on the mechanical assembly case.
- Step 3:* Unlatch and remove the front and rear covers on the electronic assembly case.
- Step 4:* Uncoil the interconnecting cables from behind the cable access door on the tape transport case and plug them into mating receptacles at the rear of the electronic assembly.
- Step 5:* Connect the a-c power, and the input and output to the rear of the electronic assembly.

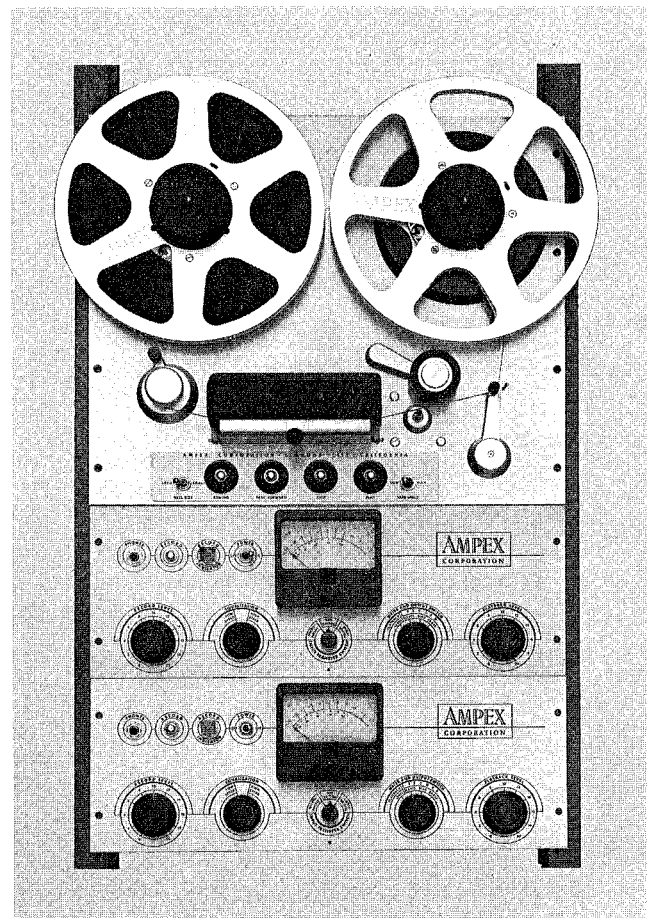
assembly.

- Step 5:* Install the electronic assembly, tightening the four knurled nuts to fasten it to the frame.
- Step 6:* Connect the captive head cables at their locations on the electronic assembly.
- Step 7:* Connect the captive CABLE TO ELECTRONICS to the electronic assembly.
- Step 8:* Replace the back panel, making certain that all cables run freely through the semi-circular cut-outs at the bottom of the sliding panel.

Two Case Portable Models

(For 351-2 see the applicable INTERCONNECTING illustration at the back of this SECTION).

The two case portable models are shipped in a ready to operate condition, except for the connection of interconnecting cables. Convenient rubber feet are located at both ends of each case, and metal rests are provided on the



Rack layout (Model 351-2)

Rack Mounted Models

Mount these versions of the equipment on a standard 19-inch relay rack with the mechanical assembly above the main electronic panel.

POWER CONNECTION

Connect the power cable from the a-c POWER input connector, J8, on the electronic assembly to a convenient 115 volt a-c power source.

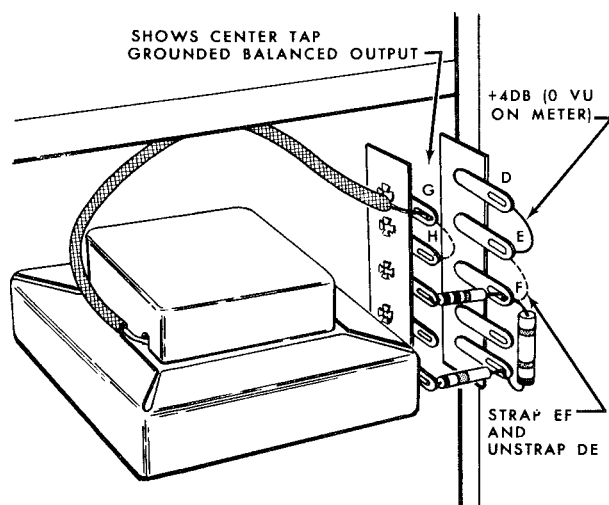
OUTPUT

A mating connector for LINE OUTPUT is supplied. The user must fabricate his own cables, using the connectors supplied with the recorder.

Studio Line

Plus 8 v-u, 600 ohm line output, balanced or unbalanced, is available across terminals 2 and 3 of the line out connector, J5. Pin 1 is the chassis ground.

If unbalanced output is desired, wire the mating connector so that the pin 2 side of the line is tied to ground or tie A to B at TS1. Supply 600 ohm termination to this output at all times to maintain correct meter calibration while recording or reproducing. If the output is not feeding a terminated line, or if the output is not connected, such as on remote pickups, the line out termination switch, S4, must be left in the ON position.



Center tap grounded balanced output and strapping for 4VU output.

To obtain a center tap, grounded balanced output, strap the black lead of transformer T3 to ground at the tie point shown in the illustration.

Plus 4 v-u output can be achieved by unstrapping D and E at transformer T3 and strapping E to F. Readjust the record calibration according to the instructions in the "Alignment and Performance Checks" paragraphs in SECTION 8.

High Impedance Amplifier Input

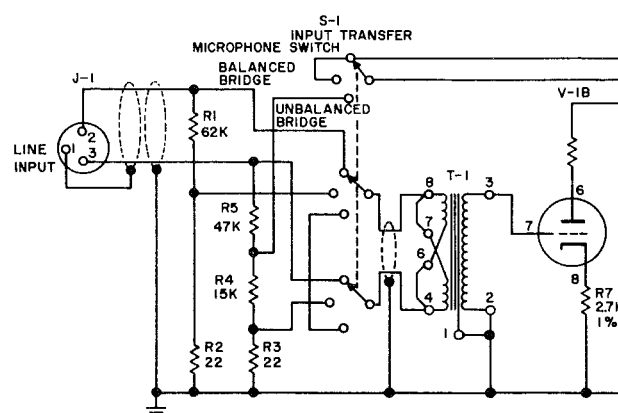
Wire the mating connector so that pin 3 of the line out connector, J5 is connected to the high side of the amplifier input. Strap pins 1 and 2 of the mating connector for connection to the ground side of the amplifier input. The line out termination switch S4, must be left in the ON position at all times.

INPUT

During this discussion refer to the foldout illustration — Schematic Diagram-Electronic Assemblies at the back of SECTION 8.

Microphone Input

Any low impedance microphone having a nominal impedance between 30 and 250 ohms can be plugged directly into the equipment. Wire the mating connector so that the microphone is connected to pins 2 and 3 of LINE INPUT, J1. The cable shield must be connected to pin 1. Place the input transfer switch, S1, in the MIC position.



Microphones with 50 ohms or less impedance.

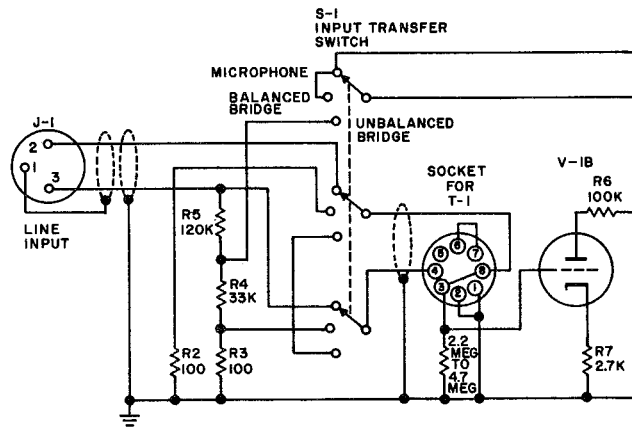
The microphone input transformer is strapped for the optimum step up when using a 150 to 250 ohm source. With microphones of 50 ohms or less impedance, to obtain 6 db additional gain strap the input as shown.

This should be done only if insufficient gain is found to exist when the input is fed from a source impedance less than 50 ohms.

IMPORTANT

To maintain flat response in the balanced bridge condition when the transformer is strapped for 50 ohms, change resistor values of the following:

R1—22K ohms R3—22 ohms
 R2—22 ohms R4—3.9K ohms
 R5—18K ohms



High impedance microphone input.

High impedance microphones are not recommended for use in this equipment because, in general, the quality is not satisfactory for professional work. If it becomes necessary to connect a high impedance microphone, the input circuit must be re-wired as shown below:

- Step 1: Remove the input transformer T1.
- Step 2: Remove the 100K ohm resistor R1 from the switch S1.
- Step 3: Between pin 3 and pin 1 on the input transformer socket, connect a resis-

tance the value of which is between 2.2 megs and 4.7 megs.

Step 4: Using a jumper connect pin 3 to pin 8 on the transformer socket.

Step 5: Wire the microphone input connector for connection to pins 1 and 2 (shield to pin 1), and leave pin 3 open.

Bridging a Balanced Studio Line

Connect a balanced line to pins 2 and 3 of the input connector, J1. Pin 1 is ground. Place the input transfer switch, (S401) in the BALANCED BRIDGE position. Input levels of minus 10 to plus 20 v-u can be accommodated. The load placed on the line is approximately 200K ohms.

Bridging an Unbalanced Source

Connect an unbalanced line, radio tuner, etc., to pins 1 and 3 of the input connector. Pin 1 is the ground side. Place the input transfer switch S1, in the UNBALANCED BRIDGE position. This connection provides a 100K ohm bridging input for any rms program voltage greater than .25 volt.

Gain Changes in Balanced Bridge or Unbalanced Bridge

An increase of 10 db in balanced and unbalanced bridge can be achieved by changing two resistors. Change R1 to 33K ohms and R5 to 12K ohms. The resulting input impedances will be 66K ohms in the balanced bridge position and 30K ohms in the unbalanced bridge position.

An increase of 14 db unbalanced bridge gain without changing balanced bridge gain can be obtained by shorting out resistor R5 and changing R4 to 100K ohms. Resulting input impedance will be 50K ohms.

For a 10 db increase in balanced bridge gain without changing unbalanced bridge gain, change resistor R1 to 33K ohms, R5 to 27K ohms and R4 to 5.6K ohms. Resulting input impedances will be 66K ohms for balanced bridge and 33 K ohms for unbalanced bridge.

SUMMARY

For Gain Increase	Component	New Value	New Input Impedance	
			BAL BRIDGE	UNBAL BRIDGE
10 db BAL BRIDGE and UNBAL BRIDGE	R1	33K ohms	66K ohms	30K ohms
	R5	12K ohms		
14 db UNBAL BRIDGE	R5	zero (short out)	200K ohms	50K ohms
	R4	100K ohms		
10 db BAL BRIDGE	R1	33K ohms	66K ohms	33K ohms
	R5	27K ohms		
	R4	5.6K ohms		

PHONES

High impedance head phones must be used. To monitor the incoming line or reproduce output, plug the high impedance phones into phone jack J6 PHONES on the amplifier face panel or J4 MONITOR on the back of the amplifier chassis. The monitor jack J4 is a high impedance unbalanced output isolated from the main line. To preserve low frequency response, feed into an input impedance 50K or higher. To preserve high frequency response the cable should have not over 500 uuf of capacitance.

REMOTE CONTROL

The operation of the tape transport mechanism can be remotely controlled by a Remote Control Unit.

NOTE

Whenever the remote control unit is not connected, the dummy plug P502P, supplied with the equipment, must be plugged into J502S.

60 CYCLE AMPLIFIER

The Ampex Model 375 Precision 60 Cycle Amplifier can be plugged directly into the equipment at J503S. No other connections are necessary. The Model 375 is used where power sources are erratic and there is need for a precision 60 cycle time base for driving the capstan.

CAUTION

If this unit is used with the Recorder/Reproducer, the control circuit fuse F402 must be increased to 5 amperes.

NOTE

Do not remove the dummy plug P503P unless the 60 cycles amplifier is connected.

OVERALL PERFORMANCE CHECK

(Read SECTION 4, OPERATION before making these checks.)

Make the following equipment performance checks at the time of installation and when necessary thereafter:

REPRODUCE (Playback) LEVEL
 REPRODUCE (Playback) RESPONSE
 REPRODUCE (Playback) NOISE MEASUREMENT
 RECORD CALIBRATION
 FREQUENCY RESPONSE
 RECORD NOISE MEASUREMENT

NOTE

It should be noted that this machine has been adjusted at the factory to

produce frequency response within specifications when recording on an average tape. In the last few years the high frequency output from tape has improved tremendously. In order to keep pace with these improvements, in the summer of 1959 Ampex selected a new "average" tape to adjust bias and record equalization. Machines adjusted to the new average tape may be identified by the catalog number of the electronics, No. 02-30960 representing the revised machine. The 02-30960 electronics also are adjusted for a 3¾ inches per second (ips) playback response curve incorporating a 120 microsecond turnover.

Complete instructions for making the above checks are given in the "Alignment and Performance Checks" paragraphs of SECTION 8.

DISTORTION

Overall distortion can be measured by connecting any standard distortion measurement

apparatus across the output. The readings from a wave analyzer or selective frequency distortion meter will be more accurate than those from a null type instrument at lower distortion levels. Distortion readings are somewhat dependent on tape. A reading of 1% is normal at operating level while a reading of 3% is normal at 6 db above operating level. Second harmonic distortion is negligible; measured distortion is predominately third order.

FLUTTER AND WOW

Flutter and wow are produced by periodic irregularities in tape speed and appear as frequency deviations in recording or reproduction. They can be measured by means of a calibrated flutter test tape (see "Accessories" section) and a standard flutter bridge. Readings will be near or below 0.11% rms at 15 ips, 0.14% rms at 7½ ips, and 0.18% at 3¾ ips. The Ampex primary standard of measurements is based on the use of a flutter meter calibrated to indicate the deviation from mean carrier frequency of any rate between 0.5 and 250 cps expressed in percent rms.

INTERCONNECTING SINGLE TRACK

Cable	Catalog Number	Qty.	From		To	
			Receptacle	Chassis	Receptacle	Chassis
A-c	05-0156-01	(1)	J8 POWER	Electronic Assembly	A-c source	
Power Interconnecting		(1)	J7 TAPE TRANSPORT	Electronic Assembly	CABLE TO ELECTRONICS	Captive at Tape Transport
Reproduce Head		(1)	J3 PLAYBACK HEAD	Electronic Assembly	Captive at Tape Transport	
Record Head		(1)	J2 RECORD HEAD	Electronic Assembly	Captive at Tape Transport	
Erase Head		(1)	J10 ERASE HEAD	Electronic Assembly	Captive at Tape Transport	

PORTABLE SINGLE TRACK

Power Extension	05-0157-01	(1)	J7 TAPE TRANSPORT	Electronic Assembly	End of Captive Tape Transport power interconnecting cable.	
-----------------	------------	-----	-------------------	---------------------	--	--

DUAL TRACK EQUIPMENT (Unmounted)

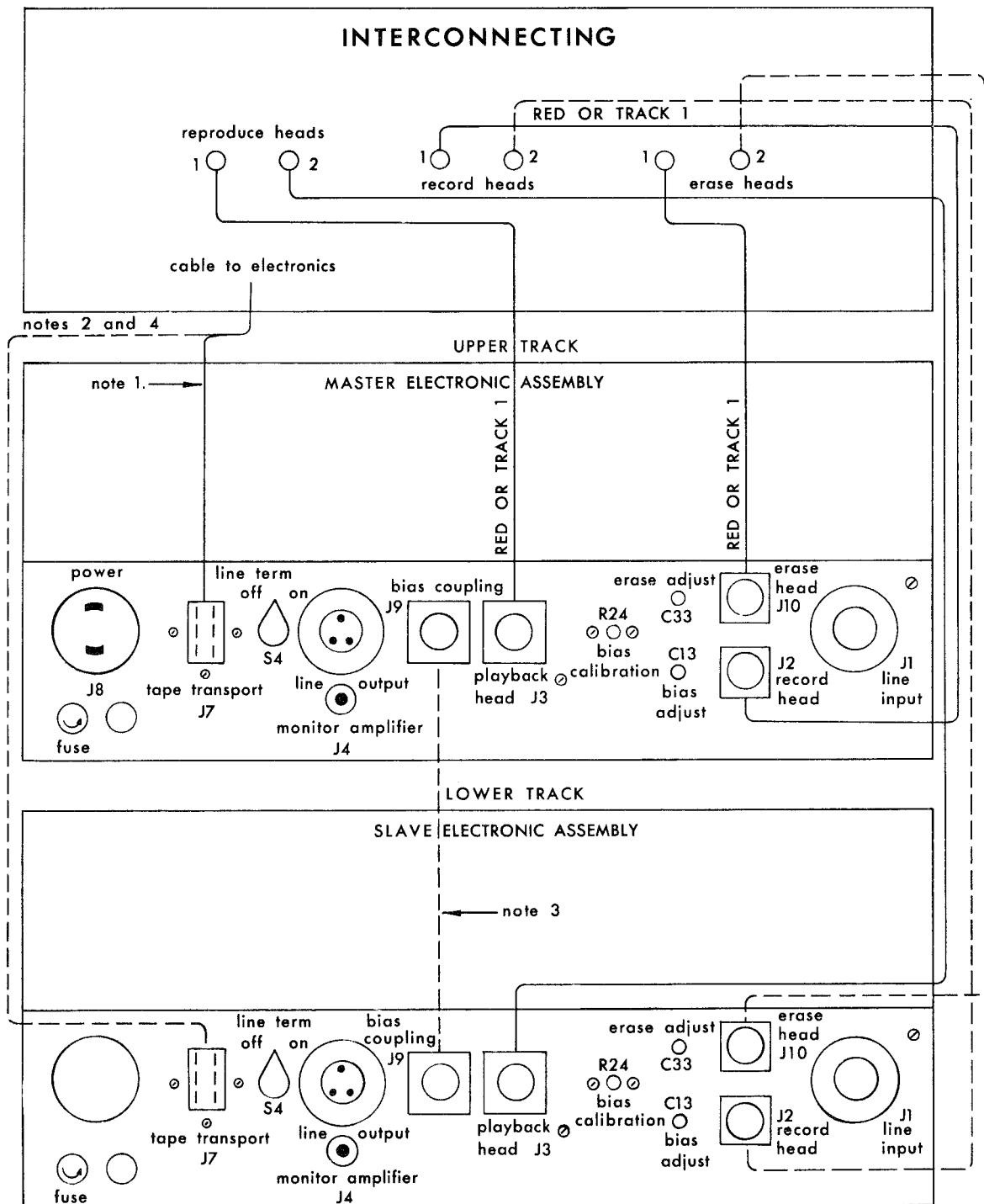
Power Interconnecting	05-0159-01	(1)	J7 TAPE TRANSPORT	Electronic Assembly 1 and 2	End of Captive Tape Transport power interconnecting cable.	
-----------------------	------------	-----	-------------------	-----------------------------	--	--

	Catalog Number	Qty.	From		To	
			Receptacle	Chassis	Receptacle	Chassis
Bias Interconnecting	05-0160-02	(1)	J9 BIAS COUPLING	Master Electronic Assembly	J9 BIAS COUPLING	Slave Electronic Assembly

DUAL TRACK EQUIPMENT (Portable)

	05-0159-02		J7 TAPE TRANSPORT	Electronic Assembly 1 and 2	End of Captive Tape Transport power interconnecting cable.	
--	------------	--	-------------------	-----------------------------	--	--

NOTE: Cables marked with a red band, interconnect in upper electronics for the Model 351-2 only.



NOTES:

1. 05-0157-01 POWER EXTENSION CABLE IS USED WITH SINGLE TRACK PORTABLE EQUIPMENT.
2. 05-0159-01 INTERCONNECTING CABLE IS USED WITH DUAL TRACK STEREOPHONIC EQUIPMENT.
3. 05-0160-02 BIAS INTERCONNECTING CABLE IS USED WITH PORTABLE DUAL TRACK STEREOPHONIC EQUIPMENT.
4. 05-0159-02 POWER INTERCONNECTING CABLE IS USED WITH PORTABLE DUAL TRACK STEREOPHONIC EQUIPMENT.