

DU MONT TA-164-A



DU MONT

TELEVISION TRANSMITTER DIVISION
ALLEN B. DU MONT LABORATORIES, INC.
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INTRODUCTION

The Medical world, the many and varied branches of Industry and the multiple fields of Merchandising have long considered the application of television to their needs. In almost each instance, however, the available equipment failed to fill the requirements in one or more respects.

The Medical or Surgical world required full color with high resolution at costs in keeping with rigid budgets. Industry required portability, picture fidelity, accuracy in performance and general overall high standards. Most available industrial camera systems failed to fill basic needs. The Merchandising fields, particularly in Department Stores, demanded full and accurate color, and high picture resolution to effect a highly efficient sales program. Here again, available equipment failed to fill requirements for the reason that all systems were predicated on the limitations of Television Broadcasting.

Du Mont's design of a television system for industry, therefore, has been predicated on the theory that industry must not be satisfied with equipment inferior or even equal to that employed in Television Broadcasting. There is no need to restrict picture quality, resolution, or bandwidth to the necessary limits which must be imposed upon broadcast equipment to accomplish a nation-wide, competitive, television broadcast service. The Du Mont Industrial Color Television System described in the following pages of this booklet does not in any sense represent a compromise between the limited standards of television broadcasting and the necessary broad requirements of industry. Television broadcasting's problem of narrow bandwidth and compatibility which has restricted picture resolution and color fidelity in other color television systems, was not considered in its design. It was our aim to design a high color fidelity, high resolution, wideband television system specifically for non-broadcast, wired industrial applications. The result is here in the Du Mont Model TA-164-A Industrial Color Television System.

Allen B. DuMont
President.

INDUSTRIAL TELEVISION

Du Mont, pioneer in the television industry, has long been active in the field of industrial television. Bringing imagination and engineering ingenuity to this comparatively new field, Du Mont has now successfully completed development on the first industrial *color* television system, the model TA-164-A.

The following paragraphs may serve to define industrial television and to describe why color is so important to an industrial television system.

What is Industrial Television?

Industrial television essentially may be described as an electronic system for transferring a scene from one location to another more desirable location, where it may be seen conveniently on a viewing screen. The device which picks up the scene is the camera, and the unit which contains the viewing screen is referred to as a monitor.

The industrial television process differs from

that employed to transmit television signals to a home television receiver in that the industrial television signal travels on cables directly to the viewing screen. The ordinary television broadcast to the home, of course, must be transmitted "on-the-air" and requires the additional elaborate studio control, high-power transmitter, and antenna equipment for its operation.

Because the industrial television system is a closed system it is not subject to the interference, static, and reflection ghosts that the common television broadcast experiences. For this same reason the industrial television system is under none of the frequency bandwidth restrictions and other limitations imposed on broadcast television. Therefore, without these restrictions, Du Mont engineers have been able to develop the best possible system, keeping in mind only the compromise between cost and practicability. There is no Federal Communications Commission license required to operate the Du Mont industrial television system.



Stereo, or three-dimensional television developed by the Remote Control Engineering Division of Argonne National Laboratory, the Atomic Energy Commission's midwest installation, through the industrial cooperation of Allen B. Du Mont Laboratories, Inc.



Part of the crowds at the 1950 I.R.E. Show who were attracted by the Du Mont Industrial Color Television Exhibit.

Du Mont and Industrial Television

In keeping with their reputation for being first with the finest in all phases of television, Du Mont turned early to the field of industrial television.

The first Industrial Color Television System was demonstrated to the trade at the 1950 Convention of the Institute of Radio Engineers, at Grand Central Palace in New York City. Leaders of business, research, government, medicine and the electronics field saw for the first time what Du Mont means by a high-fidelity full-color system.

Du Mont has been long noted for the fine picture quality of their television equipment and in particular their Image-Orthicon Camera. Following World War II, Du Mont, in cooperation with the government and industry, turned the techniques of their years of experience to the field of industrial television. Although Du Mont's high-resolution, dependable mono-

chrome (black & white) cameras gave more than satisfactory service, many applications demanded a camera that would resolve colors of equal light intensity. In the monochrome camera system, different colors of equal light intensity are virtually indistinguishable on the viewing monitor and identification of some subjects becomes exceedingly difficult. The answer to this problem was color and with the development of their closed circuit industrial color television Du Mont forged ahead in the field of industrial television.

Du Mont has now perfected their Industrial Color Television system to the point where high resolution, high fidelity color is faithfully reproduced.

Soon Du Mont Industrial Color Television Systems will be operating in many key industrial, medical, and government locations.

We hope that this bulletin may help you to determine how Du Mont's Industrial Color Television can best serve your needs.

FEATURES OF THE DU MONT TA-164-A

● Sharp, high-fidelity color picture

The TA-164-A resolves the finest detail with the 500 line horizontal resolution . . . 18-megacycle bandwidth assures that all the color in the original is transmitted to the viewing monitor . . . The fast, 180 field per second frame repetition rate means bright, stable, flickerless images . . . No interference from outside signals with the closed system . . . Design stability has eliminated all drift after warm up.

● Ease of Operation

Camera is equipped with a trigger-lock, multi-lens selector handle and pan-handle focusing . . . Camera can be remotely controlled . . . Color control is centralized at a single control point . . . The entire operation can be controlled by a single operator unless continuous movement of the camera is desired . . . Single standard a-c power cord to plug in.

● Dependability

Designed for round-the-clock industrial use . . . Top quality, extra-long-life components used throughout . . . rugged fool-proof cables and connectors . . . complete electrical and magnetic shielding.

● Portability

Five light weight compact units, including the camera . . . Simple to connect and disconnect

● Economy

Low power consumption



An actual operating room scene being televised.

MEDICAL-SURGICAL APPLICATIONS

Modern medical and surgical techniques have become increasingly complex over the past years. New concepts, new techniques, new treatments in all the numerous branches of medical science have made the task of instruction in these methods more and more difficult owing to the rapidity with which they appear and to the rapidity with which new methods replace the old.

Now more than ever it is important to keep abreast of developments and this is best accomplished by affording the students in the crowded medical schools the opportunity to see at first hand the new techniques being practiced. Increasingly it is becoming evident that the present methods of visual communication are all but inadequate.

The practical use of the amphitheatre with its banked seats is obsolete by reason of overcrowding and because the number of specialists surrounding the operation block out effective observation.

Motion pictures of such techniques would at first glance seem to be the answer, but such has not been found the case. Films lose value because they are too obviously staged and lose much of the drama of the actual operation. The medium of television provides an immediacy which can only be achieved otherwise, by the viewer actually being present in the operating room. Further, detailed related instructions may be included for a particular group of viewers in accordance with their special instruction requirements during routine periods of an operation. Teaching techniques may be varied to best suit the viewer groups at each presentation.

Monochrome, or black and white television, because of the lack of color, prevents accurate definition of the operating scene. Color television permits the remote viewer close observation of the operation, in full color, in the same manner as those performing the operation. A practically unlimited audience can be reached at remote locations, as for example in class rooms, without disturbing the surgeons and with no difficulty

in setting up the equipment either in the operating room or at the viewing site. Moreover, the color television gives a complete coverage, revealing details that would not have been seen from the balcony of an amphitheatre.

Color television equipment previously used has been largely experimental in nature and unavailable commercially. While the value of this equipment was proven, the standards were limited and failed to realize the full possibilities of a color system.

The Allen B. Du Mont Laboratories, with its extensive background in the field of electronics, has designed equipment ideally suited for the purpose of medical and surgical training. The Du Mont Model TA-164-A Industrial Color Television System which provides the high color fidelity and high picture resolution required for an accurate presentation of surgical technique, is now available commercially, and may be purchased for installation in any medical school, clinic, or hospital.

Easily installed, easily operated, portable by design, accessible for easy maintenance, the Model TA-164-A Industrial Color Television System will prove of invaluable assistance in surgery, dermatology, cancer research or any field of medicine requiring color presentation and reproduction as an aid to further education.



The Du Mont camera being used to pick up a classroom lecture.

INDUSTRIAL APPLICATIONS



Low-voltage Supply, Synchronizing Generator, Camera Control and Color Mixer, and 7-inch Color Monitor.

Wherever industrial personnel must see . . . the Time Studies Engineer, the Efficiency Expert, the Expediter, the Research Engineer, the Product Engineer, the Plant Manager, the Plant Guard, the Bank Teller, the Traffic Control Manager, the Freight Dispatcher, the Train Dispatcher, and Management of Industry, there is an application for industrial television. Wherever immediate and accurate sight is important for control, television can help cut time, cut costs, and improve efficiency. Wherever there exists an element of danger to human lives on any research or development project, television can provide the sensitive eyes in close proximity telling the complete story without danger to the valuable personnel conducting the project.

This is only true if the television system employed brings sharp, clear, true-to-life images to the viewer and is capable of the best possible operating efficiency.

The Du Mont TA-164-A Industrial Color Television System fills such requirements. As the name implies, this equipment has been designed specifically for Industrial Applications. The equipment is not intended for broadcast use and is therefore not restricted to the limitations of broadcasting. It produces high resolution, high fidelity color pictures rivaling the human eye for accuracy. It maintains the portability, flexibility, accessibility, and dependability that has made Du Mont famous throughout the television world. It is capable of televising almost

every process, method, or experiment required by Industry. It can be placed in positions impossible to reach and observe by any human. Without danger to human life, it can materially assist in proving and studying in detail an operation, design or technique safely and accurately.

The design of the Du Mont TA-164-A Industrial Color Television System permits operation and control at safe distances up to 1000 feet. High definition, full color pictures can be observed on 12½ inch high intensity monitors using the direct-view principle for daylight viewing. A selection of four lens positions on the camera increases flexibility, permitting the wide angle as well as minute closeup observations. The portability and flexibility of the system permits easy dismantling and setup, from one project to another. Single cables, Jiffy connectors, and many other features contained in broadcast equipment are offered in this system to maintain efficiency and operating ease. In the field of Chemistry, Petroleum, Steel, Aircraft, Transportation, Atomic Energy, Jet Propulsion, Rocket Engines, Textiles, Commerce, Education, Photography, Motion Pictures, and multitudinous other industries, Du Mont Industrial Television has its applications.

The Du Mont TA-164-A Industrial Color Television System with its high resolution, high color fidelity, and wideband operation, can fill the widest variety of industrial needs while satisfying the most exacting demands for detail and accuracy.

RESEARCH AND DEVELOPMENT APPLICATIONS

In the new era of industrial research and development, more and more emphasis is being placed on automatic control of remote processes.

Because of the exacting nature of many of these processes, it is necessary to exercise very close supervision over them. In numerous instances a metered indication is insufficient and direct viewing must be provided for the additional safety factor vital to the most precise monitoring. In other cases a variety of reasons such as comfort, inaccessibility, height, pressure, instability of the process, etc., makes it impossible for personnel to be in the vicinity of the project and some other means of viewing must be found.

The mechanical limitations of an optical system that must function over any length of distance are obvious. Further, a mechanical viewing system is relatively immobile and lacks flexibility.

Combining the best of optical and electronic principles, the Du Mont Type TA-164-A Industrial Color Television operates over distances of thousands of feet and brings the subject to the monitor in full natural color, with no reduction in light level. In short the Du Mont TA-164-A is an extension of the operator's own eyesight and possesses an unusual amount of flexibility

that could not be realized in any other way. While the operator views the picture monitor, several cameras may be trained at different strategic angles on the same subject, and the picture from any one camera selected; or several cameras may be trained on several interrelated processes at the same time and a continuous check made on any of them.

Should a change dictate, the Du Mont system can be simply and easily relocated and adapted to meet the new requirements. A single man can move the units, quickly set them up and operate the system without difficulty.

The long experience and engineering skill of the Du Mont television engineers have resulted in the high resolution, fine color picture that the system reproduces. Free of the restrictions placed on the broadcast field, Du Mont engineers have found it possible to perfect the circuitry and bring to a high quality the performance of the TA-164-A under all conditions of use.

Research can be speeded up, personnel protected and step-by-step supervision maintained for all phases of development projects.

Nothing can be so indispensable as the ability to see your work. Let Du Mont quality and experience help you to achieve sight.



A technician viewing a remote industrial process on the 7-inch Color Monitor.

MERCHANDISING APPLICATIONS

Merchandisers in the Department Store and many other allied fields are constantly searching for new methods, new mediums designed to stimulate sales, bring products closer to the buying public and make shopping easier and more pleasant. Often store merchandising presentations rival Broadway productions in their perfection of showmanship, glamour, and attraction of public interest.

Still, the age-old problem of traffic flow and overall store presentation persists. Thus, inter-department cooperative displays have reduced the natural reluctance on the part of the public to visit all floors of the store, directories and individual printed promotional material have reduced the tendency to ignore the upper floors. An ideal solution, however, has not yet been provided.

Merchandisers have turned to television in the past for use as an intra-store merchandising aid and have been disappointed. The equipment employed produced black and white images

which did not do justice to the colorful products demonstrated and offered for sale. As a temporary promotion, the black and white pictures were more than adequate . . . the newness of television was enough to add impetus to the overall promotion. As a continued service, however, this black and white television as an intra-store sales medium could not hope to compete with other tried and proven merchandising methods.

Today that circumstance has changed. Excellent resolution, high color fidelity television pictures are now possible for an intra-store merchandising medium.

Du Mont knows the capabilities of its equipment, and knows that any required pictorial effect can be accomplished for the merchandiser. Brilliant, strikingly beautiful, full-color, live ads and eye-catching demonstrations can be flashed continually from any part of the store on strategically placed monitors. The sparkling color fidelity makes patterns, colors, trademarks, and



Camera focused on fashion model.



Crowds surrounding model and Color Monitor at Fashion Demonstration

other identifying color combinations stand out in bold relief in the same manner the prospective purchaser should see them.

Indeed, the recommendations of a store central studio presenting simultaneous impulse impact pictures on direct-view color monitors scattered throughout the store can be of tremendous value in day to day sales-peaked store merchandising.

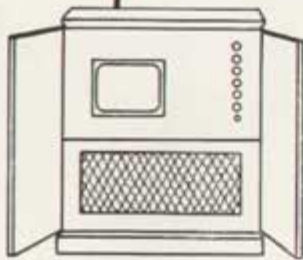
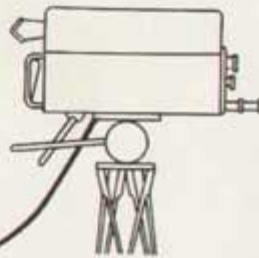
For the merchandiser in other fields, almost any field, the Du Mont TA-164-A Industrial Color Television System can provide its benefits in putting sales programs across. In merchandising it is known that the public buys what it can see . . . and what is made to seem desirable. What better way is there to place all of your products on display on the first floor . . . actively presented . . . faithfully reproduced!!!



HOW IS THE DU MONT TA-164-A USED?

- **Cameras** — One or more cameras consisting of pickup head and electronic viewfinder can be placed at various viewing locations. A camera operator is not required unless continuous movement of the camera is necessary and not provided by remote control.

The video (picture) signal is sent by cable from the camera to the control units.



- **Control Units** — The control point is the normal location of the Control and Mixer, Sync Generator, 7-inch Color Monitor and the Power Supply.

Switching and distribution amplifiers may also be located at the control point for some applications.

Pictures from an individual camera may be selected at the control point and transmitted to one or more of the viewing monitors (the distance between cameras and the control point can be up to 250 feet).

Telephones and talkback circuits are provided between the control and camera sites.

- **Monitors** — As many monitors as desired can be fed from a single camera by various arrangements of distribution facilities. Monitors are connected with the control point by low-cost coaxial cable (up to 1000' in length).

COMPONENTS OF THE DU MONT TA-164-A

- **Camera Head with Viewfinder** — Extremely sensitive pickup head with multi-lens selector, pan-handle focus, detachable viewfinder . . . Fully air-cooled throughout . . . Contains extra-wideband amplification.

The camera head is mounted on a balanced ball bearing head permitting 360° azimuth and 120° vertical swing.

Remote control mounting is available on application.

- **Power Supply** — The well-regulated power that this unit supplies to all units means extra stability . . . Rugged power tubes assure long life under the rigorous handling that may be expected in the field . . . A multi-tapped transformer permits operation under a wide variety of line voltages ranging from 90 to 120 volts.

- **Sync Generator** — The heart of the Industrial Color Television System, the design and craftsmanship of the Sync Generator is an important reason for the high resolution, fine quality picture . . . The compact size of this complex equipment is only possible with the careful layout and hand-tailored construction that is characteristic of all Du Mont television equipment.

- **Control and Mixer** — Vital control unit showing simple remote camera controls and color controls . . . Built-in cathode-ray oscillograph permits the operator to make the finest adjustment of controls . . . Completely enclosed, air-cooled unit has carrying handles to facilitate moving from location to location.

- **Seven-Inch Monitor** — The monitor gives a very bright, clear, full color picture with the metallized, high-voltage picture tube.





A Du Mont Jiffy Cable connector.

Lenses — A complete line of camera lenses is available from Du Mont for any applications.

The following lenses are available:

- Wide angle 50 mm., $f/1.9$, 2"
- General purpose 90 mm., $f/3.5$, 3½"
- General purpose 135 mm., $f/3.8$, 5½"
- Telephoto 215 mm., $f/3.9$, 8½" (Inc. Mount and Coupling)
- Telephoto 254 mm., $f/4.5$, 10" (Inc. Mount and Coupling)
- Telephoto 300 mm., $f/5.6$, 12" (Inc. Mount and Coupling)
- Telephoto 350 mm., $f/4.5$, 14" (Inc. Mount and Coupling)
- Telephoto 510 mm., $f/5.6$, 20" (Inc. Mount and Coupling)

Jiffy Cable Connectors — Simple to fasten . . . Can be rapidly connected and disconnected . . . Foolproof, will only fit proper receptacles . . . cannot be hooked up incorrectly.

Cables

Camera cable "D" from the camera to the control point can be purchased in lengths of 25', 50', 100', 150', 200', and 250'.

Coaxial RG-11U cable can be obtained in any lengths for connection from the control site to monitor receivers.

Interconnection cables within the control room are available in many sizes for any location of units within the control room.

All cables are heavy duty waterproof rubber and coaxial cables are shielded from electrical or magnetic interference.

Size and Weight

From the table below the dimensions and weights of all units can be read at a glance:

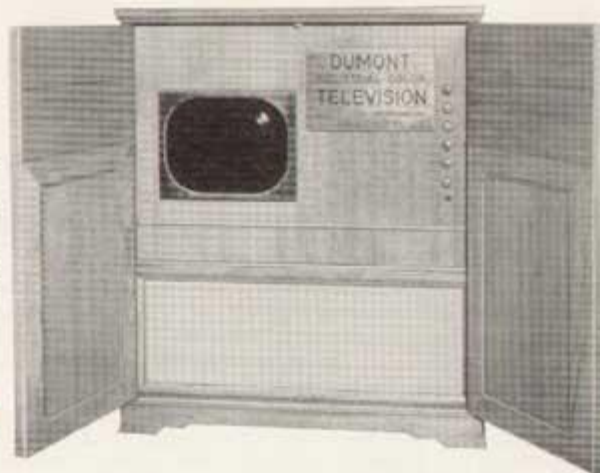
Unit	Width	Height	Length	Weight Lbs.
Pickup Head and Viewfinder	12"	16"	21"	85
Color Monitor	9"	17"	20"	50
(exclusive of color wheel and shroud)				
Control and Mixer	9"	17"	20"	50
Sync Generator	9"	17"	20"	50
Low Voltage Power Supply	10"	17"	29"	150

Temperature and Pressure — Du Mont designs all equipment for operation in ambient temperatures up to 110° F. Above that temperature auxiliary cooling should be provided.

The Industrial Color Television System may be operated in pressures up to 3 atmospheres absolute.

For air-conditioning considerations the unit consumes 1450 watts.

Twelve and one-half Inch Monitor — A handsomely designed, distinguished looking monitor, this receiver permits viewing by 35 to 40 persons . . . For applications where the ultimate in viewing is required . . . rich natural-color picture.



The de-luxe Du Mont 12½" Color Monitor.



The control operator adjusting the 7-inch Color Monitor.