

INSTRUCTION SHEET
BROOK HIGH QUALITY AUDIO AMPLIFIER - MODEL 22A

THESE INSTRUCTIONS ARE IMPORTANT FOR OPTIMUM RESULTS FROM YOUR BROOK AMPLIFIER. Read them before you connect your amplifier...if you don't read them before, be sure to read them soon after.

The Model 22A Amplifier is a complete high-quality amplifier system built in a single chassis. It contains 5-input circuits: one for phonograph pickup and four other program sources, such as TV, FM-AM radio and/or tape recorders. If the program sources are high-quality and the speaker and its enclosure are high-quality, then the overall system will give the finest and most natural possible reproduction of music and voice.

The amplifier contains 8-amplifier stages and 8 tubes plus rectifier. For operation on disc records, the gain is 110 db measured at 1000 cycles, and all the tubes in the amplifier are in circuit. The playback characteristic switch has 6 positions to provide exact compensation for the recording characteristics of most types of records. This playback characteristic or recording compensation is an exact compensation for the recording characteristics, but it does not take account of the variations in recordings due to studios, different interpretations by various conductors, etc., and you will find it necessary to use the bass and treble controls to obtain the best balance of lows, middles, and highs on each particular record for the very utmost in record reproduction. Occasionally, you may find a record that will have better tone balance when played on some switch setting other than its own. Your ear must be the final judge in getting the correct tone balance.

For operation from TV or FM-AM radio or tape recorder, the first two stages of the amplifier are cut out of circuit, and the gain is 95 db.

The Model 22A is housed in an all-metal case; dimensions: 13-1/4" wide, 13-3/4" deep, 4-1/2" high. Because of the heat generated by the tubes and other components of the amplifier, adequate ventilation must be provided so that air can circulate through the sides and top of the perforated metal case. The amplifier should be placed so that the back is completely open for ventilation; the sides clear for 1/2" or more, and the top clear for at least 1", preferably 3". Care should be taken not to put other components, which might be affected by the heat, or records, directly above the amplifier in such a way that they would be affected by the heat generated by the amplifier.

The front panel includes (starting from left): channel selector; record playback characteristic control; bass control; treble control; volume control with Automatic Bass Compensation; the on-off switch is in the lower right-hand corner; pilot light in lower left-hand corner.

The rear panel includes (starting from left):

1. The AC power cord.
2. Fuse (3 Ampere)

3. AC outlet into which may be plugged an extension cord with several outlets, if more outlets are necessary. The total AC load on these AC outlets should not exceed 250 watts.
4. Output terminal strip, marked for 2, 4, 8, and 16-ohm loudspeaker connections.
5. Five input jacks and their associated level controls.

Jacks A & B - For tuners (AM, FM, AM-FM, TV) or recorders, with overall gain (inc. 55 db of basic amplifier) 95 db flat. Input impedance: .25 meg. fitted with level controls.

Jack C - For tuners, recorders, or crystal pickups, with overall gain (inc. basic amplifier) 95 db flat. Input impedance: 1 megohm.

Jack D - For tuners, recorders, or crystal pickups, with overall gain (inc. basic amplifier) 75 db flat. Input impedance: 1 megohm.

Jack E - For magnetic or variable reluctance pickups, with total gain (inc. basic amplifier) 110 db at 1000 cycles, compensated for pickup along with Record Playback Characteristic Control. Input impedance: 47,000 ohms. If your pickup has a better frequency characteristic with a different load resistor, the 47,000-ohm resistor may easily be changed. Resistor is mounted directly on the input jack, and carries color bands yellow, purple, and orange. Original resistor may be removed and new values soldered in after bottom plate is removed to permit access.

IT IS IMPORTANT THAT THE LEVEL CONTROLS ON CHANNELS A, B, & E, BE SET CORRECTLY. These level controls serve three purposes:

1. To balance the levels of the various tuners and the pickup so that switching from one input to another will not be accompanied by unpleasant variations in level.
2. To set the input level to the volume control so that the automatic bass compensation circuit starts off on the right basis.

The level controls should be adjusted as follows: with the volume control on Position 7, each level control should be adjusted when operating with the radio receiver, or pickup with which it will be normally employed so that the room volume will be what you would call a fairly high room volume. Technically, this is defined as running at peak power of approximately 1/2 watt in the speaker. This is about as loud as you would normally want to listen to any single speaking voice. These statements are made merely to define "volume setting" which will constitute a starting point for the level control adjustment. Level control on Channel E will be at or near maximum with the very low-level magnetic-type pickup. The overall gain of the amplifier is more than sufficient to drive the basic amplifier to full output.

If the level control is set too high on a particular channel, the volume control will be set lower than normal for a given volume setting and the bass will be accentuated too much. Likewise, if the level control is set too low, the volume control will be higher than normal for that particular setting and the bass will be deficient. The average program will probably sound best with the bass control set at 1 to 3, and the treble control 7 to 5. If the bass is too heavy, decrease the level control setting. This will lead to a higher volume control setting which automatically takes out some of the bass. Remember that Position 7 on the volume control is intended to be a fairly loud room volume and that most of your listening will be done between 5 and 7 on the volume control. You may find it necessary to make several adjustments of the level control over a period of time until you get the right balance of bass on the programs, or records, to which you listen most of the time.

The bass and treble control switches you will use to accommodate variations in your room acoustics, primarily, as well as program variations. The bass and treble controls should be set to your own individual taste so that the music sounds natural to you. Your own ears are the best instruments known to determine when the balance of bass, middle and treble is right.

SETTING UP FOR OPERATION CONSISTS OF THE FOLLOWING STEPS:

1. Connect speaker leads to terminal strip on basic amplifier. Screw terminals are marked for proper load impedances. The BROOK Amplifier is not critical on load impedance. An 8-ohm speaker should be connected to the 8-ohm output terminal but the difference in performance is very slight if the speaker is connected to the 4-ohm or the 16-ohm taps. The 4-ohm will have very slightly less distortion than the 16-ohm tap on an 8-ohm load, at the same power output.
2. Plug line cord from amplifier into 105-120 volts, 50-60 cycles AC outlet.

THE RECORD PLAYBACK CHARACTERISTIC CONTROL:

This switch provides exact compensation for the published recording characteristic of some of the better-known records. It should be emphasized that while recording companies make every effort to keep their records as close as possible to published characteristics, there are considerable variations between records supposedly following the same recording curve. When a record is being played, and the switch is set to that particular make of record, the signal at the volume control is very close to what comes out of the microphone in a studio and the frequency characteristic of the music is substantially flat. The bass and treble controls should be used to accommodate the tone of the recording to what your ear tells you is the best tone balance for that recording, just as they are used in a radio program.

Frequently, it will be found that records will sound better with some other setting of the Playback Characteristic Control, and if your ear likes the record better at the alternate setting, that is the correct control setting for you.

THE BASS CONTROL:

The Bass Control consists of a 2-stage resistance-capacitance network controlled by a seven-position switch. With the switch set at position 1, the low frequency response of the amplifier is flat down to 20 cycles. Positions 2 thru 7 give gradual steps of low frequency boost to a maximum of 18 db measured at 50 cycles. Bass boost is increased as the volume setting is decreased because the volume control is of the compensating type.

The Volume Control compensates completely for the decreased sensitivity of the human ear to low frequencies at low levels by boosting the bass as the volume is decreased.

The factors which affect the setting of the Bass Control for the most pleasing results depend on acoustical properties of the surroundings, the characteristics of the broadcast studio, variations in recordings, the human ear, and the level at which the system is operating. The control should be set to your own personal taste.

THE TREBLE CONTROL:

Treble Control is a two-stage resistance-capacitance network controlled by a 7-position switch. This control varies the high-frequency response of the system in steps of about 5 db measured at 10,000 cycles. The maximum attenuation at 10,000 cycles is approximately 36 db obtained at position 1 on treble control.

Treble Control position 7 gives a response flat within 0.5 db to well beyond 20,000 cycles.

The treble control serves to adjust the tone balance between high and middle notes to the most pleasing value. Under ideal conditions, a flat response is necessary for the best results but many practical considerations may indicate the use of a falling or occasionally a rising curve for the most pleasant listening.

When there is a noise background on the program such as needle scratch in recordings, or static or hiss on radio, an audio characteristic falling at the higher frequencies will reduce the annoyance due to the noise more rapidly than it will reduce listening pleasure by attenuating the higher frequencies.

For any particular amount of noise relative to signal, there is a setting of treble control which will give the best overall listening; and this setting may be different for various listeners. In general, larger amounts of noise relative to the program call for greater attenuation of higher frequencies and lower settings of the treble control.

FM programs have pre-emphasis on highs, intended to override noise backgrounds and for best results some attenuation of highs is necessary to have an ideally flat overall response. Some attenuation of highs may occur in the output circuit of an FM receiver. If they do not reduce the highs to their proper level for tone balance, a reduced setting of the treble control will restore correct tone balance.

At times, there is a deficiency of highs due to a sharp cut-off of the speaker at a frequency well below the upper frequency limit of a program. There will be a tendency for the listener to boost the highs to compensate for the almost complete loss of the upper frequencies. However, the gradual rise of the amplifier characteristic cannot restore the tones lost above the cutoff of the speaker, and the only result is to produce a peak in the overall response just below speaker cutoff, which does not improve quality but tends to produce listening fatigue.

High Quality does not mean the presence of high frequencies in such amount as to be instantly striking. Rather, it means the presence of all tones from the lowest to the highest audible, free from distortion and in perfect balance so as to give the reproduced sound the complete naturalness of the live program.

If the input and output connections are made as described, the power applied for a short time for tube warm-up, and an audio signal applied to any of the five input jacks, the amplifier will operate properly.

If the amplifier fails to operate satisfactorily, the following procedure should be used.

1. Be sure that electrical power of the proper voltage and frequency (105 to 125 volts, 50 or 60 cycles AC) is applied to the amplifier.
2. Check the main power fuse. If it is blown out, broken, or missing, insert a new fuse of the correct type and value (Type 3AG, 3 ampere; or Slo-Blo 3 ampere).
3. Be sure all tubes are in the correct sockets and that all the filaments are lighted.
4. Have all tubes checked for proper operation.
5. Check all lead wires and connections.
6. Be certain that associated equipment is not causing the trouble.
7. Consult a competent radio serviceman, the dealer from whom the amplifier was purchased, or write directly to the factory.

Hum trouble can usually be traced to external causes, such as poor shielding of the input circuits, remote control unit very close to a magnetic field, direct pickup of hum by the magnetic pickup from the phonograph motor, or other magnetic fields, pickup cartridge not grounded, pickup arm not grounded, or a poor ground on the amplifier.

Grounding the amplifier to ground, such as a water pipe, will almost always be helpful.

A defective tube in the amplifier will cause an excessive amount of hum.

Occasionally a tube will become microphonic due to rough handling in shipment. If this condition develops, the tubes in the pre-amplifier should be replaced one by one with a good tube until the condition is corrected.

A circuit diagram with component values is furnished with the amplifier to assist in locating any trouble that might occur. Save this diagram and this folder as it will be helpful when the amplifier requires service.

Should any unusual operating difficulty arise, we suggest you contact the factory. If for any reason an amplifier has to be returned to the factory, please write for shipping instructions. If the original shipping cartons have been lost, we will be glad to send you cartons to facilitate returning the amplifier.

BROOK ELECTRONICS, INC.
P. O. BOX 491
ELIZABETH, NEW JERSEY

11/18/53