ALLEN B. DUMONT LABS., INC. MODELS 180, 181, 182, 183

Circuit Data, Controls, Trouble Chart

GENERAL FEATURES

These receivers are classified as "Electrostatic and Direct Vision." Electrostatic indicates that the gain of the screen image is obtained between the plates of a mirror, while Direct Vision means that the picture is visible from any angle of view without the use of a mirror, lens, or other device, as in Direct Vision. The latter causes a dark, brilliancy and the widest angle of view. Steady, steady, steady, black and white pictures that are large enough for all the family to enjoy at any time are secured by the use of a fourteen inch cathode-ray tube which forms a picture eight by ten inches. A separate high frequency section brings sharp picture reproduction of the sound channel which is associated with the picture. A single control turns both the sound and the color channels on the receiver as no more difficult to operate than an ordinary broadcast receiver. To the above features, and the compact size, minimum number of controls and unique layout and you will have an idea of the features of a commercial television receiver which we believe will find you easy to install and service in spite of the apparent complexity of the subject television.

CIRCUIT ARRANGEMENT

A simple straight line layout is used in these receivers that should prove extremely helpful to the serviceman. Viewed from the front the video receiver is on the left side of the chassis, the sound receiver in the center, and the sight receiver on the right. Fig. No. 1 shows the front controls and the sound receiver while Fig. No. 2 shows the rear of the chassis. The entire assembly in the form of a compact chassis is contained in the top portion of the chassis containing both sweep circuits along with the modulating circuits of the cathode-ray tube. To prevent confusion each side is considered separately, half appearing in Fig. No. 1 and the remainder in Fig. No. 2. The seven auxiliary controls as shown in Fig. No. 2 are provided for the use of the installer and serviceman. These controls are necessary to make the final alignment of picture size and position when the receiver is installed under conditions imposed by the magnetic field of the picture channel and the power supply line voltages. They are to adjust the control so these do not need "readjustment and since they are not provided for the owner's use, we suggest that the dealer or serviceman save the back of the cabinet as it is not possible to tamper with the controls when the back is in place. The parts of the parts and tubes shown in Fig. No. 1 and Fig. No. 2 can be checked by comparing the "V" numbers, etc. with the schematic drawings.

Operating Controls of the Receiver (Front)

The controls are familiar with the controls on the front of the receiver. Since the receiver has no remote control, only one set of controls is necessary. The controls are arranged so that the instruction sheet supplied the purchaser can be used only the adjustments required. These instructions are repeated here in a slightly more useful form than this sheet. Figure No. 1 shows the front of the receiver with the controls numbered and the various parts and the purpose of these controls is as follows:

1. Marked TUNING. ON and OFF

This is a power switch for starting and stopping a set. It is also the volume control of the picture signal. It should be adjusted in conjunction with the intensity control (No. 6) to produce a picture of pleasing contrast. Further adjustments can be made, but most of the time, the only control needed is the volume control. If the volume is turned up too high, the gain is off and the picture is not satisfactory. The volume control should be adjusted to give a full range of the picture signal and the intensity control should be turned to give a full range of the picture signal.

2. Marked SELECTOR

This control is a four position switch provided for selecting the television channel.
Figure 5 — Schematic Diagram. Separator and Sweep Circuits

Figure 6 — Schematic Diagram. Voltage Divider and Socket Connections
CAUTION AND WARNING

Large cathode-ray tubes operate at high voltages and hence are evacuated to a very high degree of vacuum. Therefore the atmospheric pressure on the glass can run into tens of pounds, depending on the size of the tube. A collision of glass would be as bad as an explosion and all cathode-ray tubes should be handled with care.

The DuMont Laboratories have gone to extreme lengths to provide a cathode-ray tube that is safe for the home and the structural design results in its ability to stand tests nearly twice as severe as usually employed. The service-man, however, should observe the following rules as he will probably be the only one to handle the average tube.

1. Be careful in handling the tube.
2. Watch the use of tools near the tube.
3. Don’t scratch the surface of the glass.
4. Don’t stand the tube on a metal surface or in any other way cause certain parts to be quickly heated or cooled.

TERMINAL VOLTAGES

Using Western Model 772, 30,000 Ohms per Voltmeter (with Televisor)

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Grid</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>V6</td>
<td>360</td>
<td>130</td>
<td>-4.3</td>
<td></td>
</tr>
<tr>
<td>Y10</td>
<td>240</td>
<td>140</td>
<td>-4.3</td>
<td></td>
</tr>
<tr>
<td>V11</td>
<td>180</td>
<td></td>
<td>-3.2</td>
<td></td>
</tr>
<tr>
<td>V12</td>
<td>276</td>
<td>200</td>
<td>-11.8</td>
<td></td>
</tr>
<tr>
<td>V8</td>
<td>115</td>
<td></td>
<td>-11.8</td>
<td></td>
</tr>
<tr>
<td>V1</td>
<td>160</td>
<td>140</td>
<td>-2</td>
<td>Contrast on null.</td>
</tr>
<tr>
<td>V2</td>
<td>190</td>
<td>140</td>
<td>-2.5</td>
<td></td>
</tr>
<tr>
<td>V3</td>
<td>180</td>
<td>140</td>
<td>-2.5</td>
<td></td>
</tr>
<tr>
<td>V4</td>
<td>170</td>
<td>140</td>
<td>-2.5</td>
<td></td>
</tr>
<tr>
<td>V6</td>
<td>170</td>
<td>140</td>
<td>-2.0</td>
<td>Cannot be measured at the grid of V6. Should read -4 volts at center tap of 333 high voltage winding to ground.</td>
</tr>
<tr>
<td>V7</td>
<td>160</td>
<td>225</td>
<td>-7.5</td>
<td></td>
</tr>
<tr>
<td>V17</td>
<td>333</td>
<td>333</td>
<td>-18</td>
<td>filament to ground = 314 volts</td>
</tr>
<tr>
<td>V13</td>
<td>333</td>
<td>333</td>
<td>-1800</td>
<td>filament to ground = 1800 volts</td>
</tr>
<tr>
<td>V14</td>
<td>2Y2</td>
<td>2Y2</td>
<td>-3000</td>
<td>output after L7 = 1000 volts (output after 2B1 = 2000 to 4000 volts) (ground is positive)</td>
</tr>
</tbody>
</table>

The above measurements were taken with respect to ground, the following are points to point:

- V2 from cathode to grid -40 to -160
- From cathode to first anode +300 to +1600
- From cathode to second anode +6000

Figure 1 — Schematic Diagram, Power Supplies

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SERVICE

While the technique employed in servicing television receivers is similar to ordinary radio practice, there is a greater need for basic knowledge and the time will be well spent that is used to study the fundamental principles of television before attempting actual service work. For obvious reasons it will be impossible to include fundamental theory in this manual, however, since very little data is available at this time, the following description may be helpful.

Fig. 1 is a schematic diagram showing the synchronizing circuit. The two WTC transistors (Y12 & Y16) function as the synchronizing signal separators. The outputs of these transistors feed the respective synchronizing circuits. The signal is then amplified and filtered by the horizontal and vertical oscilloscopes. The sweep of the picture is controlled by a sawtooth waveform. The horizontal sweep signal is generated by a 5555 circuit that produces a sawtooth waveform. The vertical sweep signal is generated by a separate 5555 circuit that produces a sawtooth waveform.

Let us consider first the low frequency vertical sweep circuit. Condenser C6 is charged from the power supply through the resistor consisting of R68 and R74. R68 functions as an amplifier in this circuit, although it has more effect on the frequency of operation. Condenser C7 charges to the power supply voltage and is discharged by the end of the sweep cycle. As a result of charge, the charge on C7 is limited by the charging current through R68. As the cathode approaches ground potential, the grid of the tube is driven to a higher potential, and the anode voltage decreases. The signal is then applied to the grid, and the horizontal sweep circuit is initiated. The rf signal is applied to the base of the vertical sweep transistor (Y12). The signal is then amplified and filtered by the vertical oscilloscope.

Since the frequency of the vertical sweep is high, a high-frequency inductive component is added to C6. This component provides a high-frequency bypass for the vertical sweep circuit.

The circuit shown in Fig. 2 is a typical circuit for a television receiver. The circuit includes the following components:

- **Cathode**
- **Grid**
- **Anode**
- **Shunt resistor (R1)**
- **Biasing network (R2)**
- **Coupling capacitor (C1)**
- **Sawtooth waveform generator (T1)**
- **Output amplifier (T2)**

The cathode is connected to the positive supply, and the grid is connected to the cathode through a shunt resistor (R1). The anode is connected to the output amplifier (T2) through a coupling capacitor (C1). The sawtooth waveform generator (T1) provides the sweep signal to the grid of the vertical sweep transistor (Y12). The output amplifier (T2) amplifies the signal and drives the cathode-ray tube. The sensitivity of the circuit can be adjusted by the biasing network (R2).
Antenna Installation
In the installation of television receivers the proper antenna is a necessity. Successful installations will result from attention to details, while sloppiness and carelessness will bring only poor customer satisfaction and repeated calls. There is nothing difficult about the installation of television aerials, a little patience and experience is all that is required. Regular broadcast aerials in the majority of cases will be found useless. Impress upon the owner and make a satisfactory installation regardless of what other equipment he already has. Satisfactory picture reception is what both of you require for the completion of the installation.

The Dipole Antenna
The Dipole form of aerial is generally satisfactory; it consists of two metal rods, each approximately five feet long and placed on a line with each other. Extreme accuracy in the length of these rods is usually not necessary and if the receiver is located very close to the transmitting station it may be found advisable to cut down the length of each rod. The simple dipole aerial is shown in Fig. No. 5.

The Lead-In
The most popular lead-in from the dipole to the television receiver will be a twisted copper wire as it is inexpensive and generally satisfactory in locations where the signal is strong. The length of this lead is usually not of extreme importance. It is better to get the Dipole located in the clear and as far from electrical interference as possible than to limit its location by using a theoretical, exact length feeder. The twisted pair should be added to the leads on the Dipole as a good connection is essential and necessary since several changes in the position of the antenna may be required for best results.

The other form of lead-in is the coaxial line such as the Amphenol No. 72. This form of feeder should be used in installations where the length of the lead-in is too long for satisfactory work with the twisted pair and again where the installation is at an extreme distance and every bit of energy picked up must be delivered to the receiver.

Polarization
If the dipole is mounted horizontally it is said to be horizontally polarized, and if vertically it is vertically polarized. Since the physical location materially affects the aerial no specific form can be advised and we must suggest you start by using horizontal polarization and change if necessary to produce the best results in the area.

Location of the Antenna
In selecting the location of the Dipole, it should be erected so that it is in line of sight with the transmitter. This does not mean that no signals can be secured where a direct view of the transmitter cannot be obtained. Surprising results are often secured on these high frequencies and no concise rules can be assigned to this work. If the location is on a street having heavy traffic there may be considerable noise level due to automobile ignition systems. In this case, locate the Dipole to the rear of the building and away from the source of the noise as far as possible. In the case of electrical machinery where you have no control, the same method can be employed along with the utilization of the directional effects of the aerial which will be covered later.

Room Illumination
Wherever possible the receiver should be so placed in the home that a direct glare from either natural or artificial light does not fall upon the face of the cathode-ray tube. The received pictures may be viewed under a variety of conditions where it is not always convenient to darken the room completely. Adjustments made to meet these conditions will not cause damage to the receiver. Viewing the pictures in a dimly lighted room as possible is always at an advantage as it permits the setting of the intensity and contrast controls in a manner that will give picture tone values more correctly relating to those actually used in the studio from which the picture is transmitted.

Installation Process
It is a good plan to proceed as follows with the installation.
1. Erect the Dipole antenna in the clear. Start by using horizontal polarization (mount the rods horizontally) and turn them so that their plane is at right angles with the location of the transmitter.
2. Adjust the receiver to produce a picture.
3. Return to the antenna and make final adjustments for best signal strength and removal of ghosts, etc.

Ghost Effects
Where the picture appears to be duplicated and slightly displaced, the additional picture is referred to as a ghost. This effect is usually due to the presence of the signal and can be cured by altering or rotating the Dipole; or by using a reflector or reflectors.

Directional Effects
In the simple Dipole, directional effects are not very pronounced, but it does have a rather sharp no-signal radius and it is possible in some instances to materially reduce interference by placing the offending source in this area. If the installation of the receiver is being made at a distance from the transmitter or if the signal level is very low due to local conditions it is well to consider the use of a reflector. This is done by placing a rod, about ten feet long, parallel with the Dipole and about five feet in back of it. The directional effect of the Dipole remains the same, namely at right angles to the plane, while the reflector is placed at right angles to the plane of the Dipole.