The TELEVISION SALESMAN'S HAND BOOK

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So You See
DU MONT
TELEVISION
AS WELL AS HEAR

AN AID TO A BETTER UNDERSTANDING
OF PRESENT DAY TELEVISION

ALLEN B. DU MONT LABORATORIES, INC.
PASSAIC, N. J.

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Introduction

The new art of Television is sure to be accepted with open arms by the entertainment and novelty loving American public. The interest which it has created can only be realized by being in the position of having a thousand and one questions directed at you daily and this is the position in which every Dealer's Salesman will soon find himself. It is with this in mind that Du Mont has prepared this Television Salesman's Handbook, in order that the alert and progressive salesman may bring himself up to date on the developments of television during the past decade or more.

The DU MONT ORGANIZATION

MANY organizations have contributed to the perfecting of the art of Television and a discussion of this progress will be given farther along in this handbook. When a prospective purchaser of a Television Receiver asks questions they may cover a multitude of angles but the one primary consideration will be the reputation and experience of the manufacturer of the product. Du Mont receivers are manufactured by Allen B. Du Mont Laboratories, Inc. of Passaic, New Jersey, an organization formed eight years ago for the purpose of developing cathode-ray tubes and circuits allied to Television. At the time this company began operations there was no television and little prospect of any immediate return from this field. Mr. Allen B. Du Mont, the president and founder of this company had much experience in the development of vacuum tubes having been employed in this division of Westinghouse and later held the position of Chief Engineer of the DeForest Company. Mr. Du Mont had gone through the experimenting of mechanical television and realized that the only answer to successful Television was the cathode-ray tube. At that time the cathode-ray tube was not a new discovery but there was a great need for its improvement and general development. Equipped with this knowledge and purpose Mr. Du Mont with the aid of a few well chosen assistants began the task of making the cathode-ray tube commercially practical for Television and laboratory work. With only theory, a few existing cathode-ray tubes, which were only designed to last a maximum of 40 hours of operation, and a wealth of

ideas Mr. Du Mont has developed the cathode-ray tube to its present state of perfection. An example of this achievement is the 14 inch cathode-ray tube or "Teletron" used in the Du Mont Models 180, 181 and 182. This tube is guaranteed for 1000 hours of operation and has an anticipated life of 2000 hours or better.

Allen B. Du Mont Laboratories, Inc. have operated a business of manufacturing and marketing cathode-ray tubes, oscillographs and allied equipment to engineering and college laboratories. It is this business which has given Du Mont the necessary experience to design and manufacture dependable Television receivers of quality which will build for it a reputation with the public equal to that for which it is known in the engineering field. With the able assistance of Paramount Pictures Inc., Du Mont holds an enviable position in the Television field today. Du Mont was "first" to place a commercial Television Receiver on the American market and will lead the field through the years of progress in this new industry.

The HISTORY *of* TELEVISION

THE possibility of seeing events at places remote from the observer has been a dream of humanity for countless centuries. As early as 1880 specific proposals were made as to how this might be accomplished. Only meager results were obtained until around 1925 when Jenkins in America and Baird in England succeeded in transmitting low definition pictures. No major improvements were made by these experimenters, but they made use of numerous technical advances that had taken place. Since that time further advances in technique and design have rendered high definition television a reality.

It might be well at this time to point out some of the more important contributions by various scientists and engineers which made the present system possible.

In tracing the development of television, it must be remembered that every system of electric vision which has been proposed depends fundamentally upon certain physical changes which are produced by light. If the phenomena known as photo-electricity were non-existent all television would be impossible, and the possibility of television, therefore, may be said to date from the original discovery of the electro-chemical effect of light by Becquerel in 1839.

The chemical changes observed by Becquerel could be put to no practical use, and it was not until 1873 that the first photo-electric effect of practical value was observed by a telegraph operator named May who was using some high resistances composed of the metal Selenium. May observed that his instruments behaved erratically whenever the sun

shone on the resistances, and the effect was traced to a decrease in the resistance of Selenium when exposed to light.

The announcement of this discovery led within a short time to speculation on the possibility of transmitting pictures and scenes to a distance by means of electricity, and within a few years a number of schemes were put forward. For various reasons, however, they were all impracticable at the time.

One of the earliest proposals of which details were published was put forward in 1880 by Ayrton and Perry. They proposed to use a transmitter consisting of a large screen made up of small squares of Selenium and to project an image of the scene to be transmitted on to this screen by means of a lens. Each square of Selenium was to be connected by a separate wire to the corresponding point in the receiver where a magnet and light source was located. The magnet operated an aperture which allowed a varying amount of light to be passed thru it depending upon the light received on the Selenium at the transmitter. Hence by having a sufficient number of cells and light sources connected to each other a complete picture could be obtained. To obtain a picture of corresponding detail to the present 441 line picture over 3,000,000 cells, connecting wires and light sources would be necessary so the reason for this scheme's failure is obvious.

Nipkow's patent of 1884 disclosed a method of scanning which employed a disc of large diameter near the periphery of which was a series of small holes arranged in the form of a spiral. The transmitter employed a Selenium cell, the only practical form of photo-element known at the time. His receiver, however, employed an ingenious system of light modulation which depended on the property possessed by flint glass of rotating the plane of polarization of light when situated in a magnetic field. Although this system, because of the sluggishness of Selenium and the lack of means of amplification was too insensitive to give practical results, the basic idea of the scanning disc has been used extensively.

The modern cathode-ray tube used in television is a development of the Braun-Wehnelt tube which was in laboratory use at the beginning of the century. The effects produced by the discharge of electricity thru a vacuum had been investigated since 1859, and the name "cathode ray" was given by Plücker to the discharge of electricity from the cathode of a vacuum tube when a high potential was applied to the anode. It was later shown that this discharge produced fluorescence of the glass walls of the tube, due to bombardment by particles of electricity to which the name "electron" was given by Johnstone Stoney in 1890.

In the Braun tube of 1897, the electron stream emitted from the cathode when a high potential was applied to the anode was directed up the tube, and after passing thru an aperture impinged on a mica screen coated with fluorescent material. The point of impact of the beam was thus made visible, and by applying an external magnetic field the beam could be moved so as to fall on any point on the fluorescent screen.

In 1905 Wehnelt added an important improvement to the Braun tube by using a hot cathode — a strip of platinum coated with oxides and heated electrically to red heat. The increased electron emission obtained with

this cathode enabled a much lower potential to be applied to the anode of the tube and gave a fluorescent spot of greater brilliance, at the same time greatly increasing the deflection sensitivity of the tube.

Up to this time no attempt had been made to reduce the spot on the screen to the smallest dimensions, although the advantage of such a refinement was understood. The early tubes had metal diaphragms which limited the section of the electron beam, but in 1902 Ryan showed that a magnetic coil surrounding the neck of the tube had a focusing action on the electron beam, and by varying both the position of the coil and the value of current thru it, an exceedingly sharp spot could be obtained.

Another improvement was the insertion of a cylinder or shield surrounding the cathode called a Wehnelt cylinder, which, on applying a suitable negative potential, acted as a pre-concentrator of the electron stream and directed it up the tube in the form of a narrow jet.

In 1907 a patent was granted to Boris Rosing for a system of television in which a cathode ray tube was used as the receiver. Rosing's transmitting arrangements were similar to many others, and used two mirror drums revolving at right angles to each other at widely different speeds to scan the image. The varying current impulses from the photo-cell were transmitted to the receiver where they were caused to charge two condenser plates in the cathode ray tube. The fluctuating charges on these plates caused the beam of electrons projected from the cathode to be deflected away from an aperture, and the amount of the beam which passed thru the aperture was proportional to the potential of the plates and thus to the degree of

light and shade in the original scene. Having passed thru the aperture, the electron beam was caused to scan the surface of a fluorescent screen placed at the far end of the tube and so to reproduce the original image.

Successful results were never obtained with this scheme partly on account of the crude forms of photo-cells and cathode ray tubes then available, and partly on account of the lack of any means of amplification.

Shortly after this, Campbell Swinton proposed a system of television utilizing two cathode ray tubes of appropriate design, one at the transmitter and one at the receiver, and in 1911 he described the system before the Röntgen Society. It will be noticed that this system has almost no basic difference with the present electronic methods of pickup and viewing.

Campbell Swinton conceived the idea of a mosaic screen of photo-electric elements which were to form a part of a special cathode ray tube. The image of the scene to be transmitted was to be projected on to the mosaic screen by means of a lens, and the back of the screen was to be scanned by a beam of cathode rays controlled magnetically by the currents from two alternating current generators. The cathode ray beam in the receiver was synchronized with that in the transmitter by means of deflecting coils connected by wires to the same generators as the transmitter, and a separate conductor carried the photo-electric currents for modulating the receiver beam.

In 1911 the three-electrode amplifying tube of Lee DeForest was practically unknown, and hence this system was never tried. Our present television is only possible with the addition of this vastly important invention.

And so we jump to 1925 when Jenkins in America and Baird in England within a few months of each other actually succeeded for the first time in transmitting crude pictures from a transmitter to a nearby receiver. Each had utilized many of the contributions previously enumerated, which were essential for successful operation, and neither had added any new basic features to make this possible. From this time progress was more rapid, and although the bulk of the work done was on mechanical systems, definite improvement was shown. Many scanning systems were tried utilizing devices such as the Nipkow disc, mirror disc, lens disc, mirror drum, lens drum, mirror screw, vibrating mirror, rocking prism, sliding prism, prism rings and many others. In spite of all this, in 1931 the picture being transmitted consisted of only 60 lines at a speed of 20 pictures per second which was entirely inadequate as regards detail and flicker. Furthermore, the defects of the mechanical systems had been made only too apparent. Rapidly moving parts caused noise and difficulty of synchronization — bulky and costly apparatus as well as excessive mechanical accuracy caused experimenter to look for some other means of accomplishing the transmission of higher definition pictures.

And so we take another jump to the present time when on April 30th, 1939, a regular schedule of telecasting will begin. It is only right that Television should at this time emerge from the laboratory to bring this thrilling new form of incomparable entertainment to the home. The technical aspect of television at this time is such that it can progress but little further without the able assistance of the public, who are the most sincere and constructive critics. It will be found that the pictures have reached a point of perfection which compares favorably with good 16 mm. home movies which have been so popular during the last few years. We believe that this quality will meet with public favor and that thru the cooperation of the public, with research, Television will grow successfully until it has become as commonplace as present day radio.

The systems now being used are entirely electronic, and no mechanical moving parts are to be found at transmitter or receiver. Again we can say that this has been accomplished by a gradual improvement in details rather than by any basic new invention. The scanning disc at the transmitter has been replaced by the photoelectric mosaic pickup tube somewhat similar to that originally proposed by Campbell Swinton in 1911 but with many refinements. The reforming of the picture at the receiver is accomplished by the cathode ray tube, a refinement of the Braun tube of 1897. These two tubes are the bases of our present Electronic Television Systems.

How the
Modern Television System Works

Courtesy of Business Week, McGraw-Hill Pub. Co.

A TELEVISION program begins in the television camera, which "views" the scene in the studio or through which movie film is run (see chart). The camera is a large box carefully mounted so that it can be swung in all directions to follow the action of the program. The box contains a lens at one end which focuses the scene on a flat plate, mounted in a vacuum within the camera. This plate serves the same purpose as the plate in an ordinary camera — that is, it serves to transfer the image focused upon it into a latent image.

In ordinary photography, the latent image is photochemical in nature and is developed chemically. In television, the latent image is photoelectrical in nature. Actually, the sensitive plate is a mica sheet on which are deposited millions of tiny drops of silver whose surfaces are sensitive to light. When light is focused on these drops by the lens of the camera, they acquire a positive electric charge. The amount of charge acquired by each drop is in direct proportion to the amount of light falling on it. In consequence, the lights and shadows are transformed into a latent image in electric charge.

The electric charge is then removed from the plate, bit by bit, through the agency of an electron beam which scans the plate in much the same way as the eye scans a page of printed matter. The scanning motion is in a

series of fine parallel horizontal lines, which are explored from left to right, one after the other*, in the same manner as each line is read in a column of type.

The electrical "highlights" and shadows of the image —the electrical charges which exist on each silver drop in each line—are removed by the beam in the form of electric charge impulses and impressed on the transmission circuit. The variations in charge are transmitted by the circuit, which must preserve faithfully all the subtleties of electrical "shading." After arriving at the transmitter, the impulses are impressed on an ultra-short carrier wave and radiated from the antenna.

At the receiver the process is reversed. First, the ultra-short wave is picked up and amplified by the receiver and then "detected." The detector tube restores the signal to a form which is substantially the same as it was when it left the camera in the studio. This signal controls the image-reproducing tube (cathode-ray tube). This most essential tube is an evacuated, funnel-shaped, glass structure containing a source of electrons which are sprayed, something like water from the nozzle of a hose, on the fluorescent screen that forms the wide end of the funnel. This closed and slightly rounded end of the cathode-ray tube is the screen on which the image actually appears.

When the stream of electrons strikes the screen it creates a spot of light. The brilliance of this spot is controlled by the picture-impulse signal. Furthermore, the

* Actually the individual lines of the image are sent in interlaced order—that is, the odd-numbered (first, third, fifth, etc.) lines are sent first, and the lines between are blank. The blanks are then filled in with the even-numbered lines (second, fourth, sixth, etc.). The picture area is thus covered twice for each complete picture, a technique necessary to eliminate flicker in the images.

direction of the beam is controlled electrically, so that the spot moves across the screen in a series of lines, fluctuating in brilliance as it goes. The motion of the spot causes it to scan the screen surface in exact synchronization with the moving electron beam in the television camera. The moving spot traces out the highlights and shadows of the scene, line by line, until a complete picture is covered. This process consumes 1/30th of a second (see footnote*). Thereupon the spot moves to the top of the screen and traces out another picture in the next 1/30th of a second, and so on.

Some idea of the technical problem present in "photographing" and reproducing the image may be gained from the fact that the electron beam (in the camera and cathode-ray tube) moves across each line in the image at a rate of about 2½ *miles per second*, and that it changes in intensity (to recreate the detail of the image) *every 1/50th of an inch*. The image contains about 400 lines (actually 441 lines are used but roughly 40 of these are not active in forming the visible picture).

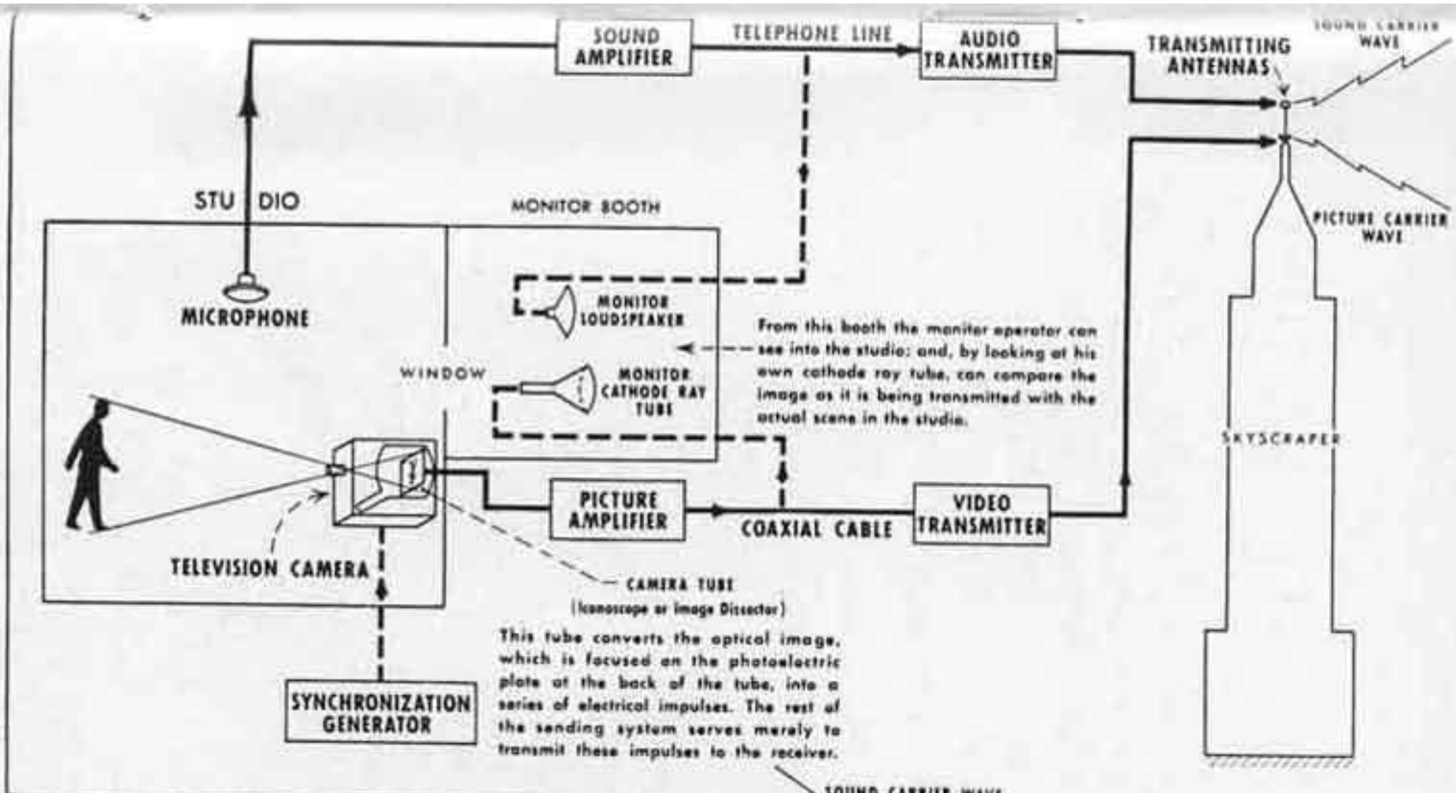
The sound accompanying the picture is taken care of by a separate transmitter. A microphone in the studio is moved about to follow the action of the program and is kept out of the view of the camera, in the same way as in the filming of movies. The microphone feeds into amplifiers and then into a separate broadcast transmitter.

At the receiver, the sound signal is amplified, detected, and applied to the loudspeaker. The circuits are so arranged that only one tuning dial (or push-button) is required to tune in both sight and sound. Hence it is impossible to mix the picture from one station with the sound from another.

An ordinary sound radio set contains three controls: one for station selection, one for volume, and one for tone. The television set has these controls, and a minimum of two others for fixing the brightness of the picture and regulating the contrast of range of light between highlights and shadows. Other subsidiary controls to regulate focus, centering, and the width and height of pictures are available, but are usually not adjusted after the installation of the receiver.

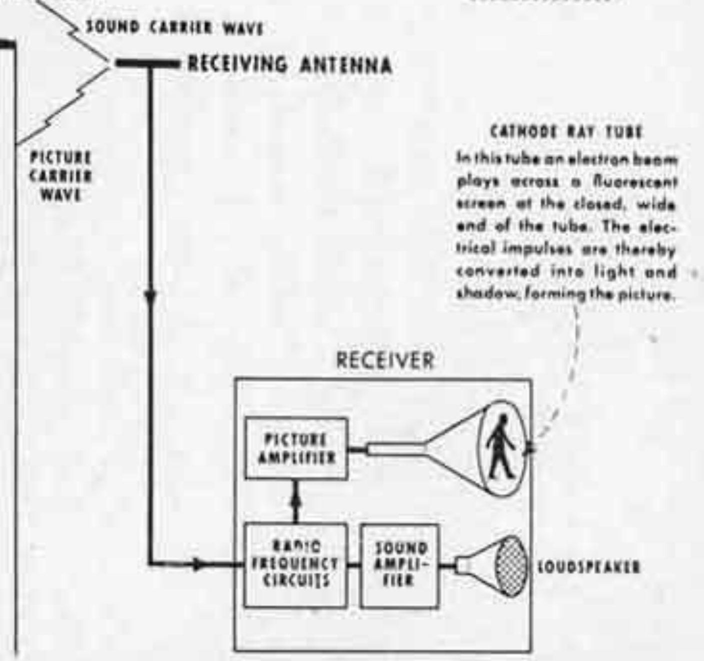
A very high voltage (judged by ordinary standards) is required to operate the image-reproducing tube — from 1500 to 7000 volts depending on the size of the tube and required brilliance of the picture. Care is taken to protect the user from this voltage, and it need be no more dangerous than the 15,000-volt hazard associated with spark-plugs in an automobile, if the circuit is properly designed.

DIAGRAM OF TELEVISION SYSTEM FOR SENDING



A television program begins in the studio with the camera for the visual system and the microphone for the sound system, both functioning separately but synchronously. In the camera, the image which is being "viewed" is focused on a photoelectric plate, where it is scanned by an electron beam and where the picture elements are converted into electrical impulses. These impulses — 6,000,000 every second — move through an amplifier and a transmitter over coaxial cables to the antenna atop a skyscraper where they are broadcast.

DIAGRAM OF TELEVISION SYSTEM FOR RECEIVING



At the receiver, sight and sound signals are picked up and amplified. They move then through detectors in which the video signal is restored to the form in which it left the camera. In the cathode-ray tube an electron beam traces the picture on the screen.

The TELEVISION SALES PICTURE

At the beginning of any new industry there is always a certain class of buying public which will buy on novelty value alone or because they are always the first in their particular circle to own any new product or gadget. This type of sale is rather limited, however, and we must look to the real entertainment value of Television for our bulk sales.

Large Pictures

Du Mont's experience and the surveys which we have made indicate a preference, on the part of the prospective purchaser, for a Television receiver with picture of approximately 8 inches by 10 inches and this prime requisite is supplied in the Du Mont 180 series Television receivers which all employ a 14 inch cathode-ray tube. The usable screen area of this large bulb due to its spherical shape is only 8" by 10" but the design of this bulb insures safety. We must bear in mind that the bulb of a cathode-ray tube is evacuated and therefore the surface of the bulb is under an atmospheric pressure of approximately 14.5 lbs. per square inch. On a bulb as large as the one mentioned it is obvious that the pressure on its surface is in the order of several thousand pounds which might cause collapse. With these facts in mind we realize that the obvious idea of using a rectangular glass blank with a flat window instead of the Du Mont onion shaped bulb is neither safe nor practical.

While we advocate the large size screen Du Mont will also have several models of receivers in the 190 series

to employ a nine inch cathode-ray tube which provides a picture approximately 5 inches by 7 inches. These receivers will meet the demand for a less expensive set which will embody the quality features of the more elaborate Du Mont receivers. We believe that these nine inch receivers will eventually make sales for the receivers with larger screens.

Direct Vision

Du Mont believes that direct vision, that is, viewing the screen of the tube directly without the use of mirrors or lenses, is the best method. Less light is lost in this manner and a wider angle of vision is provided. In addition the scenes and subjects appear more life-like and an illusion of the sound coming from the screen is produced. In England many of the first receivers appeared with Mirror Vision, but after two years of experience, due to public demand, the trend has changed to direct vision. The mirror vision units have one feature in their favor and that is that they may be housed in cabinets of more conventional design due to the fact that the cathode-ray tube which is necessarily long may, in this case, be mounted vertically. The Du Mont line, however, provides both the direct and mirror vision types.

Programs

One question which the prospective purchaser is sure to ask is, "What will I see?" This is, of course, a most important question but unfortunately one which is very difficult to answer at this time. It is logical to assume, however, that N.B.C., C.B.S., and Du Mont will be on the air several hours each day with varied programs. Many of these in the beginning will be televised film, news and short subjects. Direct pickup from the studio will be used to some extent and events of interest will, no doubt, be picked up by mobile unit, transmitted to the main transmitter and Telecast.

We have tried to present a picture of the Television sales possibilities as they appear to date. To foresee what the sales volume will be in this Television service area is extremely difficult but the consensus of opinion among the radio manufacturers and the trade papers indicate that between 20,000 and 25,000 receivers will be sold in 1939. To give any set rules as to what sales problems will confront the salesmen in an industry in which there has been no sales is not practical. We believe that the material contained in this handbook will provide the progressive salesman with the information which he needs to be sure of his ground when discussing Television with the prospective purchaser. We know that every salesman has been waiting for the time when he would be able to turn his efforts to Television sales and we are confident that the prevailing enthusiasm among these men will insure success for them and the organization they choose to promote. We feel secure in the thought that Du Mont sales are in capable hands and that Television will be sold on the quality of the receiver and the entertainment that it provides.

25 QUESTIONS *and* ANSWERS

For your convenience, we have listed 25 questions and 25 satisfactory answers. These are the questions which we have found to be most frequently asked and it is for this reason that we stress them at this point even though the answers to the majority of these have been given in the text of this handbook.

Q.—What will a Du Mont receiver do?
A.—Du Mont receivers models, 180, 182, 183, 190, 192 provide television combined sight and sound entertainment. These receivers are capable of receiving 4 and 5 different television stations when they are available.

Q.—Can I receive the regular radio broadcasts in addition to television sight and sound with a Du Mont receiver?
A.—Du Mont models 181 and 191 incorporate an all wave radio in addition to the Television sight and sound provided in the models 180, 182, 183, 190 and 192.

Q.—How many Television stations can I receive?
A.—The only stations which are in operation or under construction at this time in the New York Metropolitan area are the N. B. C. station W2XBS, the C. B. S. station W2XAX and the Du Mont station W2XVT. N. B. C. has announced programs beginning April 30th, 1939, and C. B. S. and Du Mont will probably provide programs shortly thereafter.

Q.—How far away can Television be received?
A.—It is possible for television to be received at great distances from the transmitter. But at the present time, up to 40 to 50 miles is the dependable working range of the Television Transmitters. Programs have been received, from B. B. C. transmitter in England, as far away as South Africa but this is considered more as an unaccountable phenomena of ultra short wave transmission than as an achievement.

Q.—What type of programs will be provided?
A.—It is logical to assume that N. B. C., C. B. S., and Du Mont will be on the air several hours each day with varied programs. Many of these in the beginning will be televised film, news and short subjects. Direct pickup from the studio will be used

to some extent and events of interest will, no doubt, be picked up by mobile unit, transmitted to the main transmitter and Telecast.

Q.—Is the Du Mont receiver simple to operate?
A.—All Du Mont receivers are extremely simple to operate and anyone capable of tuning a regular radio receiver will be able to handle the controls.

Q.—Do I need a special antenna?
A.—Yes, a special antenna known as a dipole will be required in most locations for best results. This antenna consists of two metal rods mounted on a board in the same line, slightly separated and pointing in opposite directions. This assembly is mounted on a pole of some type so that the rods are parallel to the earth and facing the transmitter. The lead-in is a pair of twisted wires one attached to each rod.

Q.—How much will such an antenna installation cost?
A.—The average cost of a dipole installation should be about $25. This figure will naturally vary with the location, the difficulty of the installation and the length and type of the lead-in required. Under ordinary conditions a pair of twisted wires will be satisfactory as a lead-in but where the Television signal is weak or interference such as diathermy is prevalent, a special cable known as coaxial cable may be used to better advantage. This is somewhat more expensive but not prohibitive in cost.

Q.—Will an indoor antenna be satisfactory?
A.—In a great many locations where the receiver is within 10 miles of the transmitter a small indoor dipole may be used. Many factors affect this, however, and for a permanent installation an outdoor antenna is generally more satisfactory.

Q.—Will static interfere with Television reception?
A.—Generally speaking, no. Atmospheric static such as lightning has practically no effect on Television reception. Man-made static, however, may cause some trouble but many things can be done to eliminate this interference. Diathermy machines and automobile ignition are the most common trouble makers and these may be shielded. The Television signal is usually strong enough to ride out any other interference.

Q.—How much does it cost to operate a Television receiver?
A.—The average cost of operating a Du Mont series 180 Television receiver will generally not exceed two cents per hour.

Q.—High voltages are used in Television receivers ranging from 1500 to 7000 volts. Is there any danger of being shocked while operating a receiver?
A.—Du Mont receivers are so designed that it is impossible to get at the high voltage without removing the back of the cabinet. As an additional precaution a safety switch automatically turns off the receiver if the back of the cabinet is removed.

Q.—Is it necessary to view Television in the dark?
A.—No, Television may be viewed under a variety of room lighting arrangements. The two primary things to keep in mind are that Television pictures can not compete with daylight and light reflections on the screen will destroy the natural contrast of the picture.

Q.—Will a Television receiver soon become obsolete?
A.—Every up-to-date radio and Television development is incorporated in Du Mont Television receivers and unless the present Television Transmitting system is changed these receivers should provide satisfactory entertainment for several years.

Q.—How much do Television receivers weigh?
A.—The weight of Television receivers will naturally vary with the size and design of the cabinet but a good average weight for a receiver similar to the Du Mont 182 console would be approximately 125 pounds. Small table models may weigh as little as 40 pounds.

Q.—How many and what kind of tubes are used in Du Mont Television receivers?
A.—The number of tubes used in Du Mont receivers vary. The 180 series employs 21 standard receiving type tubes and a type 144-9-T Teletron or Cathode ray tube on which the 8" by 10" picture is formed. The 190 series employs 19 standard receiving type tubes and a 94-11-T Teletron on which the 5¾" by 7½" picture is formed.

Q.—What is the average life of the Teletron or picture tube?
A.—Du Mont Teletrons are guaranteed for 1000 hours of operation within a period of one year but the anticipated life is upwards of 2000 hours.

Q.—What do replacement tubes cost?
A.—The 144-9-T used in the Du Mont 180 series Television receivers cost $75 list and the 94-11-T used in the 190 series will cost $60 list.

Q.—Who will service my Television receiver?

A.—In the majority of cases the trained service man of the dealer from whom you purchase the receiver will do any service work required. Specialized Television service companies or the manufacturers will do the servicing if the dealer is not equipped to handle Television service.

Q.—If I purchase a Du Mont receiver will I need any additional equipment?

A.—No additional equipment will be needed with the exception of a dipole antenna.

Q.—Do I need a special power line in my house to operate a Television receiver?

A.—No, Du Mont receivers are designed to operate on 110 volt 60 cycle power lines which are provided in most homes and apartment buildings. For D. C. operation either a special receiver will be required or means of satisfactorily converting D.C. to 110 volt 60 cycle current.

Q.—What are the lines which cross the illuminated screen of a Television receiver when a picture is not being received?

A.—These lines are known as the return trace caused by the beam of electrons returning to the opposite side of the screen in preparation of the scanning trip across the screen.

Q.—Is there a tax on Television Program service?

A.—No. In the United States Television will no doubt be operated on the same basis as radio. All programs will either be sponsored or sustained by the Telecaster.

Q.—What type of programs can be televised?

A.—Generally speaking, we may say that anything which can be photographed with a movie camera can be televised.

Q.—How close should the viewer be to the screen of the Television receiver for best results?

A.—It has been found that it is best to be four or five feet away from the screen of a television receiver if the screen is 8 inches by 10 inches. For smaller screens the viewer may be slightly closer. With the Du Mont 180 series receivers a distance of 5 feet is best, making it possible for a substantial number of persons to enjoy the program.

Operating Instructions

DU MONT SERIES 180 TELEVISION RECEIVERS

CONTROLS

Marked **CONTRAST — On-Off**

Actually this is the volume control of the picture signal. It is adjusted in conjunction with control marked INTENSITY to give a picture of pleasing contrast to meet individual preference. The location of the receiver and the amount of signal received from the transmitter will determine the setting of this control. It is also the power switch used for starting and stopping the set.

Marked **SELECTOR**

This control is a four position switch provided for covering four television channels.

Step	*Station*	*Side Band*	*Audio Carrier*	*Video Carrier*
A	NBC and DU MONT	Single	49.75	45.25
B	CBS	Single	55.75	51.25
C	——	——	——	——
D	——	——	——	——

Marked **TUNING**

Only one control is necessary to properly tune both the sight and sound channels. Simply adjust this control until the best reception of the sound is secured and your picture will be taken care of automatically.

Marked **INTENSITY**

The intensity or brightness of the picture is controlled by this knob. It should be retarded (turned to the left) for the first 15 seconds when the set is turned on. Further instructions concerning this will be found under Room Illumination.

Marked **FOCUS**

This control is used to sharpen the individual lines of the pattern and once set seldom requires further adjustment.

Marked **VOLUME**

This control adjusts the volume of the sound received and has no effect whatever on the picture.

ROOM ILLUMINATION

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 as dark a room as possible is always 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.

TO OPERATE

Set the **SELECTOR** control to the television channel you desire to receive. Retard the **INTENSITY** control (turn to left) and then start the receiver by means of the **OFF-ON** control (also marked **CONTRAST**). After the set has been in operation about fifteen seconds, advance the **INTENSITY** control until the screen begins to brighten. The sound **TUNING** control can now be used to tune in the sound channel and the sound **VOLUME** control adjusted to give the desired volume of sound. With the tuning of the sound the picture channel will be correctly aligned and then the **CONTRAST** and **INTENSITY** controls should be adjusted for the proper contrast and brightness. Finally a slight adjustment of the **FOCUS** control should complete the tuning process.

Model 180

DU MONT TELEVISION RECEIVER

Description

Cabinet—large table model, walnut finish

Dimensions—height 24", width 15", depth 25"

Weight—110 lbs. approximately

Screen Size 8" by 10"

Direct Vision

Television sight and sound

Four channels with band switch selector

22 Tubes

Superhetrodyne

Dynamic Speaker

AC operated 110 volts 60 cycles

Power consumption—250 watts

Price $395.00

Model 181
DU MONT TELEVISION RECEIVER

Description

Cabinet—console, walnut finish
Dimensions—height 48⅝", width 23", depth 26"
Weight—150 lbs. approximately
Screen Size 8" by 10"
Direct Vision
Television sight and sound
Four channels with band switch selector
22 Tubes
Superhetrodyne
Dynamic Speaker
AC operated 110 volts 60 cycles
Power consumption—250 watts
Also incorporates all wave radio

Specifications of All Wave Radio

Three band superhetrodyne
Push button and manual operation
8 Tubes
Dynamic Speaker
AC operated 110 volt 60 cycles
Power consumption—65 watts
Price Complete $540.00

Model 182
DU MONT TELEVISION RECEIVER

Description

Cabinet—console model, walnut finish
Dimensions—height 45", width 22½", depth 26"
Weight—140 lbs. approximately
Screen Size 8" by 10"
Direct Vision
Television sight and sound
Four channels with band switch selector
22 Tubes
Superhetrodyne
Dynamic Speaker
AC operated 110 volts 60 cycles
Power consumption—250 watts
Price $445.00

Model 183

DU MONT TELEVISION RECEIVER

Description

Cabinet—low console, walnut finish

Dimensions—height 38¼", width 21", depth 25¾"

Weight—150 lbs. approximately

Screen Size 8" by 10"

Direct Vision

Television sight and sound

Four channels with band switch selector

22 Tubes

Superhetrodyne

Dynamic Speaker

AC operated 110 volts 60 cycles

Power consumption—250 watts

Price $________

Operating Instructions

DU MONT SERIES 190 TELEVISION RECEIVERS

CONTROLS

Marked **INTENSITY**

The intensity or brightness of the picture is controlled by this knob. It should be retarded (turned to the left) for the first 15 seconds when the set is turned on. Further instructions concerning this will be found under Room Illumination.

Marked **CONTRAST**

Actually this is the volume control of the picture signal. It is adjusted in conjunction with the Intensity to give a picture of pleasing contrast to meet individual preference. The location of the receiver and the amount of signal received from the transmitter will determine the setting of this control.

Marked **VOLUME**

This control adjusts the volume of the sound received and has no affect whatever on the picture.

Marked **TUNING**

Only one control is necessary to properly tune both the sight and sound channels. Simply adjust this control until the best reception of the sound is secured and your picture will be taken care of automatically.

SELECTOR BUTTONS (Right to Left)

OFF—Turns receiver off, any selector button turns receiver on.

Station	*Audio Carrier*	*Video Carrier*
A—NBC and DU MONT	49.75	45.25
B— CBS	55.75	51.25
C—________	71.75	67.25
D—________	83.75	79.25
E—________	89.75	85.25

ROOM ILLUMINATION

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 as dark a room as possible is always 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.

TO OPERATE

Retard the **INTENSITY** control (turn to left). Press button for the Television channel you desire to receive which will automatically turn on the receiver. After the set has been in operation about fifteen seconds, advance the **INTENSITY** control until the screen begins to brighten. Tune in the sound channel with the **SOUND TUNING** control and adjust the **VOLUME** control for the desired volume of sound. With the tuning of the sound the picture channel will be correctly aligned and the proper contrast and brightness may be obtained by adjusting the **CONTRAST** and **INTENSITY** controls.

Model 190

DU MONT TELEVISION RECEIVER

Description

Cabinet—table model, walnut finish

Dimensions—height 15¼", width 20½", depth 23½"

Weight—75 lbs. approximately

Screen Size—5¾" by 9½"

Direct Vision

Television sight and sound

Five channels with push button selector

20 Tubes

Superhetrodyne

Dynamic Speaker

AC operated 110 volts 60 cycles

Power consumption—175 watts

Price $________

Model 192
DU MONT TELEVISION RECEIVER

Description

Cabinet—console, walnut finish

Dimensions—height 33", width 30", depth 16½"

Weight—95 lbs. approximately

Screen Size—5¾" by 7½"

Mirror Vision

Television sight and sound

Five channels with push button selector

20 Tubes

Superhetrodyne

Dynamic Speaker

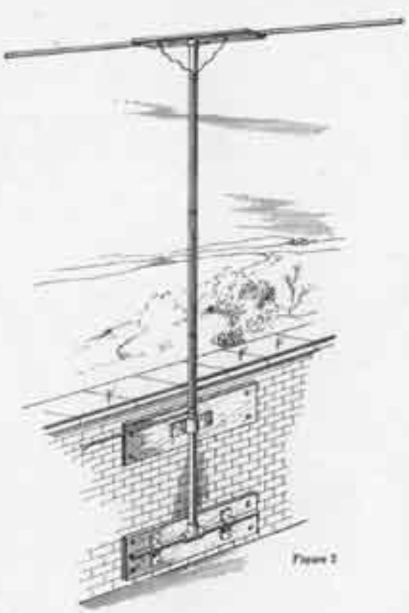
AC operated 110 volts 60 cycles

Power consumption—175 watts

Price $__________

Also available with all wave radio

Price $__________ Model 191



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. 3.

A Glossary of
TELEVISION TERMS

AMPLITUDE—A term synonymous with gain or size.

AUDIO (*Latin, "I hear"*)—Pertaining to the transmission of sound.

BLIZZARD HEAD—A blonde actress, to studio technicians who have to worry about proper lighting for her hair to avoid flares.

BROAD—A general illumination unit used in lighting the set.

BUSINESS—Anything in television for which a technical designation is lacking or forgotten by the speaker. Badly overworked.

CATHODE-RAY TUBE—Evacuated glass bulb containing the screen on which the picture is reproduced in the receiver.

CONTRAST CONTROL—A knob on the receiver for adjusting the range of brightness between highlights and shadows in a picture.

COAXIAL CABLE—Special telephone cable suitable for conveying television signals.

DEFLECTION (ELECTROSTATIC)—A system where the motion of the spot in producing the picture is controlled by the static action of the deflection plates.

DEFLECTION (MAGNETIC)—A system where the motion of the spot in producing the picture is controlled by magnetic fields.

DIPOLE—An aerial comprised of two separate rods.

FIELD—In the RMA Television System there are two fields to each frame. In other words each picture is comprised of two fields scanning alternate lines.

FOCUSING CONTROL—A knob on the receiver for bringing the picture into sharpest definition.

FRAMING CONTROL—A knob or knobs on the receiver for centering and adjusting the height and width of pictures.

FRAME—One complete picture. Thirty of these are shown in one second on a television screen.

GHOST—An unwanted image appearing in a television picture as a result of signal reflection.

GOBO—A light-deflecting fin used to direct light in the studio and protect the camera lens from glare.

HOT LIGHT—A concentrated light used in the studio for emphasizing features and bringing out contours.

ICONOSCOPE—A type of television camera tube.

IMAGE DISSECTOR—A type of camera tube developed by Farnsworth.

INTERLACING—A technique of dividing each picture into two sets of lines to eliminate flicker.

LINE—A single line across a picture, containing highlights, shadows, and half-tones; 441 lines make a complete picture.

LIVE TALENT—Participants in a program picked up directly in the studio, as distinguished from film presentations.

PANNING—A horizontal sweep of the camera. (From "panorama".)

REFLECTORS—Additional rod or rods placed near the antenna to reinforce signals.

SAWTOOTH—A wave of electric current or voltage employed in scanning.

SCANNING—The action of the electron beam in exploring (in the camera tube) or reproducing (in the cathode-ray tube) the half tones in a picture.

SCOOPS—Multiple lighting units in the studio.

SPOT—The visible spot of light formed by the impact of the electron beam on the screen as it scans the picture.

TELECAST—A television broadcast.

TELECINE TRANSMISSION—A movie program.

TELETRON—A receiving cathode-ray tube developed by Du Mont.

TELEVISION—The transmission and reproduction of transient visual images by radio.

TILTING—A vertical sweep of the camera.

SYNCHRONIZATION—The process of maintaining synchronism between the scanning motions of the electron beams in the camera tube and the cathode-ray tube in the receiver.

VIDEO (*Latin, "I see"*)—Pertaining to the transmission of transient visual images (cf. "audio").

WINDSHIELD—A perforated metal cover which fits over the microphone protects it from drafts caused by the powerful air conditioning system used to remove heat caused by the lights in the studio.

WOMP—A sudden surge in the signal strength resulting in a flare-up of light in the picture.

So You See
DU MONT
TELEVISION
AS WELL AS HEAR