



TELEVISION

CAMERA

EQUIPMENT

(FIFTH EDITION)



TV CAMERAS	CAMERA LENSES
CAMERA ACCESSORIES	CAMERA MOUNTS
LIGHTING EQUIPMENT	MOBILE UNITS

TELEVISION CAMERA EQUIPMENT CATALOG

(Fifth Edition)

PRICE \$1.00



RADIO CORPORATION OF AMERICA

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ABOUT THIS CATALOG

This catalog provides information on RCA TV Camera equipment for television studio and closed circuit use. Other RCA Broadcast Equipment Catalogs supply information on film, TV tape, terminal, microwave and audio equipment; also on AM, FM and TV transmitters, antennas, and transmission line equipment.

The information contained in this catalog is intended to serve as a buying guide for the user. Complete specifications and ordering information are supplied. Readers who desire more information or individual bulletins on particular equipment items are invited to write to their RCA Broadcast Representative.

OTHER RCA TECHNICAL PRODUCTS

RCA also manufactures many other electronic products, including: two-way radio and microwave relay communications equipment; optical and magnetic film recording equipment; sound systems of all types; 16mm projectors and magnetic recorders; industrial inspection and automation equipment; scientific instruments, such as the electron microscope; closed-circuit television systems; and many types of custom-built equipment for industry, the military, educational and medical services. Information describing these products may be obtained from RCA Sales Offices in the United States and Canada. International customers should contact local RCA distributors or RCA International Division, Clark, N. J.

PRICES

Domestic prices of the equipment shown in this catalog are provided in a separate price list. Prices are listed in the order in which they are shown in the catalog. To determine the price of any equipment first note the page on which it is shown in the catalog, then consult the price list in accordance with this page number. Equipments are identified by type and MI (Master Item) numbers which are used to identify apparatus on invoices and packing slips. International prices for the various equipment items shown in this catalog are available from your local RCA distributors or RCA International Division, Clark, N. J.

HOW TO ORDER

The RCA Broadcast Camera Equipment shown in this catalog is sold directly through RCA Broadcast Representatives, who are familiar with broadcast equipment and related problems. These RCA Representatives are located in convenient offices. Domestic orders for equipment shown in this catalog, or requests for additional information, should be directed to the nearest RCA Sales Office. International Readers are invited to contact their local RCA distributor or the RCA International Division, Clark, N. J.

4½-inch Image Orthicon TV Camera

TYPE TK-60A



FEATURES

- 4½-inch image orthicon for sharper, crisper monochrome pictures
- Compact control panel with simplified operating controls
- Six camera chains easily controlled by one operator
- Rapid stabilization—produces picture within one minute of cold start
- Counter-balanced yoke assembly—maintains camera balance while focusing
- Built-in remote iris control with transistorized servo amplifier system
- 8-inch viewfinder kinescope for large, bright picture
- Built-in electronic lens cap
- Performance unaffected by line voltage variation from 95 to 130 volts or 190 to 260 volts
- Uses standard television camera cable



The complete TK-60A Studio Camera Chain including camera, set of lenses, camera processor, power supply, master monitor, control panel and console housing.

DESCRIPTION

The RCA TK-60A Studio and Field Cameras are all new live monochrome camera chains featuring major advances in operational simplicity, stability and performance. The basic camera, which is identical in both the studio and field equipments, utilizes a 4½-inch image orthicon tube which provides a substantial improvement in resolution, signal-to-noise ratio and gray scale reproduction. These qualities result in pictures having the faithfulness of detail and general high quality normally associated with fine photography.

Extensive use is made of stabilized circuitry in every part of the camera chain, beginning with the voltages applied to the image orthicon and extend through all of the video amplifiers, deflection circuits and processing circuits. As a result, a great improvement has been achieved in stability of operation, which has permitted in turn a major reduction in the number of operating controls and the amount

of effort required for operation. In addition, the frequency with which readjustments of setup controls must be made and the amount of servicing required are minimized.

All of the basic setup controls are found in the camera. Once these setup controls and voltages are adjusted they need no further attention in normal day-to-day operation. Cameras may be interchanged freely between camera controls without change of setup adjustments. The simplicity of the operating controls together with the inherent stability of the camera chain makes it possible for one video operator to handle several camera chains simultaneously.

The major units of the TK-60A Camera Chain consists of a combined camera-viewfinder, a processor, a type WP-16B Power Supply, a TM-6C master monitor, and a remote control panel. The camera chain is supplied complete with tubes including image orthicon, a set of three lenses, a 50-foot camera cable with connectors, a camera wedge

mount and a 13-inch console housing for the master monitor and remote control panel. The processor and power supply are designed for mounting in a standard cabinet rack. A Cradle Head and one of the available tripods or pedestals should be ordered to support the camera.

Camera-Viewfinder

The camera and viewfinder in the TK-60A are combined in a single unit. The streamlined styling of the new housing with its keystone motif and new sage-gray coloring give it distinctive, pleasing and extremely functional appearance. All circuit functions within the camera have been segregated into three subchassis units and a setup control panel. The sub-chassis units consist of a video preamplifier, a deflection chassis and an auxiliary chassis.

Access to the inside of the camera is provided by two hinged side doors which open downward, forming convenient horizontal working surfaces during maintenance periods or are easily removed if desired. The video preamplifier is located in the lower lefthand side of the camera. The deflection and auxiliary chassis are mounted in opposite sides of the camera by means of swing-out hinges which permit them to be raised for access to other parts of the camera assembly and for servicing. A control panel containing the camera setup controls is mounted toward the rear of the camera in the lower left side. The image orthicon and coil assembly are located on a movable focus carriage at the bottom of the camera.

Cool air is drawn in through ventilating holes in the bottom of the camera, circulated throughout the case and exhausted by a very quiet "whisper" type fan mounted in the top of the camera case. A separate blower is used to maintain proper image orthicon operating temperature. In addition, a small blower is mounted in the high voltage compartment to cool the associated components.

Large, Bright Viewfinder

The viewfinder of the TK-60A features an 8½-inch rectangular kinescope which produces a large, bright picture display. Maximum usable highlight brightness is at least 150 foot-lamberts with a resolution capability of 600 lines. The viewfinder is normally fed by a signal from the output of the processor, permitting the cameraman to see a picture identical to that delivered to the studio output. This signal is sent over the camera cable and is equalized for flat response to the same degree as the output signal delivered by the camera. Provision is made to select remotely from the camera position an alternative signal feed through the camera cable. This feed may be used to show the cameraman a composite picture from an effects system when the camera is being used as an input source for special effects. In addition, the input of the viewfinder may

be connected locally to the output of the camera preamplifier to provide a quality check on the video signal as it leaves the camera.

Ease of Focusing

A unique arrangement has been provided to counterbalance the weight of the image orthicon focus and deflection coil assembly as it is moved backward and forward during optical focusing of the camera. As the camera is focused, this assembly is counterbalanced by the camera auxiliary subchassis which moves in a direction opposite to that of the coil assembly. In this way, the work required to move the focus mechanism is always minimum regardless of the angle-of-tilt of the camera. Furthermore, there is no tendency for the coil assembly to "slide down hill" when the camera is tilted.

Camera and viewfinder are combined in a single unit, styled for pleasing appearance and simplicity. Large 8½-inch viewfinder produces unusually bright picture with high definition.





Quick change lens mount permits insertion or removal of lens by merely turning two captive thumbscrews.

Transistor Amplifier Intercom System

Each TK-60A Camera Chain includes a self-contained intercom system with its own power supply. Two separate intercom circuits are provided. One circuit is for production use and has an outlet at the camera that is terminated in the processor from which connections may be made to existing station production intercom circuits. The second circuit is utilized by engineering. This circuit has outlets in the camera, processor and remote control panel and may be operated independently from a built-in d-c power source in the camera or connected to the existing station engineering intercom system. An outstanding feature is the provision of a built-in transistor amplifier and volume control at each point where a headset is plugged into the system. This provides a liberal reserve of intercom level at all times and permits each user to adjust the level to suit his own needs. Each station on the intercom system has back-loading to permit the bridging of a large number of stations without affecting sound level.

Large, Sturdy Lens Turret

The rugged, large diameter lens turret of the TK-60A camera provides mounting facilities for four lenses with remote iris control. The 11 $\frac{3}{4}$ -inch diameter turret provides liberal spacing between adjacent lenses, thus reducing optical interference. Rigid mechanical support and accurate optical alignment of the lenses are assured by rim support bearings at the edge of the turret, providing a solid mount-

ing for heavy telephoto and zoom lenses. The turret shaft projects through the length of the camera and terminates in a handle at the rear, permitting change of turret position by a simple, direct rotating motion of the handle. Accurate, quiet-operating turret indexing is assured by four rollers which simultaneously engage notches in the rear of the turret itself.

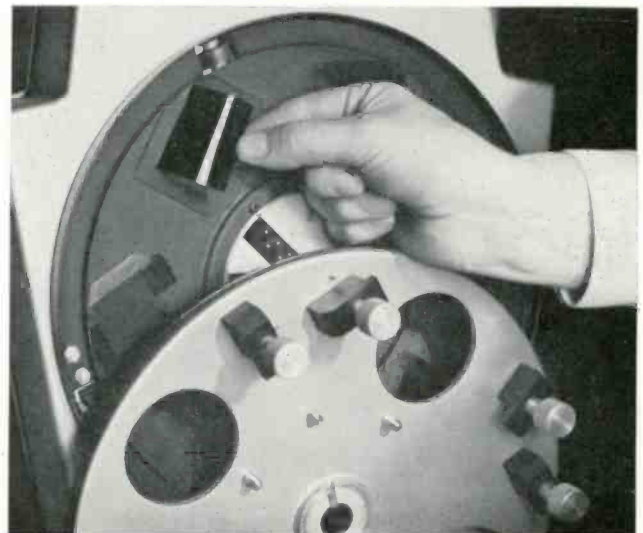
A new precision quick-change lens mount allows replacement of individual lenses by means of two captive mounting screws requiring only one-half turn to secure or to free the lens. The lens mount is designed to accommodate the MI-26882 series lenses which include mechanical provisions for linear, remote controlled iris adjustment.

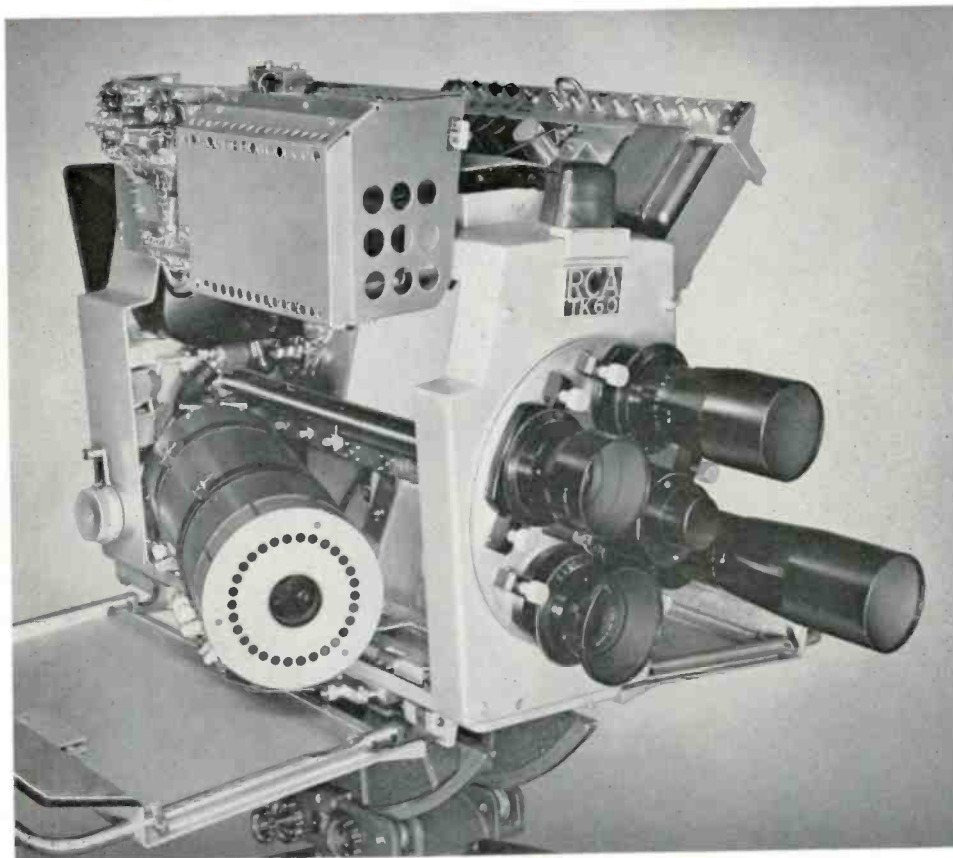
Mechanical drive for remote control of iris adjustment is provided by an enclosed precision servo mechanism located at the center of the turret. A single gear engages the iris drive rings of the four lenses permitting simultaneous iris adjustment of all lenses mounted in the turret. The servo motor may be controlled either locally from the rear of the camera or remotely from the camera remote control panel. A slip-clutch guards against the possibility of damage to the lenses or drive mechanism due to jamming, and permits hand operation of iris adjustment at the front of the camera when desired. The iris drive mechanism is easily removable from the turret by loosening two thumbscrews, permitting detachment of the turret by simply removing a center nut.

Neutral Density Filter Holder

Immediately behind the lens turret is a disc containing six openings for the insertion of neutral density filters, any one of which may be introduced into the light path to compensate for major variations in light level. Selection

Easily removable lens turret provides access to filter holder wheel with space for six neutral density filters. Holder wheel is rotated by knob from operator's end of camera. Detent stops between filters provide convenient optical lens cap.





The TK-60A Camera literally turns "inside-out" for complete access to all parts.

of filters is provided by a control knob at the rear of the camera which rotates the disc to the desired position. Detent stops located between filter positions permit use of the disc as an optical lens cap.

Easy-To-Service Features

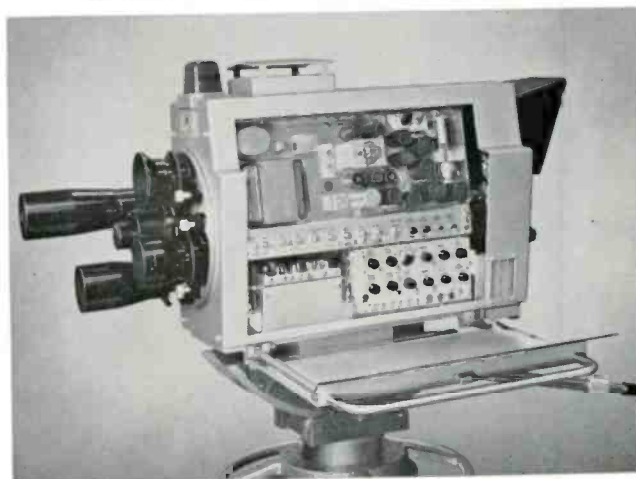
Many electrical and mechanical features are found in the TK-60A to facilitate servicing. The inherent stability and reliability of the circuits minimize the servicing required. When routine checking and repair are needed, a number of self-testing circuits make the job easy. All significant circuits are wired to pin jacks for making either meter or oscilloscope measurements of signal and power supply voltages.

In stabilized circuits employing feedback and current stabilization, many of the normal tests for tubes and circuit performance do not give significant indications. However, an effective test of such circuits can be made by an arbitrary reduction of filament voltage. In the TK-60 camera, means are provided for applying this reduced voltage test to one segment of the system at a time. Thus it is possible to obtain an indication of potential trouble and to isolate it to a particular area. Test switches are included in both the camera and processor for applying this type of test in a routine manner.

Accessibility to Image Orthicon Tube

The focus-deflection coil assembly swings out to one side for easy replacement of the image orthicon tube. This simple approach avoids the need for removal of the turret or of any subassembly within the camera in order to change the pickup tube, and reduces tube replacement time to a period of two or three minutes. The hinged

Compact pre-set control panel combines camera set-up controls and numerous test probe points for easy servicing. Sturdy side doors provide convenient work space for test instruments.



mounting of the two largest chassis subassemblies in the camera provides accessibility to other areas in the camera. These subassemblies are operable in either normal or swing-out positions.

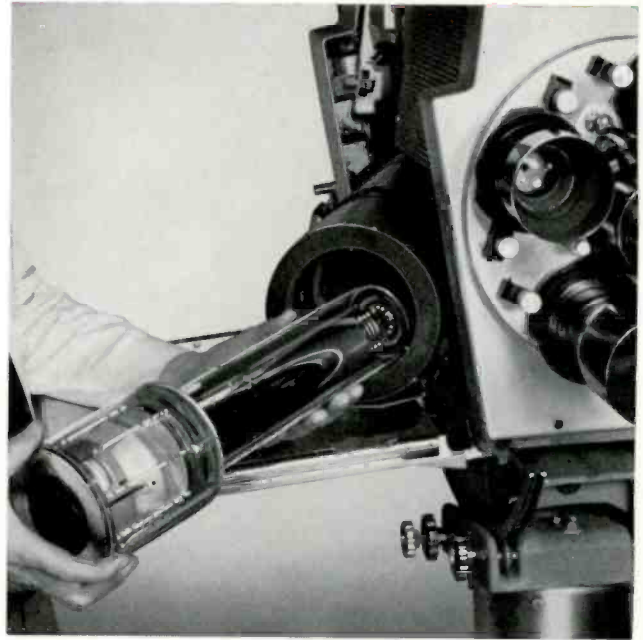
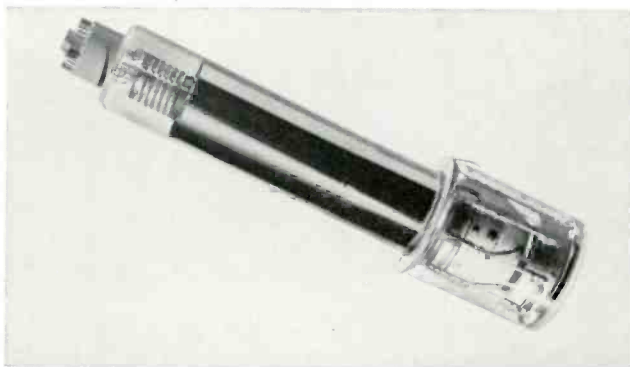
Solid type terminal strips with solder connections are used throughout the camera chain except on sub-assemblies which may occasionally require removal. Connections to removable sub-assemblies are made by captive plugs and receptacles to permit easy removal for servicing or replacement.

4½-Inch Image Orthicon Tube

The heart of the TK-60A Camera is the RCA 4½-inch Image Orthicon, a newly designed tube made to the same high precision standards as color pickup tubes. It features the use of a wall-mesh and high quality dynode construction which assure uniform beam landing and freedom from shading and background non-uniformities of all kinds. Close tolerances held on electrical characteristics of the 4½-inch tube are a feature of special importance which permits the use of setup controls with restricted ranges in the TK-60A.

The 4½-inch tube operates on the same basic principles as the well known 3-inch types. In appearance it has the same general shape, but is simply larger in size. The significant difference from the 3-inch tubes lies in the larger area of the glass target scanned by the electron beam. It is this larger area which accounts for the ability to give increased resolution, or more significantly, the signal to noise ratio is increased by a factor of almost 2 to 1. Though the target of the 4½-inch image orthicon is larger, the photo-cathode (used diameter) is the same as that of the 3-inch tube. Hence camera lenses having the same size image diagonal may be used with either 4½- or 3-inch tubes. Magnification of the electron image in the

Key to superior picture quality in the TK-60A Camera is the 4½-inch image orthicon tube. While target area is twice as large for higher resolution, image magnification permits use of same size lenses as are used with 3-inch tubes.



Swing-out yoke mounting arrangement permits change of I.O. tube within two or three minutes.

4½-inch tube is brought about by suitable strengthening and shaping of the magnetic focusing field in the image section of the tube.

Another important feature built into the 4½-inch tube is relatively close spacing between the glass target and the mesh. As a result, signal-to-noise ratio is increased and the linear portion of the transfer characteristic is lengthened, permitting more accurate reproduction of the gray scale. Also, broad redistribution of secondary electrons is reduced, thus minimizing the possibility of overshoots and halos in the picture.

High Voltage and Focus Current Regulation

Close regulation of the voltages applied to the image orthicon and viewfinder is of prime importance in achieving stable performance. This is accomplished by using corona-discharge tubes to maintain highly accurate voltages. In circuits where desirable to eliminate the possibility of even small variations of the voltages, the corona-discharge tubes are enclosed in a temperature-controlled oven.

In addition to precise voltage regulation for the image orthicon, the magnetic focusing field must be equally stable. Current regulating circuits are employed in the processing amplifier to maintain the focus current within a maximum variation of 0.12 percent. Current reference is obtained from the drop in a resistor having a low temperature coefficient, and voltage reference is obtained from a highly stable zener diode.

Stabilization Techniques

With normally-used fixed bias controls, the beam current in the image orthicon drifts through a rather large range during the first half hour or so of operation. To eliminate the need for constant resetting of this bias during warm-up, beam current stabilization is provided in the TK-60A by the use of feedback between G2 and G1 of the image orthicon tube. This arrangement keeps the beam at the proper value for discharge of picture-whites and for minimum noise at all times.

A separate blower system is provided for temperature stabilization of the image orthicon, consisting of a blower and a plenum chamber with two exhaust ducts. One duct maintains adequate cooling to the heater and cathode section, the other directs air to the image section of the image orthicon tube. The duct to the image section contains two heater elements, which are controlled by a thermostat mounted in the yoke assembly and in contact with the glass envelope near the target. The thermostat and heaters provide rapid warmup and maintain proper operating temperature of the image section of the image orthicon tube. Two flexible hoses are utilized as air passages from plenum chamber to the yoke assembly.

Current stabilization is used in amplifier tube circuits essentially throughout the TK-60A chain. Both temperature and aging effects which tend to cause a slump in cathode current are effectively counteracted where desirable by using a cathode resistor of high value with the grid returned to a positive voltage. Any change in emission characteristics of the tube will therefore result in only a small effective change in cathode current. Maximum use is made of feedback techniques in video output stages, deflection systems, and clamp circuits. Precision resistors with very low temperature coefficients are used in all critical circuits to minimize drift in voltage and current and to reduce camera warmup time. These are further aids in maintaining stable signal levels, linearity, and low differential gain.

Magnetic Shielding

Special care has been employed in the design of the TK-60A deflection assembly to provide complete magnetic shielding around the tube and its associated coils. This makes it possible to operate the camera in stray fields of intensities as high as 10 gauss without significant deterioration in picture quality.

Premium tubes with high performance and long life are used wherever possible. Every effort has been made to minimize the number of tube types and to operate them conservatively. Use of these tubes along with feedback and current stabilization yields a great increase in life



All operating controls required by cameraman are located at the rear of the camera for ease of operation.

expectancy and general reliability. Extensive use is also made of the new, very small, Nuvistor triode tube. It is used exclusively in the video preamplifier, and in a number of other functions associated with blanking and deflection. One of the most significant characteristics of the Nuvistor (especially important to the video preamplifier) is freedom from microphonics. Other desirable characteristics include very small size, very low heat dissipation, high gain, and long life.

Built-in Calibration Pulse

A control for adjusting gain of the signal multiplier in the image orthicon is included among the setup controls in the camera. A built-in calibration signal is provided for making proper preset adjustment of this control. The calibration signal consisting of a symmetrical square wave at scanning line frequency, is added by a switch to the picture signal at the input of the video preamplifier. The calibration signal is factory-adjusted to provide the normal level of 0.7 volts peak-to-peak at the output of the preamplifier. It presents a half-black, half-white picture on the viewfinder. By using the filter holder disc as a half mask and focusing the camera on an all-white scene it is seen that the white portion of the image orthicon signal fills in the black area left by the calibration signal.

When the gain of the signal multiplier is correct, both halves of the scene will appear to have equal white values

on the viewfinder. If they are not equal, the multiplier gain control should be adjusted to make them equal. As a result of the stabilized circuitry in both the preamplifier and the high voltage supply, this adjustment of correct signal level remains accurate for a considerable period of time.

TK-60A Camera Control

Essentially all of the setup controls in the TK-60A equipment are located in the camera where the viewfinder and a built-in calibration signal provide the measuring facilities required for setup adjustment, while only operating controls are placed at the camera control position. A previously adjusted camera may therefore be placed into service without need for adjusting setup controls at the camera or at the control position.

Setup functions at the camera include the usual adjustments for the image orthicon such as beam, beam alignment, target voltage, target calibration, orthicon focus, multiplier focus, and G6. A separate control for the wall-mesh electrode in the image orthicon tube is also located in the camera. Size and centering control (dual centering controls to accommodate reversal of scanning) and linearity adjustments are located on the deflection subchassis, while preset shading controls appear on the auxiliary subchassis.

Operating controls which are located on the camera include turret handle, optical focusing control, and manual control for rotating the neutral density filter holder, and two switches for reversing directions of horizontal and vertical scanning, respectively. The turret handle and focusing control retain the general locations and modes of operation to which cameramen have become accustomed in earlier RCA cameras. All of the operating controls listed in this group are conveniently located at or near the rear of the camera.

Remote Control Panel

The remote control panel contains the three operating controls of the TK-60A camera chain, consisting of the remote iris control, brightness and a contrast control. The remote iris control is the principal operating control in the camera chain. An open-loop servo system drives all four lenses on the turret simultaneously. In the MI-26882 series of lenses, the iris scales are linear and identical in all focal lengths. Thus the calibrated scale at the control (either at the rear of the camera or on the remote control panel as determined by a selector switch) shows the actual iris setting for any lens in the turret.

The remote control panels may be used for either of two modes of operation. The desired mode of operation is selected by a simple jumper arrangement in the camera and processor. In the clamp-on-black mode of operation the functions of the remote control knobs are as follows. The iris control is adjusted to maintain the correct light exposure to the photo cathode of the image orthicon. The contrast control functions as a video gain control. The brightness control is utilized to maintain the desired black level.

In the clamp-on-white mode of operation the iris control operates as above. The adjustment of the contrast control alters the level of the black information of the video signal with reference to the fixed peak white level as established by preset adjustment of the white clamp reference in the camera. The brightness control is adjusted to establish the desired black level to which the black video information is adjusted by the contrast control.

Two alternate versions of the remote control panel are available, identical in electrical function but designed to accommodate different mounting requirements. The MI-26008 Remote Control Panel is 11 $\frac{1}{8}$ by 2-21/32 inches in size and is designed for mounting beneath the master monitor in the space provided in the MI-26786 thirteen-inch console housing. The MI-26007 Remote Control Panel is 7 $\frac{3}{4}$ by 2 $\frac{1}{8}$ inches in size and is designed to mount in the space provided in the front of a TM-35 Portable Master Monitor.

Electronic Lens Cap

A special new feature, of considerable convenience when the camera is left unattended, is an "electronic lens cap." It may be applied at any time by either the cameraman

Small and simplified camera remote control panel contains only two actual operating controls. Two versions of panel are available, MI-26007 (illustrated) for use with TK-60 Field Camera Chains, and MI-26008 for use with TK-60 Studio Chains.



or the video operator. Tallies at both locations show when the camera has been capped. A switch cuts off the accelerating voltage in the image section of the pickup tube and applies a bias of about 4 volts to the target; thus the picture is effectively removed from the tube.

Built-in Image Orbiter

Electromagnetic image orbiting and immobilization, completely self-contained in the camera, are provided at a speed of 1 rpm. A switch at the back of the camera permits orbiting with or without image immobilization or turning the orbiting system off. In the "off" position, a red tally warns operator that the orbiter is not operating.

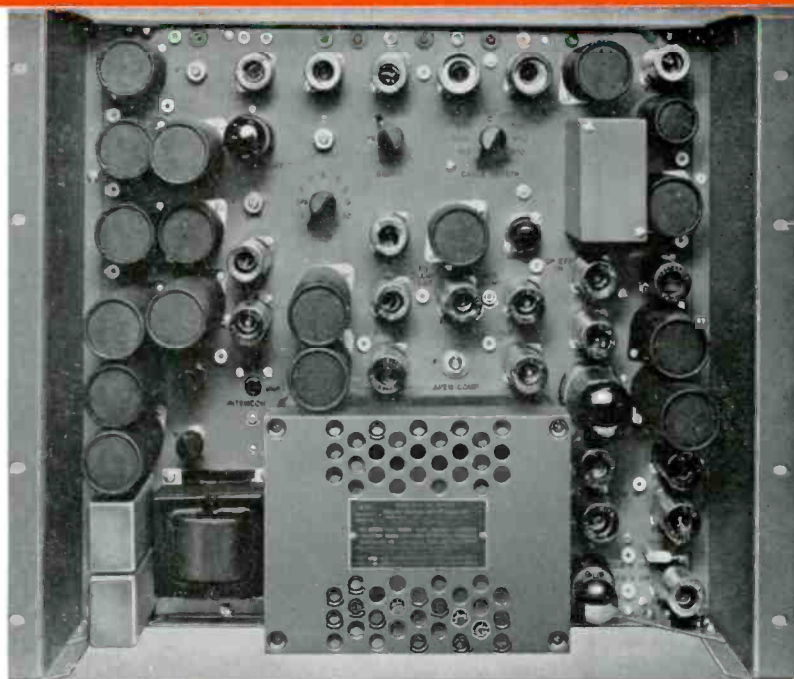
Processor

The processor is a rack-mounted unit built on a standard bath-tub chassis occupying 15 $\frac{3}{4}$ inches of rack space. It contains all of the circuits for processing the signal delivered by the camera preamplifier and for providing three separate outputs to the signal switching and distribution system. It contains receptacles for the camera cable, power input to the camera chain, and intercom and remote control circuits. Also included are a 24-volt power supply and other components required for a self-contained intercom system.

The bandwidth of the video preamplifier and processor amplifier (including cable equalizing networks) is 8 mc within $\pm\frac{1}{2}$ db. The improved signal-to-noise ratio obtainable with the new 4 $\frac{1}{2}$ -inch I.O. tube is sufficient to permit the use of considerable aperture correction to enhance the already improved detail response of the larger tube. Circuits are included in the processor for providing up to 13 db of aperture correction peaked at 6.0 mc, with continuously variable amplitude adjustment. The same image orthicon characteristics which permit the use of aperture correction also permit the use of gamma correction. Three preset values (0.7, 0.8 and 1.0) may be selected by a switch without affecting output video level.

Accurate Cable Compensation

The processor also includes a tap switch for introducing video equalization to compensate for different lengths of camera cable. This switch provides increments in compensation corresponding to 100-foot increments in length up to a maximum of 1000 feet. The same switch assembly includes equalizing circuits for the coax used for viewfinder feed.



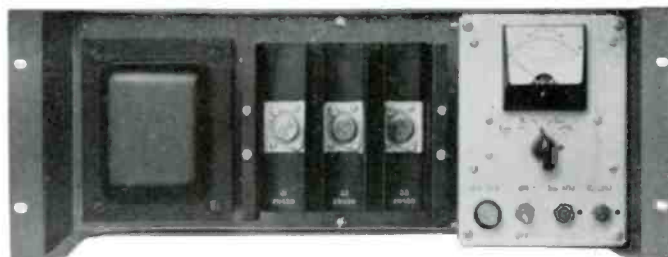
Rack-mounted Camera Processor, MI-26003.

Semiconductor Power Supply

A Type WP-16B power supply, completely tubeless and with a current rating of 1.6 amperes at 280 volts, provides the necessary regulated power for the camera, processor and TM-6C master monitor. It also includes the necessary subchassis units which supply unregulated voltage and centering current required in the camera. Designed for minimum heat radiation and space consumption, it occupies only seven inches of rack space.

All power transformers in the camera, processor and the transistorized WP-16B regulated power supply are of the self-regulating type. They permit variation in line voltage between 95 and 130 volts or 190 and 260 volts without any need for changing transformer voltage taps. This feature also provides automatic compensation for the drop in a-c supply voltage to the camera over the camera cable up to a length of 1,000 feet. In addition, it gives

A single WP-16B Semi-Conductor Power Supply powers entire TK-60A Camera Chain.





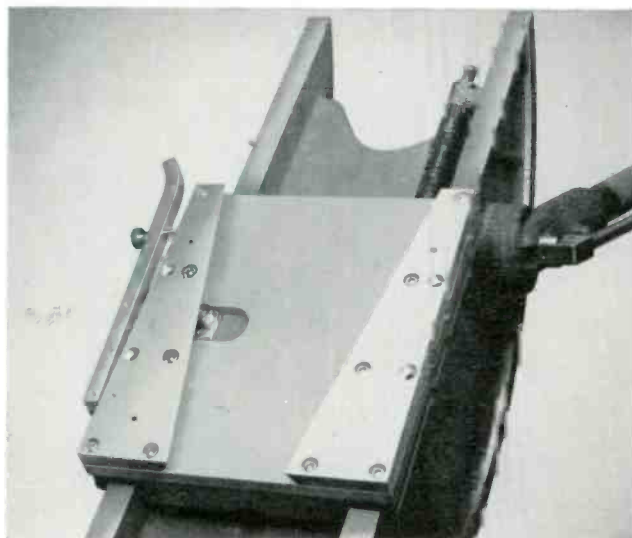
TK-60A uses standard camera cable and connectors for complete interchangeability with existing equipment.

assurance of stabilized heater voltages on all tubes and increases the stability and performance of the regulated d-c power supply.

Wedge Mount for Camera Head

A new type of positive mount for the camera on the cradle head is provided in the form of a metal wedge and a mating wedge mount adaptor. This type of fastening

Camera Wedge Mount permits easy mounting of camera with accurate positioning and positive lock mechanism.



permits easy and rapid mounting of the camera. The wedge mount adaptor may be easily attached to an existing cradle head by 8 screws.

Standard Camera Cable

Because of the very extensive use of RCA MI-94 type of camera cable in nearly all television stations. The TK-60A camera chain has been designed to use the same cable. Installation of the new camera, therefore, does not require replacement of existing cables. This is an important consideration in those cases where cables are routed through conduits in studio walls and where large quantities of MI-94 cables are already on hand. The camera cable receptacle is located on the base of the camera at the rear in the position which has become familiar in earlier RCA cameras.

TK-60A FIELD CAMERA CHAIN

The TK-60A Field Camera Chain is similar to the TK-60A Studio Camera equipment with the exception that the TK-60A is packaged for portable field applications. The major units of the TK-60A Field equipment consists of a combined camera-viewfinder, a field processor, a Type WP-16B power supply, a power supply field case, a TM-35 portable master monitor, and a remote control panel. The camera chain is supplied complete with tubes including image orthicon. A cradle head, Type TD-11A folding metal tripod, set of interconnecting cables, set of camera cables with connectors (50, 100 and 200 foot lengths), and a set of three lenses complete the camera chain.

The camera-viewfinder unit of the TK-60A Field Camera Chain is identical with that of the TK-60A Studio Camera equipment. The field processor is similar to the rack mounting processor with the exception that the field unit is housed in an attractive, portable field case and utilizes field type connectors mounted on a sub-panel at one end of the case. A similarly styled field case is supplied for the WP-16B power supply. The camera remote control panel fits into a space provided in the front of the TM-35 portable master monitor.

The TM-35 portable master monitor with remote control in place may be mounted on any convenient operating table. The field processor and WP-16B power supply may be mounted beneath the desk since neither unit contains operating controls.



Complete TK-60A Field Camera Chain, including camera with cradle head and tripod, portable master monitor with camera remote control panel installed, field processor (at lower left) and WP-16B Power Supply in field case.

SPECIFICATIONS

General Specifications

Type of Reproduction.....	Monochrome
Number of Scanning Lines.....	525 or 625
Frame Repetition Rate.....	30 or 25 per sec.
Field Repetition Rate.....	60 or 50 per sec.
Line Repetition Rate.....	15,750 to 15,625 per sec.
Picture Signal.....	1.0 volts, peak-to-peak composite, nominal 1.4 volts, peak-to-peak composite, optional
Picture Polarity at Output.....	Black negative
Viewfinder Display Size.....	4½ x 6 inches (8" kinescope)
Viewfinder Brightness.....	150 foot Lamberts Max.
Impedance of Coaxial Transmission Line.....	75 ohms
Maximum Length of Camera Cable.....	1000 feet

Picture Quality

Limiting Horizontal Resolution.....	700 TV lines minimum in center, 500 TV lines minimum in corners
Signal-to-Noise Ratio.....	Nominal 36-38 db peak-to-peak signal/RMS noise for bandwidth of 4.5 mc
Square Wave Tilt.....	Adjustable to zero at vertical rate
Blanking Signal Overshoots.....	Not in excess of EIA specifications
Overall Frequency Response:	
With 100 ft. Camera Cable.....	±½ db to 8 mc; down not more than 3 db at 10 mc
With 1000 ft. Camera Cable.....	±1 db to 8 mc; down not more than 4 db at 10 mc

Scanning Aspect Ratio.....	4:3
Scanning Linearity.....	Within ±1% normal
Overscan Amplitude.....	Horizontal 10%; Vertical 10%
Retrace Intervals.....	Horizontal 7.6 μsec.; Vertical 635 μsec.
Range of Centering Adjustment.....	Horizontal ±10%; Vertical ±20%
Orbiting.....	Approximately circular path 7% dia. of picture height at 1 RPM. With immobilization, motion in received picture not over 1%

Operational Specifications

Remote Iris Control.....	Elapsed time to cover entire range: 2.0 sec.; accuracy of setting: ±0.25 lens stop
Contrast Control.....	Range: 0% to 50% clipping of blacks
Electronic Lens Cap Control.....	Two-Way switch on remote control panel, operating in conjunction with similar switch on camera
Gamma Correction.....	Switchable to three preset values of 0.7, 0.8 and 1.0
Aperture Correction.....	Peaked at 6.0 mc; amplitude adjustable continuously from 0 to +13 db
Camera Cable Equalization ¹	Adjustable in steps of 100 ft. to a maximum of 1000 ft.

¹ Coaxial lines for preamplifier output and for viewfinder signal input are equalized simultaneously with identical compensating networks.

SPECIFICATIONS (Continued)

Electrical Specifications

Input:

Horizontal Drive.....	4.0 ±0.5 volts, peak-to-peak negative ²
Vertical Drive.....	4.0 ±0.5 volts, peak-to-peak negative ²
EIA Blanking.....	4.0 ±0.5 volts, peak-to-peak negative ²
Effects Signal to Viewfinder.....	Video at 0.7 volt nominal,

1.0 volt nominal, black negative
Audio Cue Signal.....Balanced into 60 ohms at 2W level

Output:

Video No. 1, No. 2 and No. 3.....	Non-composite level either
	0.7 or 1.0 volt, peak-to-peak black negative ³ (Sync may be added
	to any two outputs)

Isolation Between Any two Non-composite

Outputs.....	At least 46 db from 1 kc to 100 kc;
	At least 30 db from 10 cps to 10 mc

AC Power Input:

50 cycle	60 cycle
230 volt chain	115 volt chain

Line Frequency 50 cycles ±1 cycle 60 cycles ±1 cycle

Power Requirements (approx.

total including master mon-	
itor and power supply).....	1200 watts 1200 watts

DC Power Load (from WP-16B Power Supply)

	Including TM-6C	Excluding TM-6C
Regulated, +280 V.....	1350 ma	900 ma
Unregulated, ±400 V.....	190 ma	190 ma
Centering Current, -4 V.....	1450 ma	1000 ma

Tube and Semiconductor Complement

Camera Viewfinder:

1-6AU5	4-1N1734	2-2N2219
1-6EM5	1-1N3020B	1-2N2323
2-6DQ5	1-2N329A	2-2N2348
1-8HP4	2-2N369	2-GV3A-1300R
1-6688	3-2N404	1-M-42C-9.8
2-6922	2-2N585	3-PS1148
3-7308	1-2N706	2-SV4010A
21-7586	1-2N1132	1-SV4091A
1-7295B	1-2N1233	

Processor:

2-6BC7	1-6080	12-7308
2-6BX7	7-6688	1-2N369
2-12AX7	1-7119	1-2N2219

Mechanical Specifications

Overall Dimensions:

Camera-Viewfinder	
Camera Case.....	15" wide, 19½" high, 26¼" long
Total with Viewfinder Hood, Turret,	
Iris Drive and Tally Light.....	15" wide, 22" high, 36" long
Processor (Rack Mounting).....	19" wide, 15½" high, 10" deep
Field Processor.....	8½" wide, 18½" high, 23" long
Remote Control Panel	
(TM-35 Mounting).....	7¾" wide, 2⅛" high, 3½" deep
Remote Control Panel,	
(Console Mounting).....	11⅞" wide, 2-21/32" high, 3½" deep
WP-16B Power Supply,	
Rack Mounting.....	19" wide, 7" high, 13½" deep
Field Case for WP-16B	
Power Supply.....	8½" wide, 18½" high, 27½" long
TM-6C Master Monitor.....	13⅞" wide, 18" high, 20" deep
TM-35 Portable Master Monitor.....	8½" wide, 15⅞" high, 20¾" deep
Console Housing.....	12¼" wide, 44¼" high max., 46" deep max.

Weight:

Camera-Viewfinder	150 lbs.
Processor, Rack Mounted.....	60 lbs.
Field Processor.....	70 lbs.
Remote Control Panel, TM-35 Mounting.....	1½ lbs.
Remote Control Panel, Console Mounting.....	2 lbs.
WP-16B Power Supply, Rack Mounting.....	71 lbs.
WP-16B Power Supply in Field Case.....	80 lbs.
TM-6C Master Monitor.....	55 lbs.
TM-35 Portable Master Monitor.....	49 lbs.
Console Housing, 13-inch.....	75 lbs.

Equipment Supplied

Type TK-60A Monochrome Studio Camera Chain including the following:

115 V., 60 Cycle Chain		230 V., 50 Cycle Chain	
Qty.	MI Number	Description	Qty. MI Number
1	26002-A	Camera Viewfinder	1 556002-A
1	26003-A	Processor, Rack Mounting	1 556003-A
1	26008	Remote Control Panel,	
		Console Mounting	1 26008
1	26084-B	Power Supply, WP-16B	1 26094-B
1	26083-A	Centering Current Subchassis	1 26083-A
1	26082-A	Unregulated High Voltage Subchassis	1 26082-A
1	26882-A3	Lens, 50mm, f/2.0	1 26882-A3
1	26882-A4	Lens, 75mm, f/2.0	1 26882-A4
1	26882-A5	Lens, 127mm, f/2.8	1 26882-A5
1	26373	Viewfinder Hood	1 26373
1	26877-A	Image Orthicon, RCA 7295-B	1 26877-A
1	26725-E5	Camera Cable, 50 feet	1 26725-E5
1	26884-A	Wedge Mount	1 26884-A
1	26786	Console Housing, 13-inch	1 26786
1	26136-C	Master Monitor, TM-6C	1 N26136-C
1	26579-B	Blower for TM-6C	1 556579-B
1	26667	CRO, RCA Type 5ABP1	1 26667
1	26655	Kinescope, RCA Type 10SP4	1 26655

Type TK-60A Monochrome Field Camera Chain including the following:

115 V., 60 Cycle Chain		230 V., 50 Cycle Chain	
Qty.	MI Number	Description	Qty. MI Number
1	26702-A	Camera Viewfinder	1 556002-A
1	26009-A	Field Processor	1 556009-A
1	26007	Remote Control Panel,	
		TM-35 Mounting	1 26007
1	26084-B	Power Supply, WP-16B	1 26094-B
1	26083-A	Centering Current Subchassis	1 26083-A
1	26082-A	Unregulated High Voltage Subchassis	1 26082-A
1	26216	Field Case for WP-16B	1 N26216
1	26882-A3	Lens, 50mm, f/2.0	1 26882-A3
1	26882-A4	Lens, 75mm, f/2.0	1 26882-A4
1	26882-A5	Lens, 127mm, f/2.8	1 26882-A5
1	26373	Viewfinder Hood	1 26373
1	26154	Portable Master Monitor, TM-35	1 556154
1	26877-A	Image Orthicon, Type 7295-B	1 26877-A
1	26359	Set of Interconnecting Cables	1 26359
1	26725-E5	Camera Cable, 50 feet	1 26725-E5
1	26725-E6	Camera Cable, 107 feet	1 26725-E6
1	26725-E7	Camera Cable, 200 feet	1 26725-E7
1	26884-A	Wedge Mount	1 26884-A
1	26203-A	Cradle Head	1 26203-A
1	26046	Tripod, Type TD-11	1 26046

Optional and Accessory Equipment

Cradle Head	MI-26203-A
Television Pedestal, Type TD-3A.....	MI-26036
TD-3A Counterweights (25 lbs.) required for TK-60.....	MI-26391
Console Well Adaptor for MI-26008 Remote Control Panel	MI-26252
Rack Adaptor for MI-26008 Remote Control Panel.....	MI-26254
Rack Adaptor for MI-26007 Remote Control Panel.....	MI-26887-2
Left Panel Assembly and Side Cover for Console Housing	MI-26788-1
Right Panel Assembly and Side Cover for Console Housing	MI-26788-2
Upper Left Side Cover Only.....	MI-26789-1
Upper Right Side Cover Only.....	MI-26789-2
Shock Mount for Processor.....	MI-26511-A6
Shock Mount for WP-16B.....	MI-26511-A5
Shock Mount for TM-35.....	MI-26511-A3
Spare Video Pre-amplifier for TK-60A Camera.....	MI-26006
Spare Remote Iris Drive Assembly for TK-60A Camera.....	MI-26019
Spare I.O. Yoke Assembly for TK-60A Camera.....	MI-26004

² Pulse widths as specified by EIA in RS-170. Terminals for signals are arranged for loop-through connections with isolating filters.

³ Circuits terminated at sending end and Z₀ = 75 ohms.

Color Camera Chain

TYPE TK-41C



FEATURES

- All-purpose live color TV camera providing low noise, high resolution picture
- All controls conveniently located—only one master control needed for on-air operation of camera chain
- Prism optics eliminate "ghosts"
- Precision yokes allow precise registration
- Single camera cable included
- Optional console mounting or rack mounting available for camera control equipment
- Performance independent of line voltage variation over wide range
- Built-in camera cable equalization
- Optical orbiter extends life of I.O. tubes
- Forced-air ventilation of pick-up tubes
- Stable, fixed, plug-in gamma corrector units
- Uses standard TV and zoom lenses
- Short warm-up period and drift-free operation achieved by use of highly stabilized circuits throughout camera



Ease of manipulation will delight the studio cameraman and aids in maintaining smooth program performance.

DESCRIPTION

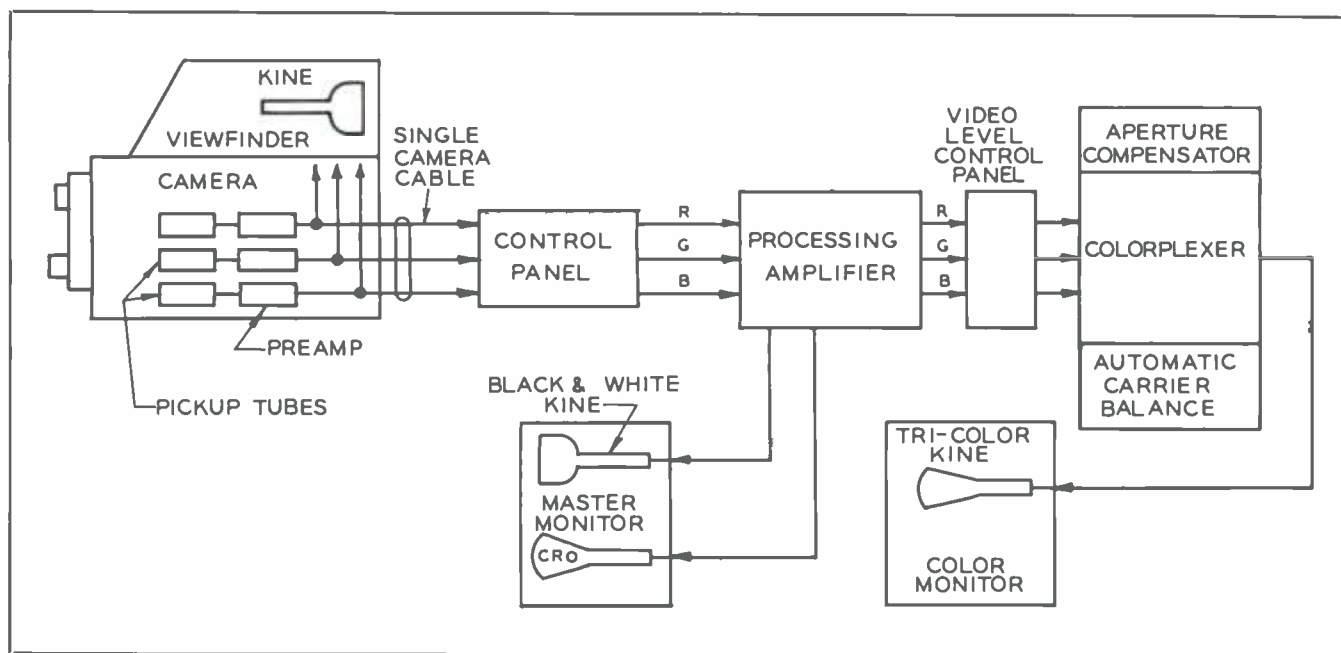
The RCA TK-41C Color Camera Chain provides the television broadcast station with the ideal means of originating beautiful, full-color programs. Live color programming permits maximum realization of the benefits of color—adding a brilliant new dimension to programming techniques and presenting commercial products in thrilling reality. Local color originations of studio programs and commercials, sporting events, community parades and festivals can build station prestige and stimulate sponsor interest. Live color commercial inserts and station breaks between color network and color film features hold and strengthen viewer interest by maintaining color program continuity. Color mobile units, designed to handle up to five color cameras, are available to extend the use of color cameras to a broad variety of field programming applications.

Dependable and Economical Performance

Designed with the objective of providing an easily operated, space-conserving and economical color television

pick-up system, the TK-41 series of cameras have earned wide acceptance throughout the broadcast industry. Their performance and reliability have been thoroughly proven by extensive use under daily operating conditions. The camera is easily handled and is designed for operation by a single cameraman. A cradle type camera mounting head, which accurately maintains the camera in balance about its own center of gravity, results in maneuverability and convenience of operation comparable to that of monochrome studio camera equipment.

The TK-41C camera employs the same complement of standard lenses as monochrome camera equipment. The camera control equipment includes a processing amplifier which is identical with that used with the RCA Type TK-26C 3-Vidicon Color Film Chain. Centralized controls provide minimum setup time. During "on-air" operation, the camera control operator can control signal processing for best picture quality by the use of only one knob. Control operations can be located at a console or rack position as desired.



Simplified diagram showing major components of the TK-41C Color Camera Chain. The lineup features considerable space and cost saving advantages over previous color chains.

Camera Chain Components

The TK-41C Color Camera Chain is functionally similar to monochrome camera chains in that it consists of a live pick-up camera in addition to signal processing, control and monitor units. The major equipment units include the color camera, viewfinder, camera control panel, processing amplifier, TM-21D color monitor, TX-1D Colorplexer with aperture compensator and automatic carrier balance, TM-6C master monitor, and power supplies.

The color camera proper contains a light splitting prism optical system, three image orthicon tubes to provide red, blue and green signals, horizontal and vertical deflection circuits for the image orthicons, a target blanking circuit, regulated high voltage and negative voltage circuit, image orthicon protection circuit, and three plug-in video pre-amplifiers, one for each of the three color channels. The electronic viewfinder includes a 7TP4 kinescope with necessary deflection and video circuits to provide a picture for the camera operator.

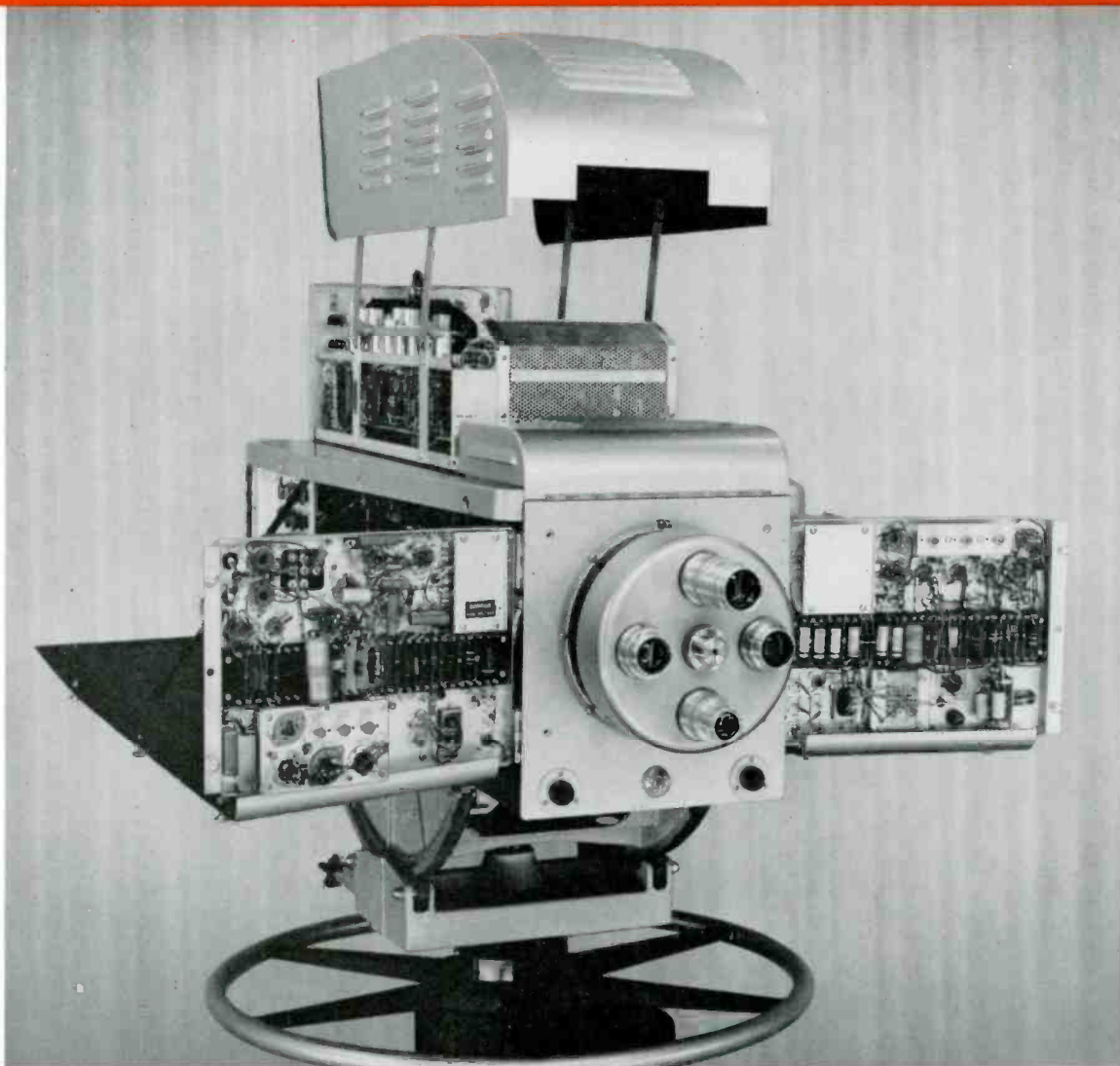
The three video signals from the color camera are fed directly to the camera control panel on which both operating and selected set-up controls are located. These signals are in turn fed to the processing amplifier which performs the functions of cable compensation, video amplification, blanking and shading insertion, feedback clamping, linear clipping, gamma correction and output amplification as well as providing auxiliary switching for the master monitor kinescope and CRO.

The processing amplifier feeds a monochrome master monitor, which provides both kinescope and CRO displays of signals at various vital points in the system, selected by push-button. A colorplexer combines the processed video signals into a single FCC standard color signal. The colorplexer feeds a tri-color monitor and the camera switching system. This unit accepts the red, green and blue signals from the image orthicons and transforms them to M, I, and Q signals. These are adjusted with respect to bandwidth and delay and then multiplexed to produce one composite signal from the three input signals. An aperture compensator connects in series with the luminance channel of the colorplexer. The output of the colorplexer is fed to the studio video switching system. A TM-21D Color Monitor is also included in the chain and is utilized at the camera control position to provide a check on the quality of the final color picture.

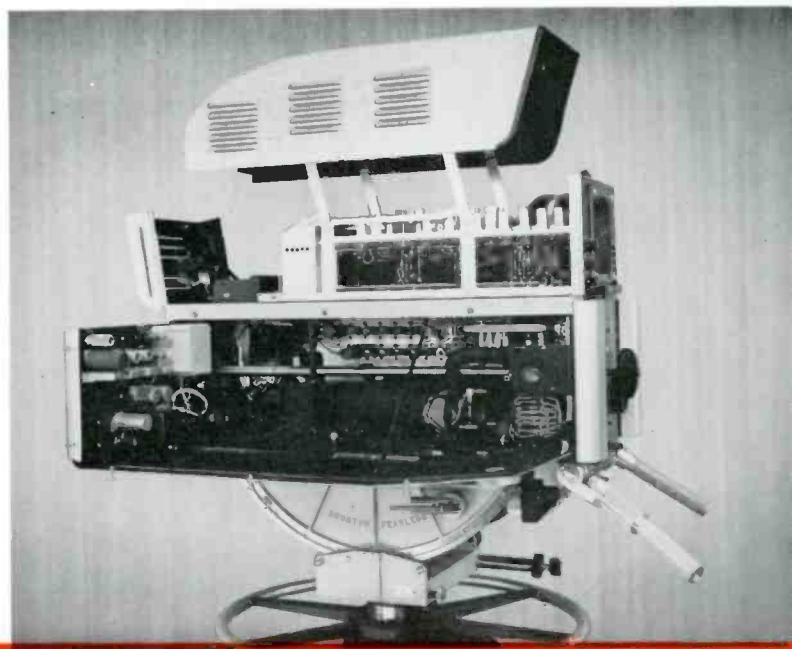
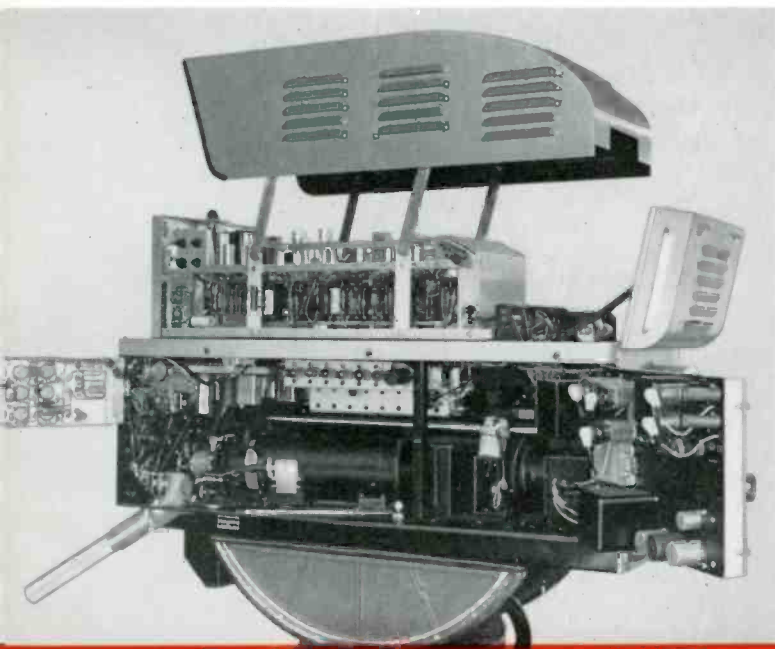
TK-41C Color Camera

The RCA Color Camera contains the three image orthicon pick-up tubes with their focus, deflection and beam-alignment coils, complete horizontal and vertical deflection circuits, the video pre-amplifiers, blowers, light-splitting optical system, turret with four lens positions, and means for adjusting optical focus and remote iris opening.

The camera is entirely self-contained with the exception of the d-c power supplies, video processing amplifier and



COMPLETE ACCESSIBILITY to all circuits and controls makes maintenance and servicing of RCA color camera a pleasure for both operators and service technicians.



certain electrical controls which are located for operating convenience at the camera control panel. All electrical connections to the camera are made through a single eighty-two conductor camera cable attached by a connector in such manner as to permit the cable to be brought toward the front of the camera, drawn through a special cable clamping bracket, and then draped in a gradual curve to the floor out of way of the cameraman.

Physically the TK-41C Color Camera is 14½ inches high, 44 inches long, and the width tapers from 16 inches at the front to a maximum of 21 inches at the rear edges of the side door covers. On the front end of the camera is the lens turret, and on the rear are the local electrical set-up controls and the control handle for rotating the turret. The optical focus handle is located on the right. This focus control and the turret handle are normally the only two controls which require the attention of the cameraman during a television program.

Improved Operational Stability

The TK-41C incorporates a number of design improvements for ease of operation and assurance of highest picture quality. A new focus current regulator holds focus current to within 0.1 per cent for accurate and stable registration. A low impedance blanking circuit provides immunity to horizontal deflection crosstalk. The addition of temperature compensation to the vertical deflection coils has reduced the required camera warmup period and assures long-term stability of registration. Vernier adjustments are provided for horizontal and vertical size, linearity, skew and centering adjustments. Excellent stability of color balance has resulted from stabilization of the image orthicon multiplier gain. Through "super regulation" techniques the image orthicon electrode voltages are maintained to 0.25 per cent, thereby virtually eliminating electrical focus drift. A stabilized beam current supply assures optimum signal-to-noise ratio and proper shading of the picture over long periods without touchup.

Electro-Mechanical Lens Cap

A remote-controlled douser type optical lens cap permits precise adjustment of black level and precision adjustment of color balance for precise matching of cameras. An improved field lens holder maintains precise alignment of the field lenses on the optical axis and avoids vignetting, while a new turret and detent mechanism provides noise-free rotation of the lens turret. Camera test facilities have been centralized with test probe points and selector switches grouped on a convenient test panel within the



Set-up controls shown above are all conveniently located behind hinged doors. Only two handle controls are needed for on-air operation of camera.

camera. New full-length side doors provide substantially improved access to the camera interior.

Transistor Intercom System

Two sets of communication and program sound and associated volume controls jacks are mounted on a strip installed below the back operating panel at the rear of the camera. A transistor intercom system provides high level voice communications between the camera operator, the camera control operator, and the program director or other studio personnel. Variable volume controls allow individual adjustment of sound level. Electrical registration controls are also located on the rear plate of the camera behind hinged covers. They include the following independent controls: red and blue skew, with polarity reversing switch, height, width, and vertical and horizontal Q adjustment. An off-on switch operates the blower motors. An overscan switch is also provided. The G-5 controls are located just inside the left side cover near the rear of the camera. Dynode gain controls are similarly located on the right side.

Complete Accessibility

The side door panels of the camera housing swing outward making all components readily accessible for servic-

ing. From the cameraman's position, the right side door exposes the hinged horizontal deflection chassis, which may be swung 180 degrees from its normal position, permitting replacement of tubes and access to the remote iris synchro motor driving mechanism and other parts of the optical system. The yoke assembly of the red channel and the tube side of the red channel video preamplifier are also exposed. When the left side panel is dropped, the hinged vertical deflection chassis can also be swung outward 180 degrees. It permits further access to elements of the optical plate assembly, and the blue and green channel yoke assemblies. The Type 4415 or 4416 Image Orthicon tubes can be replaced by removing a single holding screw of each yoke assembly and swinging the yoke assembly out the sides of the camera. The yoke assemblies have been designed and are held to very close tolerances so that when used with Precision Image Orthicons very precise registration is obtainable.

Raising the ventilation hood at the front of the camera gives access to the connections of two heater transformers in this area as well as the relay lens. The elapsed time indicator is visible when the hood is raised. Viewfinder component and circuit tests together with tube replacements may be made with the viewfinder cover in the raised position.

The viewfinder may be removed from the camera to provide access to wiring of the hinged shelf type chassis at the rear of the camera. This shelf is used for tie points for the image orthicon sockets, and for filtering components of the deflection circuits. Included here are the three video preamplifier input coupling and filter circuits. The image orthicon protection circuit with its associated tube and relay is also mounted here. Loss of either the vertical or horizontal deflection to the yokes of any of the image orthicons in the camera causes the circuit to bias off the image orthicons. This prevents the beam from being concentrated in a single line or spot which might cause permanent damage.

Plug-In Video Preamplifiers

Removing the viewfinder also gives access to the plug-in preamplifiers located just ahead of the top shelf. These supply the red, blue and green signals to the camera cables and the camera viewfinder. Each of the preamplifiers includes six stages. The first four are simple shunt-peaked stages. The second stage has a screwdriver adjusted cathode peaking circuit for adjusting tilt in the low-frequency end of the response curve of the amplifiers. In the cathode of the third stage there is a similar circuit

with a knob type control which may be adjusted to give minimum streaking for the associated image orthicon. The last two stages are a feed-back pair, providing cathode output to the 51-ohm camera cables and to the viewfinder. There is an adjustable trimmer in this stage which affects the response curve tilt at the high-frequency end. Each of the preamplifiers is shock mounted and bonded to the cross members of the upper camera framing.

Two tally lights are mounted on the front face of the camera. They serve to indicate to the actors when the camera is in actual use. In addition, there is one on top of the viewfinder for directors and one on the kinescope bezel plate for the operator. The latter are operative, however, only when used in conjunction with a camera switching unit. The lights are normally off until a tally relay is actuated by a control voltage (24 volts d-c).

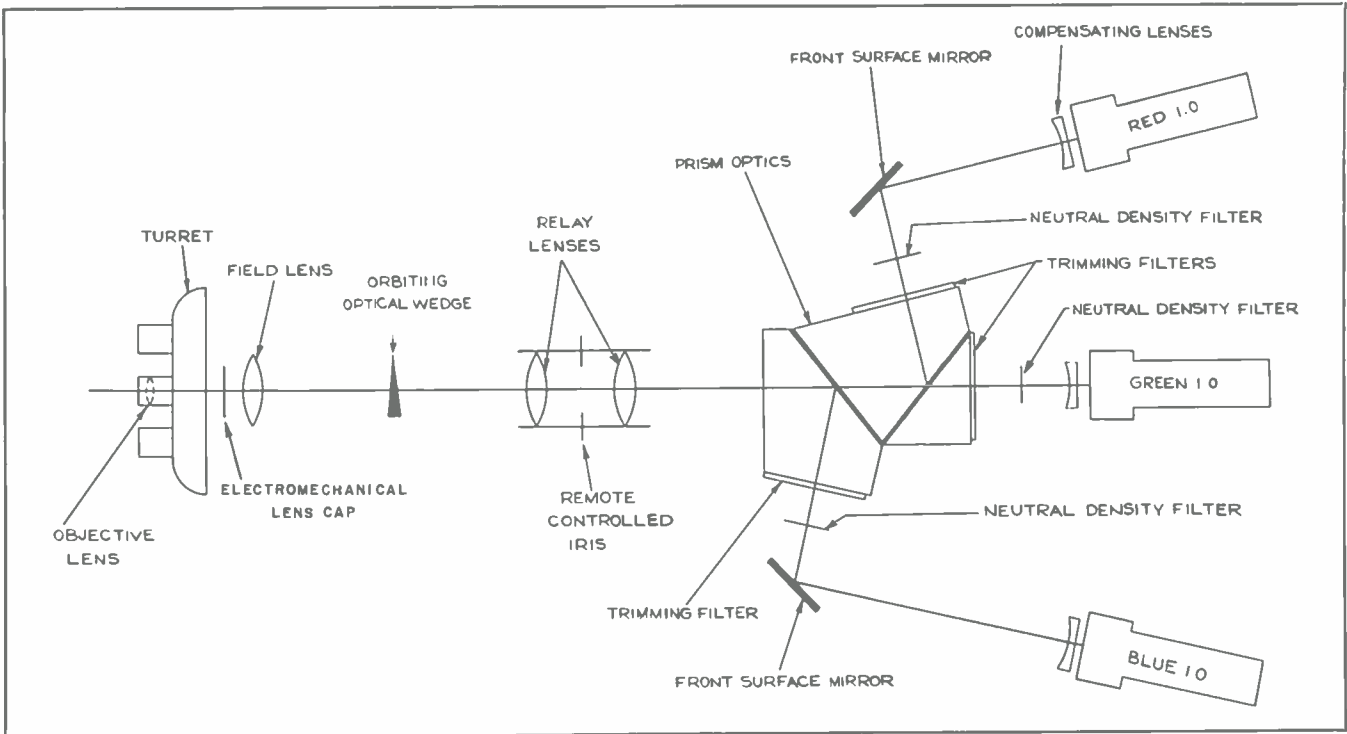
Filtered Forced-Air Ventilation

The individual image orthicon tubes and the area within the camera housing are forced-air cooled. Separate blowers are used to cool the individual image orthicon tubes. Cooling air is brought into the socket end of each yoke assembly by means of flexible hose leading from its associated blower. Replaceable air filters reduce the necessity for frequent cleaning of the optical system. All external areas of the camera and viewfinder have an aluminum finish to further aid in maintaining optimum temperature conditions within the camera. Two utility outlets and a fuse are mounted on the under side at the back end of the camera. They provide facilities for an independent source of a-c that may be used for test equipment.

Prism Optical System

The rotatable lens turret accommodates four objective lenses. A set of camera lenses having focal lengths of 50, 90, and 135 mm is supplied. Telephoto lens may also be mounted on the turret. The optical axis of the taking lens is at the bottom section of the turret. The turret is attached to a shaft that protrudes through a stationary drum. The drum serves as a light trap as well as a support for the lens turret shaft. Each objective lens has a matching field lens mounted on a "spider" support housed within the drum. The objective lenses and associated field lenses remain properly matched at each selected position of the lens turret. Lens selection is achieved by means of a handle type manual control on the back panel of the camera.

Optical focus is accomplished by moving the lens turret longitudinally along the optical axis. This is done by rotat-



Optical system diagram for TK-41C Color Camera.

ing the focus handle located at the right rear of camera. Focusing secondary image on each of the red, blue and green image orthicon is achieved by sliding the individual image orthicon yoke assemblies backward or forward along their respective optical axis during initial set-up.

A complete relay optical system is mounted behind the field lenses. It consists of a de-polarizing filter, relay lenses, remote control iris, prism-dichroic blocks, light filters, front surface reflective mirrors and field flatteners. The purpose of this system is to separate the light image into three primary color images and direct each to the photo-sensitive cathode of an individual image orthicon tube. The individual components in this system are mounted on a supporting base plate. The complete unit can be taken from the camera by removing four screws that secure the base plate to the camera frame and then disconnecting the cable attached to the iris control selsyn.

Sealed Dichroic Surfaces

The dichroic surfaces are sealed within a solid prism optical block to eliminate any multiple reflections within the optical system and to prevent deterioration of the dichroic surfaces from dust or handling.

Color trimming filters are used in conjunction with the prism-dichroic surfaces to adjust the overall spectral sensitivity curves as desired for the color camera. The front

surface mirrors are adjustable in two directions in order to center the image on the red and blue image orthicon after the camera is positioned to center the image on the green image orthicon. These mirror adjustment controls are brought to the outside of the light tight optical assembly so that adjustment can be made in strong light without removing the light box covers. No special tools are required for these adjustments. The neutral density filters required to balance the sensitivity of the three channels can likewise all be inserted without removing the light tight covers. The three image orthicon tubes are mounted within focus and scanning coil assemblies, located at the rear of the optical assembly. Located directly ahead of the photo cathode of each image orthicon is a field flattener lens. These lenses serve as part of the relay optical assembly to provide an evenly illuminated image with good corner geometry and focus.

Optical Image Orbiter

Located in a vertical plane in front of the relay lens assembly is a rotating circular glass plate with a slight taper that gives a circular movement to the image on the photocathodes of the image orthicon tubes. The unit is driven by an a-c motor at a rate of approximately one orbiting cycle per minute. The picture movement is so slight and so slow that it is not apparent to the viewer;

however, it virtually eliminates image burn-in on the image orthicon tubes. This extends the life of the image orthicons and reduces operating costs.

Stabilized Camera Viewfinder

The viewfinder is used by the operator of the color camera to frame the scene, to aid in focusing the camera, and to facilitate in setting up the camera registration. The viewfinder consists of a monochrome kinescope provided with deflection, blanking and video circuits required to provide a picture for the camera operator. A six push-button selector switch at the right of the viewing screen enables the operator to view any channel separately, to view the red or the blue superimposed on the green, or to view all three images superimposed. The focus, brightness, and contrast controls are mounted to the left of the viewing screen.

The ultor and focus voltages of the kinescope are regulated with corona type regulators. This provides a wide range of kinescope brightness change without defocusing the kinescope image.

The single channel positions are used when making adjustments on individual channels; the red on green and blue on green are useful for registration adjustments. The switching is accomplished by altering the bias on the input amplifier tubes; each of these tubes is kept at cutoff except when it is desired to view the particular signal connected to its input. Blanking pulses of adjustable duration are produced by two multivibrators (triggered by horizontal and vertical drive) and added to the video signal before application to the viewfinder kinescope. A d-c restorer is included to maintain optimum contrast and brightness of the viewfinder over a wide range of scene content and compositions.

The viewfinder is designed to slide in guides and lock in position directly above the camera. All signal and operating voltages are fed to the unit through a self-aligning socket connection that automatically engages when the unit slides into place. A pull handle to facilitate the installation and removal of the viewfinder is located on its operating panel just below the viewing screen. To the left of this handle is a thumb latch to release the unit from a locked position. The viewfinder is covered by a multi-louvered hood which can be raised to facilitate ease in servicing the unit. A detachable viewing hood (MI-40502) is attached to the viewfinder control panel for shielding the viewing screen from extraneous light.

Camera Mounting Equipment

A cradle type tilt head, designed especially for use with the color camera, provides ease of maneuverability in both tilting and panning of the camera and viewfinder, com-

parable to that of the RCA monochrome camera. The TK-41C is provided with a TD-9C Motor Driven Pedestal for general studio use.

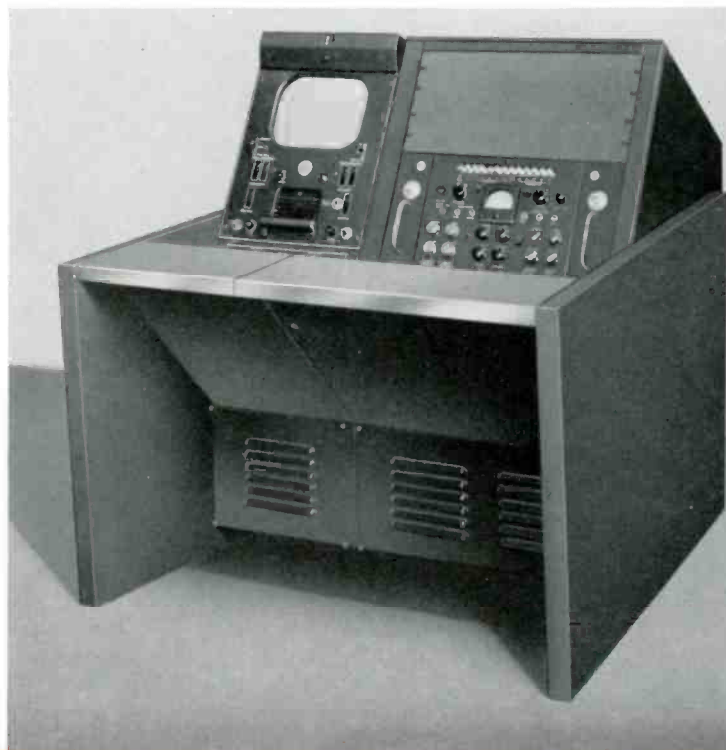
The TK-41C camera control units may be conveniently mounted in the Control Console. This control position includes: (1) a TM-6C Master Monitor mounted in its Console Housing with the Video Level Control Panel, and (2) a Master Console Housing in which the Camera Control Panel and the Processing Amplifier may be mounted. This Master Console Housing is designed to mount the 19-inch Camera Control Panel in the indented section of the console desk and the Processing Amplifier in the top sloping portion of the console. The camera control equipment also includes a TM-21D Color Monitor. This may be suspended from the wall or ceiling or set upon a stand.

If preferred, all of the TK-41C control equipment may be rack mounted with the exception of the color monitor. In this case a Rack Mounted Control Desk and Accessory Kit, MI-40415, is available to provide desk space at the rack location.

Simplified Control Panel

The Camera Control Panel, on which the remote control adjustments of the color camera are mounted, is located in the sloping portion of the desk section of the 19-inch

Master Monitor and Processing Amplifier mounted in new console housings. The consoles are also designed to house Camera Control Panel, Color Monitor, and other camera chain equipment.



console which houses the processing amplifier. It lies below and in front of the processing amplifier front panel, and has a cover plate through which only two controls protrude. These are the Pedestal and Iris Control knobs. The latter operates the remote iris selsyn motor in the optical system, and is the only control required during program origination. Mounted directly above this control, in the processing amplifier panel, is the iris f-stop indicator meter. In normal operation, the remote iris control performs the function of overall gain control for the complete color camera chain. The master pedestal control provides simultaneous adjustment of the pedestal voltage in the three channels. Set-up controls for each of the three image orthicons may be reached by lifting the cover plate.

Colored knobs identify the three video channels. The individual channel controls include horizontal and vertical centering, alignment, orthicon focus, multiplier focus, image focus, image accelerator voltage and target voltage. Also provided is a target test knob to aid in setting target voltage accurately and rapidly, as well as a selector switch which permits the metering of: target, orth focus, image focus and multiplier focus voltage settings in each color channel.

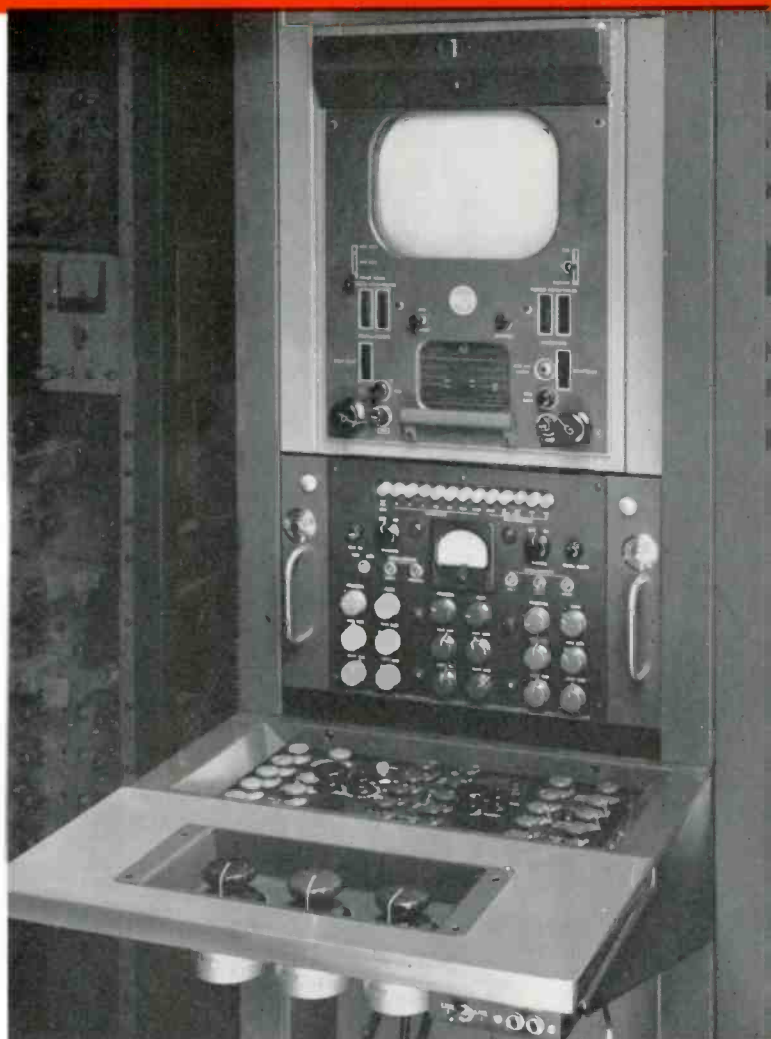
Video Level Control Panel

The Video Level Control Panel is mounted adjacent to the MI-40535 Camera Control Panel. The Video Level Control Panel consists of three attenuator pads located in the video line between the Processing Amplifier and the Colorplexer to allow precise settings of the white balance, thereby completely eliminating pedestal-riding during programming. The control may also be used to introduce color shifts of precisely controlled amplitude into the picture to compensate for minor color differences between cameras. The pads are thus used as trimmer adjustments to achieve true color picture uniformity between cameras.

Compact Processing Amplifier

The Processing Amplifier of the TK-41C has been designed to perform a great number of functions in a single versatile unit. Integration of these electrical functions in a single unit results in a simple, space-conserving system. Use of this design allows set-up time to be substantially reduced and requires fewer video operators and control room engineers for programming. Hence considerable savings in operating costs can be realized. A large reduction in power required as well as increased tube life due to extremely conservative operation of tubes further reduce costs, at the same time improving performance and overall quality.

The basic circuit elements in the processing amplifier are three plug-in video amplifiers which perform accurately and with extreme stability the following functions: cable



Optional rack mounting for the TK-41C control equipment may be specified. A convenient desk with top panel removed to reveal set-up controls is shown above.

compensation, video amplification, blanking insertion, shading insertion, feedback clamping, linear clipping, gamma correction, and output amplification. Pulse circuitry needed for the camera and shading generators, is obtained from stabilized multi-vibrators. These multi-vibrators provide pulses of constant amplitude and width independent of the incoming pulse. These circuits require no tube selection and are completely stable. Shading signals are provided for insertion of either horizontal or vertical shading. A fourth plug-in unit serves as the video section of an electronic switcher which is an integral part of the main chassis. The switcher, used with Master Monitor, TM-6C, provides an individual or combined presentation of red, blue and green video.

The entire chassis of the processing amplifier is drawer-slide mounted for easy pull-out for servicing. The front panel is hinged, thus permitting it to be opened to facilitate removal of tubes and servicing of other components behind the panel.

An edge-lighted translucent plastic escutcheon is mounted on the outside surface of the panel to provide illumination of the nomenclature for the various controls when the unit is operated in semi-darkness. All controls are conveniently mounted on the panel. Thirteen lucite pushbuttons at the top of the panel control the switching arrangement which permits separate Master Monitor Kinescope or CRO observation of important test points, including individual channels, various channels superimposed, and colorplexer output. A staircase signal for the CRO circuit is provided for a sequential display of red, blue, and green channels.

Precision Master and Color Monitors

The Type TM-6C Master Monitor provides in a compact form a complete monitoring unit for the observation of the camera chain's video signals. It is used for both picture (kinescope) and waveform (oscilloscope) monitoring of signals at any stage of transmission from the camera to the output of the colorplexer. Careful scrutinization of a number of details of the video signal may be performed which will aid in maintaining proper level and color balance, as well as obtaining registration during set-up.

The unit employs a special ten-inch aluminized, straight gun, electro-statically focused kinescope for direct picture monitoring and a five-inch, flat faced, cathode ray tube for waveform presentation. When used with the processing amplifier of the color camera, the wide band CRO display consists of three adjacent waveforms corresponding to the red, blue, and green video signals.

The Color Control Monitor, Type TM-21D, provides an accurate, stabilized color picture display at high brightness level and is extremely useful in pinpointing parts of the color chain requiring adjustment. The equipment affords the control operator precision checks on camera registration, color balance, shading, deflection and transmission system transients, and effects of pedestal adjustments, as well as camera deflection linearity, chroma level and phase of hue adjustments. It greatly simplifies camera



Type TM-21D Color Monitor, MI-40226-D, provides stable, accurate color picture display for continuous checks of picture quality.

matching and provides a standard against which color performance can be evaluated. Long term stability of the monitor is assured by liberal use of feedback. Time devoted to monitor adjustments is negligible.

Optional Rack Mounting of Camera Controls

All the units normally housed in the consoles—Master Monitor, Control Panel and Processing Amplifier may be rack mounted. To complete the camera chain, a Colorplexer, aperture compensator, automatic carrier balance, focus current regulator and a set of two WP-16B power supplies also mount in standard 84-inch cabinet racks.

Television Color Camera Chain Power, Space, Tube and Weight Information

Equipment	MI	Tubes	D-C ma	A-C Watts	Total Heat	Rack Space	Weight
Color Camera—Defl.	40534	40	225 + (210 at 360 v.)	132	277	—	250
—Preamp.			330				
Viewfinder	40501-A	22	125 + (65 at 360 v.)	58	117	—	45
Processing Amplifier	40520-A	55	360	175	200	10 1/2"	50 1/2
Focus Current Regulator	40524-B	4	12	85	90	5 1/4"	22
Focus Voltage Regulator	40541	6	34 +	17	5	3 1/2"	7 1/2
Colorplexer	40209-C	29	280	90	180	21"	34
Automatic Carrier Balance	40416-A	5	20	15	—	3 1/2"	10
Aperture Compensator	40414	2	33	10	15	1 3/4"	3
TM-6C Master Monitor	26136-C	31	450	90	220	18"	55
TM-21D Color Monitor	40226-D	61	—	900	900	—	213
WP-16B Power Supply (2 Units)	26084-B	—	*1600 each	700 ea.	—	7" ea.	50 ea.
WP-16B Centering Current Unit	26083-A	—	1000	—	—	—	2
WP-16B Unregulated High Voltage Unit	26082-A	—	250	—	—	—	3

* 1600 ma with no unregulated current—1350 ma with 250 ma unregulated current.

SPECIFICATIONS

Electrical

CAMERA:

Input:

Horizontal Drive from Processing Amp-51 Ohm.....Min. 2 volts, (neg.)
peak-to-peak
Vertical Drive from Processing Amp-51 Ohm.....Min. 2 volts, (neg.)
peak-to-peak

D-C Power (from power supplies):

Regulated
Camera.....280 volts, 245 ma
Preamplifiers.....280 volts, (3x110) ma
Unregulated
Camera and Deflection.....360 volts, 210 ma
Focus Coil Current.....78 ma
Tally Lights (Relay Controls).....24 volts d-c

A-C Power:

Heaters, Blowers.....117 v., 50/60 cycle, 1 phase, 132 watts

Output:

Video Response.....Flat to 6 mc
Video Signals (black negative) 51 Ohm.....0.3 volt, peak-to-peak
Video Signals to Viewfinder.....0.6 volt, peak-to-peak
Video Gain.....15 db

VIEWFINDER:

Input:

Video Signals (negative).....0.6 volt, peak-to-peak
Horizontal Drive (negative—Hi-impedance).....2 volts, peak-to-peak
Vertical Drive (negative—Hi-impedance).....2 volts, peak-to-peak

D-C Power (from power supply):

Regulated.....280 volts, 125 ma
Unregulated.....360 volts, 65 ma
Tally Lights (Relay Controls).....24 volts, d-c

A-C Power.....50/60 cycles, single phase, 117 volts, 58 watts

PROCESSING AMPLIFIER:

Input:

Video (red, blue, green and test).....0.3 volt peak-to-peak
Impedance (red, blue, green and test).....75 ohm $\pm 5\%$
Horizontal Drive (high impedance).....1.5 to 5 volts peak-to-peak
Vertical Drive (high impedance).....1.5 to 5 volts peak-to-peak
Blanking Pulse (high impedance).....1.5 to 5 volts peak-to-peak
Calibration Pulse (high impedance).....15 kc sq. wave 0.7 volt
peak-to-peak

Output:

Video to Colorplexer (red, blue and green).....0.7 volt peak-to-peak
Impedance.....75 ohms
Video to Monitor CRO.....0.7 volt peak-to-peak
Impedance.....(Sending end 75 ohms, receiving end unterminated)
Video to Monitor Kinescope.....0.7 volt peak-to-peak
Impedance.....75 ohms

Horizontal Drive:

Width.....8.5 microseconds $\pm 5\%$
Amplitude.....3.5 volts peak-to-peak
Impedance.....75 ohms

Vertical Drive:

Width.....800 microseconds $\pm 20\%$
Amplitude.....3.5 volts peak-to-peak
Impedance.....75 ohms

Blanking Pulse:

Width.....Equal to input pulse width $\pm 1\%$
Amplitude.....2 volts peak-to-peak
Impedance.....75 ohms

Calibration Pulse:

Width.....Equal to input pulse width
Amplitude.....0.7 volt peak-to-peak $\pm 1\%$
Impedance.....Low

Twenty Cycle Staircase Voltage to Master Monitor:

Amplitude (maximum).....22 volts peak-to-peak
Impedance.....High

Regulated D-C Supply Voltage.....280 volts
D-C Current.....360 ma
A-C Power Input.....175 watts

Dimensions.....10 15/32" high x 17 5/8" wide x 20 3/16" long

Weight.....50 1/2 lbs.

NOTE: For specifications on Master Monitor, Color Monitor, Colorplexer and Power Supply see separate catalog description of these items.

Tube Complement

CAMERA:

2—4415 I.O.	5—12AT7
1—4416 I.O.	2—12AU7-A
1—6AL5	12—6AH6-WA
3—6CB5-A	3—5687-WA
2—6V6-GT	1—6922
2—IB3-GT	1—6AU5-GT
4—6U8-A	1—GV3A-1300

VIEWFINDER:

2—6AB4	1—6CB6-A
1—6197	1—6DQ6-B
1—6AH6-WA	2—1X2-B
1—6AL5	3—12AT7
1—6AQ5-A	5—12AY7
1—6AS7-G	1—7TP4
1—GV6A-1450	1—M45G-11.5

PROCESSING AMPLIFIER:

9—12AT7	9—6CL6
3—12AU7-A	1—6BX7-GT
1—12BH7-A	16—68Q7-A
9—12AX7-A	4—6AL5
3—6U8-A	

FOCUS CURRENT REGULATOR:

2—6BX7-GT	1—6CW4 (Nuvistor)
1—12AX7-A	

COLORPLEXER:

10—6AU6-A	2—0A2
2—6AH6-WA	2—6BX7-GT
3—12AU7-A	1—5726
3—6BK7-B	1—6X4
4—6AS6 (Stock #204603)	1—6BC4

APERTURE COMPENSATOR:

1—6BQ7A	1—6U8-A
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AUTOMATIC CARRIER BALANCE:

2—6AL5	1—6AW8-A
1—6AN8-A	1—6AU6-A

FOCUS VOLTAGE REGULATOR:

4—6CW4	1—7119
1—6201	

Overall Mechanical

	Camera	Viewfinder	Camera Control Panel
Length	44"	34 1/8"	18"
Width	21"	13 5/16"	13 1/8"
Height	14 1/2"	11 1/8"	8"
Weight	265 lbs.*	45 lbs.	18 lbs.

* Camera weight less objective lenses, panning and focus handles.

NOTE: The TK-41C Camera equipment is also available for operation on 625 line, 50-field standards and from 50-cycle, 115-volt or 230-volt power source.

SPECIFICATIONS (Continued)

Equipment Supplied

CONSOLE-MOUNTED CONTROL			RACK-MOUNTED CONTROL	
Qty.	MI Number	Description	Qty.	MI Number
1	40534	Color Camera (less Image Orthicons).....	1	40534
1	40501-A	Viewfinder (including Kinescope).....	1	40501-A
1	40502	Hood	1	40502
1	40520-A	Processing Amplifier (less Gamma Correctors).....	1	40520-A
3	40833-1	Gamma Corrector (0.7).....	3	40833-1
1	40833-2	Gamma Corrector (1.0).....	1	40833-2
1	40535	Camera Control Panel.....	1	40535
1	40524-B	Focus Current Regulator.....	1	40524-B
1	40541	Focus Voltage Regulator.....	1	40541
1	40829	Neutral Density Filters, Set of.....	1	40829
1	26550-1	Lens, 50mm Objective.....	1	26550-1
1	26550-2	Lens, 90mm Objective.....	1	26550-2
1	26550-3	Lens, 135mm Objective.....	1	26550-3
1	40802-A1	Field Lens (for 50mm Objective Lens).....	1	40802-A1
2	40802-A2	Field Lens (for 90mm and 135mm Objective Lens).....	2	40802-A2
1	40209-C	TX-1D Colorplexer	1	40209-C
1	40414	Aperture Compensator	1	40414
1	40416-A	Automatic Carrier Balance Control	1	40416-A
1	26136-C	TM-6C Master Monitor.....	1	26136-C
1	26544	Sync Interlock Relay (for TM-6C).....	1	26544
1	40226-D	TM-21D Color Monitor.....	1	40226-D
1	26786	Console Housing (for TM-6C).....	—	—
1	26787	Console Housing (for MI-40520-A and 40523).....	—	—
1	26579-B	Blower (for TM-6C).....	—	—
—	—	Rack Mounting Desk for Control Panel.....	1	40415
—	—	Rack Mount Adaptor for TM-6C	1	26526
—	—	Rack Extension Kit.....	2	40408
1	26655	Kinescope Tube, Type 10SP4 (for TM-6C).....	1	26655
1	26667	CRO Tube, Type 5ABP1 (for TM-6C).....	1	26667
2	40890	Image Orthicon Tube, Type 4415.....	2	40890
1	40891	Image Orthicon Tube, Type 4416.....	1	40891
2	26084-B	WP-16B Power Supply.....	2	26084-B
2	26083-A	WP-16B Centering Current Sub-chassis Unit.....	2	26083-A
1	26082-A	WP-16B Unregulated High Voltage Sub-chassis Unit.....	1	26082-A
1	40868-2	Camera Cable, 50-ft. (with Connectors).....	1	40868-2
1	40834	Cable Harness and Barrier Strips.....	1	40834
1	26759-41	Power Cable	1	26759-41
1	26759-42	Power Cable	1	26759-42
1	26646	Adjustable Transformer	1	26646
1	26647	Transformer Mounting Plate (for MI-26646).....	1	26647
1	40824	Cradle Head	1	40824
1	40861	TD-9C Motor Driven Pedestal.....	1	40861
1	40871	Video Level Control Panel.....	1	40871
—	—	Table Assembly for MI-40871.....	1	40872

NOTE: The following bulk cable is required and should be ordered separately to meet individual installation requirements:

83-A	RG-11/U 75 Ohm Coaxial Cable.....	83-A
75	RG-59/U 75 Ohm Coaxial Cable.....	75
13380-12	12-Conductor Shielded Cable.....	13380-12
13380-8	8-Conductor Shielded Cable.....	13380-8

Accessory Equipment

Neutral Density Slide Mechanism for TK-41C.....	MI-40528	Field Lens Test Pattern Jig.....	MI-40873
Spare Video Preamplifier for TK-41.....	MI-40800-A	100 Ft. Camera Cable.....	MI-40868-3
Pulse Delay Line.....	MI-26886	200 Ft. Camera Cable.....	MI-40868-4
TA-4A Pulse Distribution Amplifier.....	MI-26158	EIA Linearity Test Chart.....	MI-26822-1
Left End Panel for Console Housing.....	MI-26788-1	EIA Resolution Test Chart.....	MI-26822-2
Right End Panel for Console Housing.....	MI-26788-2	EIA Registration Test Chart.....	MI-26822-3
Left Side Cover for Console Housing.....	MI-26789-1	EIA Linear Gray Scale.....	MI-26822-4
Right Side Cover for Console Housing.....	MI-26789-2	EIA Logarithmic Gray Scale Chart.....	MI-26822-5
Single Headset	MI-11743	Type BR-84D Cabinet Rack.....	MI-30951-D84
Double Headset	MI-11744	*WA-9A Calibration Pulse Generator.....	MI-26070
Interphone Connection Unit (Transistorized).....	MI-11784	*WA-1E Color Bar Generator.....	MI-34001-F
Interphone Retardation Coil.....	MI-11737	WA-7C Linearity Checker.....	MI-34017-B
Mounting Plate for Interphone Connection Unit.....	MI-11735		
Mounting Panel for Retardation Coil.....	MI-11736-A		
Gamma Corrector (0.5).....	MI-40833-3		

* If not already available, one each of the above starred equipments is necessary for operation of the TK-41C Color Studio Camera Chain.

3-inch Image Orthicon TV Camera

TYPE TK-14



FEATURES

- New, advanced yoke design obtains higher resolution from image orthicon
- Peak electrical focus maintained by stabilized I.O. control voltages
- High quality viewfinder with 7-inch aluminized kinescope
- Thermostatically controlled forced ventilation of coil and tube
- Protection circuit for deflection failure
- "Overscan" switch for warm-up and rehearsal
- Transistor amplifier intercom system
- Short "set-up" time; fast, accurate focusing
- Plug-in blower, pre-amplifier, and yoke assemblies

DESCRIPTION

The RCA TK-14 Image Orthicon Television Camera is designed as an all-purpose monochrome camera head and viewfinder which can be used for either field or studio applications. The camera features a 3-inch, Type 5820A, Image Orthicon Tube and improved circuitry which afford higher horizontal and vertical resolution capability. Excellent video signals under normal lighting conditions (25 to 150-foot candles) are obtained, and good pick-ups with minimum incident illumination of 0.5 foot candle permit use of the TK-14 at sporting events, night clubs, and other pick-up points where lighting conditions are poor. A 7-inch aluminized kinescope tube and high quality viewfinder enables the cameraman to view the scene.

Stability and flexibility in performance are stressed in the design of the TK-14. New circuitry affording greater focus current regulation, target, dynode and image section stabilization with noticeably better picture quality are incorporated in the new camera and camera control. Fringe field effects are greatly reduced through inclusion of an electrostatic shield over the image section of the orthicon tube. A protection circuit for deflection failure, and

thermostatically controlled forced ventilation of coil and tube are features of the camera.

A new, modern appearance is featured by the TK-14 Camera. The camera and viewfinder are finished in an attractive silver gray textured vinyl, with the exception of the camera side doors which are finished in a contrasting light blue. A dome type tally light is mounted at the top of the viewfinder for clear visibility from all directions.

A transistorized intercom system is built into the new camera. Two intercom circuits are provided—one each for engineering and production use. Each circuit has individual volume controls.

"Inside out" accessibility is retained in the TK-14. The mechanical layout and design of both camera and viewfinder afford greater ease of servicing and maintenance. Plug-in blower, preamplifiers, and yoke assemblies permit quick spare interchange. Short "set-up" time, fast, accurate focusing, and convenient "overscan" switch for warm-up and rehearsal are operational features of the camera chain.



New TK-14 Monochrome TV Camera features easy access to circuits and controls. Camera is mounted on TD-10 Hydraulic Pedestal.

The TK-14 Studio Camera Chain includes the Camera, Viewfinder, Studio Camera Control, TM-6C Master Monitor, Focus Current Regulated Supply, Electromagnetic Orbiter Generator and WP-16B Power Supply with Centering Current Unit and Unregulated High Voltage Unit. This equipment is designed to mount in a standard 13-inch console housing and standard racks.

The TK-14 Field Camera Chain includes the Camera, Viewfinder, Field Camera Control, Focus Current Regulated Supply, Electromagnetic Orbiter Generator, Field Case in which the focus current regulator and orbiter generator are to be mounted, and TY-31 Field Power Supply. This equipment is designed as a portable system with all units in field cases for ease of transporting.

Both systems are supplied with lens, cables and tubes, as required. The camera can be mounted on studio or field type tripods, dollies or pedestals.

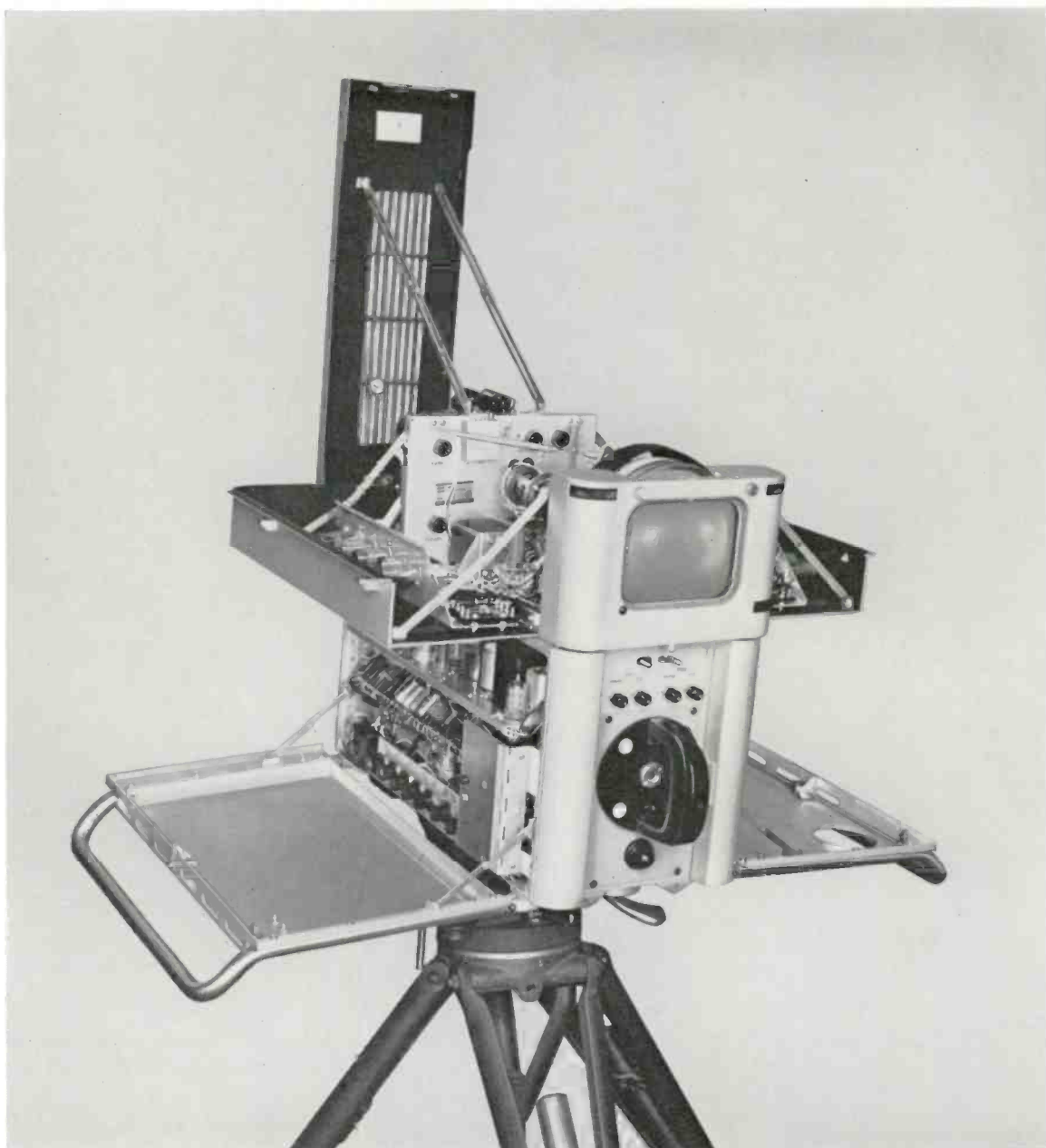
Camera

The camera comprises a mounting for the image orthicon pickup tube together with its focus, deflection and beam-alignment coils, complete horizontal and vertical deflection circuits, a video pre-amplifier, target heater, blower duct, yoke assembly, and an optical system consisting of a turret with four lens positions and means for adjusting optical focus and iris openings. It is entirely self-contained except for a B power supply and certain electrical controls which are located, for operating convenience, at the camera control. All electrical connections are made through a single cable and plug which carry input power and sync generator signals to the camera, and video output and control circuits from it.

Physically the camera is divided into three main compartments. In the center compartment is located the pickup tube with its deflection, focus and alignment coils. The two side compartments, accessible by opening the side doors, contain the video and deflection amplifiers respectively. On the front end of the camera is the lens turret, and on the rear are some of the electrical controls and the control handle for rotating the turret. The optical focus control is located on the right hand side of the camera (from the rear or operating position). This focus control and the turret handle are normally the only two controls which require the attention of the cameraman during a television program.

A bracket containing seven controls and switches is attached to the camera frame at the base of the deflection chassis. The blower-motor assembly is located at the bottom front portion of the camera under the yoke assembly. A 24-pin connector and two sets of communication and program sound jacks are within easy reach on the bottom of the camera housing. Two tally lights at the front and one at the rear of the camera in conjunction with the tally light dome atop the viewfinder and the tally light in the kinescope mask are used as "on-the-air" indicators. Interconnecting plug and latch locks are incorporated in the camera to accommodate the viewfinder which mounts directly on top of the camera.

Optical focusing is obtained by moving the tube and its associated yoke coils. The complete yoke assembly is supported on a ball bearing slide mechanism which is an integral part of the assembly. Although rigidly fastened to the frame when in position, the entire assembly is removable in a few moments for servicing because it forms a plug-in unit. This suspension is smoothly driven through its entire travel for optical focusing by $2\frac{1}{4}$ turns of a focus knob. The knob remains in place when the side door is



Hinged doors permit complete access to camera and viewfinder.

opened. This simple yet rugged drive mechanism imparts a non-linear motion so that relatively great image orthicon motion per degree of knob rotation is obtained for close-ups. Conversely, vernier motion is provided near infinity focus, where rapid motion would make accurate focusing difficult.

The improved yoke provides better shading, less geometric distortion and improved shielding. To improve the camera resolution capabilities an electrostatic shield has been incorporated in the yoke to minimize the degradation from deflection fields upon the image section of the orthicon tube. A special wrap-around mu-metal shield extends

from the image end past the alignment coils for complete shielding against external magnetic fields.

The yoke assembly is provided with a toroidal coil which is connected to an orbiting generator located at the control position. The current through this coil creates a slight displacement of the focus coil and magnetic field at the image end. The direction of displacement rotates to keep the electron image at the target in a constant orbiting motion to avoid burn-in of the image orthicon. The rate of orbiting is sufficiently slow and slight to be virtually unnoticeable. This feature prolongs the useful life of image orthicons to reduce operating costs.

Simplified Alignment

The alignment coil assembly incorporated in the camera comprises two pairs of coils in space quadrature so that independent control of currents in the two pairs of coils will produce a correcting cross field in any direction required. In this system, no mechanical adjustment of the coil is required; it is rigidly mounted. The alignment procedure involves the simultaneous adjustment of two potentiometer controls which determine the currents in the two sets of coils. In order to simplify the alignment procedure, an auxiliary orthicon focus control has been included in the camera.

Vertical deflection incorporates feedback and phase correction for excellent linearity and stability without need for linearity adjustments. Target blanking insertion is at low impedance to eliminate crosstalk problems. Horizontal deflection has excellent linearity, single knob linearity control, for ease of adjustment, better stability, and freedom from transients by an improved push-pull type circuit and a novel ferrite core output transformer.

A seven microsecond return time insures good operation even with the extreme delay conditions associated with 1000 foot camera cable operation. Adequate and symmetrical centering controls are available. Both deflection circuits can be switched from normal scan to 10 percent overscan to guarantee against burned target areas during warm up, rehearsals, and stand-by while maintaining linearity and aspect ratio.

Thermostatically Controlled Cooling

Thermal control of the operating temperature for the image orthicon tube is incorporated in the TK-14. The "plug-in" blower which is easily removed from the camera is cycled by a thermostat imbedded in the mask on the face of the pickup tube. The output of the blower couples to a gas mask type hose which directs cooling air through the air passages along the surface of the tube and between the coils. This assures proper operating temperature for stable performance and longer tube life. Provisions are also made for continuous operation of the blower and the target heater to meet extreme conditions. Protection for the image orthicon tube is assured through the use of a protection circuit which cuts off the tube when there is a loss of driving signals, deflection circuit failure, or failure of the activating relay.

Image Orthicon Stability

The stability of the output signal of the image orthicon tube has been greatly improved by incorporating new highly regulated voltage sources. A new subchassis has been added in the camera to supply exceedingly stable +1300 volts for the dynode multipliers and -600 volts for the photo cathode and G-6. These circuits utilize a comparatively new device in the form of a hydrogen gas



TK-14 high voltage regulation circuit utilizing gas discharge tube provides improved image orthicon stability.

filled metal tube which is capable of precise regulation of high voltages. This tube operates on a gas discharge principle.

Further picture improvement is achieved by stabilized voltages and currents supplied from the new Focus Current Regulated Supply. This supply maintains the focus current within 0.2 percent of its optimum value over a wide temperature range. The same unit provides a high stabilized voltage source for the G-4, target and beam setting electrode G-1 of the image orthicon tube.

Extra Features

For maximum picture sharpness and improved corner resolution, a focus modulation circuit is an important feature of the TK-14 camera. This circuit provides low-impedance feed of horizontal and vertical parabolic wave-shapes in a 4/3 aspect ratio to the orthicon wall to provide continuous beam focus over the usable target area. Blemishes inherent on the surface of the signal multiplier of the tube are defocused and are made to disappear without sacrifice of resolution.

The decelerator control is continuously variable from 0-120 volts for accurate "port hole" control. Image accelerator control provides "S-distortion" correction. Vertical deflection reversal is provided by a switch for special effects applications. Switch is made at the same time to a preset centering potentiometer to insure operation with the same target area. Horizontal deflection reversal is possible in that two coaxial leads feed the yoke so that a simple change of the yoke connections at the yoke plug will permit, for example, mirror image operation.

A multiplier video gain control allows a cure in the case of dynode overload. A line voltage tap switch compensates for line voltage drop associated with different cable lengths. An elapsed time indicator records hours of tube operation conveniently.

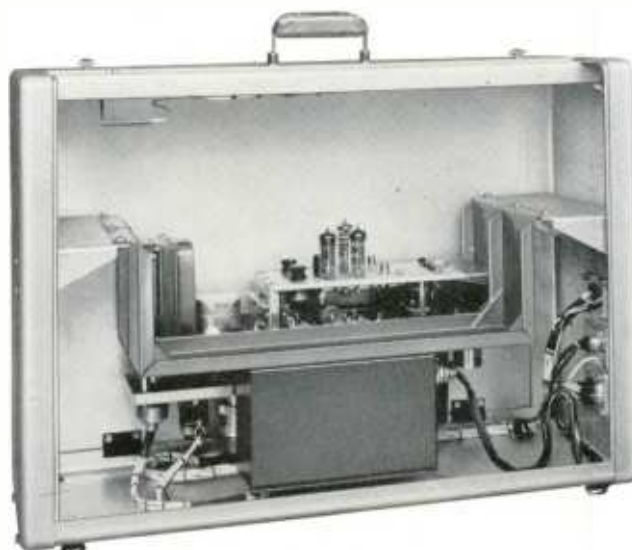
The video amplifier is a plug-in unit with all power connections made through a single plug and receptacle and with three small coaxial connectors for the input, main output, and viewfinder output signal connections. The amplifier is mounted on rubber to minimize the effects of vibration and shock.

Amplitude response is uniform to 8 megacycles and performance at low frequencies is free of streaking. Two stages of cathode high peaking eliminate overshoot and smear by very accurately compensating for the amplifier input loss of high frequencies while reducing microphonics associated with conventional high peaking. A separate output of this amplifier provides signal for the viewfinder. Ample gain insures a bright viewfinder picture with even a low-limit camera tube. Shading signals are introduced in the camera amplifier thus allowing shading in the viewfinder picture—a feedback pair in the output stage adds viewfinder isolation, sending-end cable termination, and provides linearity and stability.

Electronic Viewfinder

The Electronic Viewfinder is a picture monitor using a seven-inch aluminized kinescope tube (RCA-7TP4) which enables the cameraman to view the scene. The design of this unit permits ease of access to the circuits and components, without interrupting operation. The kinescope is enclosed in a magnetic shield which minimizes stray fields and also serves as a light shield around the tube. The video amplifier includes adjustable blanking width controls to match blanking used in the camera control, thus eliminating confusion in determining the actual edges of the transmitted picture. The Viewfinder unit literally plugs into the top of the camera thus forming a complete operating unit. The front is easily detached for kinescope removal. A detachable viewing hood may be rigidly mounted to the mask assembly to prevent stray light from striking the face of the kinescope. The number of exposed operating controls has been reduced to three (contrast, brightness, and focus) with rim-type control knobs protruding through the rounded corners of the kinescope mask assembly.

Variable-width blanking permits adjustment of the viewfinder picture for accurate framing. Horizontal deflection is highly efficient; vertical deflection is a duplicate of the camera circuit; the video amplifier is wide band; and a driven clamp provides accurate d-c restoration. The viewfinder is attached to the camera by a two-finger, one-hand type release mechanism.



Focus Current Regulated Supply and Orbiter Generator shown mounted in Auxiliary Field Case.

Focus Current Regulated Supply

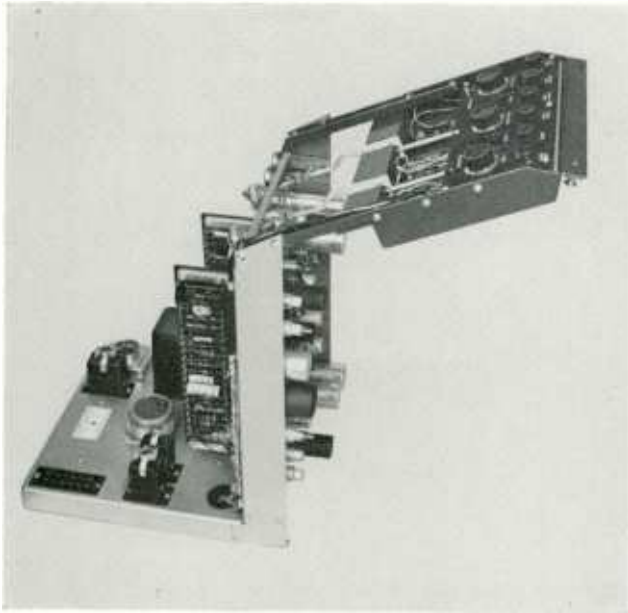
The Focus Current Regulated Supply is a precisely regulated power source for the yoke focus coil and G-4, target, and beam setting electrode G-1 of the image orthicon tube. The focus current is adjustable and a metering jack is incorporated to permit the use of a MI-21200-C Test Meter. Pin jacks are available for circuit test and voltage measurements. A hinged subchassis is utilized to permit ease of servicing.

This unit is designed for rack mounting. However, it is easily mounted in the Auxiliary Field Case along with the orbiter generator when used with the field camera chains.

Studio Camera Control

The Studio Camera Control enables the video operator to monitor and control the quality of the picture signal produced by the studio camera. It is a desk-type console section with a TM-6C Camera Monitor mounted in the upper part, and the control chassis mounted in the compartment below. The camera monitor has a ten-inch picture tube for displaying the picture and a five-inch oscilloscope tube which reproduces the picture signal waveform. Controls for gain and black level setting are brought out on the monitor front panel.

The major operating controls have been reduced to three: Beam, Orthicon Focus, and Image Focus. These are equipped with standard, medium sized knobs which match those used on the associated Master Monitor. Less frequently used controls are grouped under a hinged cover over the control panel. The lucite panel is coated with dull black paint and utilizes edge lighting which illuminates designations but does not produce any stray light.



Studio Camera Control showing chassis and control panel.

The control chassis contains the necessary circuits for amplifying the video signal, establishing black level, mixing in a sawtooth correcting signal, adding picture synchronizing signal and providing three separate outputs. In order to provide more comprehensive control of the picture quality an arrangement has been included for controlling the non-linearity of the video-amplifier.

Type TM-6C Master Monitor

The Type TM-6C Master Monitor provides in a compact form a complete monitoring unit for the observation of the TK-14 camera chain's video signals. It is used to show both picture (kinescope) and waveform (oscilloscope) monitoring of signals at any stage of transmission. Careful scrutinization of a number of details of the video signal may be performed which will aid in maintaining proper level as well as obtaining registration during set-up.

The unit employs a special ten-inch aluminized, straight gun, electro-statically focused kinescope for direct picture monitoring and a five-inch, flat faced, cathode ray tube for waveform presentation. The primary operating controls are located on the front panel. Other frequently used controls are mounted under a cover at the top of the panel. Controls used only for initial set-up are mounted on the left side of the chassis. All monitor components are readily accessible for servicing.

Semiconductor Power Supply

The WP-16B Semiconductor Regulated Power Supply is a rugged, high-efficiency, lightweight source of precisely

regulated voltage, capable of supplying current loads of up to 1600 milliamperes. This is sufficient for an entire monochrome camera chain including the master monitor.

Centering current and unregulated voltage are supplied by means of subchassis units which are powered by separate, non-regulating secondary windings of the power transformer. These units are required when the WP-16B is used with the TK-14 camera chain.

The Centering Current Subchassis Unit is used for supplying centering current to live camera and master monitor. It contains two transistors and associated circuits mounted on a small sub-assembly. The current is adjustable between 300 and 1200 ma. by means of a control located on the front panel of the power supply. The Unregulated Voltage Subchassis Unit is used for the deflection circuits of the camera and master monitor which require a higher voltage than that provided by the regulated voltage output.

The WP-16B Power Supply is factory wired for an unregulated d-c voltage output of 400 volts. Taps are provided on the power transformer which can be connected to provide output voltage of 360, 380, 420 and 460 volts. The ripple content of the unregulated output is only 5 volts peak-to-peak and the output voltage is maintained within one percent for a fifteen percent change in line voltage. When the unregulated voltage sub-chassis unit is used, the capacity of the regulated output is reduced to 1350 milliamperes.

Portable Field Camera Control

The Field Camera Control for use in remote pick-ups is contained in a suitcase unit for easy carrying, and enables the video operator to monitor and control the quality of the picture signal produced by the field camera. On the front panel are located two cathode ray tubes which serve as picture quality indicators. A seven-inch aluminized kinescope is used as a picture monitor, and a three-inch CRO tube is used as a waveform monitor.

An improved feature of the Field Camera Control is the sub-assembly, plug-in, r-f type high voltage supply. It is a completely separate unit which receives only its B+ and filament voltages from the camera control, and in turn supplies the +1500 volt focus potential and 10 kv ultor voltage for the kinescope as well as the -1500 volt cathode potential for the CRO tube. This extremely compact, efficient, and well-shielded unit provides stable ultor and focus voltages and ensures constant focus and deflection on the kinescope screen.

Built-in Master Monitor Facilities

A seven-inch kinescope in the Field Camera Control provides the control operator an excellent monitor to evaluate picture quality. Appropriate circuits to obtain the maximum performance from this tube have been included. Its high contrast and brightness provide a picture which is easily observed under outdoor daylight conditions.

The waveform monitor, or CRO, features a highly stable sweep circuit which operates at either one-half of horizontal scanning frequency or one-half of vertical scanning frequency at the operator's choice. Indirect edge lighting is used with a calibrated lucite scale over the face of the CRO tube for easy and accurate measurements. When sync is mixed in the field camera control, a complete presentation of the CRO is available which enables the operator to set the proper levels.

Improved circuitry assures a video-frequency response that in no way limits the system. New sine-wave clamping employed at three places effectively establishes black level and guarantees gray scale rendition without introducing high-frequency unbalance to damage the blanking waveform. A regenerative type blanking circuit stabilizes blanking insertion. Fixed blanking set-up adds a controlled amount of "blacker-than-black" blanking. Ability to "stretch" the whites or grays is sometimes helpful in improving inferior pictures or producing special effects in contrast. Two "black-white" stretch circuit switches permit selection of four different conditions of gray scale alteration while keeping overall video amplitude constant.

From the output stage of the video amplifier are available two identical isolated video outputs which operate at the standard level of one volt of picture signal. Monitoring is direct from the outgoing line. Sync can be mixed in the camera control and thus makes available a composite signal at each output.

The mechanical construction of the Field Camera Control has been designed to realize the benefits of sub-assembly construction as far as possible. A small blower provides forced cooling to the unit. Accessibility is excellent, thereby making servicing easy.

A "target-set" button is provided to automatically reduce the target potential by two volts as a means for rapidly setting the target two volts above cut-off. Both vertical and horizontal sawtooth shading signals of either polarity are available. Video response is compensated by a "3-position" switch for various cable lengths in common use.

Circuitry is provided to allow use of the existing intercommunication lines in the camera cable to feed the driving currents to the electro-magnetic orbiter coil located in the camera, when the orbiting generator is plugged into the camera control. This does not affect normal operation of the intercommunication circuits. A switch on the camera



TK-14 Field Camera Chain showing Field Camera Control on table, TY-31A Field Power Supply and Field Case containing Focus Current Regulator and Electro-magnetic Orbiter Generator beside camera and viewfinder mounted on field tripod and dolly.

control is provided to stop the orbiting motion when a perfectly stationary image is required, as in the case of superimpositions. A tally light provides a warning indication when the orbiter is turned off.

Auxiliary Field Case

The Auxiliary Field Case is designed to accept the Orbiter Generator and Focus Current Regulator Supply. All cables and connectors required within the case for interconnecting the two units are supplied. No special wiring is necessary. All circuits required for a field installation are brought out to connectors on the rear of the case.

Portable Field Power Supply

The Field Power Supply, Type TY-31A, is a portable unit designed to supply all the d-c current required by the TK-14 Field Camera, Viewfinder, and Field Camera Control in one camera chain. A blower cooling system directs an air stream directly over the tubes. An important feature is the broad range of output current values at which regulated voltage may be obtained. The addition of a relay to withdraw a series regulator under light load provides a regulating range from 1.25a at 285 volts down to about 400 ma. The low end of the output range is especially useful when servicing only one unit of the camera chain, in which case the current drain is low.

General*

Type of Reproduction.....	Monochrome
Number of Scanning Lines.....	525 or 625
Frame Repetition Rate.....	30 or 25 per sec.
Field Repetition Rate.....	.60 or 50 per sec.
Line Repetition Rate.....	15,750 or 15,625 per sec.
Picture Signal.....	0.7 volt, peak-to-peak, non-composite nominal 1.0 volt, peak-to-peak, composite, nominal 1.0 volt, peak-to-peak, non-composite, optional 1.4 volt, peak-to-peak, composite, optional
Viewfinder Kinescope Size.....	7"

Input Signals:

Horizontal Drive.....	4.0 ±0.5 volts, peak-to-peak, negative ¹
Vertical Drive.....	4.0 ±0.5 volts, peak-to-peak, negative ¹
EIA Blanking.....	4.0 ±0.5 volts, peak-to-peak, negative ¹
EIA Sync.....	4.0 ±0.5 volts, peak-to-peak, negative ¹
Input Termination Impedance.....	75 ohms

Output Signals:

Studio Camero Video Outputs.....	3, non-composite (Sync may be added to one output)
Field Camero Video Outputs.....	2, non-composite (Sync may be added to both outputs)
Impedance of Output Terminations.....	75 ohms

Power Requirements:

Studio Camero Chain

A-C Power

115 volts, 60 cycle chain.....	960 watts
230 volts, 50 cycle chain.....	960 watts

D-C Power (from camera chain supplies)

Regulated +280 volts.....	1,290 ma
Unregulated +400 volts.....	160 ma
Focus Current.....	75 ma
Centering Current—5.0 volts (approx.).....	1000 ma

Field Camero Chain

A-C Power

115 volts, 50/60 cycle chain.....	1,650 watts
230 volts, 50 cycle chain.....	1,650 watts

D-C Power (from TY-31)

Regulated +280 volts.....	1,240 ma
Unregulated +400 volts.....	160 ma
Focus Current.....	75 ma
Centering Current—5.0 volts (approx.).....	1000 ma

Picture Quality:

Limiting Horizontal Resolution.....	650 TV lines, minimum in center
Signal-to-Noise Ratio.....	Nominal 30-33 db peak-to-peak signal/RMS noise for bandwidth of 4.5 mc
Blanking Signal Overshoots.....	Not in excess of EIA specifications
Overall Frequency Response with 100 ft. Camero Cable.....	±0.5 db to 7 mc; down not more than 3 db at 8 mc
Scanning Linearity.....	Within ±1%
Overscan Amplitude.....	10%
Orbiting Speed.....	1 RPM

Operational Specifications:

Pedestal Range.....	0 to 50% clipping of signal
Gamma Correction.....	Separate block and white gamma switches
Camera Cable Compensation.....	Adjustable to compensate for a maximum length of 1000 ft. of camero cable

Tube Complement

Camero: 4—6AH6, 1—6CU6, 1—6X8, 1—5687, 1—6AQ5, 1—6S4,
3—12AT7, 1—5820-A, 1—6AS6, 1—6U8, 3—12AU7, 1—1300R,
1—600R, 1—6BQ6-GT

Viewfinder: 1—OA2, 1—6AS7G, 1—6S4, 2—5763, 2—1X2A, 1—6BQ6-GT,
4—12AT7, 1—7TP4, 3—6AL5, 1—CL6, 2—12AU7

Focus Current Regulator Supply: 3—6CW4, 3—7119

Studio Camero Control: 1—OA2, 6—6AH6, 1—6AU5-GT, 8—12AT7,
1—6AG7, 4—6AL5, 1—6BQ7A, 2—12AU7

Field Camero Control: 4—1X2A, 2—6BQ6, 1—6S4, 3—5763, 8—6AH6,
1—6BQ7A, 10—12AT7, 1—3KP1, 5—6AL5, 1—6CL6, 6—12AU7,
1—7TP4, 1—6AU5-GT, 1—6L6, 2—991

* See separate catalog description for specifications and tube complement on master monitor and power supplies.

Mechanical Specifications

Unit	Dimensions	Weight (lbs.)
Camero (overall)	27½" long, 16" wide, 14½" high	78
Viewfinder (overall)	23½" long, 10½" wide, 8½" high	31
Focus Current Regulator Supply	19" wide, 3½" high, 10⅞" deep	12
Orbiter Generator	19" wide, 3½" high, 10¼" deep	5
Studio Camero Control	26" long, 11⅝" wide, 23⅝" high	27
Field Camero Control	27½" long, 8½" wide, 17½" high	67
Field Power Supply	26" long, 8½" wide, 18½" high	58
Field Case for Focus Current, Regulator and Orbiter	27½" long, 8½" wide, 19" high	20

Ordering Information

TK-14 Field Camera Equipment:

115 V., 60 Cycle Chain			230 V., 50 Cycle Chain		
Qty.	MI Number	Description	Qty.	MI Number	Description
1	26014	Image Orthicon Camero	1	556014	Image Orthicon Camero
1	26024	Camero Viewfinder	1	556024	Camero Viewfinder
1	26064	Field Camero Control	1	556064	Field Camero Control
1	26091	Field Power Supply, TY-31	1	N26091	Field Power Supply, TY-31
1	26093	Focus Current Regulated Supply	1	556093	Focus Current Regulated Supply
1	26853	Orbiter Generator	1	556853	Orbiter Generator
1	26294	Auxiliary Field Case	1	26294	Auxiliary Field Case
1	26650	Cathode Ray Tube, RCA 3KP1	1	26650	Cathode Ray Tube, RCA 3KP1
1	26666	Kinescope Tube, RCA 7TP4	1	26666	Kinescope Tube, RCA 7TP4
1	26656-A	Image Orthicon, RCA 5820-A	1	26656-A	Image Orthicon, RCA 5820-A
1	43201	Set of Interconnecting Cables	1	43201	Set of Interconnecting Cables
1	826160	Lens, 50mm, f/1.8	1	826160	Lens, 50mm, f/1.8
1	826161	Lens, 85mm, f/1.9	1	826161	Lens, 85mm, f/1.9
1	826162	Lens, 135mm, f/3.5	1	826162	Lens, 135mm, f/3.5
1	26725-E5	Camera Cable, 50 feet	1	26725-E5	Camera Cable, 50 feet
1	26725-E6	Camera Cable, 100 feet	1	26725-E6	Camera Cable, 100 feet
1	26725-E7	Camero Cable, 200 feet	1	26725-E7	Camero Cable, 200 feet
1	26372	Set of Call Letter Panels	1	26372	Set of Call Letter Panels
1	26203-A	Camera Cradle Head	1	26203-A	Camera Cradle Head
1	26046	Metal Tripod, TD-11A	1	26046	Metal Tripod, TD-11A

TK-14 Studio Camera Equipment:

115 V., 60 Cycle Chain			230 V., 50 Cycle Chain		
Qty.	MI Number	Description	Qty.	MI Number	Description
1	26014	Image Orthicon Camero	1	556014	Image Orthicon Camero
1	26024	Camero Viewfinder	1	556024	Camero Viewfinder
1	26074	Camera Control Chassis	1	556074	Camera Control Chassis
1	26136-C	Master Monitor, TM-6C	1	N26136-C	Master Monitor, TM-6C
1	26084-B	Power Supply, WP-16B	1	26094-B	Power Supply, WP-16B
1	26083-A	Centering Current Sub Chassis Unit	1	26083-A	Centering Current Sub Chassis Unit
1	26082-A	Unregulated High Voltage Sub Chassis Unit	1	26082-A	Unregulated High Voltage Sub Chassis Unit
1	26093	Focus Current Regulated Supply	1	556093	Focus Current Regulated Supply
1	26786	Console Housing, 13-inch	1	26786	Console Housing, 13-inch
1	26579-B	Blower for Master Monitor Housing	1	556579-B	Blower for Master Monitor Housing
1	26667	Cathode Ray Tube, RCA 5ABP1	1	26667	Cathode Ray Tube, RCA 5ABP1
1	26655	Kinescope Tube, 10SP4	1	26655	Kinescope Tube, 10SP4
1	26656-A	Image Orthicon, RCA 5820-A	1	26656-A	Image Orthicon, RCA 5820-A
1	26746	Set of Interconnecting Cables	1	26746	Set of Interconnecting Cables
1	826160	Lens, 50mm, f/1.8	1	826160	Lens, 50mm, f/1.8
1	826161	Lens, 85mm, f/1.9	1	826161	Lens, 85mm, f/1.9
1	826162	Lens, 135mm, f/3.5	1	826162	Lens, 135mm, f/3.5
1	26725-E9	Camero Cable, 50 feet	1	26725-E5	Camero Cable, 50 feet
1	26853	Orbiter Generator	1	556853	Orbiter Generator
1	26372	Set of Call Letter Panels	1	26372	Set of Call Letter Panels

Accessories

Shock Mount for Field Camero Control and Power Supply.....	MI-26511-A1
Shock Mount for Camero and Viewfinder.....	MI-26511-3
Lens, 8½", f/3.9.....	MI-26550-4
Lens, 35mm, f/3.3.....	MI-26550-9
Lens, 13", f/5.....	MI-26590-14
Lens, 17", f/5.....	MI-26590-15
Lens, 25", f/5.....	MI-26590-8
Orbiter Interconnecting Cable.....	MI-13333
Neutral Density Filter Holder.....	MI-26847
Spare Video Pre-Amplifier.....	MI-26153
Spare Yoke Assembly.....	MI-26747-B

¹ Pulse widths as specified by EIA in RS-170. Terminals for signals are arranged for loop through connections.

Viewfinder Vidicon TV Camera

STUDIO TYPE TK-15B



FEATURES

- Precision vidicon camera with integrated 7-inch electronic viewfinder
- Low-noise preamplifier, variable gamma and aperture correction assure excellent picture quality
- Reliable picture performance at all times by feedback stabilized black level, video, and deflection amplifiers
- Electromagnetic vidicon alignment, amplifier test pulse and local camera controls simplify setup and maintenance
- Output amplifier provides three sending end terminated video signals
- Precision focus mechanism with optical focus over full range in less than one turn of knob
- Automatic Sensitivity Control available
- Transistor amplifier intercom system

DESCRIPTION

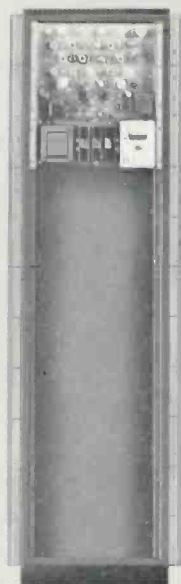
The TK-15B Vidicon Camera has many applications in both television stations and closed-circuit installations. As a source of live programming in television stations, this new vidicon camera is extremely useful for picking up scenes on which adequate lighting levels (approximately 200 foot-candles) can be maintained. For example, a single TK-15B camera can be utilized for live newscasts, simple product demonstrations and flip-chart commercials. Under adequate lighting conditions, excellent picture quality is available from the vidicon tube. Usable pictures can be obtained with lighting levels of 50 foot-candles or less, depending upon the picture quality requirements of the application. The economy of operation inherent in the vidicon makes the TK-15B an excellent investment for the uses described.

Design of the TK-15B meets professional requirements in every way. Mechanically, the camera is designed for rugged use and utmost accessibility to components. Electrically advanced circuit techniques, a reduced tube complement and simplified operating controls have been introduced without compromise to performance. Signal-to-noise ratio, gray scale rendition and detail resolution are excellent.

Each TK-15B includes two transistorized intercom circuits, for engineering and production use. Each circuit provides high level voice communications between camera operator, the camera control operator and program director or other operating personnel. Variable volume controls allow individual adjustment of sound level output.



BASIC CAMERA CHAIN
WITH LOCAL CAMERA CONTROLS



REMOTE CONTROL AND
MASTER MONITOR (OPTIONAL)

TK-15B Camera and rack-mounted equipments comprise the basic camera chain. Optional remote-control facilities are mounted in standard control console at the right.

Local operating controls (gain, pedestal, beam and electrical focus) are available at the rear of the camera, where they are convenient to the operator for setup and maintenance.



The TK-15B camera and 7-inch electronic viewfinder constitute a single, self-contained chassis equipped with a 4-lens turret and all operating controls (gain, pedestal, beam and electrical focus). A standard camera cable connects the camera with the output amplifier which may be mounted in a standard cabinet rack. These units, plus a WP-16 Power Supply, comprise the basic camera chain.

Operating control of all electrical adjustments including an ASC "on-off" switch is available by means of optional remote camera control panels. The MI-26213-A Remote Control Panel may be mounted along with a master monitor in a standard 13¼-inch television console housing or cabinet rack. Each panel includes an ASC "on-off" switch as well as gain, focus, pedestal and beam controls.

Rugged, vertical plane chassis construction has been featured in the TK-15B camera design. Hinged doors on either side of the camera open downward to expose the camera interior for inspection and maintenance. The video amplifying circuits are mounted on a hinged subchassis which swings outward from the camera, providing easy access to every component. The video preamplifier circuits are contained on a separate shock-mounted subchassis.

Precision Optical Focus Mechanism

Special attention has been given to the precise mechanical requirements of the optical system for the vidicon. Due to the small size of the picture on the surface of the vidicon photocathode, extremely close tolerances must be maintained on optical focus travel to avoid focus backlash. This is achieved by an ingenious, cam-operated mechanism which precisely translates the focus knob rotation into an exact, nonlinear characteristic motion to the vidicon and yoke assembly. Complete absence of focus backlash is thus assured, even under the severe tolerance requirements of short focal length lenses. Also, due to the special nonlinear focus motion characteristic, the amount of focus knob rotation required to adjust optical focus is essentially independent of distance.

Any high quality, 16mm Type "C" mount lenses may be used with the TK-15B camera. Up to four lenses may be mounted in the turret at any time. A hollow-turret shaft makes it possible to use a manual zoom lens as one of the four lenses.

Thorough Electrical Filtering

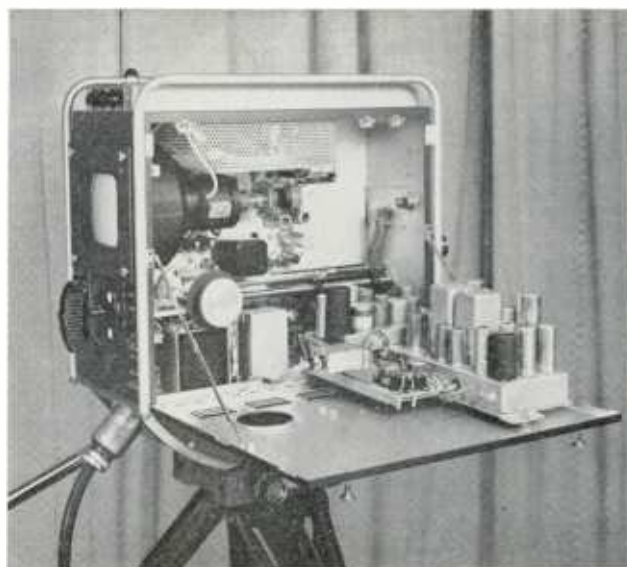
Electrical interference in the camera is eliminated by means of individual camera cable conductor barrier filters at the cable connector and thorough shielding of the low level video circuits. These facilities are vital to the quality of pictures and operational reliability.

The output amplifier performs the functions of video amplification, blanking insertion, feedback clamping, linear clipping, camera pulse amplification, gamma compensation and sync mixing. A variable gamma compensation circuit is provided in the output amplifier chassis to provide "stretching" of black information in the picture, thereby compensating for the black "compression" inherent in kinescope picture reproduction. Three separate feedback isolated video output circuits are provided with a minimum of 40 db of isolation between circuits.

Simplified Self-Stabilized Circuits

A substantial saving has been achieved in the total number of tubes used in the camera chain. In addition, the number and complexity of setup and operating controls have been minimized, resulting in savings to the user through reduced demands on the skill of technical personnel. At the same time, stability and reliability of the camera have actually been improved. For example:

- (1) All video amplifier stages are gain stabilized.
- (2) Pedestal levels are stabilized by feedback clamp circuits.



Vertical plane construction with hinged subchassis provides complete accessibility.

- (3) Deflection linearity and amplitude are feedback stabilized.
- (4) Internal calibration signal permits accurate setting of channel gain; simplifies vidicon setup adjustments.
- (5) Cascode high transconductance video preamplifier provides high signal-to-noise ratio.
- (6) Detail resolution is sharpened by delay line aperture compensation.

The TK-15B camera is available with several combinations of accessory equipment to fit a variety of applications. For broadcast television studio use and other applications requiring a very high quality picture monitor and waveform monitor, a studio camera chain is available including a TM-6C Master Monitor and console housing.

A single WP-16B Power Supply is capable of powering two camera chains. The TK-15B Vidicon Camera working in conjunction with an Automatic Sensitivity Control, MI-26191-A, makes possible virtually unattended operation. The ASC continuously monitors the output of the vidicon camera and translates this information into a control signal which is fed back to the Vidicon tube. The control voltage is applied to all of the control electrodes of the Vidicon, except the Vidicon target. This results in an effective change of target voltage, but avoids the introduction of d-c components into the video signal with changes in control voltage. Changes in vidicon sensitivity may thus be made automatically to compensate for changes in scene high-light level of approximately 20 to 1.

SPECIFICATIONS

General

Type of Reproduction..... Monochrome
 Viewfinder Kinescope..... Seven-inch diameter, P4 phosphor
 Number of Scanning Lines..... 525 or 625, 2 to 1 interlocked
 Frame Repetition Rate..... 30 or 25 per second
 Field Repetition Rate..... 60 or 50 per second
 Line Repetition Rate..... 15,750 or 15,625 per second
 Incident Illumination for Best Results..... 200 foot-candles
 Picture Polarity at Output..... Black negative
 Maximum Length of Camera Cable..... 500 feet
 Lens Type..... 16mm C-mount
 Intercom Facility..... Separate engineering and production, transistorized amplifier talk circuits, plus cue

Electrical

AC Power:

115 volts, 50/60 cycle chain..... 376 watts
 230 volts, 50 cycle chain..... 376 watts
 Current (utility outlet)..... Fused for 5 amperes

Input Signals:

Horizontal Drive 4 volts peak-to-peak negative
 Blanking 4 volts peak-to-peak negative
 Sync 4 volts peak-to-peak negative

Output Signals:

Picture #1..... Picture with optional sync 1.4 volts
 Picture #2..... Picture with optional sync 1.4 volts
 Picture #3..... Picture only, 1.0 volt
 Bandwidth..... Essentially flat to 6 megacycles, 3 db down at 8 megacycles

Aperture Compensation Peak

Boost Frequency..... 4.5 megacycles, ± 0.25 mc

Aperture Compensation Amplitude..... Continuously variable from 0 to 10 db

Gamma Correction Factors..... 0.5, 0.7 and unity

Isolation between Output Lines..... 40 db minimum

Output Impedance..... 75 ohm coaxial, doubly terminated

Mechanical

Dimensions:

Camera Case (head on)..... 11" wide, 21 $\frac{5}{8}$ " high, 26 $\frac{7}{8}$ " deep
 Output Amplifier (rack mounting)..... 14" high, 19" wide, 9" deep
 Camera Control Panel (console mounting)..... 11" wide, 3 $\frac{1}{2}$ " high, 2 $\frac{3}{4}$ " deep
 Camera Control Panel (TM-35 mounting)..... 7 $\frac{3}{4}$ " wide, 2 $\frac{1}{8}$ " high, 3 $\frac{1}{2}$ " deep

Weight:

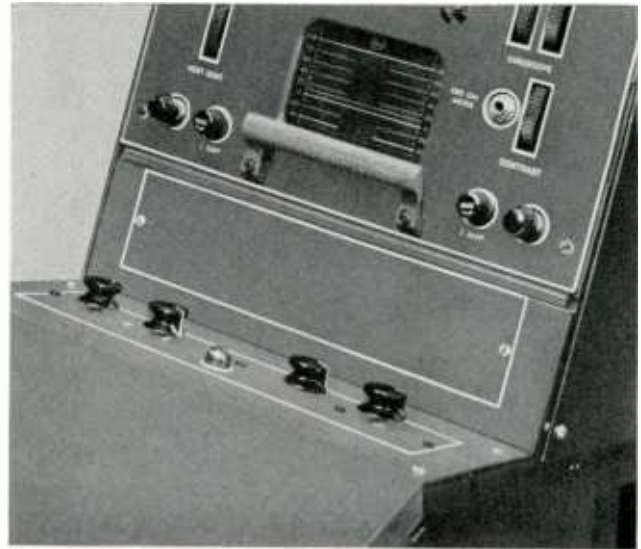
Camera 79 lbs.
 Output Amplifier 23 $\frac{1}{2}$ lbs.
 Camera Control Panel..... 2 $\frac{1}{2}$ lbs.

Note: More complete technical specifications are available on request

Equipment Supplied

TK-15B Studio Vidicon Camera Chain with TM-6C Master Monitor, including the following:

115 V., 60 Cycles		230 V., 50 Cycles	
Qty.	MI Number	Description	Qty. MI Number
1	26023-C	TK-15B Vidicon Camera	1 P26023-C
1	26063-A	Output Amplifier	1 P26063-A
1	26213-A	Remote Control Panel	1 26213-A
1	26842	Viewfinder Shade	1 26842
1	26084-B	Power Supply, WP-16B	1 26094-B
1	26083-A	Centering Current Subchassis	1 26083-A
1	26725-E5	Camera Cable, 50 feet	1 26725-E5
1	36316-25	Lens, 25mm, f/1.5	1 36316-25
1	36316-50	Lens, 50mm, f/1.5	1 36316-50



Remote control panel mounts below master monitor for control room operations with waveform and picture display.

1	36316-75	Lens, 75mm, f/1.9	1	36316-75
1	36323-A	Vidicon Tube, Type 7735-A	1	36323-A
1	26136-C	Master Monitor, TM-6C	1	N26136-C
1	26655	Kinescope Tube, 10SP4	1	26655
1	26667	Cathode Ray Tube, 5ABP1	1	26667
1	26579-B	Blower for TM-6C Master Monitor	1	556579-B
1	26786	Console Housing, 13-inch	1	26786
1	26212	Console Well Adaptor for MI-26213-A	1	26212

TK-15B Studio Camera Chain with TM-35 Master Monitor, including the following:

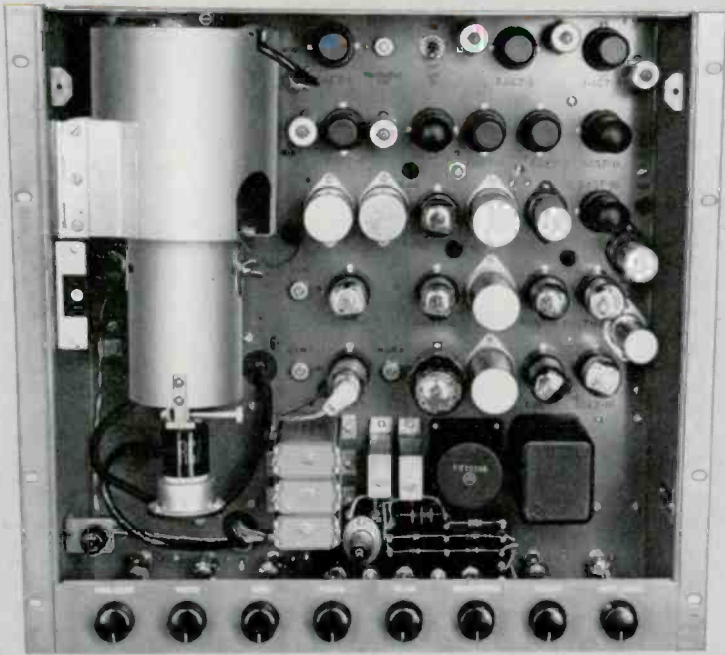
115 V., 60 Cycles		230 V., 50 Cycles	
Qty.	MI Number	Description	Qty. MI Number
1	26023-C	TK-15B Vidicon Camera	1 P26023-C
1	26063-A	Output Amplifier	1 P26063-A
1	26213-A	Remote Control Panel	1 26213-A
1	26842	Viewfinder Shade	1 26842
1	26084-B	Power Supply, WP-16B	1 26094-B
1	26083-A	Centering Current Subchassis	1 26083-A
1	26725-E5	Camera Cable, 50 feet	1 26725-E5
1	36316-25	Lens, 25mm, f/1.5	1 36316-25
1	36316-50	Lens, 50mm, f/1.5	1 36316-50
1	36316-75	Lens, 75mm, f/1.9	1 36316-75
1	36323-A	Vidicon Tube, Type 7735-A	1 36323-A
1	26154	Master Monitor, TM-35	1 556154
1	26873	Console Mounting Adaptor for TM-35	1 26873
1	26786	Console Housing, 13-inch	1 26786
1	26212	Console Well Adaptor for MI-26213-A	1 26212

Accessories

Automatic Sensitivity Control Chassis (115 V., 60 cycle).....	MI-26191-A
Automatic Sensitivity Control Chassis (230 V., 50 cycle).....	MI-N26191-A
Camera Cradle Head.....	MI-26203-A
TD-10 Hydraulic Pedestal.....	MI-26053
TD-11A Metal Tripod.....	MI-26046
TD-15A Tripod Dolly, folding type.....	MI-26042-A
Remote Control Panel, TM-35 Mounting.....	MI-26161-A
Adjustable Viewfinder Hood.....	MI-26843
Interphone Connection Unit.....	MI-11784

Monoscope Camera

TYPE TK-1C



FEATURES

- Useful to television transmitting station, laboratory, factory, or service bench
- Centralized operating controls
- Compact construction; "bath tub" chassis for standard rack mounting
- Built-in high voltage power supply
- Auxiliary input for alignment purposes
- Provision for remote control of gain and focus
- Pattern shows scanning symmetry, vertical and horizontal resolution, shading, reproduction of isolated details, contrast and brightness
- Accessible arrangement

DESCRIPTION

The Type TK-1C Monoscope Camera is a completely self-contained television camera which produces a video signal by scanning a picture pattern built into the monoscope pickup tube. The camera may be used as a convenient means of generating a television picture signal for video testing of television transmitting equipment, or for "test pattern" transmission during warm-up and stand-by periods. In the latter case, the station call letters may be made a part of the pattern, thereby providing station identification. It may, likewise, be used in the television transmitting station as a readily available source of video signal, of high quality, to be used in place of the studio camera when making tests or adjustments on other units of the system. In the laboratory, factory, or service bench, the equipment may be used as a source of video signal to test or adjust television receivers, video amplifiers, and picture tubes.

The TK-1C Monoscope Camera comprises the monoscope tube, the scanning generators, the video output amplifiers, and the high voltage power supply for the monoscope tube. This equipment is built on the familiar recessed "bath tub" type of chassis which fits into a standard 19-inch rack. All tubes and large components are located on the

front of the chassis, while the wiring and smaller components are on the rear. The controls are grouped on a narrow control panel along the bottom of the chassis. When installed and in operation, the front is covered by a large cover plate which conceals everything but the control panel. This cover plate is interlocked to protect operating personnel from the high voltages present in the equipment.

The monoscope tube in the TK-1C is mounted in a vertical position at the left of the chassis. The upper part of the tube is enclosed in a Mumetal shield. The magnetic deflecting coils are mounted within the shield, and are attached to it. By disconnecting the tube socket, anode, and signal leads, the whole assembly—tube, coils, and shield—may be swung outward. This arrangement allows quick tube change and conserves rack space.

The monoscope tube ordinarily used in the TK-1C is an RCA 2F21. This tube provides a standard test pattern which shows the following details of the quality of reproduction in a given television system: scanning symmetry, resolution in both vertical and horizontal directions, shading and reproduction of isolated details. In addition it provides a pattern to facilitate proper adjustment of contrast and brightness. Monoscope tubes may also be obtained with

special pattern showing station call letter, monogram, or other subject matter of the customer's choice. Type 1699 tubes are available on a custom basis.

The Vertical Deflection Generator consists of four tubes and associated circuits. The first of these tubes amplifies the driving signal received from the synchronizing generator and generates a saw-tooth voltage wave which is amplified in the second, third, and fourth tubes. The output is applied to the magnetic deflecting coils of the monoscope tube. Negative feedback is employed to improve scanning linearity.

The Horizontal Deflection Generator includes three tubes and associated circuits. The first tube is the driving signal input amplifier and saw-tooth voltage generator; the second and third tubes amplify the output wave and feed it to the horizontal deflecting coils of the monoscope tube.

The Blanking Amplifier is used to provide the proper level and polarity of the blanking pulses received from the synchronizing generator before these pulses are fed into the Video Amplifier for mixing with the video signal.

The Sync Amplifier is used to provide proper level and polarity of synchronizing pulses from the synchronizing generator. These pulses are fed into the video amplifier for mixing with the video signal.

The Video Amplifier includes six stages of video amplification—together with a clipper stage which is inserted between the fifth and sixth stages. The monoscope output signal is fed directly into the first stage of this amplifier, and the blanking signal is introduced in the output of the fifth stage. The output of the fifth stage (which contains

both video and blanking signals) is fed to a clipper stage which adjusts the height of the blanking "pedestals". The clipper feeds an output stage which consists of two tubes having their grids tied in parallel, but with the plate circuits separate. This provides two separate outputs—one for picture output and one for monitoring purposes.

SPECIFICATIONS

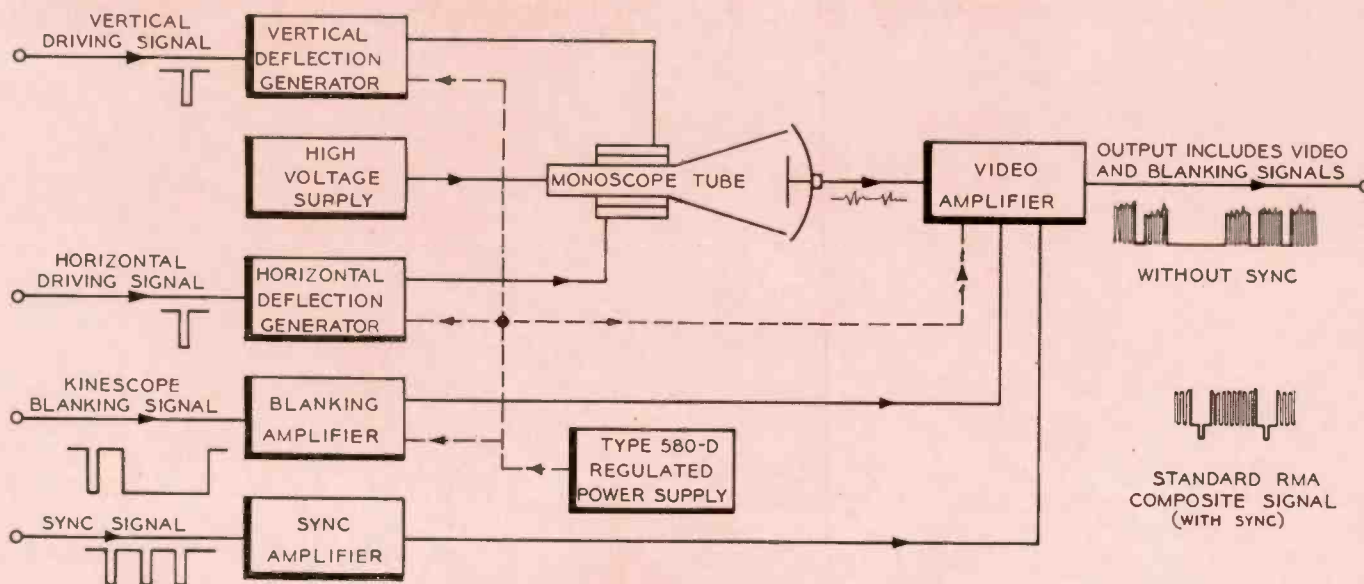
Output Voltage.....	1.5 volts peak-to-peak
Output Impedance.....	75 ohms
Number of Scanning Lines.....	525 or 625
Field Repetition Rate.....	60 or 50 per sec.
Line Repetition Rate.....	15,750 or 15,625 per sec.
Input Pulses Required:	
Blanking, Horizontal Drive and Vertical Drive (neg. polarity).....	3.5 to 5 volts
Resolution Capability.....	At least 450 lines
Power Consumption:	
AC Power.....	100 watts
280 volts, d-c.....	200 ma.
-3 volts, d-c (centering).....	300 ma.
Dimensions.....	17½" high, 19" wide, 11" deep
Weight.....	55 lbs.
Tube Complement:	
6-6AC7, 3-6AG7, 3-6SL7GT, 1-6V6-GT, 1-6Y6-G, 1-1B3-GT, 1-991, 1-2F21, 3-6SN7-GT	

Ordering Information

Monoscope Camera (less Monoscope Tube)	
For 115 Volts, 50/60 cycles.....	MI-26030-B
For 230 Volts, 50/60 cycles.....	MI-P26030-B
Monoscope Tube, 2F21.....	MI-26657

Accessories

Special Monoscope Tube.....	Type 1699
Power Supply, Type 580-D	
For 115 Volts, 50/60 cycles.....	MI-21523-C
For 230 Volts, 50/60 cycles.....	MI-P21523-C



Block Diagram of TK-1C Monoscope Camera Circuit.

Ortal Fixed Focus Lenses

FOR 4½-INCH IMAGE ORTHICON CAMERAS



35mm
MI-26882-2

50mm
MI-26882-3

75mm
MI-26882-4

127mm
MI-26882-5

8-inch
MI-26882-6

12½-inch
MI-26882-7

16-inch
MI-26882-8

- Choice of lenses from 35mm to 22-inch focal length
- Specifically designed for 4½-inch image orthicon cameras
- Quick-change lens mount for ease of insertion and removal from lens turret
- Geared iris ring may be operated by remote control servo drive motor
- Iris opening linear with respect to rotation of index ring
- Possible to maintain linear relationship between rotation of index ring and size of iris opening

DESCRIPTION

The Ortal Fixed Focus Lenses are a series of optically superior type fixed focus lenses for use with RCA TK-60A 4½-inch Image Orthicon TV cameras. In the design of the Taylor-Hobson Ortal range, the specialized requirements of television have been most fully taken into account. Each lens is shaped to transmit maximum possible information within the limits set by the television system.

The mechanical construction of the Ortal range of lenses, like the optical design, has been evolved specifically for TV camera requirements. Internal flare has been reduced to a minimum by the use of annular reisses and by matt blacking of all internal surfaces, together with the use of critically positioned baffles of suitable size. This is particularly advantageous because of the low frontal lighting often encountered in the TV studio, coupled with the extremely high sensitivity of the Image Orthicon tube as

compared with a photographic emulsion. The lenses are treated with anti-reflective coatings to assure optimum contrast in image formation and maximum transmission from a given construction.

An important feature of the lens design is the iris diaphragm control mechanism which provides for complete interchangeability between lenses on camera turrets fitted with remote control of the lens diaphragm. This provision is independent of focal length or maximum aperture. The mechanism provides a linear relationship between the rotation of the index ring and the size of the diaphragm aperture; the f/scale is, therefore, absolutely linear between all stops. Overall rotation of the index ring, as well as rotation between marked aperture values, is common to all lenses irrespective of focal length or maximum aperture.

DESCRIPTION (Continued)

When the lens is used on a camera turret incorporating iris-drive the index ring serves as the lens gear ring. The maximum torque required to drive the gear ring is 15 inch-ounces per lens, and the movement is smooth and free. The mechanism is totally enclosed within the lens iris barrel to prevent entrance of foreign matter which might cause deterioration of the movement. Good balance on the

camera turret is achieved by maintaining a weight of 2½ pounds for each lens below 12½-inch focal length.

The Ortol lenses feature a quick-change type TV-88 lens mount, which utilizes two captive screws to secure the lens in position. Only a half-turn of each clamp is required to insert or remove the lens from the camera turret.

SPECIFICATIONS

Depth of Field: MI-26882-2 f/2.8, 35mm (1.38-inch)

Distance Focused On (Feet)	f/2.8		f/5.6		f/8.0		f/11.0		f/16.0		f/22.0	
	ft.	in.	to ft.	in.	ft.	in.	to ft.	in.	ft.	in.	to ft.	in.
INF.	22	7	inf.		11	4	inf.		8	0	inf.	
15	9	1	43	6	6	7	inf.		5	4	inf.	
8	6	0	12	2	4	10	25	4	4	1	inf.	
5	4	2	6	3½	3	7	8	6	3	2	12	3
4	3	5½	4	9	3	0	5	11	2	9	7	5
3	2	8¼	3	4¼	2	5½	3	11	2	3	4	6
2½	2	3½	2	9	2	1½	3	1	2	0	3	5
1½	1	5¼	1	7	1	4¼	1	8	1	6	1	9
1	0	11¾	1	¼	0	11½	1	¾	0	11¼	1	1
.75	0	8¾	0	9¼	0	8¾	0	9¼	0	8½	0	9½

Depth of Field: MI-26882-3 f/2.0, 50mm (2-inch)

Distance Focused On (Feet)	f/2.0		f/4.0		f/5.6		f/8.0		f/11.0		f/16.0		f/22.0	
	ft.	in.	to ft.	in.	ft.	in.	to ft.	in.	ft.	in.	to ft.	in.	ft.	in.
INF.	65	8½	inf.		32	11	inf.		23	6¾	inf.		16	6½
25	18	2¼	39	11¼	14	3¾	100	4	12	2¾	inf.		10	¾
15	12	3½	19	3¾	10	5	27	1¼	9	3¼	40	1¼	7	11¾
8	7	2	9	½	6	6	10	4¾	6	¾	11	10	5	6
5	4	8	5	4½	4	4¾	5	9¾	4	2¼	6	2½	3	11
4	3	9½	4	2¾	3	7¼	4	5¾	3	5¾	4	8¾	3	3½
3	2	10¾	3	1½	2	9½	3	3	2	8½	3	4½	2	7¼
2½	2	5	2	7	2	4¼	2	8	2	3½	2	9	2	2¾
2	1	11½	2	½	1	11	2	1¼	1	10½	2	1¾	1	10
1½	1	5¾	1	6¼	1	5½	1	6¾	1	5¼	1	7	1	5

Depth of Field: MI-26882-4 f/2.0, 75mm (3-inch)

Distance Focused On (Feet)	f/2.0		f/4.0		f/5.6		f/8.0		f/11.0		f/16.0		f/22.0	
	ft.	in.	to ft.	in.	ft.	in.	to ft.	in.	ft.	in.	to ft.	in.	ft.	in.
INF.	145	7	inf.		72	11	inf.		52	2	inf.		36	7
50	37	4	75	8	29	10	156	3	25	9	inf.		21	4
25	21	5	30	1	18	9	37	8	17	1	47	2	15	1
15	13	8	16	8	12	7	18	8	11	9	20	9	10	10
10	9	5	10	8	8	10	11	6	8	6	12	2	8	0
8	7	7	8	5	7	3	8	11	7	1	9	4	6	8
6	5	9	6	2	5	7	6	6	5	5	6	8	5	3
4	3	11	4	1	3	10	4	2	3	9	4	3	3	8
3	2	11	3	0	2	11	3	1	2	10	3	2	2	10
2	1	11	2	0	1	11	2	1	1	11	2	1	1	11

SPECIFICATIONS (Continued)

Depth of Field: MI-26882-5 f/2.8, 127mm (5-inch)

Distance Focused On (Feet)	f/2.8		f/4.0		f/5.6		f/8.0		f/11.0		f/16.0		f/22.0	
	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.
INF.	297 3	inf.	208 2	inf.	148 10	inf.	104 4	inf.	76 0	inf.	52 4	inf.	38 3	inf.
100	75 1	150 0	67 10	191 1	60 2	300 10	51 5	inf.	43 6	inf.	34 8	inf.	27 11	inf.
50	42 11	59 10	40 6	65 4	37 8	74 6	34 1	94 6	30 5	142 2	25 11	917 6	22 0	inf.
25	23 2	27 1	22 5	28 3	21 7	29 9	20 4	32 5	19 1	36 7	17 2	46 4	15 5	68 7
15	14 4	15 9	14 1	16 1	13 9	16 6	13 3	17 4	12 8	18 4	11 11	20 5	11 1	23 9
10	9 8	10 4	9 7	10 5	9 5	10 7	9 3	10 11	9 0	11 4	8 7	12 1	8 2	13 1
8	7 10	8 2	7 9	8 3	7 8	8 4	7 6	8 7	7 4	8 9	7 1	9 2	6 10	9 9
6	5 11	6 1	5 10	6 2	5 10	6 2	5 9	6 4	5 8	6 5	5 6	6 7	5 4	6 11
5	4 11	5 1	4 11	5 1	4 10	5 1	4 10	5 2	4 10	5 3	4 8	5 5	4 7	5 7
4	3 11	4 1	3 11	4 0	3 11	4 3	3 11	4 1	3 10	4 2	3 10	4 3	3 9	4 4

Depth of Field: MI-26882-6 f/4.0, 203mm (8-inch)

Distance Focused On (Feet)	f/4.0		f/5.6		f/8.0		f/11.0		f/16.0		f/22.0	
	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.
INF.	541 3	inf.	386 10	inf.	271 1	inf.	197 5	inf.	136 0	inf.	99 2	inf.
150	117 11	206 6	108 7	243 2	97 2	331 9	85 10	610 4	71 11	inf.	60 4	inf.
75	66 2	88 8	62 2	92 5	59 2	102 8	54 10	119 3	48 11	163 3	43 4	294 2
50	46 0	54 10	44 6	57 0	42 7	60 9	40 4	66 1	37 1	77 5	33 10	97 8
30	28 7	31 7	28 0	32 4	27 3	33 5	26 4	34 11	24 11	37 9	23 6	41 10
25	24 0	26 1	23 7½	26 7	23 1	27 3	23 5	28 3	21 5	30 5	20 4	32 6
20	19 4½	20 8	19 1½	20 11½	18 9½	21 4¾	18 4½	21 11½	17 8½	23 0	17 0	24 4¾
15	14 8	15 4¼	14 6¼	15 6	14 4	15 8¾	14 1¼	16 ¼	13 8¾	16 6½	13 3¾	17 2½
12	11 9½	12 2½	11 8½	12 3¾	11 7¼	12 5¼	11 5½	12 7½	11 2½	12 11	11 11¼	13 3¾
9	8 10¾	9 1¼	8 10¼	9 1¾	8 9½	9 2¾	8 8½	9 3¾	8 7	9 5½	8 5¼	9 7¾

Depth of Field: MI-26882-7 f/4.0, 318mm (12½-inch)

Distance Focused On (Feet)	f/4.0		f/5.6		f/8.0		f/11.0		f/16.0		f/22.0		f/32.0	
	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.
INF.	1325 10	inf.	947 5	inf.	663 7	inf.	483 0	inf.	322 6	inf.	242 2	inf.	116 11	inf.
400	307 7	569 7	281 9	687 2	250 3	995 2	219 7	inf.	182 5	inf.	151 8	inf.	118 6	inf.
200	174 3	234 10	165 8	252 5	154 5	284 5	142 3	338 1	125 10	493 7	110 6	inf.	92 0	inf.
150	135 1	168 8	130 0	177 6	122 11	192 7	115 2	215 8	104 2	269 5	93 7	385 0	80 0	inf.
100	93 3	107 10	90 9	111 4	87 4	117 0	83 5	125 0	77 7	141 2	71 7	167 1	63 5	241 4
75	71 2	79 3	69 9	81 1	67 9	84 1	65 4	88 1	61 9	95 8	58 0	106 9	52 7	132 4
50	48 4	51 10	47 8	52 7	46 9	53 9	45 8	55 4	43 11	58 2	42 0	61 11	39 2	69 7
35	34 2	35 10	33 11	36 2	33 5	36 9	32 11	37 5	32 0	38 8	31 0	40 3	29 6	43 2
25	24 7	25 5	24 5	25 7	24 3	25 10	23 11	26 2	23 6	26 9	23 0	27 5	22 2	28 8
20	19 9	20 3	19 8	20 4	19 6	20 6	19 4	20 8	19 1	21 0	18 9	21 5	18 3	22 2

SPECIFICATIONS (Continued)

Depth of Field: MI-26882-8 f/4.0, 406mm (16-inch)

Distance Focused On (Feet)	f/4.0		f/5.6		f/8.0		f/11.0		f/16.0		f/22.0		f/32.0	
	ft.	in. to ft. in.	ft.	in. to ft. in.	ft.	in. to ft. in.	ft.	in. to ft. in.	ft.	in. to ft. in.	ft.	in. to ft. in.	ft.	in. to ft. in.
INF.	2167	9 inf.	1548	11 inf.	1084	9 inf.	789	5 inf.	543	3 inf.	395	7 inf.	272	6 inf.
750	556	7 inf.	505	1 inf.	443	7 inf.	385	1 inf.	315	9 inf.	259	9 inf.	200	8 inf.
400	338	4 489 3	318	8 537 3	293	2 630 2	266	7 804 1	231	7 inf.	200	2 inf.	163	4 inf.
200	183	6 219 10	117	8 228 11	169	6 244 0	160	4 266 0	147	2 313 2	133	11 398 0	116	7 727 6
150	140	7 160 9	137	2 165 7	132	4 173 3	126	9 184 0	118	5 205 2	109	9 238 1	97	11 325 7
100	95	10 104 7	94	3 106 7	91	11 109 8	89	3 113 9	85	1 121 5	80	7 132 0	74	2 154 8
75	72	8 77 6	71	9 78 7	70	5 80 2	68	11 82 4	66	5 86 2	63	9 91 4	59	8 101 5
50	49	0 51 1	48	7 51 6	48	0 52 2	47	4 53 0	46	2 54 7	44	11 56 6	42	11 60 1
35	34	6 35 6	34	4 35 8	34	1 36 0	33	9 36 5	33	2 37 1	32	6 37 11	31	6 39 5
28	27	8 28 4	27	7 28 5	27	5 28 7	27	2 28 10	26	10 29 3	26	6 29 9	25	10 30 8

Depth of Field: MI-26882-9 f/5.6, 559mm (22-inch)

Distance Focused On (Feet)	f/5.6		f/8.0		f/11.0		f/16.0		f/22.0		f/32.0	
	ft.	in. to ft. in.	ft.	in. to ft. in.	ft.	in. to ft. in.	ft.	in. to ft. in.	ft.	in. to ft. in.	ft.	in. to ft. in.
INF.	2885	10 inf.	2020	11 inf.	1470	6 inf.	1011	10 inf.	736	7 inf.	507	3 inf.
750	597	5 inf.	549	2 inf.	498	11 inf.	433	0 inf.	373	9 inf.	304	7 inf.
400	351	8 462 5	334	6 496 0	315	4 545 6	287	11 654 7	260	8 861 8	225	3 inf.
275	252	2 303 11	243	4 317 11	233	1 337 5	217	10 375 10	202	0 435 5	180	3 592 4
200	187	6 214 4	182	7 221 2	176	10 230 4	168	0 247 5	158	6 271 7	144	11 324 8
150	142	11 157 10	140	1 161 5	136	9 166 2	131	5 174 10	125	8 186 5	117	1 209 8
100	96	11 103 4	95	7 104 10	94	1 106 9	91	7 110 2	88	10 88 10	84	6 122 8
80	78	0 82 1	77	3 83 0	76	3 84 2	74	8 86 3	72	10 88 10	70	0 93 7
60	58	11 61 1	58	6 61 7	57	11 62 3	57	0 63 4	56	0 64 8	54	4 67 1
50	49	3 50 9	49	0 51 1	48	7 51 6	48	0 52 3	47	3 53 1	46	1 54 8

ORDERING INFORMATION

Stock Identification	Description	Lens Opening	Total Vertical Field Angle	Total Horizontal Field Angle
MI-26882-2	1.38" Ortol Lens.....	f/2.8	50°	38.6°
MI-26882-3	2" Ortol Lens.....	f/2.0	34.6°	28.0°
MI-26882-4	3" Ortol Lens.....	f/2.0	23.6°	19.2°
MI-26882-5	5" Ortol Lens.....	f/2.8	14.2°	11.4°
MI-26882-6	8" Ortol Lens.....	f/4.0	9.0°	7.2°
MI-26882-7	12 1/2" Ortol Lens.....	f/4.0	5.7°	4.5°
MI-26882-8	16" Ortol Lens.....	f/4.0	4.5°	3.6°
MI-26882-9	22" Ortol Lens.....	f/5.6	3.2°	2.6°

Fixed Focus Lenses

FOR 3-INCH IMAGE ORTHICON CAMERAS—TK-14 and TK-41



35mm
MI-826159

50mm
MI-826160

85mm
MI-826161

135mm
MI-826162

FEATURES

- Specifically selected for TV camera use
- High optical quality at economical cost
- Lightweight construction for easy turret manipulation
- Full range of focal length and speed to meet TV studio programming needs
- Color corrected for both color and monochrome television applications

DESCRIPTION

The Fixed Focus Lenses are specially designed for high quality optical performance with 3-inch image orthicon cameras. All lenses are fixed-focused at infinity and are available with focal lengths from 35 to 135mm. When used with RCA 3-inch image orthicon cameras, focus adjustment is provided by means of the camera focus carriage. These lenses feature high resolution which only superior optical design and workmanship can attain; varied focal length and adjustable speed which provide the high degree of flexibility required for TV programming; and precision design and lightweight construction which permit smooth, convenient turret manipulation. All lenses mount directly in the four-lens turret of both monochrome and color type RCA 3-inch image orthicon cameras. They have a mechanical back length of 28.9mm and are supplied with a lens hood for protection from random reflections.

SPECIFICATIONS AND ORDERING INFORMATION

Focal Length	Lens Opening	Aperture Dial Setting	Angle of View	Weight lb.	Length Inches	Stock Identification
35mm	f/2.0	2, 2.8, 4, 5.6, 8, 11, 16, 22	64°00'	3/4	4.25	MI-826159
50mm	f/1.8	1.8, 2, 2.8, 4, 5.6, 8, 11, 16, 22	46°06'	1/2	2.72	MI-826160
85mm	f/1.9	1.9, 2.8, 4, 5.6, 8, 11, 16	29°00'	1	4.66	MI-826161
135mm	f/3.5	3.5, 4, 5.6, 8, 11, 16, 22	18°00'	1	5.43	MI-826162

Standard and Telephoto Lenses

FOR 3-INCH IMAGE ORTHICON CAMERAS—TK-14 and TK-41



FEATURES

- Complete line of high quality lenses selected specifically for TV camera use
- Wide range of focal lengths provide flexibility in programming
- Lightweight construction provides minimum turret load, easy installation and removal
- Bayonet-type mounting of long focal length lenses permit quick exchange without screwing threaded mount
- Each lens includes variable iris opening, individual focus adjustment and engraved depth-of-field scale

DESCRIPTION

The variable focus lenses for 3-inch image orthicon cameras cover a broad range of focal lengths for both studio and field use. All lenses mount directly in the four-position turrets of RCA TV cameras. The lens group provides utmost versatility in television studio scenes, sporting events, dramatic closeups and fast action scenes . . . and makes possible the detailed pickup of objects varying in size, from a coin less than 3 inches from the lens, to a ball player located over 400 feet away.

The RCA series of camera lenses range in focal lengths from 1½ inches to 25 inches (35mm to 610mm). For purposes of description, the group of lenses will be divided into two classes (1) Standard Lenses for Television Studio and Field Use and (2) Telephoto Lenses for Television Field Use.

Long Focal Length Lenses for Field Use

The group of special lenses, frequently called telephoto lenses, include the 13-inch, 17-inch and 25-inch lens sizes.

All incorporate simplicity of design and lightweight construction. They are ideally suited for television field uses, sports pickup, etc. Focal lengths from 13 to 25 inches enable interesting closeup, particularly when the action is over 50 feet away. The design requirement of lightweight construction is met by use of a thin, lightweight barrel which is provided with a light baffle to prevent internal reflections of the lens tube. The 13-inch and 17-inch focal lengths employ Cooke three-element type lens design with all optical elements coated to improve shadow details and brilliancy in the image for both black-and-white and color television work. Each lens has an adjustable graduated iris diaphragm to permit stopping the lens to f/32. A locking clamp prevents accidental movement of settings. A rotatable lens hood is provided which can be easily removed, if desired. All lenses incorporate a quick-change, precision-machined bayonet mount which permits rapid interchange or removal of long lenses from the camera turret as desired. The 25-inch lens is supplied with a complete set of fixed iris diaphragms.

Standard Lenses (Studio and Field Use)

This group of lenses includes the 35mm, 50mm, 90mm, 135mm and 8½-inch sizes. The first four lenses in this group are of short focal length with a substantial depth of field and require little adjustment for closeup scenes. They are corrected for lateral and longitudinal chromatic aberration. The 8½-inch lens is similar in design to the long lenses described above—it features the same lightweight barrel, built-in iris and turret mounting bayonet adaptor. Focusing barrel adjustments, suited to RCA camera turret designs, permit the pre-setting of a given lens for closeups while other lenses remain at infinity focus. This avoids time-consuming re-adjustment of the focus knob for extreme

closeups. All lenses are threaded to receive standard filters and sunshades are available but not supplied.

The studio lenses employ an adjustable built-in iris and double threaded mountings of stainless steel for long wear and safety. Lenses are specially treated by a coating process which increases efficiency of light transmission, thus improving the clarity, brilliance and black and white contrast of pictures obtained. Lens elements are accurately assembled and positioned in mounts. Inside the mounts are light baffles which give added contrast by reducing flare. All lens barrels carry diaphragm scales and depth of field scales.

SPECIFICATIONS

Depth of Field: MI-26550-9 f/3.3, 35mm

Circle of Confusion, .002 in.

Distance* Focused On	f/3.3		f/5.6		f/8		f/11		f/16		f/22	
	ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.	
INF.	24 —	inf.	14 6	inf.	10 —	inf.	7 6	inf.	5 3	inf.	3 9	inf.
35 feet	14 6	inf.	10 3	inf.	8 —	inf.	6 3	inf.	4 6	inf.	3 6	inf.
15 feet	9 4	40 —	7 6	inf.	6 3	inf.	5 —	inf.	4 —	inf.	3 3	inf.
10 feet	7 3	17 9	6 —	32 —	5 3	inf.	4 4	inf.	3 6	inf.	2 9	inf.
8 feet	6 —	11 9	5 3	17 6	4 6	36 —	4 —	inf.	3 3	inf.	2 8	inf.
6 feet	4 9	7 9	4 4	10 —	3 9	14 —	3 6	29 —	3 —	inf.	2 6	inf.
5 feet	4 3	6 3	3 9	7 6	3 6	9 6	3 —	14 6	2 9	130 —	2 3	inf.
4 feet	3 6	4 8	3 3	5 4	3 —	6 4	2 9	8 —	2 4	16 —	2 —	inf.
3 feet	2 9	3 4	2 7	3 8	2 5	4 1	2 3	4 9	2 —	6 6	1 10	12 —
2 feet	1 10½	2 1¾	1 9¾	2 3	1 8¾	2 4	1 8	2 7	1 6½	3 —	1 5	3 8

Depth of Field: MI-26550-1 f/1.9, 50mm

Circle of Confusion, .002 in.

Distance* Focused On	f/1.9		f/2.8		f/4		f/5.6		f/11		f/22	
	ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.	
INF.	85 —	inf.	59 —	inf.	41 —	inf.	29 —	inf.	15 —	inf.	7 6	inf.
50 feet	32 —	120 —	27 —	inf.	23 —	inf.	19 —	inf.	11 9	inf.	6 9	inf.
25 feet	19 6	37 —	17 6	43 —	15 8	63 —	13 9	162 —	9 6	inf.	6 —	inf.
15 feet	12 9	17 9	12 —	20 —	11 —	23 —	10 —	32 —	7 9	inf.	5 3	inf.
10 feet	9 —	11 3	8 8	12 —	8 2	13 —	7 6	15 —	6 3	28 —	4 6	inf.
8 feet	7 4	8 9	7 1	9 2	6 10	9 10	6 5	10 9	5 4	16 4	4 —	inf.
6 feet	5 8	6 6	5 6	6 7	5 3	6 11	5 1	7 1	4 5	9 6	3 6	25 —
5 feet	4 9	5 3	4 8	5 4	4 6	5 7	4 4	5 10	3 11	6 6	3 2	13 —
4 feet	3 10¼	4 1¾	3 9¼	4 3	3 8¾	4 4½	3 7	4 6½	3 3	5 3	2 9	7 9
3 feet	2 11½	3 1	2 10¾	3 1½	2 10	3 2½	2 9	3 3	2 7	3 7	2 3	4 6
2 feet	1 11¾	2 ¾	1 11¾	2 ¾	1 11	2 1	1 10¾	2 1¼	1 9¾	2 2½	1 8¼	2 5¾

* Distances are measured from the subject to the image plane of the camera.

Depth of Field: MI-26550-2 f/3.5, 90mm

Circle of Confusion, .002 in.

Distance* Focused On	f/3.5		f/5.6		f/8		f/11		f/16		f/22	
	ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.	
INF.	150 —	inf.	94 —	inf.	66 —	inf.	48 —	inf.	33 —	inf.	24 —	inf.
200 feet	88 —	inf.	66 —	inf.	50 —	inf.	39 —	inf.	29 —	inf.	21 —	inf.
100 feet	62 —	350 —	50 —	inf.	41 —	inf.	33 —	inf.	25 —	inf.	20 —	inf.
50 feet	38 —	75 —	33 —	106 —	29 —	210 —	25 —	inf.	20 —	inf.	17 —	inf.
25 feet	22 —	29 —	19 6	33 —	18 4	39 —	16 8	50 —	14 6	96 —	12 8	inf.
15 feet	13 9	16 8	13 —	17 6	12 4	19 —	11 8	21 —	10 6	26 —	9 6	37 —
10 feet	9 6	10 8	9 —	11 —	8 9	11 8	8 6	12 4	7 10	13 9	7 4	16 3
8 feet	7 8	8 4	7 5½	8 8	7 3	9 —	7 —	9 4	6 8	10 3	6 3	11 4
6 feet	5 10	6 2½	5 8½	6 4	5 7	6 6	5 5	6 8	5 3	7 —	5 —	7 8
5 feet	4 10½	5 1½	4 9¾	5 2½	4 8¾	5 4	4 7½	5 5¾	4 6	5 8	4 4	6 —
4 feet	3 11	4 1	3 10½	4 1½	3 9¾	4 2½	3 9¼	4 3	3 8	4 4¾	3 6¾	4 6¾

Depth of Field: MI-26550-3 f/3.8, 135mm

Circle of Confusion, .002 in.

Distance* Focused On	f/3.8		f/5.6		f/8		f/11		f/16		f/22	
	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.
INF.	310	— inf.	250	— inf.	150	— inf.	130	— inf.	74	— inf.	54	— inf.
200 feet	119	— inf.	103	— inf.	85	— inf.	72	— inf.	54	— inf.	42	— inf.
100 feet	75	— 148	69	— 176	59	— inf.	52	— inf.	42	— inf.	35	— inf.
50 feet	42	— 59	40	— 65	37	— 75	34	— 90	30	— 148	26	— inf.
25 feet	23	— 27	22	6 28	22	— 29	21	— 32	19	— 36	17	6 44
15 feet	14	5 15	14	3 16	13	10 16	13	5 17	12	9 18	12	— 20
10 feet	9	9 10	9	8 10	9	6 10	9	4 10	9	— 11	8	9 11
8 feet	7	10 8	7	9 8	7	8 8	7	6 8	7	4 8	7	2 9
6 feet	5	10 7/8 6 1 1/8	5	10 1/2 6 1 1/2	5	9 7/8 6 2 1/8	5	9 6 3	5	8 6 4	5	6 6 6
5 feet	4	11 3/8 5 5/8	4	11 5 1	4	10 3/4 5 1 1/4	4	10 1/4 5 1 3/4	4	9 1/2 5 2 5/8	4	9 5 5
4 feet	3	11 3/8 4 3/8	3	11 3/8 4 5/8	3	11 1/8 4 7/8	3	10 7/8 4 1 1/8	3	10 1/2 4 1 1/2	3	10 1/8 4 2

Depth of Field: MI-26550-4 f/3.9, 8 1/2" Objective

Circle of Confusion, .003 in.

Distance Focused On (Feet)	f/3.9		f/5.6		f/8.0		f/11		f/16		f/22		f/32	
	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.
INF.	309	inf.	215	inf.	150	inf.	110	inf.	75	inf.	55	inf.	38	inf.
1000	236	inf.	177	inf.	131	inf.	99	inf.	70	inf.	52	inf.	36	inf.
500	191	inf.	150	inf.	116	inf.	90	inf.	65	inf.	49	inf.	35	inf.
200	121	568	104	2861	86	inf.	71	inf.	55	inf.	43	inf.	32	inf.
100	76	148	68	187	60	298	52	1156	43	inf.	35	inf.	27	inf.
50	43	60	41	65	38	75	34	92	30	149	26	578	22	inf.
	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.
25	23	2 27	22	5 28	21	5 30	20	4 32	18	9 37	17	2 46	15	74
15	14	3 15	14	3 16	13	8 16	13	2 17	12	6 18	11	9 20	10	9 24

Depth of Field: MI-26590-14 f/5.0, 13" Objective

Circle of Confusion, .003 in.

Distance Focused On (Feet)	f/5.0		f/6.3		f/8.0		f/11		f/16		f/22		f/32	
	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.
INF.	470	inf.	373	inf.	293	inf.	213	inf.	147	inf.	107	inf.	73	inf.
1000	484	inf.	427	inf.	370	inf.	299	inf.	227	inf.	176	inf.	128	inf.
500	326	1070	299	1520	270	3380	230	inf.	185	inf.	150	inf.	113	inf.
200	165	254	158	273	149	303	136	376	119	628	103	3185	85	inf.
100	91	112	88	116	85	121	81	131	75	152	68	188	60	314
50	48	53	47	54	46	55	45	57	43	60	41	65	37	76
	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.
25	24	5 25	24	2 25	24	2 26	23	7 26	23	3 27	22	5 28	31	5 30
15	14	9 15	14	9 15	14	8 15	14	6 15	14	3 15	14	16 15	13	7 16

Depth of Field: MI-26590-15 f/5.7, 17" Objective

Circle of Confusion, .003 in.

Distance Focused On (Feet)	f/5.6		f/6.3		f/8.0		f/11		f/16		f/22		f/32	
	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.
INF.	717	inf.	637	inf.	502	inf.	365	inf.	251	inf.	183	inf.	126	inf.
1000	589	3307	560	4646	501	inf.	422	inf.	334	inf.	267	inf.	201	inf.
500	371	768	359	823	334	996	297	1588	250	inf.	211	inf.	167	inf.
200	176	232	173	237	166	250	157	276	143	333	129	443	111	986
100	94	108	93	109	91	111	88	116	83	125	79	138	72	166
	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.	ft. in.	to ft. in.
50	48	3 51	48	1 52	47	7 52	46	10 53	45	6 55	44	57 11	41	9 62
25	24	7 25	24	6 25	24	5 25	24	2 25	23	10 26	23	5 26	22	9 27

Depth of Field: MI-26550-8 f/5.6, 25" Objective

Circle of Confusion, .003 in.

Distance Focused On (Feet)	f/5.6		f/6.3		f/8.0		f/11		f/16		f/22		f/32	
	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.	ft.	to ft.
INF.	1669	inf.	1378	inf.	1085	inf.	789	inf.	542	inf.	394	inf.	271	inf.
1000	770	1428	734	1570	685	1855	612	2729	520	inf.	441	inf.	352	inf.
500	435	588	423	611	406	650	380	732	342	927	306	1365	260	6382
200	189	213	187	216	183	220	178	229	167	245	160	268	146	317
100	97	103	96	104	95	105	94	107	92	110	89	115	84	123
	ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.		ft. in. to ft. in.	
50	49 3	50 10	49 1	50 11	48 11	51 2	48 6	51 7	47 10	52 5	47	53 5	45 10	55 1
25	24 10	25 2	24 10	25 2	24 9	25 3	24 7	25 5	24 5	25 7	24 3	25 10	23 11	26 2

ORDERING INFORMATION

Stack Identification	Description	f No.	Full Vertical Field Angle	Total Horizontal Field Angle*
MI-26550-9	Studio Camera Lens, 35mm.....	f/3.3	38°	48.5°
MI-26550-1	Studio Camera Lens, 50mm.....	f/1.9	27°	35°
MI-26550-2	Studio Camera Lens, 90mm.....	f/3.5	15°	20°
MI-26550-3	Studio Camera Lens, 135mm.....	f/3.8	10°	13.3°
MI-26550-4	Studio and Field Camera Lens, 8½".....	f/3.9	6.47°	8.4°
MI-26590-14	Field Camera Lens, 13".....	f/5.0	4.23°	5.5°
MI-26590-15	Field Camera Lens, 17".....	f/7.0	3.23°	4.17°
MI-26550-8	Field Camera Lens, 25".....	f/5.0	2.20°	2.83°

* Field angle applies for use with Monochrome Cameras only; to calculate angle for Color Camera divide by 1.1.

FIELD LENSES FOR TK-41 COLOR CAMERAS
DESCRIPTION

The MI-40802 Series of Field Lenses are required to complement the normal (objective) lenses used with the RCA TK-41 Color Camera. The field lenses serve to redirect all of the light reaching the image plane from the objective lens so that it will enter the relay lens system of the color camera. This insures uniform illumination of the relayed image. The size of the primary image is not changed by the field lens.

The field lenses range in diopter power from 24.7 to 4.5. In general, a field lens having a different power is required for each objective lens. Occasionally, however, the same field lens can be used satisfactorily with more than one objective lens. The field lenses designed for each of the objective lenses used are mounted on a spider located directly behind the lens turret support drum. This spider rotates with the lens turret as lens positions are changed. All the field lenses are designed with identical thickness and location to avoid changes in the position of the primary image as lenses are interchanged.

Field lenses are made of spectacle crown glass of finest quality, precision centered and edged. Each is 1.812 inches in diameter with ½mm beveled edge and is ½ inch thick

at the central point. Both surfaces have a baked magnesium fluoride coating for minimum green reflection at normal incidence.

Each field lens is set in a brass lens assembly consisting of a lens holder approximately 3 inches in diameter before knurling, with lens cap and a mask. Each of the lens elements are accurately assembled and positioned. All lens holders carry stencilled diopter power markings.

Ordering Information

- Field Lens (20.0 diopter) for 50mm objective lens.....MI-40802-A1
- Field Lens (13.5 diopter) for 85mm, 90mm and 135mm objective lensMI-40802-A2
- Field Lens (7.0 diopter) for Electro Zoom and also 8½ objective lens.....MI-40802-A3
- Field Lens (5.75 diopter) for 13", 15", 17" and Berthiot Zoom objective lenses.....MI-40802-A4
- Field Lens (4.5 diopter) for 25" objective lens.....MI-40802-A5
- Field Lens (16.5 diopter) for 75mm objective lens.....MI-40802-A6
- Field Lens (24.7 diopter) for 35mm objective lens.....MI-40802-A7

Vidicon Camera Lenses

MI-36316 SERIES



FEATURES

- Distinguished for clarity of detail, faithfulness to subject and extreme depth of focus
- Built-in hood protects against lens flare
- Varied lens speeds and focal lengths provide necessary flexibility for indoor or outdoor applications
- Precision design—lightweight construction
- Focusing mount included with all lenses

DESCRIPTION

A complete set of Vidicon Camera Lenses are stocked by RCA to provide a wide variety of professional quality lenses for industrial, educational, medical, military and other closed circuit television applications. These lenses incorporate all of the latest optical refinements and combine precision design with sturdy mechanical construction. A complete selection of normal, wide-angle and telephoto lenses is available to complement RCA's extensive line of vidicon camera equipment. All lenses are furnished in focusing C-mounts and include an adjustable iris. In addition, all lenses are specially coated to produce sharp, high-contrast images. The MI-36316 series includes normal, wide angle and telephoto lenses for use on any vidicon camera with a 1"—32 thread, 16mm, C-mount.

SPECIFICATIONS

Description	Stock Identification	Focal Length	Focusing Scale	Aperture		Filter Size	Where Used
				From	To		
STANDARD LENSES							
Wide-Angle Lens	MI-36316-12	12mm	1½ ft. to inf.	f/1.2	f/16.0	#5.5	TV-Eye, TK-202, TK-21C
Wide-Angle Lens	MI-36316-13	13mm	1 ft. to inf.	f/1.5	f/16.0	#6	TV-Eye, TK-202, TK-21C
Normal Lens	MI-36316-25	25mm	2 ft. to inf.	f/1.5	f/16.0	#4.5	TV-Eye, TK-202, TK-21C
Medium Telephoto Lens	MI-36316-50	50mm	2 ft. to inf.	f/1.5	f/22.0	#5.5	TV-Eye, TK-202, TK-21C
Telephoto Lens	MI-36316-75	75mm	3 ft. to inf.	f/1.9	f/22.0	#7	TV-Eye, TK-202, TK-21C
Telephoto Lens	MI-36316-102	102mm	1½ ft. to inf.	f/2.7	f/22.0	#6	TV-Eye, TK-202, TK-21C

Table of Field Sizes for 16mm Vidicon Camera Lenses

Distance from Lens to Subject in Feet	9.5mm (3/8")		12mm (31/64")		13mm (33/64")		25mm (1")		50mm (2")	
	Height	Width	Height	Width	Height	Width	Height	Width	Height	Width
2	1'-8"	2'-2"	1'-4"	1'-9"	1'-2"	1'-7"	0'-8"	0'-10"	0'-4"	0'-5"
3	2'-8"	3'-6"	2'-1"	2'-9"	1'-11"	2'-7"	1'-0"	1'-4"	0'-6"	0'-8"
4	3'-9"	4'-10"	2'-11"	3'-10"	2'-8"	3'-6"	1'-4"	1'-10"	0'-8"	0'-11"
5	4'-10"	6'-7"	3'-11"	5'-2"	3'-8"	4'-10"	1'-10"	2'-6"	0'-11"	1'-3"
6	5'-11"	7'-11"	4'-8"	6'-3"	4'-4"	5'-9"	2'-2"	3'-0"	1'-1"	1'-6"
7	6'-11"	9'-2"	5'-5"	7'-3"	5'-1"	6'-9"	2'-6"	3'-6"	1'-3"	1'-9"
8	7'-11"	10'-6"	6'-3"	8'-4"	5'-9"	7'-8"	3'-0"	4'-0"	1'-6"	2'-0"
9	8'-11"	11'-10"	7'-0"	9'-4"	6'-6"	8'-8"	3'-4"	4'-6"	1'-8"	2'-3"
10	9'-11"	13'-2"	7'-10"	10'-5"	7'-2"	9'-7"	3'-10"	5'-0"	1'-11"	2'-6"
12	11'-10"	15'-9"	9'-5"	12'-6"	8'-8"	11'-6"	4'-7"	6'-0"	2'-3"	3'-0"
14	13'-10"	18'-5"	10'-11"	14'-7"	10'-2"	13'-6"	5'-4"	7'-0"	2'-8"	3'-6"
16	15'-9"	21'-0"	12'-6"	16'-8"	11'-7"	15'-5"	6'-0"	8'-0"	3'-0"	4'-0"
18	17'-9"	23'-8"	14'-1"	18'-10"	13'-0"	17'-4"	6'-9"	9'-0"	3'-5"	4'-6"
20	19'-9"	26'-4"	15'-8"	20'-10"	14'-5"	19'-3"	7'-6"	10'-0"	3'-9"	5'-0"
25	24'-8"	32'-11"	19'-8"	26'-3"	18'-0"	24'-0"	9'-4"	12'-6"	4'-8"	6'-3"
30	29'-11"	39'-1"	23'-5"	31'-2"	21'-8"	28'-10"	11'-2"	15'-0"	5'-7"	7'-6"
35	34'-7"	46'-1"	27'-4"	36'-5"	25'-3"	33'-8"	13'-1"	17'-6"	6'-6"	8'-9"
40	39'-8"	52'-8"	31'-2"	41'-7"	28'-11"	38'-6"	15'-0"	20'-0"	7'-6"	10'-0"
45	44'-5"	59'-3"	35'-2"	46'-10"	32'-5"	43'-3"	16'-11"	22'-6"	8'-5"	11'-3"
50	49'-4"	65'-9"	39'-0"	52'-0"	36'-0"	48'-0"	18'-8"	25'-0"	9'-4"	12'-6"
60	59'-2"	78'-11"	46'-10"	62'-5"	43'-3"	57'-8"	22'-6"	30'-0"	11'-3"	15'-0"
70	69'-1"	92'-0"	54'-8"	72'-10"	50'-5"	67'-3"	26'-2"	35'-0"	13'-1"	17'-6"
80	78'-11"	105'-3"	62'-5"	83'-2"	57'-8"	76'-11"	30'-0"	40'-0"	15'-0"	20'-0"
90	88'-10"	118'-5"	70'-2"	93'-7"	64'-11"	86'-6"	33'-10"	45'-0"	16'-11"	22'-6"
100	98'-8"	131'-7"	78'-0"	104'-0"	72'-0"	96'-0"	37'-6"	50'-0"	18'-9"	25'-0"

Distance from Lens to Subject in Feet	75mm (3")		102mm (4")		125mm (5")		150mm (6")		200mm (8")	
	Height	Width	Height	Width	Height	Width	Height	Width	Height	Width
2	0'-3"	0'-4"	0'-2"	0'-3"	0'-1"	0'-2"	—	—	—	—
3	0'-4"	0'-6"	0'-3"	0'-5"	0'-2"	0'-3"	—	—	—	—
4	0'-6"	0'-8"	0'-4"	0'-6"	0'-3"	0'-4"	—	—	—	—
5	0'-8"	0'-10"	0'-6"	0'-8"	0'-4"	0'-6"	—	—	—	—
6	0'-9"	1'-0"	0'-7"	0'-9"	0'-5"	0'-7"	0'-4"	0'-6"	—	—
7	0'-10"	1'-2"	0'-8"	0'-11"	0'-6"	0'-8"	0'-5"	0'-7"	—	—
8	1'-0"	1'-4"	0'-9"	1'-0"	0'-7"	0'-10"	0'-6"	0'-8"	—	—
9	1'-1"	1'-6"	0'-10"	1'-2"	0'-8"	0'-11"	0'-6"	0'-9"	—	—
10	1'-3"	1'-8"	0'-11"	1'-3"	0'-9"	1'-0"	0'-7"	0'-10"	—	—
12	1'-6"	2'-0"	1'-1"	1'-6"	0'-11"	1'-2"	0'-9"	1'-0"	0'-6"	0'-9"
14	1'-9"	2'-4"	1'-4"	1'-9"	1'-1"	1'-5"	0'-11"	1'-2"	0'-6"	0'-9"
16	2'-0"	2'-8"	1'-6"	2'-0"	1'-2"	1'-7"	1'-0"	1'-4"	0'-9"	1'-0"
18	2'-3"	3'-0"	1'-8"	2'-3"	1'-4"	1'-10"	1'-2"	1'-6"	0'-10"	1'-1"
20	2'-6"	3'-4"	1'-10"	2'-6"	1'-6"	2'-0"	1'-3"	1'-8"	0'-11"	1'-3"
25	3'-2"	4'-2"	2'-4"	3'-2"	1'-10"	2'-6"	1'-7"	2'-1"	1'-2"	1'-7"
30	3'-9"	5'-0"	2'-10"	3'-9"	2'-3"	3'-0"	1'-10"	2'-6"	1'-4"	1'-10"
35	4'-5"	5'-10"	3'-3"	4'-5"	2'-8"	3'-6"	2'-2"	2'-11"	1'-8"	2'-3"
40	5'-0"	6'-8"	3'-9"	5'-0"	3'-0"	4'-0"	2'-6"	3'-4"	1'-10"	2'-6"
45	5'-8"	7'-6"	4'-3"	5'-8"	3'-5"	4'-6"	2'-10"	3'-9"	2'-2"	2'-10"
50	6'-3"	8'-4"	4'-9"	6'-3"	3'-9"	5'-0"	3'-2"	4'-2"	2'-4"	3'-1"
60	7'-6"	10'-0"	5'-8"	7'-6"	4'-6"	6'-0"	3'-9"	5'-0"	2'-10"	3'-9"
70	8'-9"	11'-8"	6'-7"	8'-9"	5'-3"	7'-0"	4'-5"	5'-10"	3'-4"	4'-5"
80	10'-0"	13'-4"	7'-6"	10'-0"	6'-0"	8'-0"	5'-0"	6'-8"	3'-9"	5'-0"
90	11'-3"	15'-0"	8'-5"	11'-3"	6'-9"	9'-0"	5'-7"	7'-6"	4'-2"	5'-7"
100	12'-6"	16'-8"	9'-4"	12'-6"	7'-6"	10'-0"	6'-3"	8'-4"	4'-8"	6'-3"

Varotal Lenses



Studio Varotal V Lens mounted on RCA Type TK-60A TV Camera.

FEATURES

- Variable focal length lens for either color or monochrome RCA cameras
- Optical quality comparable to high-quality fixed focal length lenses
- Continuously variable focal length
- Constant optical speed throughout range
- Fully color corrected
- Smooth, precise lever action provided for manual control
- Easily installed or removed from camera

DESCRIPTION

The Studio Varotal V and Outdoor Varotal III are variable focal length lenses designed to cover the full range of focal lengths normally used for television programming. By eliminating the need to switch to a second camera for change of lens turret position, the Varotals provide means of producing a variation of close-up and distance "shots" with only one camera. The lenses enable observation of detailed processes without the loss of continuity entailed in changing lenses. In addition, dramatic effects may be obtained by "zooming" from a distance shot to a close-up of one portion of the scene, or from a close-up view to a distance shot.

Outdoor Varotal III

The Outdoor Varotal III Lens has been designed for versatile use in studios or on remotes. It features a unique dual range change from 4 to 20 inches and from 8 to 40 inches by means of a small lever on the lens—without change of rear element or loss of picture focus. High quality definition is achieved and the lens is fully color corrected and designed for use on both color or monochrome cameras. Minimum object distance for which the entire zoom range is available is twelve feet, and a close-up adaptor is available for reducing the minimum object distance to six feet.

The zoom and focus controls for the Varotal III are combined in a lever mechanism which mounts on a bracket attached to the rear of the camera. The controls are mechanically coupled to the lens by means of a pair of flexible cables and a precision gearbox which is mounted on the lens. Zoom control is provided by rotation of the lever. Focus control is provided by rotation of a knob mounted on the zoom control lever. The direction of rotation of the focus knob, with respect to focusing action, corresponds to that of the regular camera focus knob, for ease and familiarity of operation. An adjustable friction brake is provided to vary the amount of pressure required to operate the zoom control in accordance with individual operator preference. This brake may also be used to lock the zoom control at any desired point within the zoom range.

Varotal V

The Varotal V is a new Zoom lens with a focal length range of 1.6 to 16 inches and a relative aperture of f/4.0 to f/22.0 throughout the zoom range. The focal length and optical speed of this lens make it suitable for both studio and outside broadcast use. The linear iris mechanism conforms to all requirements for adjustment by an iris motor drive system or manual operation. The separate zoom and focus control of the lens are mechanically coupled to the lens by two separate flexible cables. The

zoom mechanism is mounted on a bracket at the right rear of the camera, and a lever on this control adjusts the focal length of the lens. A knob is attached to this lever for adjustment of zoom friction and may be used to lock the iris at any point within the zoom range. The zoom mechanism is a dual speed device which has two output couplings permitting a choice of zoom speeds by attaching the control cable to the desired output coupling. The focus control handle is attached to the camera pan and tilt head handle at left rear of the camera and is coupled to the lens by a flexible cable. The Varotal V lens requires a field lens when used on a TK-41 Color Camera.

Three range extenders and a close-up adaptor are available as accessories for the Varotal V. The extenders change the range of the basic lens to 2.4 to 24 inches, f/6.0; 3.2 to 32 inches, f/8.0; and 4.8 to 48 inches, f/12.0. The close-up adaptor has a minimum object distance of three feet.

The Varotal III and V are mounted on the RCA TK-11, 31 and TK-14 monochrome TV Cameras by means of a special mounting plate which is readily installed in place of the standard camera turret. Either lens may be mounted directly on the TK-60 camera turret. Control cables and a suitable mounting bracket for the zoom and focus control mechanism are supplied with the lens. Ordering information should specify the type of RCA camera on which the lens is to be mounted.

SPECIFICATIONS

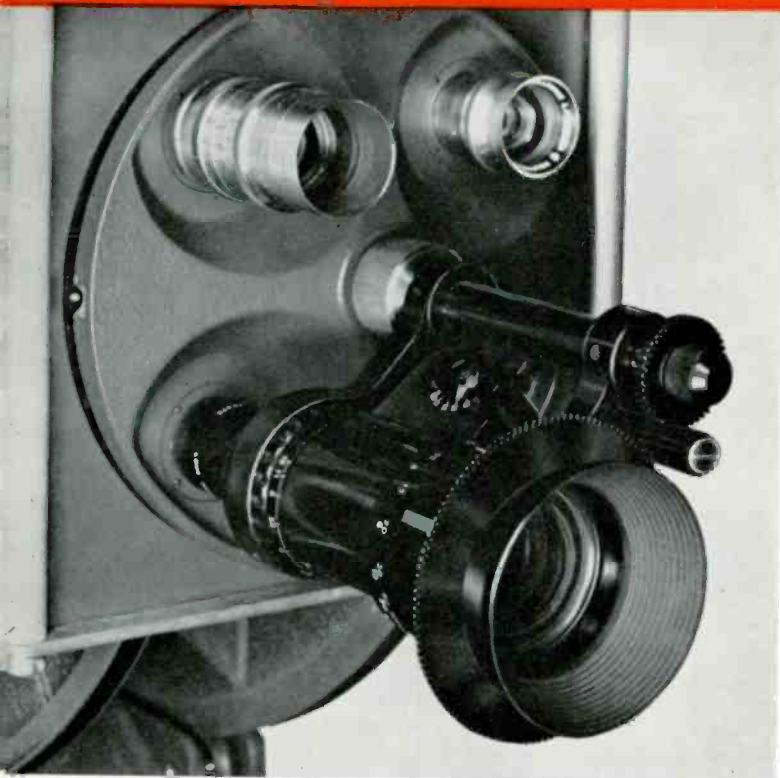
	<i>Varotal III</i>	<i>Varotal V</i>
Facal Length Range	4 to 20" and 8 to 40", range selected by lever	1.6 to 16"
Optical Speed	f/4.0 to f/45.0 f/8.0 to f/32.0	f/4.0 to f/22.0
Object Distance	12 feet to infinity	6 feet to infinity
Length (face of turret to end of lens)	25¼"	17"
Approximate Weight:		
Basic Optical Unit	33 lbs. (68 lbs. in transit case)	15 lbs.
Control Lever and Cables	4 lbs.	5 lbs.
ORDERING INFORMATION	Order as Varotal III and specify RCA Type Camera	Order as Varotal V and specify RCA Type Camera

Accessories

Range Extender 1	----	2.4 to 24" at f/6.0
Range Extender 2	----	3.2 to 32" at f/8.0
Range Extender 3	----	4.8 to 48" at f/12.0
Close-up Adaptor	Min. object distance 6 ft.	Min. object distance 3 ft.
Field Lens for RCA TK-41 Color Camera	MI-40802-A3	MI-40802-A3

Vidicon Studio Zoom Lens

FOR TK-15 TV CAMERA



FEATURES

- Provides greater camera flexibility
- 4 to 1 zoom range
- Sharp focus through entire focal range
- High resolution and contrast at all lens settings
- Simple turret mounting for rigidity and ease of installation

SPECIFICATIONS

Minimum Focal Length.....	23mm (1")
Maximum Focal Length.....	115mm (4")
Aperture Range (f constant over zoom range).....	f/2.6 to f/16
Normal Area Covered.....	9 by 12mm
Maximum Diagonal Covered.....	17.5mm
Distance Range:	
Without Close-up Lens.....	Infinity to 5 ft.
With 0.5 Diopter Close-up Lens*.....	6.5 ft. to 3.75 ft.
With 1.0 Diopter Close-up Lens*.....	3.50 ft. to 2.50 ft.

*Not supplied with lens but available as accessories.

DESCRIPTION

The Type L-20 Berthiot Pan-Cinor Lens is a high quality manually operated zoom lens for use on Vidicon studio cameras. The L-20 is a large aperture lens designed to permit operation under adverse lighting conditions. It offers constant brightness while zooming, excellent image sharpness at all optical lengths, and reliable operation.

The Berthiot L-20 Zoom Lens exhibits excellent resolution and contrast throughout the zoom range even at maximum aperture and maintains focus exceptionally well. The lens is equipped with a continuously variable iris diaphragm calibrated in "f" stops and is adjustable between f/2.6 and f/16. The optical speed of the lens remains constant at the value indicated by the aperture adjustment throughout the entire zoom range.

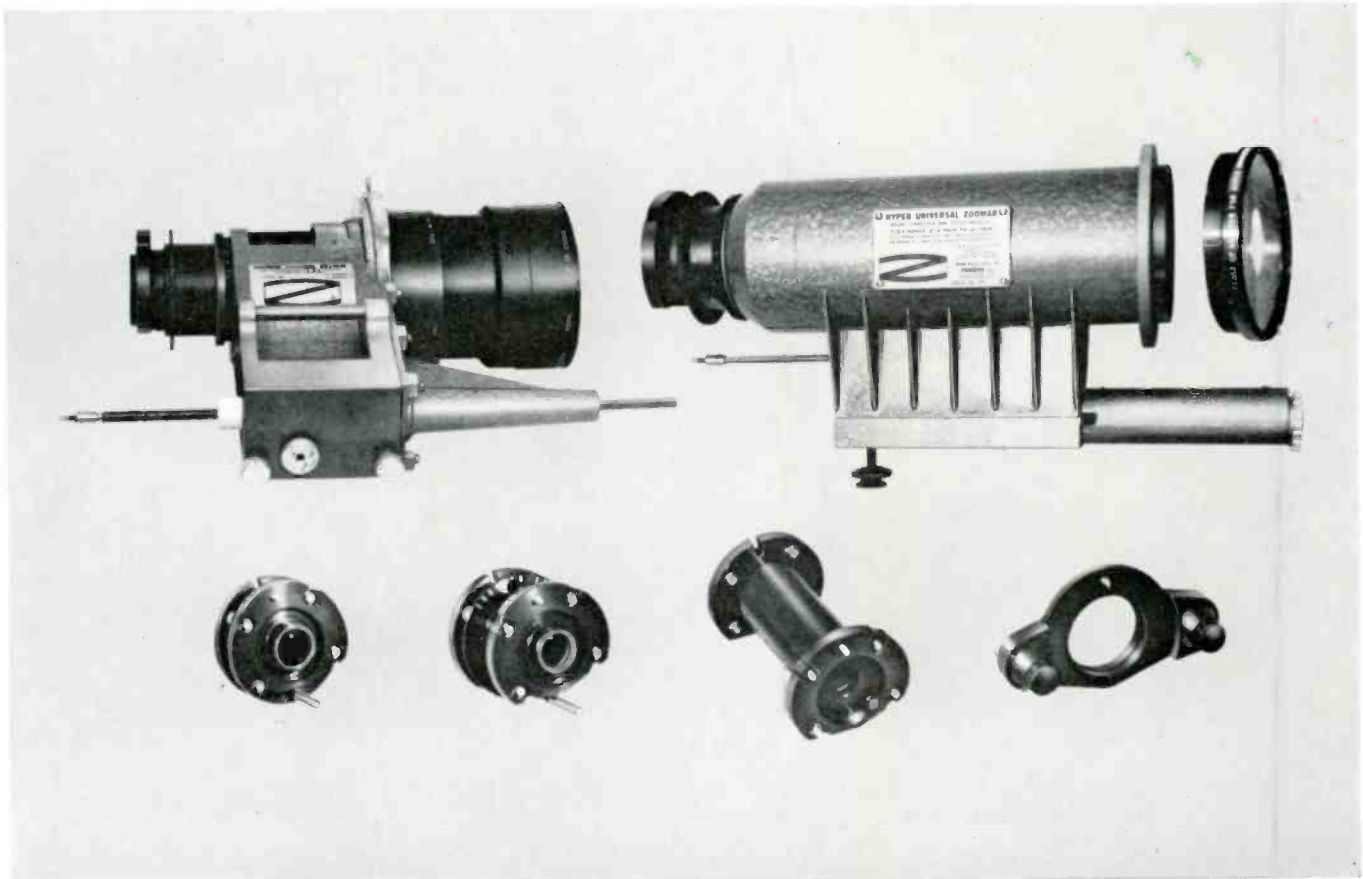
The lens is provided with a lens shade and holder for front lens or filter. The lens is operated mechanically from the rear of the camera by means of a rod. The zoom action is controlled by a push-pull movement and lens focus by rotating a knob on the end of the rod. The lens is designed to fit the rotatable lens turrets of the RCA Type TK-15 Vidicon Studio cameras. Other free lens sockets of the camera turret can be used to accommodate fixed type lenses. The L-20 lens focus range is from infinity to 5 feet. Adaptors which mount on the front of the zoom lens can be ordered separately for close camera work. An 0.5 diopter lens permits focus down to 3¾ feet. A 1.0 diopter lens permits focus down to 2½ feet.

Back Focus (distance from rear lens to image plane).....	41.17mm
Total Length (from image plane to front of lens).....	232mm
Size of Drop-in Filter.....	75mm
Weight.....	3⅝ lbs.

Ordering Information

Berthiot Zoom Lens.....Type L-20

Television Zoomar Lenses



Upper left—Angenieux Zoomar Lens, Model 10-2-1-B and upper right, Hyper Universal Zoomar with its close-up adaptor. Both lenses fit 4½-inch I.O. cameras. Lower row shows Converters #1, #2 and #3 respectively and an Interchangeable Adaptor which permits use of the lenses with 3-inch I.O. cameras. These four items are available as accessory equipment.

FEATURES

- Completely color balanced and corrected for monochrome and color cameras
- Conversion of zoom ranges by means of quick-change adaptor
- Zoom operations and focus adjustment combined in single control rod
- Self-supporting—no external bracing necessary
- Maintains optical speed throughout zoom

DESCRIPTION

Television Zoomar Lenses greatly facilitate programming by eliminating many problems of camera location and by reducing the number of cameras required to cover an event. Two types of Zoomar lenses are available to fit all RCA Image Orthicon Cameras for studio or field operation.

The Angenieux Zoomar has a basic range of 35 to 350mm at a speed of $f/3.8$ and a transmission of $T/4.5$. It will zoom through its entire range at any object distance from 3 feet to infinity. The resolution and frequency response of the lens makes it the equal or superior of most fixed focus lenses.

The Hyper Universal Zoomar basic lens zooms from 57 to 400mm at a speed of $f/3.9$. Its range of object distance is from 16 feet to infinity. An oil damping device at the base of the lens permits the operator to vary the tension



The Model 10-2-1-B Angenieux Zoomar Lens shown mounted directly to turret of RCA TK-60A I.O. Camera. Control rod governs both zoom and focus of these versatile lenses.

or drag on the zoom rod. This lens is supplied with a close-up adaptor providing a minimum focus distance of 4 or 6 feet to infinity.

Both Zoomar lenses are designed for use with 4½-inch Image Orthicon cameras. An accessory interchangeable adaptor is available to permit use of the lenses with 3-inch Image Orthicon TV cameras. All zoomars are color balanced and color corrected. The lenses are moderate in size and weight and are designed to mount directly on the camera lens turret. Zoom and focus control are provided by means of a rod which passes along or through the camera to the rear. Zoom adjustment is performed by moving the rod in or out, and focus is adjusted by rotating the same control rod. Both lenses have a geared iris ring for operation by the iris drive mechanism of an RCA TK-60 Camera. A series of converters for range extension are available for use with either type Zoomar lens to allow increased versatility of programming.

SPECIFICATIONS

	Angenieux Zoomar Model 10-2-1B	Hyper Universal Zoomar
Zoom Range and Speed:		
Basic Lens	35 to 350mm, f/3.8	2.5 to 16", f/3.9
*With Converter #1	2.45 to 22.5", f/5.6	4 to 25", f/5.6
*With Converter #2	3.6 to 26", f/8.0	6.5 to 40", f/8.0
*With Converter #3	5.7 to 57", f/11.0	11.5 to 70", f/11.0
Object Distance:		
Basic Lens	3 ft. to infinity	16 ft. to infinity
Lens With All Converters	3 ft. to infinity	16 ft. to infinity
Lens With Close-up Adaptor	—	4 to 6 ft. to infinity
Mounting Provision, basic lens	Quick Change Mount for 4½" I.O. Cameras	Quick Change Mount for 4½" I.O. Cameras
Method of Mounting to 3" I.O. Cameras	*Interchangeable Adaptor	*Interchangeable Adaptor
Length (basic lens, less converters)	17"	17.5"
Weight (basic lens only)	25 lbs.	12 lbs.

* Not supplied with lens but available as accessories.

Counterbalanced Camera Pedestal

TYPE TD-3A



FEATURES

- Easily operated by one man
- Dual rubber-tired wheels for extra stability
- Counterbalanced camera is easily raised or lowered
- Storage compartments in base for extra weights, tools, etc.
- Arrows on steering wheel show direction of wheels
- Adjustable guards prevent wheels from running into cables
- Drag clutch to suit individual requirements

DESCRIPTION

The Counterbalanced Camera Pedestal, TD-3A, offers complete mobility to cameras for normal studio requirements and needs only the cameraman to operate. The Pedestal provides for smooth, running dolly shots, raising and lowering of the camera while on the air, and smooth horizontal and vertical panning when used with Cradle Head, MI-26203-A. It gives a firm, stable mount to television cameras, resulting in more versatile operation and steadier pictures. The TD-3A has been especially designed for use in the studio and in other indoor places where telecasts might be made. It provides special safety features for both operators, and programming equipment cables and studio props.

The Pedestal is quickly and easily moved in any direction by the cameraman. A steering wheel, which is directly below the camera at all heights, guides the three sets of dual wheels. Two types of steering are available:

- (1) Synchronous steering in which all wheels are locked parallel and turn simultaneously. This is best for tracking in a straight line.
- (2) Tricycle steering in which only the forward wheel turns with the steering wheel; the back wheels are locked parallel. This enables the Pedestal to be turned sharply in any direction.

The Pedestal may be changed instantly from one type of steering to the other without displacement of the camera. Six hard-rubber-tired wheels are mounted in pairs and equipped with ball bearings for smooth and silent rolling. Wheel cable guards can be raised or lowered as desired.

Since the camera is carefully counterbalanced with adjustable weights, it may be raised or lowered simply by lifting or pushing on the steering wheel or camera. Additional camera weight such as large lenses, lights, etc., is easily compensated for by the use of additional weights to counterbalance. A drag clutch is provided to suit individual requirements. A brake locks the column at any desired height. Raising, lowering, locking or drag adjustment can be made by the cameraman anywhere in the 360 degree position of the Pedestal without his having to stoop or bend. This makes it possible to raise or lower the camera while the Pedestal is in motion.

The Pedestal base is made of arc-welded steel; the center column of seamless steel tubing. It is finished in gray hammertone; the trim and steering wheel of satin chrome.



Arrows on steering wheel show direction of wheels.
Lower ring locks column and controls drag.

SPECIFICATIONS

Overall Dimensions (not including Friction Head):	
Height (maximum)	57"
Height (minimum)	36"
Base Width (Maximum)	38 1/4"
	(Will pass through doorway 34 1/2" wide)
Net Weight	596 lbs.
Shipping Weight	750 lbs.

Ordering Information

TD-3A Pedestal, completely assembled, with lead counterweights stored in base storage compartments.....MI-26036

Accessories

Cradle HeadMI-26203-A
Counterweights for TD-3A (required for TK-60 Cameras).....MI-26351



◀ Pedestal with housing removed, showing placement of lead weights for counterbalancing camera.



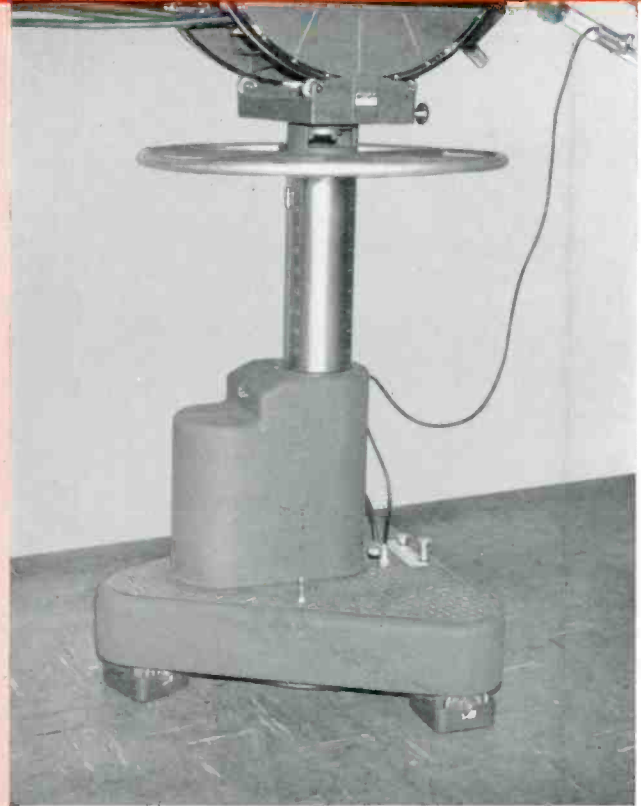
▶ Storage compartments in base provide convenient space for extra lead weights, tools, etc.

Motor Driven Camera Pedestals

TYPES TD-9AC & TD-9AM

FEATURES

- Motor driven lift mechanism provides new ease and smoothness of operation—allows cameraman to raise or lower camera without taking hands off camera control
- Height adjustable from 34 to 54 inches
- Lightweight — yet sturdily constructed to carry all types of studio cameras
- Seven-second cycling from maximum low to maximum high
- 1/3 h.p. drive mechanism shock mounted in sound proof casing
- Synchronous and tricycle steering offers complete mobility in small areas



DESCRIPTION

RCA Motor Driven Camera Pedestals are designed to provide convenient mounting with maximum maneuverability for TV cameras. Two models are available. The TD-9AC with large 34-inch steering wheel, is designed to mount color television cameras, and the TD-9AM, with 25-inch diameter steering wheel, is specified for monochrome and smaller type cameras. The pedestals are identical except for size of the steering wheel. The steering wheels are interchangeable so that one pedestal can be used for either color or monochrome cameras.

The pedestals provide two types of steering: synchronous, in which all wheels are locked parallel and turn simultaneously; or tricycle, in which only the forward wheel turns with the steering wheel and the back wheels are locked parallel. The former is best for tracking in a straight line, the tricycle steering enables the pedestal to be turned sharply in any direction.

Pedestal height is controlled by a 1/3 h.p. motor which operates through a reduction gear and lifting cable. The entire drive mechanism is shock mounted and encased in a sound proof casing. The casing has three suit-case type catches which open for easy access to motor, relays, and associated control mechanism. The drive mechanism is operated by a single two-way (nominally off) control switch. The camera can be raised from lowest to highest position in 7 seconds. The direction is instantly reversible.

The pedestal has a ruggedly constructed re-inforced metal base which will pass through 35-inch doorways. The column is of seamless tubing, and a special column head casting permits accessibility to the tilt or cradle head mounting nut. The base contains the a-c power socket and control cable connector. It rolls quietly on rubber-tired wheels. Adjustable cable guards are provided on each wheel to protect cables and other studio equipment.

SPECIFICATIONS

Overall Dimensions (not including cradle head):

Height.....	53 3/4" max., 34 1/2" min.
Width and Depth (maximum at base).....	38 1/4"
Width and Depth (minimum at base).....	35"
Net Weight.....	365 lbs.
Shipping Weight.....	490 lbs.

Ordering Information

TD-9AC Pedestal (for Color TV Cameras):

115 volts, 60 cycles, 6 amps.....	MI-40861-A
230 volts, 50 cycles, 3 amps.....	MI-N40861-A

TD-9AM Pedestal (for monochrome TV Cameras):

115 volts, 60 cycles, 6 amps.....	MI-26038-A
230 volts, 50 cycles, 3 amps.....	MI-N26038-A

34" Diameter Steering Wheel (supplied with TD-9AC).....MI-40862

25" Diameter Steering Wheel (supplied with TD-9AM).....MI-26039

Lightweight Camera Pedestal

TYPE TD-7

FEATURES

- Ideal for the small studio
- Choice of parallel or tricycle steering
- Easy, smooth dollying
- Adjustable guards prevent wheels from rolling over cables
- Height adjusts from 34 to 55 inches
- Sturdy construction for years of service

DESCRIPTION

The TD-7 Lightweight Camera Pedestal provides a firm, stable mount for television cameras. The new pedestal is lightweight and maneuverable and designed with the small type TV studio in mind. It accommodates friction, cradle or any other standard type heads for smooth horizontal panning and vertical tilting. The pedestal is easily positioned in the studio or rolled for running dolly shots, and it has provisions for raising and lowering the camera quickly and easily. Better showmanship, more versatile camera effects and smoother television production can be achieved by the cameraman as a result of the new operating ease and better control afforded by the TD-7. Two models are available: The Type TD-7AO for use with studio cameras such as the RCA TK-14 and TK-60 Cameras (90 to 170 lbs.), and the Type TD-7AV counterbalanced for lighter Vidicon cameras (60 to 90 lbs.) such as the RCA TK-15 Camera.

The TD-7 Lightweight Camera Pedestal is precision built of the finest metals—steel, aluminum, bronze—each tested and selected for its specific purpose and engineered to give years of dependable service. Weighing only 140 pounds, it is easily positioned in the studio or rolled to any studio point by the cameraman alone. It rolls smoothly and quietly on rubber-tired, ballbearing wheels. Adjustable cable guards are provided on each wheel to protect cables and other studio equipment.

The TD-7 features two types of steering: parallel steering, in which the three wheels are locked parallel and turn together; and tricycle steering, in which all steering is done with the rear wheel, while the front wheels are locked in parallel. The former type is used for straight-line tracking in running dolly shots, while tricycle steering enables the pedestal to turn sharply in any direction or to rotate around its own axis. Changing from one type of steering to the other is accomplished by simply lifting the steering



wheel. By rotating the wheel 180 degrees, it can be used either as a tee handle or a semi-circular steering wheel. The camera pedestal is quickly and easily raised or lowered by turning a hand wheel conveniently located on the side of the column. The center column and steering shaft are readily removed from the base for transporting the pedestal to field locations.

SPECIFICATIONS

Overall Dimensions (not including Head):

Height.....	55" max., 34" min.
Width.....	34" max., 30" min.
Net Weight.....	140 lbs.
Shipping Weight.....	200 lbs. (approx.)

Ordering Information

Type TD-7AO (Crank lift type for TK-14, TK-60 Cameras).....MI-26044-A
 Type TD-7AV (Crank lift type for TK-15 Camera).....MI-26054

Accessories

Cradle Head (for TK-14, TK-60 or TK-15).....MI-26203-A

Hydraulic Camera Pedestal

TYPE TD-10

FEATURES

- Camera easily and rapidly raised with hydraulic lift
- Base legs adjustable to expand wheel spread
- Fully adjustable cable guards
- Large 8-inch diameter wheels for smooth dollying
- Swivel locks on wheels
- Low cost

DESCRIPTION

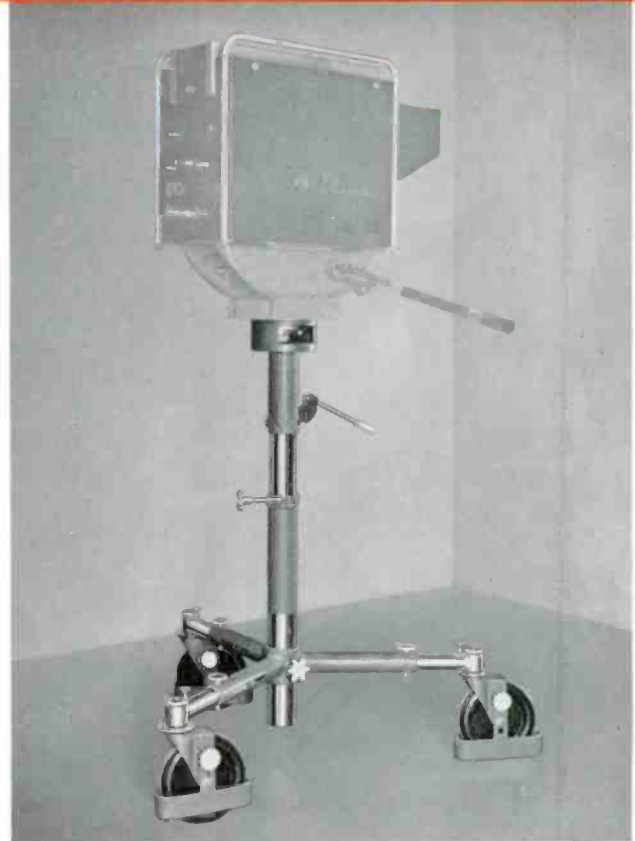
The TD-10 Hydraulic Camera Pedestal, MI-26053, is an attractive chrome-trimmed mount designed for use with RCA TK-14, TK-15, and other monochrome television cameras. This sturdy pedestal is an economical choice for many studio and field applications.

The TD-10 offers greater convenience and utility than a combination tripod and dolly at a comparable price. Set up time is held to a minimum. Between camera shots the hydraulic lift allows height adjustments to be made easily and rapidly for operator preference; an important feature not easily accomplished with the tripod and dolly. Simple adjustments to the legs may be made to expand the wheel base. The large wheels provide smooth dolly shots.

The TD-10 pedestal meets the requirement for a camera mount that is easier to adjust in base width and height than the tripod-dolly combination, yet is more economical than pedestals which have the facility for providing smooth "on air" height adjustments.

The Type TD-10 Camera Pedestal features a hydraulic lift built into the lightweight center column to allow camera operator to easily raise the top of the pedestal to any desired operating height between 35 to 60 inches from the floor. The camera is lowered by simply releasing the hydraulic valve. A three-position positive lock is provided at the pedestal base for a coarse adjustment of pedestal height.

The pedestal comes complete with sturdy metallic three-legged base which eliminates the need of a mounting dolly. A three position positive lock is provided on each leg to extend the base to achieve maximum stability and maneuverability. The base dimensions may be expanded



from 32 to 43 inches. Large eight-inch diameter wheels employ full caster ball bearings for smooth dollying action. They are provided with individually adjustable cable guards. A swivel lock is included on each wheel so that a fixed position may be maintained when desired.

The TD-10 Pedestal makes possible an attractive highly versatile mounting for monochrome cameras at a remarkably low price. Provisions are made for easy access to the head mounting nut. The standard RCA cradle or friction head may be used. The pedestal is easily disassembled into a small package for transporting to remote locations.

SPECIFICATIONS

Overall Dimensions (not including head):	
Height (maximum)	60"
Height (minimum)	35"
Base, not extended (minimum dimension).....	32"
Base, extended (minimum dimension).....	43"
Weight	76 lbs.

Ordering Information

Type TD-10 Hydraulic Camera Pedestal.....MI-26053

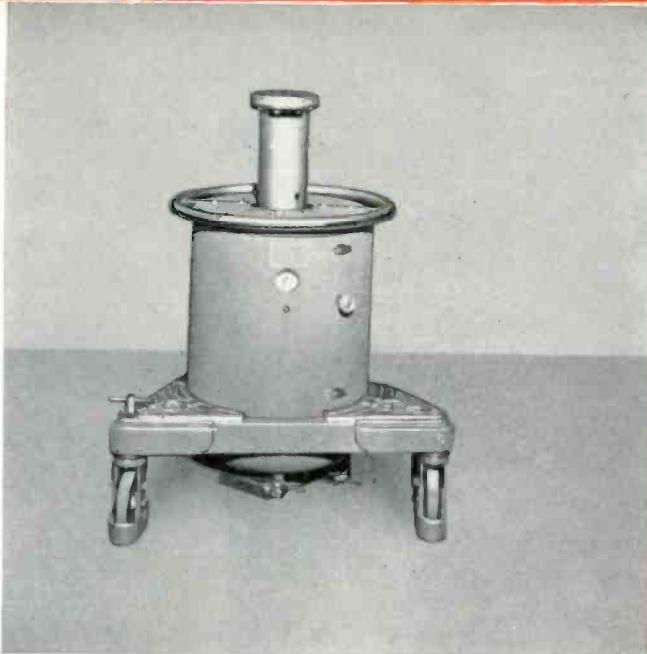
Accessories

Cradle Head

MI-26203-A

Pneumatic-Balance Pedestals

TYPE PN6 Series



DESCRIPTION

The PN6 Series of Pneumatic-Balance Pedestals fill the need for a camera support that provides smooth, even motion in both the vertical and horizontal planes, and consequently allows the most flexible camera performance. Three models of Pneumatic-Balance Pedestals are available: (1) The Model PN6-29 standard Pneumatic-Balance Pedestal; (2) the Model PN6-29B Pneumatic Pedestal with Brake; and (3) Model PN6-33B Pneumatic Color Pedestal with Brake. The PN6-29 and PN6-29B camera pedestals may be used with either vidicon or image orthicon monochrome camera equipment. The heavier type PN6-33B has been especially designed for color cameras.

The Pneumatic-Balance Camera Pedestal incorporates a closed air system reservoir. The camera mount is on a piston which rides in a cylinder on a cushion of compressed air. An encircling reservoir provides the storage space for excess air when the camera is at the lower heights. The spring-like effect of the compressed air on the piston results in a practically weightless camera load. Addition of air may be made through the use of an ordinary tire pump, a transfer bottle, or a compressor. The Pneumatic-Balanced Pedestal is a flexible lightweight unit. In addition to the counter-balanced action on the elevation adjustment, the pedestal is easily moved about the studio by a single camera operator. It is equipped with ball-bearing, rubber-tired wheels providing silent, smooth and effortless movement. Cable guards act as pushers on any cables that may be in the line of travel. Due to the fact that there is practically no loss in the

FEATURES

- Lightweight unit with counter-balanced action easily does two-man dolly shots with single operator
- Smooth effortless camera positioning in both vertical and horizontal planes
- Rotatable base—readily relocated anywhere in 360 degrees
- Light enough to be dollyed sideways, either direction, while "booming" up or down
- Welded steel construction—light but strong
- Simple, easy maintenance

closed air system, replenishment of the air supply in the pedestal is seldom needed. In case of a change of camera load, the pressure in the system is readily compensated. Models PN6-29B and PN6-33B are equipped with a solenoid operated brake mechanism to lock the pedestal at any desired height. The brake is released by operating a switch which is mounted on the handle of the camera cradle head. A large wheel base and larger diameter steering wheel make the PN6-33B Model especially suitable for color television cameras.

SPECIFICATIONS AND ORDERING INFORMATION

Air Pressure Requirements, P.S.I.	1/3 weight of camera load		
Base Position	Can be repositioned anywhere in 360° circle by lifting "T" handle on corner		
Wheels	6" rubber tired, ball bearing with Alemite grease fittings		
	PN6-29	PN6-29B	PN6-33B
Net Weight	175 lbs.	185 lbs.	210 lbs.
Shipping Weight	215 lbs.	225 lbs.	250 lbs.
Height (excluding head) max.	50 1/2"	50 1/2"	50 1/2"
Height (excluding head) min.	30 1/2"	30 1/2"	30 1/2"
Wheel Base (center to center)	29"	29"	33"
Base Width Max.	34 1/2"	34 1/2"	37 1/2"
Base Width Min.	29 3/4"	29 3/4"	32 3/4"
Electric Column Brake	Available as kit	Included	Included
A-C Power Requirement*	None	117 v. 60 cps. 0.75 amps.	117 v. 60 cps. 0.75 amps.
		or	or
		220 v. 50 cps. 0.75 amps.	220 v. 50 cps. 0.75 amps.

Accessories

Air Compressor	PN-100
Monochrome Cradle Head	MI-26203-A
Color Cradle Head	MI-40824

*Specify A-C line voltage and frequency when ordering.

Metal Tripod

TYPE TD-11A



FEATURES

- Three-point leg bracing with individual tie rods and sturdy center post assure rigidity and stability
- Light in weight—yet rugged in design
- Folds into small, compact, self-locking package for carrying
- Leg length calibration aids in accurate positioning and adjusting
- Attractively finished in deep umber gray wrinkle and hard chrome

DESCRIPTION

The Type TD-11A tripod is designed to support all types of RCA television studio and field cameras (with friction head MI-26205-B, or cradle heads MI-26203-A and MI-40824). When used with television tripod dolly type TD-15A, it provides a maximum of convenience and mobility for dollying operations.

The Type TD-11A consists of an all-metal tripod structure of aluminum castings and tubular steel construction which provides a compact, lightweight, yet rugged design. It folds into a small-size unit which is easily portable. When collapsed for carrying, legs are latched to the center stabilizing post, thus preventing leg spread during transport.

In operation the TD-11A provides a "working-height" range of approximately 25 to 42 inches. Outstanding in design are individual tie rods which connect to and brace all tripod legs (these same three tie rods also couple to the center stabilizing post and provide a stable, rigid support).

The lower tubular portion of each leg is easily adjusted and slides within a long-length bearing which is held to close tolerances. Thus, minimum play and maximum rigidity are assured throughout the working range. When tripod legs are adjusted for desired height, they may be locked

in position by means of hand-operated clamp screws. Calibration numbers are engraved on the lower legs to simplify leveling. The lower end of each leg is provided with a self-aligning, universally-mounted casting, which in one plane has a flat surface for use on level flooring—and in another plane has a steel spike for use on rough surfaces. The flat surface also provides a suitable mounting for use with Tripod Dolly, TD-15A.

SPECIFICATIONS

Recommended Operating Heights:	
Minimum	25 $\frac{5}{8}$ "
Maximum	42 $\frac{1}{2}$ "
Maximum Diameter at Feet (legs extended).....	.70"
Dimensions (folded for transport):	
Overall Height (legs collapsed).....	31 $\frac{5}{8}$ "
Overall Diameter	10"
Net Weight	25 lbs.

Ordering Information

Type TD-11A Metal Tripod.....MI-26046

Accessories

Color Camera Cradle Head.....MI-40824
 Monochrome Camera Cradle Head.....MI-26203-A
 Tripod Dolly, Type TD-15A.....MI-26042-A

Tripod Dolly

TYPE TD-15A



FEATURES

- Provides mobility for tripod camera mounting
- Folds into compact lightweight self-locking portable package
- Large diameter 5-inch wheels permit easy movement
- Wheel stops provide for locking tripod in position
- Tripod locks firmly to dolly

DESCRIPTION

The TD-15A Tripod Dolly is designed for use with the TD-11A Tripod fitted with television cameras. When tripods are used indoors, which is very often the case, use of the dolly precludes any possibility of marring the floor, and provides greater mobility for the tripod. Used in the field with reasonably flat terrain, the dolly makes it convenient and easy to change the position of the tripod.

The TD-15A Dolly consists of a lightweight triangular-shaped steel structure supported on three swivel wheels, five inches in diameter. The finish is hard chrome. For convenience in transporting, the dolly folds into a package 8 by 14 by 29 inches. When extended and fastened to the

tripod, it occupies a circular area 57 inches in diameter. The dolly is fastened firmly to the tripod by a clamp at each leg. Spring-loaded stop feet at each wheel serve to hold the tripod in a fixed position. Wheels may be removed readily if such should be required.

As each wheel is on a swivel, the course can be easily changed by merely pushing in the proper direction. Caster locking devices at each wheel make it possible to lock two or all three wheels in a parallel position, enabling the dolly to track in a straight line for rolling dolly shots, closely simulating results obtained with more expensive equipment.

SPECIFICATIONS

Dimensions (unfolded and extended):

Height (to mounting surface for tripod legs).....6"
Diameter57"

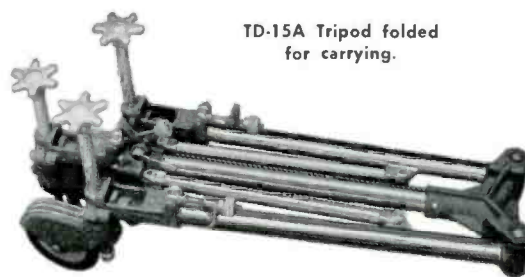
Folded for Transport:

Height8"
Width14"
Length29"

Net Weight25½ lbs.

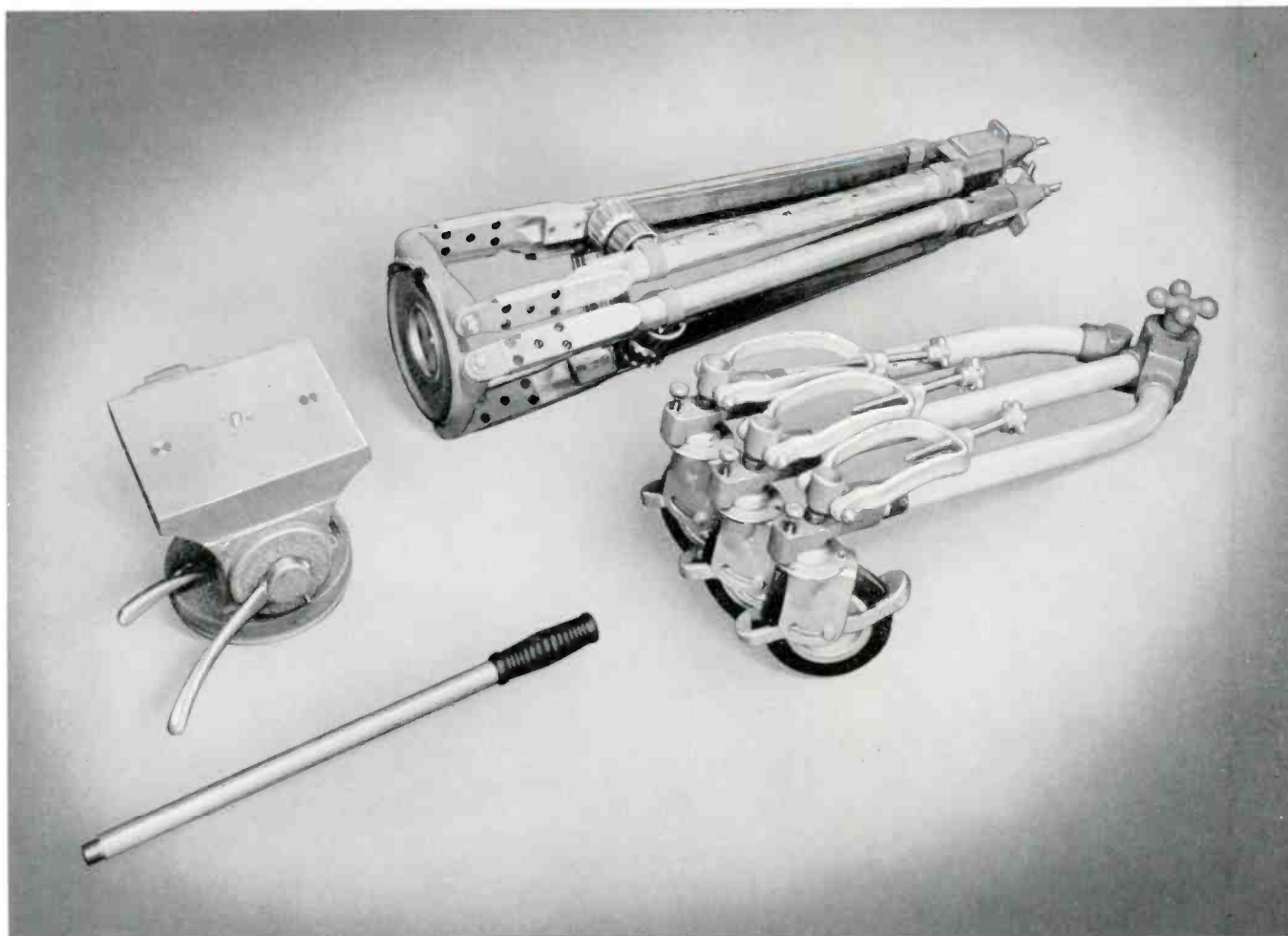
Ordering Information

Type TD-15A Tripod Dolly.....MI-26042-A



TD-15A Tripod folded
for carrying.

Vidicon Camera Mounting Equipment



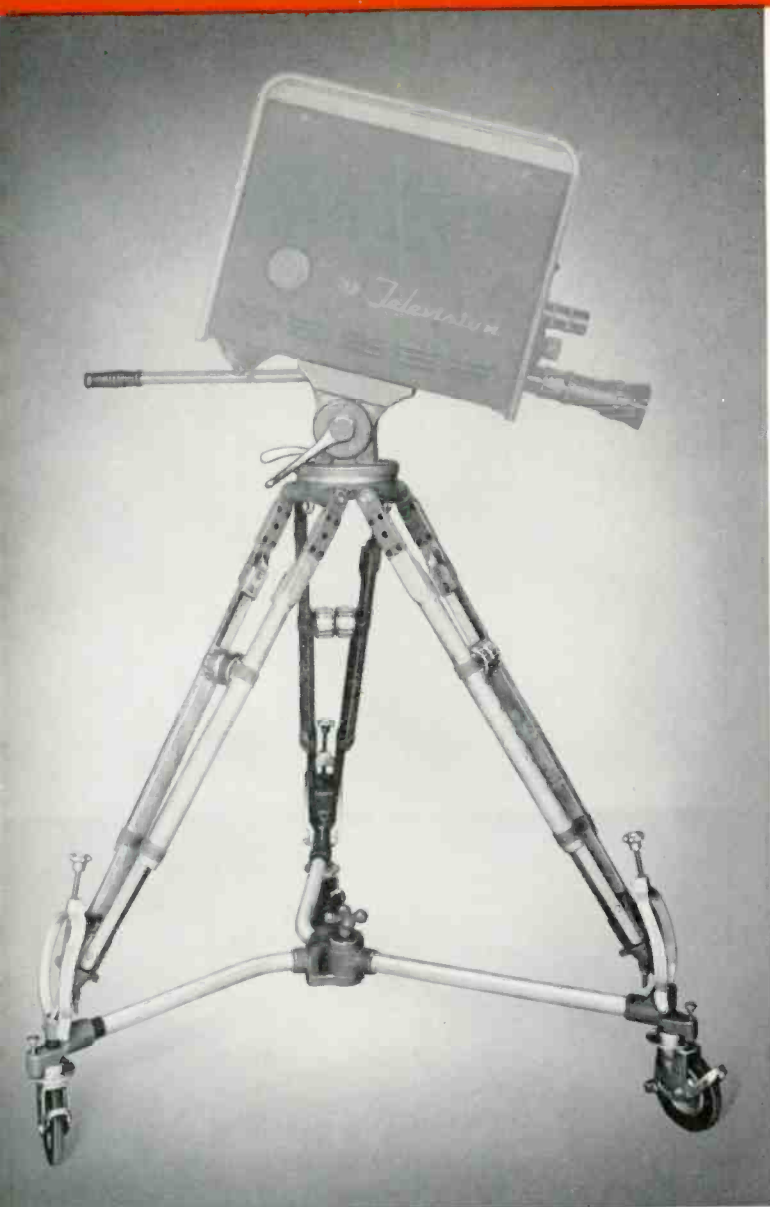
FEATURES

- **Lightweight and sturdy**
- **Pan and tilt head spring loaded to balance up to 85-pound camera weight**
- **Large 5-inch wheels for smooth dollying**
- **Indexed wheel bases provide positive positioning of wheels for accurate dolly movement and tracking**
- **Units easily disassembled and folded for transportation or storage**

DESCRIPTION

RCA Vidicon Camera Mounting Equipment, consisting of a Type TDC-10 Dolly, TDC-20 Camera Tripod, and TDC-30 Balanced Pan and Tilt Head, is designed for use in closed-circuit television applications with cameras such as the RCA Type TK-15 Vidicon Studio Camera.

Each unit of mounting equipment has been designed to provide excellent maneuverability and serviceability for indoor and outdoor applications. This equipment fully meets the educational and industrial closed circuit demands whether in classroom, studio or the field.



TK-15 Vidicon Studio Camera shown mounted on the TDC-10 Dolly, TDC-20 Camera Tripod and TDC-30 Balance Pan and Tilt Head.

The Type TDC-20 Vidicon Camera Mounting Tripod, MI-26201, is fabricated of finished maple and cast aluminum alloy clamps to provide a compact, lightweight, yet rugged support for camera equipment weighing up to 85 pounds. The tripod can be varied in height from 36 to 53¼ inches. After tripod legs are adjusted for desired height, they may be locked in position by means of hand-operated, clamp grips. The tripod is provided with standard tripod feet which offer firm support whether used with or without a dolly. It folds into a small-size unit approximately 9½ inches in diameter by 34¾ inches long.

The TDC-10 Dolly, MI-26200, consists of a lightweight, triangular shaped aluminum structure supported on three swivel wheels. It is made of satin chrome finished cast aluminum tubing 1½ inches in diameter. Large 5 inch wheels permit smooth dollying. The wheels have a positive indexing device spaced 120° apart for straight-line operation. The dolly is fastened firmly to the tripod at each leg by means of yoke clamps. When extended and fastened to the tripod, it occupies a circular area 42 inches in diameter.

The TDC-30 Balanced Pan and Tilt Head, MI-26202, is also made of cast aluminum alloy with gray wrinkle finish. It is provided with a #3/8-16 spring-loaded camera tie-down screw. The pan and tilt head is capable of balancing 70 to 85 pounds of camera weight. Large, separate, pan and tilt lock and friction levers, and off-set pan handle are provided for controlling the movement of tilt-head and camera. A two-way spirit level is provided as part of the Model TDC-30 to permit accurate leveling of the camera mounting equipment.

SPECIFICATIONS

Tripod:

Operating Heights (when mounted on dolly):	
Minimum	36"
Maximum	53¼"
Operating diameter (Legs extended).....	39"
Folded dimensions	9½" dia. by 34¾" long
Weight	16 lbs.

Dolly:

Dimensions (unfolded and extended):	
Height (overall)	9¼"
Height to Tripod Legs.....	8"
Diameter	42" approx.
Wheels	5" dia.

Dimensions (folded for transport):

Height	9¼"
Width	11¼"
Length	29½"
Weight	16 lbs.

Head:

Angle of rotation	360°
Top Plate.....	7½" long by 6⅞" wide
Tie Down Screw.....	#3/8"-16
Height	8"
Base Diameter	7"
Spring Load (to balance cameras).....	70 to 85 lbs.
Weight	22 lbs.

Ordering Information

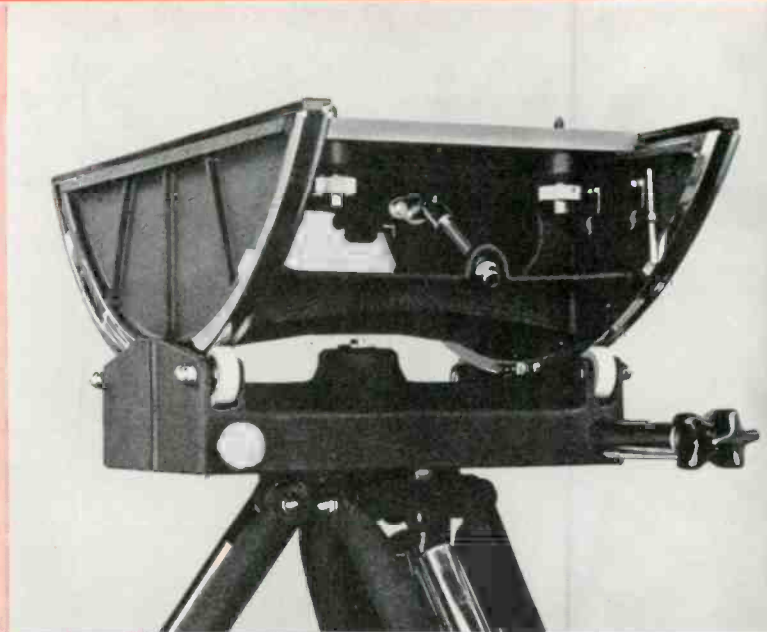
Type TDC-20 Vidicon Camera Mounting Tripod.....	MI-26201
Type TDC-10 Dolly.....	MI-26200
Type TDC-30 Balanced Pan and Tilt Head.....	MI-26202

Television Camera Cradle Heads

MI-40824 and MI-26203-A

FEATURES

- New ease of camera operation
- Accurate balance
- Rugged construction
- Adapted to fit all standard tripods, pedestals, dollies, cranes or hi-hats
- No counterbalancing springs to get out of adjustment or to produce noise



Color Camera Cradle Head, MI-40824

DESCRIPTION

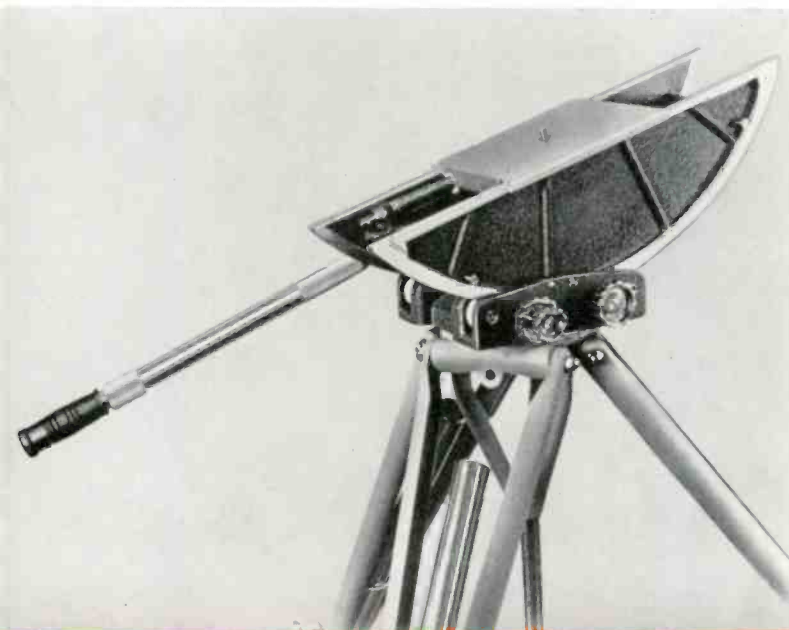
The MI-40824 Cradle Head is designed especially for use with the RCA Color Image Orthicon Cameras, while the MI-26203-A Cradle Head is specified for the Monochrome Image Orthicon Cameras. The Color Cradle Head fits all standard heavy duty pedestals, dollies, cranes, tripods or hi-hats, and the Monochrome Cradle Head may be used with the same units as well as the TD-7A Lightweight Camera Pedestal, and lightweight Mounting Adaptors.

The cradles provide a new balance and ease of camera operation. When the camera is tilted up or down, the cradle rotates around a constant center of gravity, maintaining absolute balance at all times. There are no counterbalancing springs to get out of adjustment or to produce noise. Panning action is accomplished with the same ease as the tilt action due to precision ball bearing construction. The heads have special flexibility for both studio or outdoor camera operation.

Sturdy rigid aluminum castings are used for all major parts of the new Monochrome and Color TV Camera Cradle Heads to provide and maintain accurate alignment. Separate cradle tracks allow for replacement in case of damage. The new mountings feature perfect balance around a constant center of gravity when tilting or panning.

The camera with all accessories attached, can be balanced perfectly when mounted on the head without loosening the camera hold-down screws. This is accomplished by moving the top camera plate on the head forward or back with a lead screw.

◀ Monochrome Camera Cradle Head, MI-26203-A



Tilting is controlled by an adjustable handle, which comes mounted with the Monochrome Model. The Color Cradle Head is controlled by the camera handle itself. Four phenolic-covered ball bearing rollers mounted in the base of the head support the cradle. The cradle tracks ride on these bearings, providing smooth, quiet operation. The head tilts down 38 degrees and up 30 degrees. Stop blocks prevent the cradle from riding off the bearings at the extreme limits of travel. The amount of drag on the tilt is controlled by a convenient knob, provided with a vernier differential screw for fine adjustment.

Panning action is accomplished by two precision ball bearings in the base of the head which carry the vertical load. All ball bearings are of the sealed type and require no

service lubrication for the life of the unit. Drag adjustment is provided on the tilt. Brakes on the pan and tilt quickly lock the camera in a fixed position.

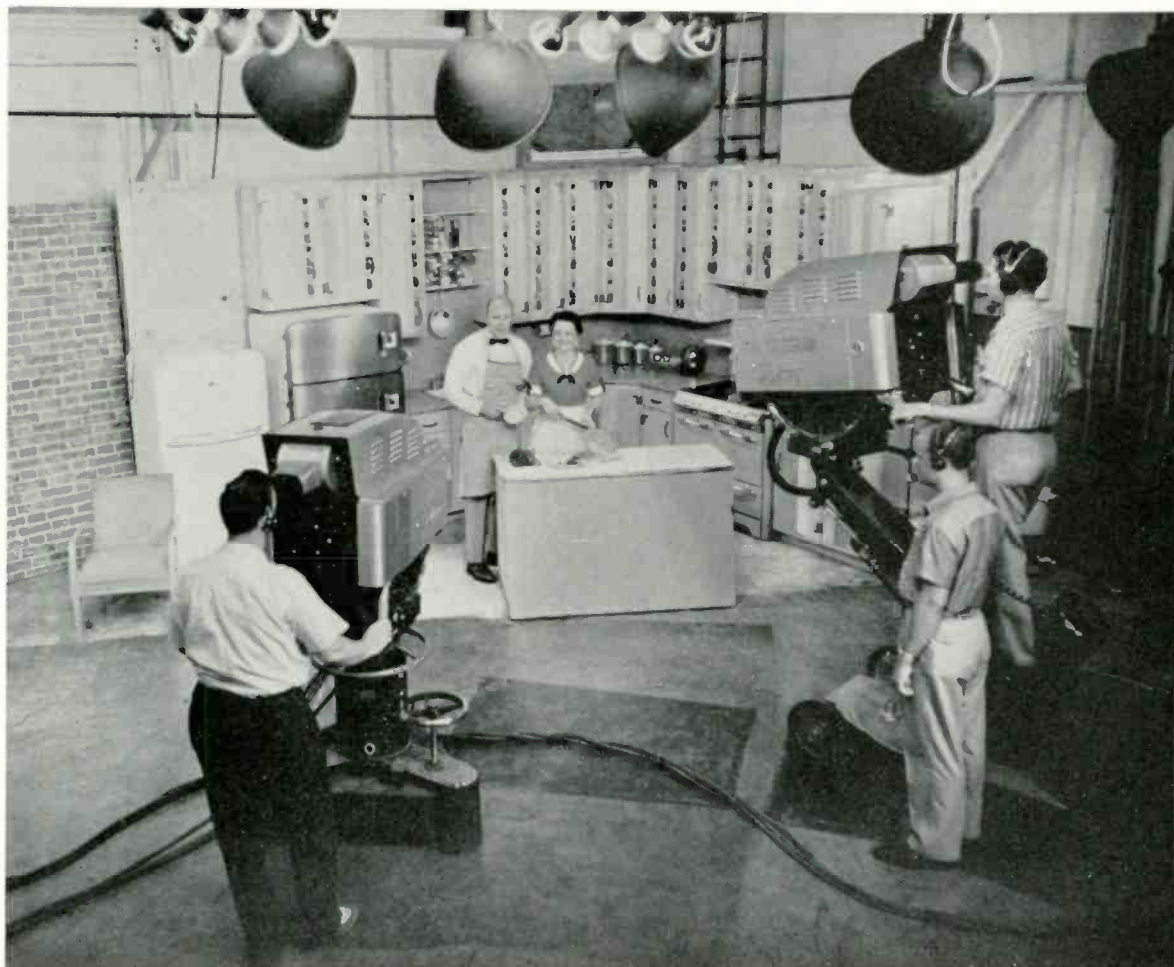
SPECIFICATIONS

	Monochrome Cradle Head	Color Cradle Head
Angle of Rotation.....	360°	360°
Top Plate	6 7/8" wide x 5" long	12" wide x 14" long
Height	7 1/4"	10 1/2"
Weight	26 lbs.	55 lbs.
Shipping Weight	45 lbs.	90 lbs.
Finish	Umber gray	Umber gray

Ordering Information

Cradle Head	MI-26203-A	MI-40824
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Cradle heads provide flexibility for both studio or outdoor operation, and they fit all standard pedestals, dollies, cranes, tripods or hi-hats.



Shock Mounts

For RCA Field Television Equipment

FEATURES

- Afford added life and protection to field television equipment
- Barry type mounts absorb harmful shock and vibration
- Sturdily constructed of stainless steel
- Protective cadmium plated finish
- Equipment slides into place with added ease



DESCRIPTION

Shock mounts are available for use with all RCA Field TV Camera Equipment. These mounts are designed to protect the camera chain from harmful shock and vibration during transportation and normal field usage. The MI-26511 Series mounting bases are individually designed for use with Field Camera Controls, Switchers, Power Supplies, Sync Generator Units, Processing Amplifiers, etc.

A variety of slide-type mounting racks with Barry-type rubber shock mounts able to withstand loads up to 50 pounds each are carried in different base sizes to accommodate all Field Television Camera Equipment units. The

chassis shock mountings are made of .063-inch stainless steel with Barry-type rubber mounts grounded to the frame by flexible strap or similar means. All steel fasteners and parts other than stainless steel are protectively plated with cadmium. Two spring-loaded index pins grip the equipment through holes in the rear of the chassis, while lock down clamps bolt the equipment into place from the front so that the equipment is securely lashed down at all times. Each mount is $2\frac{3}{8}$ inches square by $1\text{-}17/32$ inches high and has four .234-inch diameter mounting holes spaced $1\frac{1}{16}$ inches apart. The shock mounts accommodate the $\frac{1}{4}$ -inch diameter clamping thumbscrews.

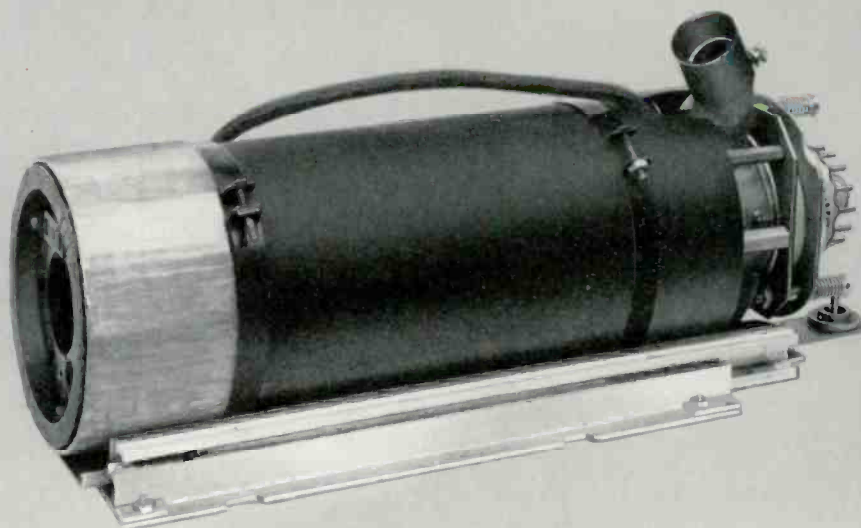
SPECIFICATIONS AND ORDERING INFORMATION

Stock Identification	Used With	Overall Length	Inside Width	Free Height*	Mountings	Loading
MI-26511-3.....	TK-14 Field Camera	$23\frac{1}{16}$ "	$9\frac{7}{16}$ "	$1\frac{13}{16}$ "	4-rubber	20—48 lbs.
MI-26511-A1.....	TK-14 Field Camera Control, TY-31 Field Power Supply, TG-12 Sync Generator	$28\frac{5}{16}$ "	$9\frac{7}{16}$ "	$1\frac{13}{16}$ "	4-rubber	13—31 lbs.
MI-26511-A3.....	TM-35 Portable Master Monitor	$20\text{-}5/32$ "	$9\frac{7}{16}$ "	$1\text{-}13/32$ "	4-rubber	13—31 lbs.
MI-26511-A5.....	WP-16 Portable Power Supply in Field Case	$28\text{-}29/32$ "	$9\frac{7}{16}$ "	$1\text{-}13/32$ "	4-rubber	13—31 lbs.
MI-26511-A6.....	TK-60 Field Processor	$25\text{-}13/32$ "	$9\frac{7}{16}$ "	$1\text{-}13/32$ "	4-rubber	13—31 lbs.

* Free height from mounting surface to bottom of equipment.

Electro-Magnetic Orbiters

For Monochrome Image Orthicon Cameras



FEATURES

- Adds new life to image orthicon tubes by minimizing "burn-in"
- Equipment mounts inside camera without affecting normal operation or appearance
- Separate remote control requires no additional wires to camera
- Orbiting movement so steady it is undetectable by viewer
- Greatly cuts tube cost—orbiter soon pays for itself
- Orbiting Cycle one minute

USES

RCA's series of Electro-Magnetic Orbiters are designed to prevent "burn-in" and increase the life of image orthicon tubes used in standard monochrome type television cameras. The equipment, which mounts inside the cameras without affecting normal operation or appearance, causes a slow continuous elliptical movement of the image approximately five percent of picture height on the photo-sensitive surface of the tube. Operating at about one revolution per minute such motion is not apparent to the viewer yet is sufficient to prevent sticking or "burn-in." The control unit for the monochrome orbiter permits remote operation from the control position, utilizing wires already available in the camera cable.

Image orthicon tubes are often retired from operation because of "burn-in" damage even though the other

characteristics which affect picture quality have not deteriorated. The installation of an RCA Electro-Magnetic Orbiter will allow many of these tubes to be returned to service.

There are several types of monochrome yoke assemblies in present-day studio TV cameras, so it is important when ordering the Electro-Magnetic Orbiter to state the type of camera in which the equipment is to be used. The following equipment is specified for RCA type cameras:

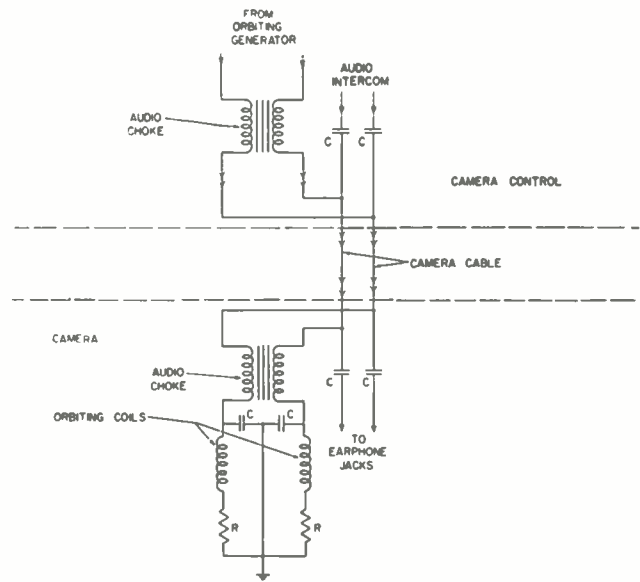
MI-26850/26853/26857 for TK-11/31 Series Monochrome Cameras

MI-26851/26853/26857 for TK-10/30 Series Monochrome Cameras

DESCRIPTION

The RCA Electro-Magnetic Orbiters for monochrome television cameras employ a suitable deflection coil placed over the image section of the image orthicon tube and excited by appropriate currents to make possible a non-mechanical method of orbiting the target charge image in its translation from the photocathode to the target. The equipment consists of two parts, the deflection coil for the image section and a generator chassis for producing the required exciting currents. The generator is supplied on a rack-mounting adaptor, but it may be removed for mounting elsewhere.

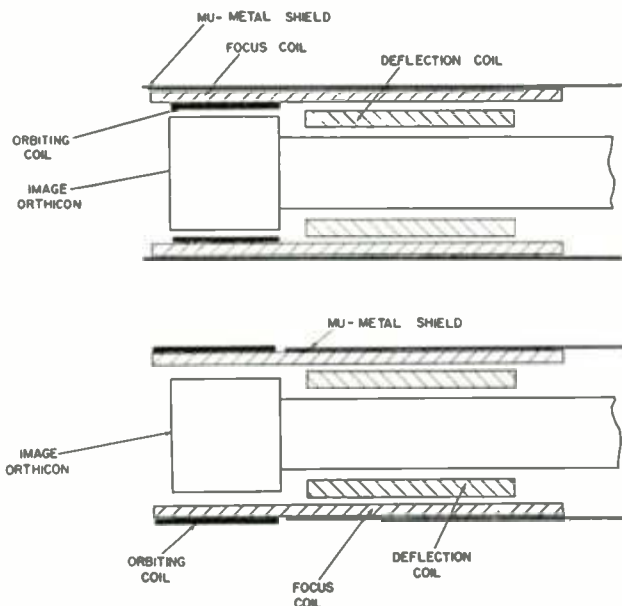
The orbiter coil is of dual toroidal construction to make it as thin as possible. The core is a thin section of either mu-metal laminations or iron wire wrap depending on type camera on which it is to be used. The mu-metal core in the case of the external coil for TK-11/31 camera preserves the continuity of the mu-metal shielding over the focus coil. The iron wire core for the internal coil for TK-10/30 Series Cameras presents a high-reluctance path for the focus field and hence does not disturb the normal magnetic focus fields within the image section of the tube. The dual toroidal coils are arranged in quadrature about the image section of the yoke assembly. The coil is driven from a small generating assembly, located at the control position, which contains a geared down motor driving a selsyn generator. The output of the selsyn consists of two 60 cps currents, one modulated with a 1 cycle-per-minute sine wave and the other with a 1 cycle-per-minute cosine wave. These waveforms are demodulated to produce two 1 cycle-per-minute currents 90 degrees out of phase.



Cable circuit schematic.

The dual coils are fed through the intercommunication circuits in the camera cable. A phantom circuit is employed to avoid interference with the intercommunication function. The resultant magnetic field produced by the current through these coils slowly rotates and slightly deflects the electron image from its normal travel between the photocathode and the target. Since all of the "burn-in" takes place at the target, this prevents "sticking" as well as orbiting the optical image on the photo-cathode. The small amount of orbiting and the slow rate used make the effect unnoticeable by the viewer. Interconnecting cable, MI-13333, is required for connecting the generator unit and camera control. A modification kit, MI-26857 is required at the camera control.

Schematic of image orthicon focus assembly showing location of internal and external orbiting coils.



SPECIFICATIONS

Power Requirements.....	117 volts, 60 cycles, single phase 8 watts
Orbiting Cycle.....	1 minute
Orbiting Deflection.....	5% picture height (approx.)
ORBITER GENERATOR	
Generator Dimensions (excluding rack mounting adapter):	
Length	8"
Width	3 1/4"
Height	5"
Weight.....	Approx. 5 lbs.
Rack Mounting Adapter Height.....	5 1/4"

Ordering Information

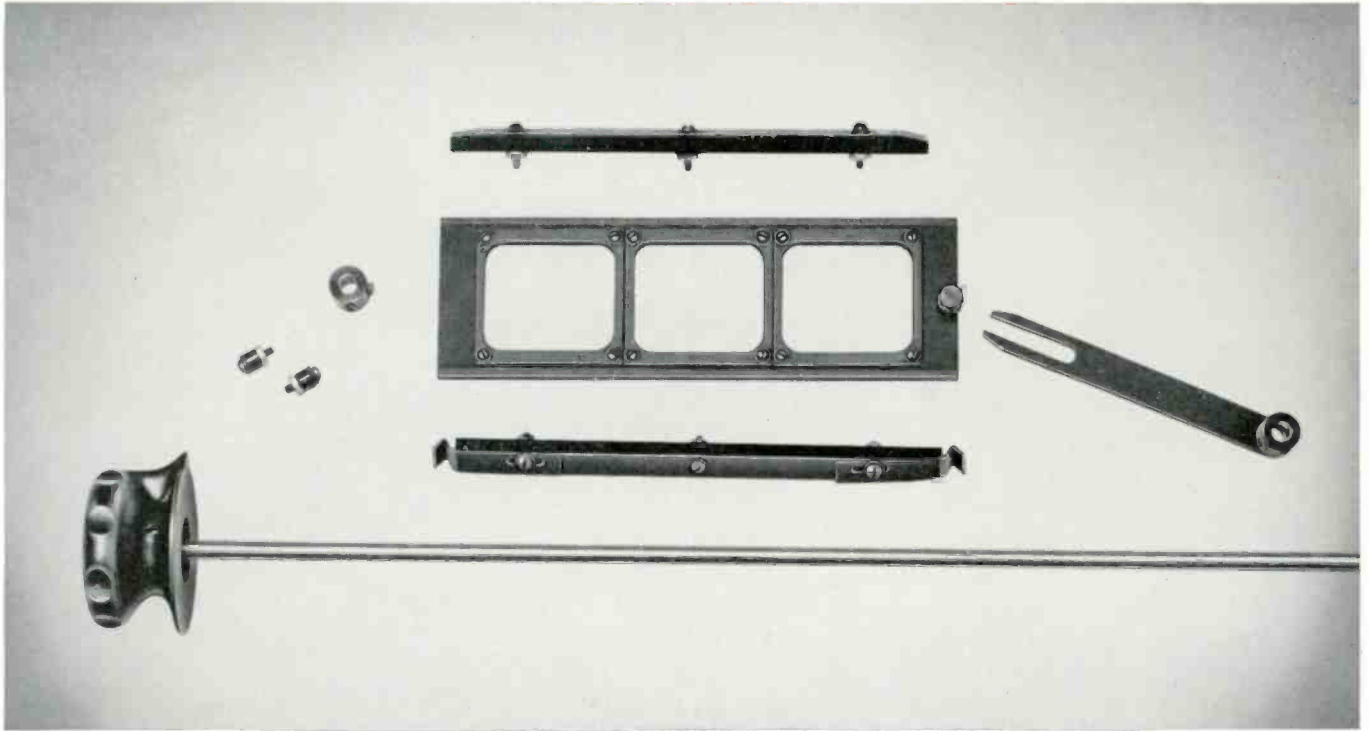
Electro Magnetic Orbiter Coil for TK-11/31 Series Monochrome Cameras	MI-26850-A
Electro Magnetic Orbiter Coil for TK-10/30 Series Monochrome Cameras	MI-26851-A
Electro-Magnetic Orbiter Generator.....	MI-26853
Modification Kit for Camera Controls.....	MI-26857

Accessories

Interconnecting Cable (required accessory, supplied in bulk, specify length when ordering).....	MI-13333
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Neutral Density Filter Slide Mechanism

FOR TYPE TK-40A and TK-41 COLOR CAMERAS



FEATURES

- Neutral density filters compensate for large variations of light level
- Permits operation of image orthicons at optimum signal to noise ratio
- Filters accommodated by convenient and easy to operate slide mechanism
- Instantaneous change from rear camera control
- Compensation does not affect color

DESCRIPTION

The Neutral Density Filter Slide Mechanism, MI-40528, provides a useful means of controlling large variations of light levels for RCA TK-40A and TK-41 Color TV Cameras. The remote iris control in the camera lens can handle variations of light levels up to 30 to 1 without difficulty; however, during the televising of outdoor events in color where daylight is the light source, the variation of incident illumination levels can be expected to vary as much as

100 to 1. By selecting neutral density filters (values of 1.0 to 2.0 supplied), all light ranges normally encountered can be handled. The MI-40528 slide mechanism kit is easily installed in RCA color TV cameras.

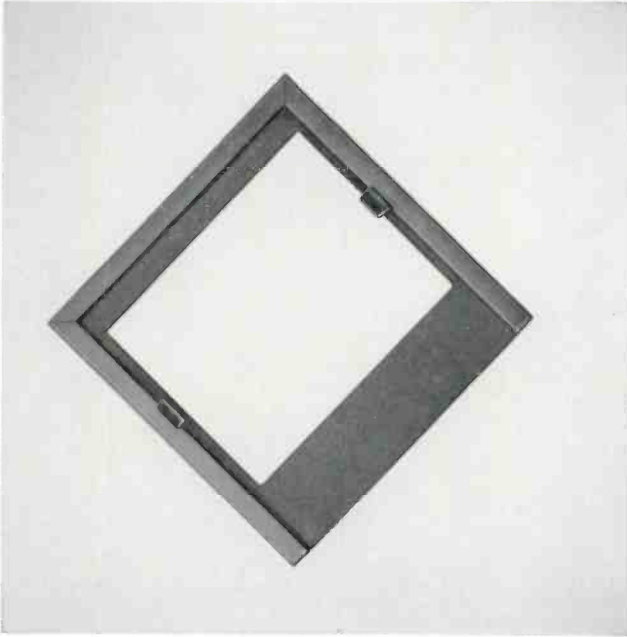
The MI-40528 Neutral Density Filter Slide Mechanism is provided as a kit of parts consisting of a brass slide assembly, three hard-brass filter holders, two rails of sturdy brass bar, two beryllium copper springs, steel control shaft, a black plastic control knob, lever assembly, three vertical compensation shields and mounting hardware. The kit may be easily installed in the optical path common to the three color image orthicon tubes. Complete instructions are furnished with the equipment.

Two neutral density filters, with values of 1.0 and 2.0 density respectively, are provided with the slide mechanism. They may be inserted into two of the three filter holders. When installed the slide mechanism is easily operated from the rear of the camera by turning the control knob to any of three positions. The central position may be used to provide normal illumination, while a turn to the left or the right instantly provides the required amount of compensation from the two filters.

Ordering Information

Neutral Density Filter Slide Mechanism.....MI-40528

NEUTRAL DENSITY FILTER HOLDERS FOR TK-11/31 and TK-14 SERIES CAMERAS



DESCRIPTION

The Neutral Density Filter Holder for TK-11/31 and TK-14 Series Cameras, MI-26847, provides a useful means for holding a neutral density filter in front of the image orthicon face plate to reduce the light level reaching the image orthicon. One filter attenuates the light equally for all lenses on the turret. This is especially useful outdoors where there is no control of lighting and the iris on the lenses cannot be stopped down sufficiently.

MI-26857 consists of a single phosphor-bronze filter holder with two tines for snapping the filter into position on the bakelite mask immediately in front of the face of the image orthicon tube. Two filters are provided with neutral density values of 1.0 and 2.0 respectively.

Ordering Information

Neutral Density Filter Holder.....MI-26847

PLATE CURRENT METER MI-21200-C1



DESCRIPTION

Plate current Meter, MI-21200-C1, is a two scale meter for checking the plate currents drawn by the regulator tubes in RCA Power Supplies Types WP-15, WP-33, 580-D and TY-31. It also is used for measuring the output volt-

age and total output current of these power supplies, and for measuring the focus coil current in RCA Image Orthicon Camera Equipment. The 0-150 ma scale is used for these metering functions. By pressing the button on the meter panel, the 0-15 ma scale can be used to measure the signal level calibration voltage in the TM-6C Master Monitor. The proper external shunts are included in each of the equipments with which the meter is used.

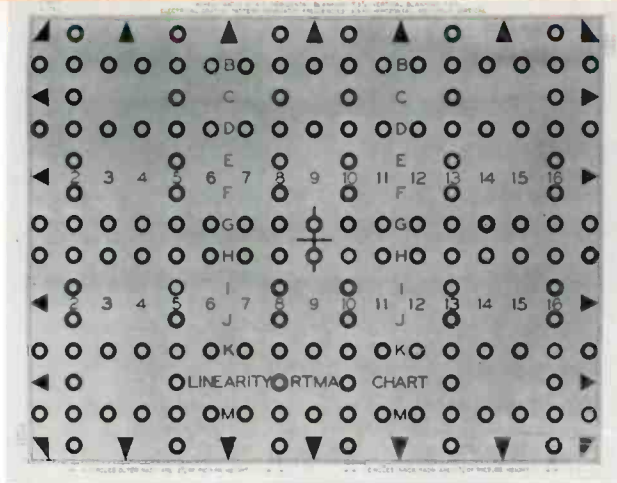
SPECIFICATIONS

Range Scales.....0-150 ma., 0-15 ma.
Approximate Size.....3 $\frac{5}{8}$ " x 5 $\frac{7}{16}$ " x 2 $\frac{3}{8}$ "
Net Weight3 lbs.
FinishBakelite case
Cable.....5' 9" cord with plug-in jack

Ordering Information

Plate Current Meter.....MI-21200-C1

Television Test Charts



EIA Linearity Chart, MI-26822-1.

DESCRIPTION

EIA Television Test Charts offer a quick, convenient and reliable means of making live camera adjustments. By using these standard checks, telecasters have an accurate and objective method of evaluating picture quality of IO or Vidicon cameras. Test charts for both monochrome and color operation are available from RCA.

EIA Linearity Chart

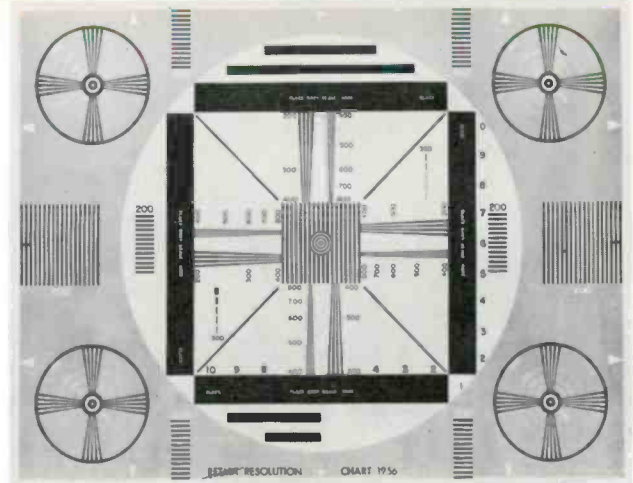
The Linearity Chart, MI-26822-1, provides a standardized, precise method of measuring television scanning linearity. It is designed for use with an electrical grating generating test pattern which provides an accurate visual reference for comparison with the scanned image of the chart.

The chart has an aspect ratio of 3 by 4 and is designed to be scanned to its boundaries as indicated by the arrows. The pattern consists of circles arranged in 14 horizontal rows and 17 vertical rows. The inside diameter of each circle is equivalent to 2 per cent of picture height, and the outside diameter is equivalent to 4 per cent of picture height. A grating pattern from a source such as the grating generator output of the TG-2A Synchronizing Generator is superimposed electrically upon the video signal produced by scanning the linearity chart. Observation of the relative position of each circle with respect to the grating bars thus permits measurement of scanning linearity within an accuracy of 1 per cent of picture height.

Ordering Information MI-26822-1

EIA Resolution Chart

The EIA Resolution Chart is designed to provide a standard reference for measuring resolution of television cameras and as an aid in testing for streaking, ringing, interlace, shading, scanning linearity, aspect ratio, and gray scale reproduction. The horizontal resolution ob-



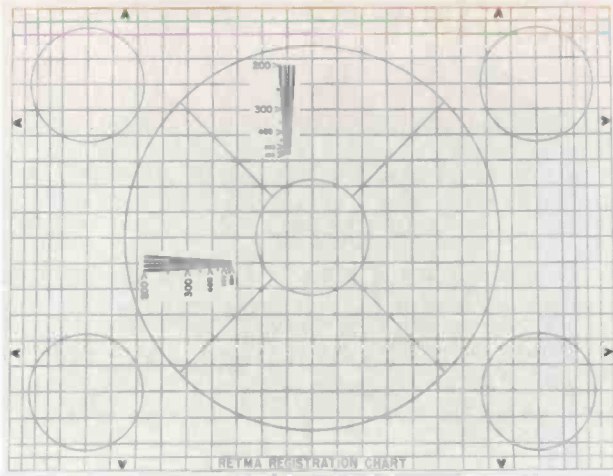
EIA Resolution Chart, MI-26822-2.

tained from many camera chains is often limited by the resolving capabilities of the camera tube and not by the bandwidth of the video amplifiers employed. Therefore, much useful information concerning the limiting resolution percentage response at various line numbers, and degradation of resolution with aging of camera tubes can be obtained from a test chart containing a high number of lines. Thus the horizontal and vertical wedges of the chart are arranged to permit resolution measurements from 200 to 800 lines. The reflection density of the various steps of the "paste on" gray scales supplied with the chart are very accurately maintained in the manufacturing process. Arranged in ten steps, the scales cover a contrast range of approximately 30 to 1. The steps are arranged in logarithmic decreasing values of reflectance so that the difference in reflection density between adjacent steps is equal to 0.16.

Ordering Information MI-26822-2

EIA Registration Chart

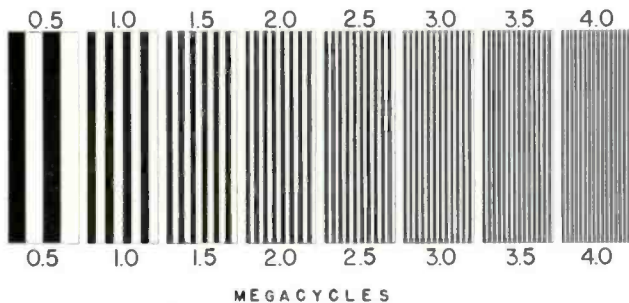
The EIA Registration Chart is used to adjust and check multiple color pickup devices for combined optical, mechanical and electrical registration, so that the output signals are in correct time relationship. The chart contains a ruled grid pattern to aid in adjusting height, width, rotation, skew, centering and linearity in each channel. The ruled grid pattern also serves to indicate any "S" distortion or bowing. The additional parallel lines about the edges are to allow for finer adjustments of the individual linearities in areas of the raster where the most difficulty is likely to occur in matching the time relationship of the scans. The arrowheads pointing to the edges may be used for adjusting the amount of scan to a 3 by 4 aspect ratio. The circles are included to indicate readily that corresponding lines are being registered, and that centering



EIA Registration Chart, MI-26822-3.

of one channel is not displaced by one complete line with respect to the others. A horizontal and vertical resolution wedge is provided for fine adjustment of centering. The 45 degree radial lines will often indicate misregistration not easily detected from the ruled grid pattern.

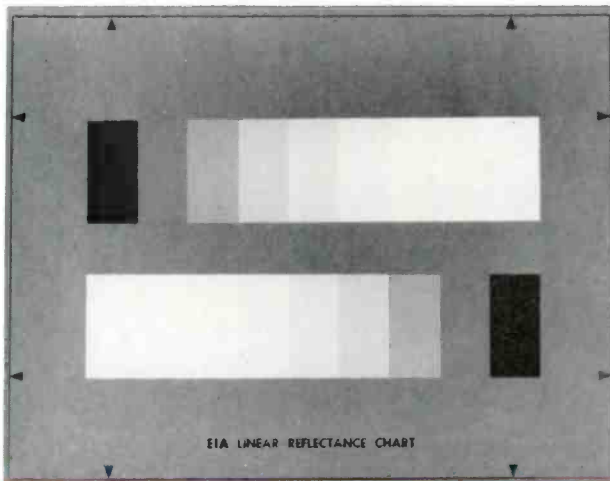
Ordering Information MI-26822-3



RCA Burst Chart

The RCA Burst Chart provides an accurate means of measuring the aperture response of a live TV camera system. The burst chart has 8 groups of alternate black and white bars. The number of black and white transitions in each group are such that when the chart is properly scanned an indication of 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5 and 4.0 megacycle response is obtained. The aperture response is a

EIA Linear Reflectance Chart, MI-26822-4.



comparative evaluation in percentage of the response of the groups as measured on an oscilloscope.

Ordering Information IB-31605

EIA Linear Reflectance Chart

The Linear Reflectance Chart provides a standard reference for the measurement and adjustment of the transfer characteristics of monochrome and color TV cameras. This chart has a pair of linear gray scales running in opposite directions placed a short distance apart on a uniform gray background. Nine chips ranging from white to black provide information on reflectance, Munsell value and reflection density. A reflectance of 60 per cent was chosen for the white chip, since it approximates the reflectance of the brightest object in the scene with present studio lighting practice. The contrast range of 20 to 1 was chosen because it has been found to cover the most useful "linear" luminance input range of an image orthicon when used for color reproduction. The crossed gray scales allow a distinction to be made readily between distortion due to poor transfer characteristics and those due to shading errors.

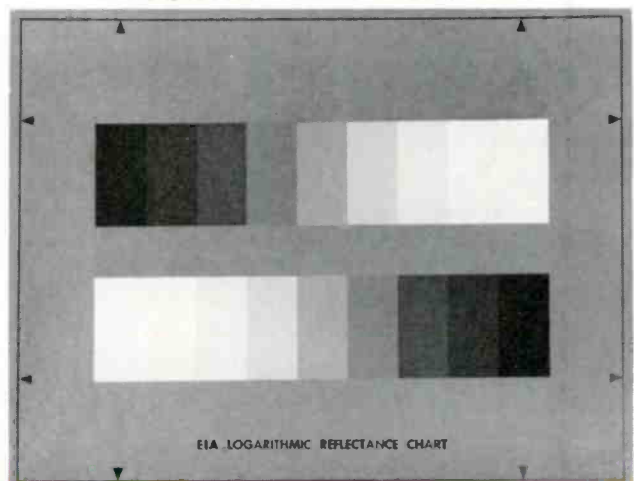
Ordering Information MI-26822-4

EIA Logarithmic Reflectance Chart

The EIA Logarithmic Reflectance Chart provides a standard reference for the measurement and adjustment of the transfer characteristics of monochrome and color TV cameras. This chart consists of a pair of gray scales running in opposite directions placed a short distance apart on a uniform gray background. The reflectance values of the lightest and darkest chips are similar to those of the Linear Reflectance Chart. However, the nine chips of the logarithmic chart are scaled to provide equal percentage steps between reflectance values of consecutive chips. The logarithmic step pattern is of value in setting up monochrome TV cameras for optimum performance on the non-linear portion of the pickup tube transfer characteristic.

Ordering Information MI-26822-5

EIA Logarithmic Reflectance Chart, MI-26822-5.



Television Diascope



FEATURES

- Projects 2 by 2 inch test slides or captions directly upon I.O. camera tube
- Precision 39mm focal length f/4.5 anastigmat coated lens
- Light intensity may be adjusted
- Standard double 2 by 2 inch slide holder aligned on camera turret
- Facilitates initial adjustment of cameras and associated equipment

DESCRIPTION

The Watson Barnet Model 251 Diascope is a useful test or programming device intended to be mounted on the turret of an image orthicon television camera in place of the normal taking lens to project an image of a test pattern or caption from a 2-inch by 2-inch slide directly upon the photocathode of the camera tube. The camera and associated equipments may be adjusted or tested by projecting the appropriate test slide. The Diascope is also an excellent device for programming slides where a film projector is not available for slide requirements.

The Diascope may be mounted on the turret of a 4½-inch I.O. live TV camera in place of one of the normal fixed focus lens. Projection is achieved by a precision 39mm focal length f/4.5 anastigmat lens with coated components designed to enlarge the 1.4 diagonal of the 2-inch by 2-inch slide picture area to fill the 1.6-inch diagonal of the photocathode surface. Lens performance is capable of projecting with good definition an opaque line .001 inch wide with .001 inch spaces.

The slides are inserted into a standard double 2 x 2 slide holder which is properly aligned by a locating pin on the camera turret that engages a slot in the Diascope mounting collar. By this means, orientation of the slide image is correct with respect to the photocathode.

The illumination system for the slide comprises a 12 volt, 6 watt Mazda No. 209 lamp, a condensing lens and a ground glass screen. The light intensity may be adjusted by means of a rheostat mounted in the end of the Diascope. The mounting collar has two contacts for supplying voltage to the Diascope from a source within the camera.

The TK-60A camera turret has mating contacts for the Diascope and supplies power to the lamp from a variable 0 to 12 volt power source within the camera. The variable 0-12 volt power source is adjusted by the iris control knob at the camera or remote position provided the appropriate switch on the camera is placed in the "diascope" mode of operation.

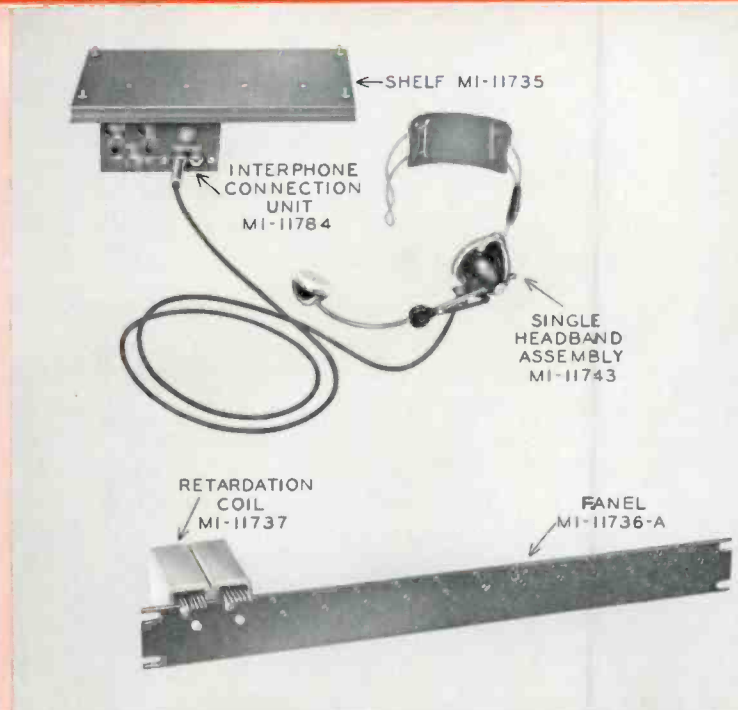
Ordering Information

Watson Barnet Diascope.....Model 251

Interphone Equipment

FEATURES

- Production intercom with studio personnel or remote line as desired
- Can mount to console, desk, or wall
- Designed to be compatible with other RCA TV equipment
- Transistor amplifier or induction coil type interconnection units available
- Regulated power supply



DESCRIPTION

RCA Interphone Equipment is designed to provide convenient line switching and headset connection facilities for a TV camera and studio communication system.

Heart of the RCA Interphone System is the Interphone Connection Unit. Two types of connection units are available. The MI-11784 Transistor Interconnection Unit must be used with RCA TK-60 and other late model Cameras having transistorized intercommunication systems built into the camera. The MI-11734 Intercom Interconnection unit is designed for use with early RCA studio and field type cameras. The two interconnection units can not be intermixed in a system.

The MI-11784 unit includes a single stage transistor amplifier, with bridge rectifier and sidetone compensation network with level control to adjust volume. Each person on the talking bus can adjust the volume to suit his individual requirement. On the front is a three-way switch for selection of three intercom lines, and the separate volume controls for "phone" and "cue" adjustment. The box also contains two jacks to accommodate single or double headsets. A 9-pin and a 12-pin cable connector plug on the rear are used for external connection. The entire unit is

housed in a box 4 $\frac{5}{8}$ inches wide, 2 $\frac{1}{2}$ inches high and 6 $\frac{3}{4}$ inches deep overall.

Operating power for the MI-11784 interphone unit is derived from the common-battery interphone circuit to which the interphone unit is connected. A bridge-rectifier is interposed in the line to the amplifier to maintain correct polarity at the amplifier regardless of the polarity of the interphone battery voltage. The sidetone compensation bridge is designed to hold the sidetone level to within 2 db of the received level for any number of connected stations up to 32.

The Transistor Interphone Connection Unit, MI-11784 can replace the MI-11734 unit where it is designed to modernize the system since the unit physically replaces the MI-11734 Connection Unit and will operate with virtually all commercially available TV headsets using carbon microphones. The substitution can be made only if the camera is modified by substituting an MI-11757 Transistor Amplifier for the induction coil in the interphone circuit. Other circuit changes as outlined in the instruction book are also required.

The Interphone Connection Unit, MI-11734, consists of a simple circuit having an induction coil and capacitor to provide an anti-sidetone feature. The circuit is housed in a compact box having two phone jacks for use either with a single or double headset as required, and a two-position toggle switch for selecting a local circuit or a remote line. A cable plug is mounted in the rear. It is designed to work in early intercom systems employing induction coils throughout.

All other components of the Interphone System are designed for operation with either Interconnection Unit.

The Retardation Coil, MI-11737, permits simultaneous use of four carbon microphones such as one interphone connection unit and three camera headsets on a common battery or power supply. The coil permits a d-c power voltage to be imposed upon the two-wire telephone talking line. The MI-11737 is an audio frequency choke which isolates the power supply from the telephone line at voice frequencies.

The MI-11736-A Mounting Panel is recommended for mounting retardation coils. The panels have standard mounting dimensions for use in the RCA BR-84 Series Racks.

The accessory, MI-11735 Shelf, is available for mounting the interphone connection units under the countertops of console housings on which switching units or camera controls are housed. The plate will accommodate one or two Interphone Connection Units.

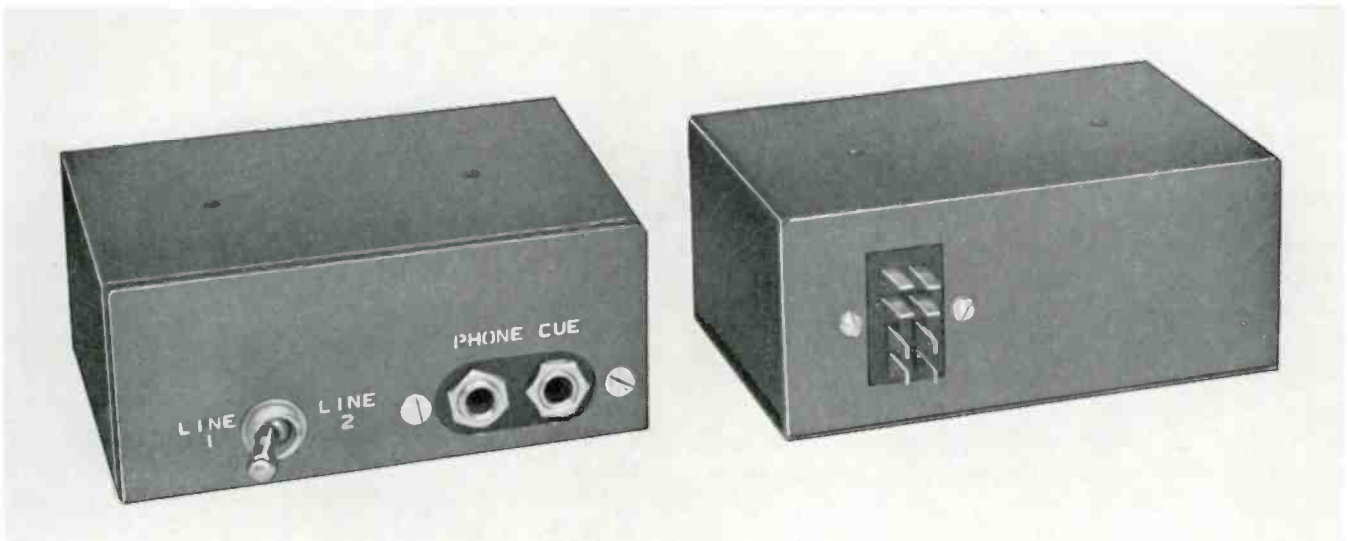
Either a single or double headset identified as Single Headband Assembly, MI-11743 and Double Headband Assembly, MI-11744, can be used with RCA Interphone Equipment. One earphone unit of the double headband assembly is used for "cue" reception. Either type can be used in the same system.



MI-11784 Transistor Interphone Unit

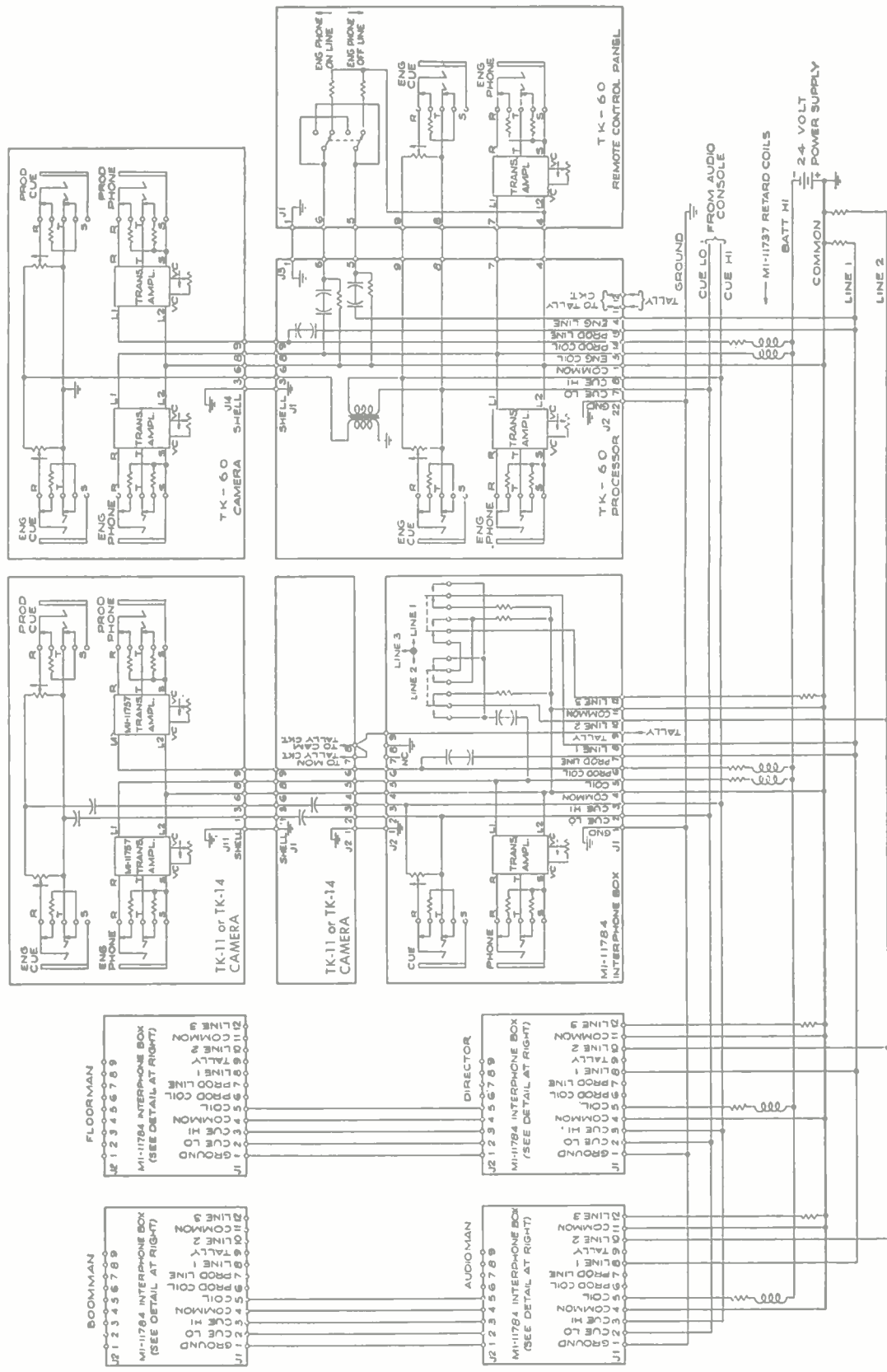


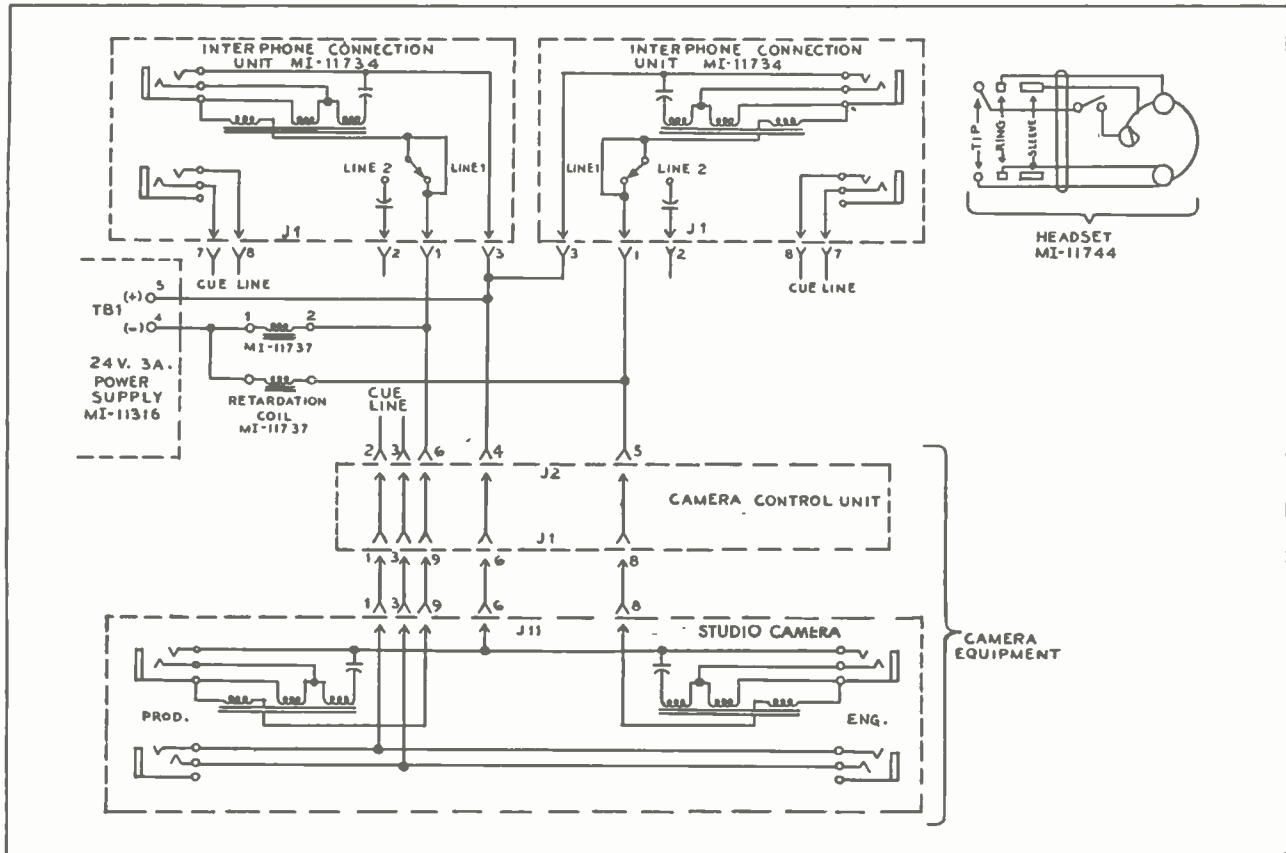
Double Headband Assembly, MI-11744



Front and rear view of Induction Coil Interphone Unit, MI-11734.

SCHMATIC DIAGRAM FOR TRANSISTOR INTERPHONE SYSTEM





Schematic Diagram for Interphone

SPECIFICATIONS

Single or Double Headset

DC Resistance:

Microphone Switch On.....	70 ohms approx.
Microphone Switch Off.....	Infinite

Inductance at 1000 Cycles:

Microphone Switch On.....	70 millihenries approx.
Microphone Switch Off.....	245 millihenries

Weight:

Single Headband Assembly.....	6 ozs. (less cord)
Double Headband Assembly.....	9 ozs. (less cord)

Transistor Interphone Connection Unit, MI-11784

Impedance.....	120 ohms
DC Voltage.....	8.5 volts (nominal)
DC Current.....	95 ma. (approx.)
Dimensions Overall.....	.45 $\frac{1}{8}$ " wide, 2 $\frac{1}{2}$ " high, 6 $\frac{3}{4}$ " deep
Weight.....	3 lbs.

Interphone Connection Unit, MI-11734

Dimensions Overall.....	.45 $\frac{1}{8}$ " wide, 2 $\frac{1}{8}$ " high, 4 $\frac{1}{4}$ " deep
Weight.....	1 lb., 11 ozs.

Retardation Coil, MI-11737

DC Resistance.....	165 ohms
Inductance.....	3.4 millihenries
Maximum Recommended Load Current.....	125 ma d-c
Dimensions Overall.....	1 $\frac{1}{8}$ " wide, 1-45/64" high, 4 $\frac{5}{8}$ " deep
Weight.....	.16 ozs.

Power Supply, MI-11316

Input.....	100-125 volts, 50/60 cps, single phase, 125 watts
Output.....	Regulated 24 volts, 3 amps. d-c
Dimensions Overall.....	7 $\frac{3}{4}$ " wide, 5 $\frac{3}{4}$ " high, 10 $\frac{5}{8}$ " deep
Weight.....	.25 lbs.

Power Supply

Input:

MI-11318.....	100-130 volts, a-c, 60 cps, single phase, 144 watts
MI-591318.....	200-260 volts, a-c, 50 cps, single phase, 144 watts

Output..... Regulated 24 volts, 6 amps, d-c

Dimensions Overall..... 19" wide, 5 $\frac{1}{4}$ " high, 9 $\frac{3}{4}$ " deep

Weight..... 25 lbs.

Mounting Shelf

Capacity.....	Mounts one or two Interphone Connection Units
Dimensions.....	11" long, 6 $\frac{3}{8}$ " wide
Weight.....	.2 lbs. (approx.)

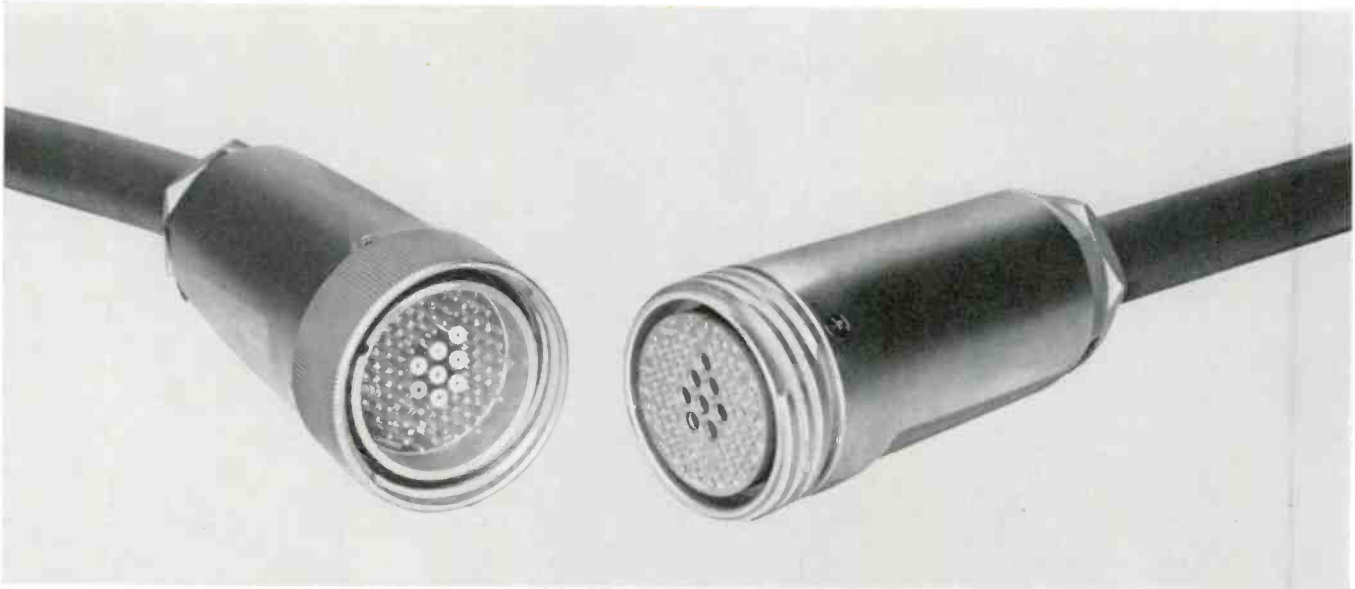
Retardation Coil Panel

Capacity.....	Mounts up to 14 retardation coils
Dimensions.....	19" wide, 1 $\frac{3}{4}$ " high
Weight.....	18 ozs.

Ordering Information

Transistor Interphone Connection.....	MI-11784
Interphone Connection Unit.....	MI-11734
Retardation Coil.....	MI-11737
Shelf for Mounting MI-11734.....	MI-11735
Panel (accommodating 14 Retardation Coils).....	MI-11736-A
Single Headband Assembly.....	MI-11743
Double Headband Assembly.....	MI-11744
Regulated Power Supply (24 V, D-C, 3 amps) 110 V, A-C.....	MI-11316
Regulated Power Supply (24 V, D-C, 6 amps) 110 V, A-C.....	MI-11318
Regulated Power Supply (24 V, D-C, 6 amps) 220 V, A-C.....	MI-591318
Transistor Amplifier (Replacement for Induction Coil).....	MI-11737

TV Cables, Plugs, Connectors



Male Cable Connector, MI-40529-1.

Female Cable Connector, MI-40529-2.

FEATURES

- Cable designs for every broadcast service—either studio or remote
- Exact replacements for cables and connectors supplied with RCA television equipment avoids unnecessary installation delays
- Various cable lengths and special cables available as kits
- Connectors and bulk cable available separately or as wired cable assemblies
- High quality, conservatively rated connectors and cable used throughout
- Insulations with conservative voltage ratings and special shields employed

DESCRIPTION

RCA television cables, plugs and connectors are made available for inter-connecting the various components of television equipment—studio, control room and remote. Camera, power, pulse, intercom, coax transmission line and inter-connecting cables with companion connectors are available as individual items or in groups for use with various equipment systems. Refer to the individual equipment catalog sheets to determine which cables are required with specific items of video equipment.

Camera Cables

The multi-conductor, flexible camera cables listed here are supplied in convenient lengths complete with necessary male and female connectors. These cables facilitate making required inter-connections between cameras and camera controls. Conductors are stranded and covered with "color-coded" insulation. An inner shield of tinned copper braid is provided. Dust caps are provided where necessary. Outer coverings are of a durable neoprene compound.

Camera Cables and Plugs

Ordering Information	Description	Length
MI-26725-E5	25-Conductor, neoprene cover, with straight male and female connectors. With dustcaps.	50 feet
MI-26725-E6	Same as above except length.	100 feet
MI-26725-E7	Same as above except length.	200 feet
MI-26725-E9	25-conductor, neoprene cover, with 90° male and a straight female connector.	50 feet
MI-26725-E10	25-conductor, neoprene cover, with 90 degree female and a 90 degree male connector. With dustcaps.	50 feet
MI-40831-1	Control Cable; 33-conductor, flexible rubber-covered, shielded and individually color coded with Jones type male and female connectors.	50 feet
MI-40831-2	Shading Generator Cable; 8-conductor, rubber-covered, flexible, with Jones type male and female connectors.	4 feet
MI-40835	Set of Interconnecting Cables for TK-26 (Camera to Camera Auxiliary): (a) Camera Cable; 20-conductor, flexible, rubber-covered, shielded, and individually color coded with rectangular Cannon type male and female connectors. (b) Coaxial Cable; Type RG-59/U, flexible, rubber-covered.	3 feet 3 feet
MI-40868-2	TK-41C Color Camera Cable. 82-conductor, single cable, vinyl covered flexible, straight male and female connectors.	50 feet
MI-40868-3	Same as above except length.	100 feet
MI-40868-4	Same as above except length.	200 feet

Coax Cable Assemblies

The coaxial transmission line cable assemblies are made available in several different convenient lengths as shown in the accompanying chart. All are durable, vinyl covered, flexible cables with inner conductor and outer shielded conductor.

Ordering Information	Description	Length
MI-26759-12	Coax Cable Assembly with 2 male plugs and dustcaps. Impedance, 75 ohms.	7 feet
MI-26759-13	Same as MI-26759-12.	25 feet
MI-26759-15	Coax Cable Assembly with 2 male plugs and dustcaps. Impedance, 75 ohms.	100 feet
MI-26759-59	Coax Cable Assembly with 2 male plugs and dustcaps. Impedance, 75 ohms.	10 feet



MI-26759 -22



MI-26759 -21

Camera Cable Connectors and Accessories

The connectors described below include both the 90 degree and straight type for use in making up camera cables in any desired length, using bulk camera cable.

Ordering Information	Type	Description
MI-11719-A	Lacing Cord.	Black #6.
MI-26759-A21	Straight Male Camera Cable Connector.	24-contact for use as a cable termination.
MI-26759-A22	Straight Female Camera Cable Connector.	24-contact for use as cable termination.
MI-26759-23	90° Female Camera Cable Connector.	24-contact for use as cable termination. Designed so cable enters connector at 90° to axis of contact pins.
MI-26759-24	90° Male Camera Cable Connector.	24-contact for use as cable termination. Designed so cable enters connector at 90° to axis of contact pins.
MI-26759-A41	Dustcap for male cable connector.	2 1/16" dia. x 1 3/32" deep, internal thread, with #10 chain and fastener.
MI-26759-A42	Dustcap for female cable connector.	2 1/16" dia. 1 1/16" deep, internal thread, with #10 chain and fastener.
MI-26759-45	Coaxial Termination. 75 ohm 1%.	Includes single contact coaxial connector plug, terminal assembly with a 1/2 watt, 75-ohm resistor.
MI-26759-48	Straight Female Connector, waterproof jacket.	24-contact for use as microwave cable termination.
MI-26759-49	Gasket for MI-26759-48.	Buna "N" rubber 1/4" square with knitted monel mesh bonded to rubber.
MI-40529-1	Male connector for color camera cable.	82-contact, for use as cable termination.
MI-40529-2	Female connector for color cable.	82-contact—same as above.
MI-40529-3	Male chassis connector.	82-contact, use with a color camera cable connector.
MI-40529-4	Female chassis connector.	Same as above.
MI-40529-5	60° Adaptor.	For color cable chassis connector.
MI-40529-6	Kellum Grip Kit.	Use with MI-40529-1 or 2.

Sets of Interconnection Cables

The cables listed below are supplied in groups in accordance with the requirements of the indicated video equipment systems.

MI-26359, Interconnecting Cables for TK-60 Field Camera Chain

Includes:

- 2 MI-26759-58 10 ft., 3-cond., Power Cable with Plugs and Covers
- 1 MI-26759-9 7 ft., 7-cond., Pulse Cable with Plugs and Covers
- 2 MI-26759-46 10 ft., 12-cond., Power Cable with Plugs
- 4 MI-26759-12 7 ft., Transmission Line Cable with Plugs and Covers
- 1 MI-26759-59 10 ft., Transmission Line Cable with Plugs and Covers
- 1 MI-26759-60 7 ft., 19-cond., Remote Cable with Plugs and Covers
- 1 MI-26759-61 10 ft., 9-cond., Interphone Cable with Plugs and Covers

MI-43201, Interconnecting Cables for TK-14 Field Camera Chain

Includes:

- 1 MI-26759-2 10 ft., 2-cond., Power Cable with Plugs and Dustcaps
- 1 MI-26759-9 7 ft., 8-cond., Pulse Cable with Plugs and Dustcaps
- 1 MI-26759-11 7 ft., 8-cond., Interphone Cable with Plugs and Dustcaps
- 1 MI-26759-12 7 ft., Transmission Cable with Plugs and Dustcaps
- 1 MI-26759-62 7 ft., 12-cond., Power Cable with Plugs and Dustcaps
- 1 MI-26759-64 7 ft., 15-cond., Power Cable with Plugs and Dustcaps
- 1 MI-26759-65 7 ft., 7-cond., Orbitor Cable with Plugs and Dustcaps

MI-26730, Interconnecting Cables for TK-31 Field Camera Equipment

Includes:

- 1 MI-26759-2 10 ft., 2-cond., Power Cable with Plugs and Dustcaps
- 1 MI-26759-7 6 ft., 12-cond., Power Cable with Plugs and Dustcaps
- 1 MI-26759-9 7 ft., 8-cond., Pulse Cable with Plugs and Dustcaps
- 1 MI-26759-11 7 ft., 8-cond., Interphone Cable with Plugs and Dustcaps
- 1 MI-26759-12 7 ft., Coaxial Transmission Cable with Plugs and Dustcaps

MI-26740-A, Interconnecting Cables and Fittings for TS-30D Field

Switching Equipment Includes:

- 1 MI-26759-2 10 ft., 2-cond., Power Cable with Plugs and Dustcaps
- 1 MI-26759-7 6 ft., 12-cond., Power Cable with Plugs and Dustcaps
- 1 MI-26759-13 25 ft., Coaxial Transmission Cable
- 1 MI-26759-15 100 ft., Coaxial Transmission Cable
- 1 MI-26759-18 Set of Coaxial Fittings

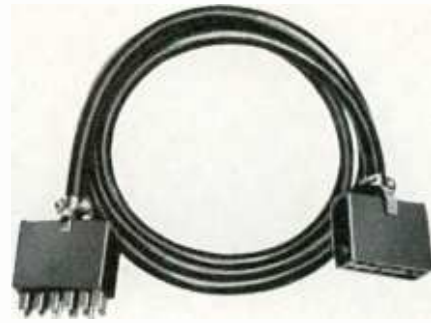
MI-26746, Interconnecting Cables for TK-11B and TK-14 Studio Camera

Control Includes:

- 1 MI-26759-6 34-inch, 12-cond., Power Cable with Plugs
- 1 MI-26759-14 64-inch, Coaxial Transmission Line Cable with Plugs

Pulse and Interphone Cables

Ordering Information	Description	Length
MI-26759-9	Pulse Cable—8-cond., neoprene covered, flexible with straight male and female Cannon type connectors and dustcaps.	7 feet
MI-26759-11	Interphone Cable—8-conductor, vinyl covered, flexible, with male and female Cannon type connectors and dustcaps.	7 feet
MI-26759-60	Remote Control Cable (TK-60 Process Amplifier to Control Panel) 19-conductor shielded, black vinyl jacket, flexible with Cannon type male and female connectors and dustcaps.	7 feet
MI-26759-61	Interphone Cable—9-conductor, flexible, shielded, black vinyl jacket non-contaminating, with Cannon type male and female connectors and dustcaps.	10 feet



12-Conductor, Power Cable MI-26759-6 supplied with Jones type connectors.

Power and Control Cables and Plugs

The cables and connectors described below are available for use as spare units or replacements for those supplied with RCA television studio equipment.

Ordering Information	Power Cable Description	Length
MI-26759-2	2-conductor, vinyl covered, flexible with male plug and female Cannon type connector with dustcap.	10 feet
MI-26759-6	12-conductor, vinyl covered, flexible with male and female Jones type connectors.	34 inches
MI-26759-7	12-conductor, vinyl covered, flexible with male and female Cannon type connectors and dustcaps.	6 feet
MI-26759-8	12-conductor, vinyl covered, flexible with male and female Jones type connectors.	6 feet
MI-26759-41	18-conductor, vinyl covered, flexible with male and female Jones type connectors.	4 feet
MI-26759-42	12-conductor, vinyl covered, flexible with male and female Jones type connectors.	5½ feet
MI-26759-46	12-conductor, vinyl covered, flexible with male and female connectors and dustcaps.	10 feet
MI-26759-57	8-conductor, vinyl covered, flexible with straight male and 90° female connector.	36 inches
MI-26759-58	3-conductor, heavy duty Cord type S, synthetic rubber insulation, with Cannon type female connector and Hubbell type 3-wire polarized armored cap (twist-lock).	10 feet
MI-26759-62	12-cond., vinyl covered, flexible with male and female connectors and dustcaps.	7 feet
MI-26759-64	15-cond., neoprene covered, flexible with male and female connectors and dustcaps.	7 feet
MI-26759-65	7-cond., rubber covered, flexible with male and female connectors and dustcaps.	7 feet

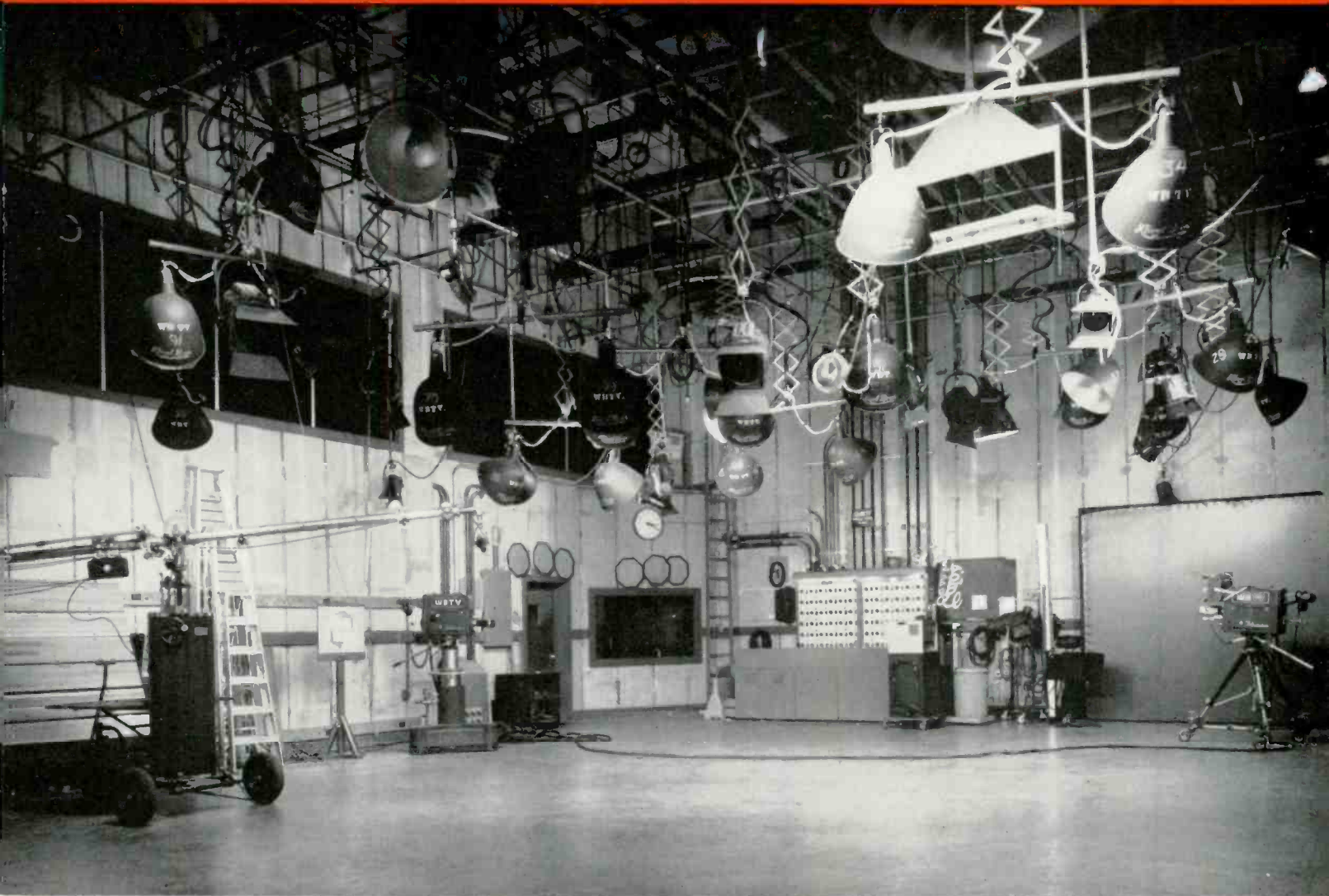
Bulk Cable and Accessories

The various cables described in the accompanying table are available to the broadcaster in bulk quantities for making TV interconnections in special or nonstandard lengths as desired.

Ordering Information	Type Cable	Approx. Diam.	Characteristics
MI-43D	MICROPHONE CABLE—3-conductor, rubber covered, with outer neoprene covering, flexible.	0.300"	3 cond. #20 A.W.G. tinned cadmium bronze, stranded for low impedance circuits.
MI-48	PULSE CABLE—8-cond., rubber covered, flexible, individual color coding.	0.75"	4 coax conductors of 72 ohms impedance and 4 cond. of #16 A.W.G. with insulation for 600 v d-c.
MI-74B	COAXIAL CABLE—Type RG-8/U, flexible, vinyl covered. Single inner conductor and outer shield conductor.	0.405"	Impedance 52 ± 2 ohms. Normal capacitance 30.5 MMF/ft.; max. operating voltage 4000 RMS.
MI-75	COAXIAL CABLE—Type RG-59A/U, flexible, vinyl covered. Single inner conductor and outer shield conductor.	0.242"	Impedance, 75 ohms. Normal capacitance 20.5 MMF/ft. max., operating voltage 2300 RMS.
MI-83A	COAXIAL CABLE—Type RG-11A/U, flexible, vinyl covered. Single inner conductor and outer shield conductor.	0.405"	Impedance, 75 ohms. Normal capacitance 20.5 MMF/ft., max. operating voltage 4000 RMS.
MI-94N	CAMERA CABLE—25-cond., neoprene-covered, flexible, color coded, shielded cable consisting of: 3 coaxial cond., 18 stranded, tinned copper cond., and 1 group of 4 tinned copper conductors.	0.83"	Coax cond., impedance 50 ohms ± 2 ohms, 18 cond. of #22 A.W.G. and 4 of #14 A.W.G. with insulation for 1000 v, RMS max.
MI-13307-A	MICROPHONE CABLE—2-conductor, flexible, shielded, color coded.	0.285"	2 conductors, each of 41 strand tinned copper wire .0063" dia. to meet RMS specifications.
MI-13318-A	COAXIAL CABLE—Type RG-58C/U, flexible, vinyl covered.	0.20"	Impedance 50 ohms. Insulation for 1900 v, RMS.
MI-13319	POWER CABLE—18-conductor, rubber-covered, flexible, shielded and individually color coded.	0.590"	16 cond. #22 A.W.G., 2 cond. #16 A.W.G. with insulation for 2500 v, RMS, 60 cycles.
MI-13320	3-V FILM CAMERA CABLE—33-conductor, flexible, rubber-covered, shielded and individually color coded.	0.75"	27 cond. #22 A.W.G., wire jacketed; 4 cond. #22 A.W.G., wire jacketed; and 2 wires, #22 A.W.G., same shielded.
MI-13321	DELAY CABLE—Type RG-65/U, flexible, shielded.	0.75"	Impedance 1000 ohms.
MI-13325	COAXIAL CABLE, flexible, double shielded, rubber cover.	0.305"	Impedance 74.99 ohms at 4 mc, normal capacitance 20 MMF/ft., max. voltage 4000 RMS.

Ordering Information	Type Cable	Approx. Diam.	Characteristics
MI-13333	POWER CABLE, 7-conductor, shielded, black rubber jacket.	0.360"	7 cond. #20 A.W.G., 600 v, RMS max.
MI-13334	POWER CABLE, 24-conductor, stranded wire, black vinyl jacket.	0.525"	4 cond. #16 A.W.G., 6 cond. #20 A.W.G., 14 cond. #22 A.W.G., 600 volts RMS.
MI-13340	POWER CABLE—27 cond., shielded, stranded wire, black neoprene jacket.	0.625"	27 cond., 3 pairs #22 A.W.G. twisted and shielded, 1 single #22 A.W.G., shielded, 1 pair #22 A.W.G., twisted, 18 cond., #22 A.W.G., 600 v, RMS max.
MI-13341	POWER CABLE, 26-conductor, shielded, black vinyl jacket.	0.625"	5 cond. #16 A.W.G., twisted and shielded overall as a group, 3 pairs #22 A.W.G. each pair shielded, 15 cond. #22 A.W.G.
MI-13351	POWER CABLE—16 cond., shielded, stranded wire, black neoprene jacket.	0.593"	16 cond. #16 A.W.G., 600 v, RMS max.
MI-13380-2	POWER CABLE—2-conductor, flexible, shielded, black vinyl jacket, non-contaminating.	0.420"	2 cond. #14 A.W.G., 600 v, RMS max.
MI-13380-3	POWER CABLE—Same as above except 3 cond.	0.450"	Same as above except 3 cond.
MI-13380-4	POWER CABLE—Same as above except 4 cond.	0.480"	Same as above except 4 cond.
MI-13380-5	POWER CABLE—Same as above except 5 cond.	0.540"	Same as above except 5 cond.
MI-13380-6	POWER CABLE—Same as above except 6 cond.	0.610"	Same as above except 6 cond.
MI-13380-8	POWER CABLE—Same as above except 8 cond.	0.610"	3 cond. #14 A.W.G.; 5 cond. #18 A.W.G.; 600 v, RMS max.
MI-13380-12	POWER CABLE—Same as above except 12 conductors.	0.625"	12 cond. #18 A.W.G.; 600 v, RMS max.
MI-13394-N	COLOR CAMERA CABLE—82 conductors, black neoprene jacket.	1.24"	67 cond. #22 A.W.G.; 3 cond. #16 A.W.G.; 4 cond. #14 A.W.G., 8 coaxial cables, Type RG-58C/U, 50 ohms impedance.
MI-40422-A	Crimping Tool (for use with MI-13325 Cable and MI-40423 fittings).		Crimps adaptor to PL-259 connector and sleeve to shield.
MI-40423	Fittings for adapting MI-13325 Cable to PL-259 Connector.		Consisting of 25 pieces each of inner and outer sleeving.

Television Lighting Equipment



FEATURES

- Complete lighting facilities from lamps to lugs—for monochrome and color TV
- Experienced lighting engineers available to help plan studio requirements
- Recommendations based on many successful stations in operation
- Efficient, economical studio lighting for any type of TV studio
- Lighting equipment designed with maximum "flexibility" in mind
- All lighting fixtures designed for maximum reliability and safety



Closeup of lighting used in a typical TV set.

DESCRIPTION

RCA's complete line of Television Lighting Equipment offers maximum flexibility, efficiency and economy in meeting the programming needs of modern, up-to-date TV studios. Based on their wide experience with the great number of today's television stations, RCA engineers have carefully selected a representative line of equipment of leading lighting manufacturers such as Kliegl Bros. and Century Lighting Inc. Such equipment includes all the fixtures, accessories and wiring and control devices needed for a workable and versatile studio lighting system.

During the planning of the television camera and control equipment for your TV studio, RCA engineers are also available to help plan your lighting system—whether it be for a "workshop-type" of studio, TV theatre studio, or a "repetitive programming" studio. RCA will plan your lighting in accordance with your studio's architectural properties, degree of flexibility desired, and as general program material dictates.

"Present-Day" TV Lighting

With the greater trend to color telecasts, proper studio lighting is occupying the attention of station designers. Rule-of-thumb lighting requirements have been drastically revised, and with the introduction of new close-spaced image orthicon tubes the philosophy of lighting has changed. Excellent pictures for monochrome or color require evenly lighted scenes. In order to secure such picture quality, light should overlap to cover scene areas with an even distribution of light.

In general, a typical flat lighting requirement for monochrome can be taken at about 100 foot candles. Flat lighting for color requirement is approximately twice that required for monochrome and will range from 150 foot candles for use with highly sensitive I.O. tubes to 300 to 400 foot candles with less sensitive I.O. tubes. These lighting ranges will generally require a lens opening of approximately $f/8.0$.

The additional lighting requirement for color can be satisfied by any one or by a combination of methods—by

raising the wattage of existing fixtures, by the addition of more fixtures of the same type and wattage (especially desirable in low-ceiling studios of 12 to 14 feet), or by adding higher wattage fixtures. Another approach may utilize the use of the new improved high sensitivity image orthicon tubes which greatly reduces the color lighting requirements. Forty watts per square foot is generally suggested for 200 foot candles of lighting.

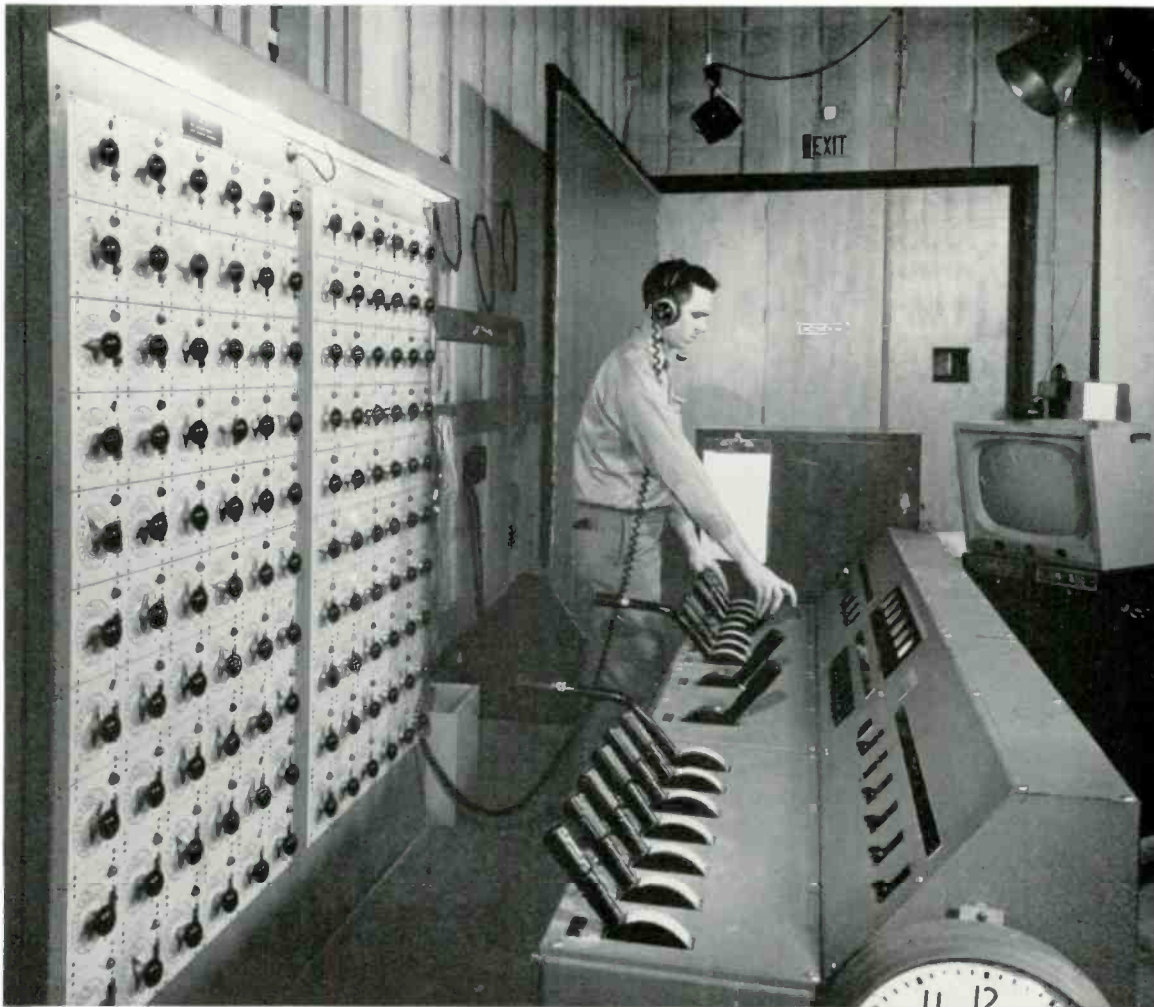
The more sensitive I.O. tubes have accounted for greater use of special or "trick" lighting effects. In black-and-white telecasting dimmer lighting fixtures are used chiefly for adjusting the contrast between front, back and side lighting and also for effects lighting to create silhouettes, transitions, and so forth. They can be equally useful in color telecasting, but in color, subject lighting is rarely dimmed except for unusual dramatic effect. However, dimmers can be used on background and base lights to show changes in the time of day, complement the action or mood, change background color, cut down scenery requirements, and to make smooth transitions from one scene to another.

In the studio, lighting fixtures are mounted from a fixed cross-hatched gridwork, or if the ceiling height permits, on counterbalanced pipe battens or rope, chain, and wire cable suspended battens. Together with the pantographs, complete versatility is obtained with a minimum of labor and delay in rehearsal time. Any size of scenery may, therefore, be accommodated, and the front fill lights may be adjusted easily to approximately the recommended camera level.

More complex switching and dimming will require control boards. Outlet load selection by means of patch plugs or rotary selector switchers greatly improve the safety and efficiency of lighting control. Electronic dimming has now taken its place in the lighting field to simplify the control functions. Because they control large studio currents with small control voltages, the electronic console may be located in the studio control room near the video operator.

Check List

In planning a TV lighting system, a great many factors must be kept in mind by the TV station engineer and the



View of an auto-transformer dimmer control console and load selector panels which combine to provide efficient and precise control of lighting for a large studio.

TV systems engineer as well. Listed here as a convenient check list are some of the objectives of the TV studio designer.

1. To provide a safe and rapid means of energizing the lighting fixtures:
 - a. By minimum lengths and number of time consuming portable cables.
 - b. By initially installing ample carrying capacity of wiring, control devices and feeders, additional costly electrical construction in an operating studio can be eliminated.
2. To specify equipment that is reliable and can be easily installed.
 - a. To assure dependable operation.
 - b. To keep maintenance and time consuming improvisations to a minimum.
 - c. To obtain the most favorable casualty, compensation, and fire insurance rates.
3. Fixtures should be specified that are:
 - a. Light weight for easy handling, yet durable to withstand the handling.
 - b. Easily adjusted, repositioned, and focused.

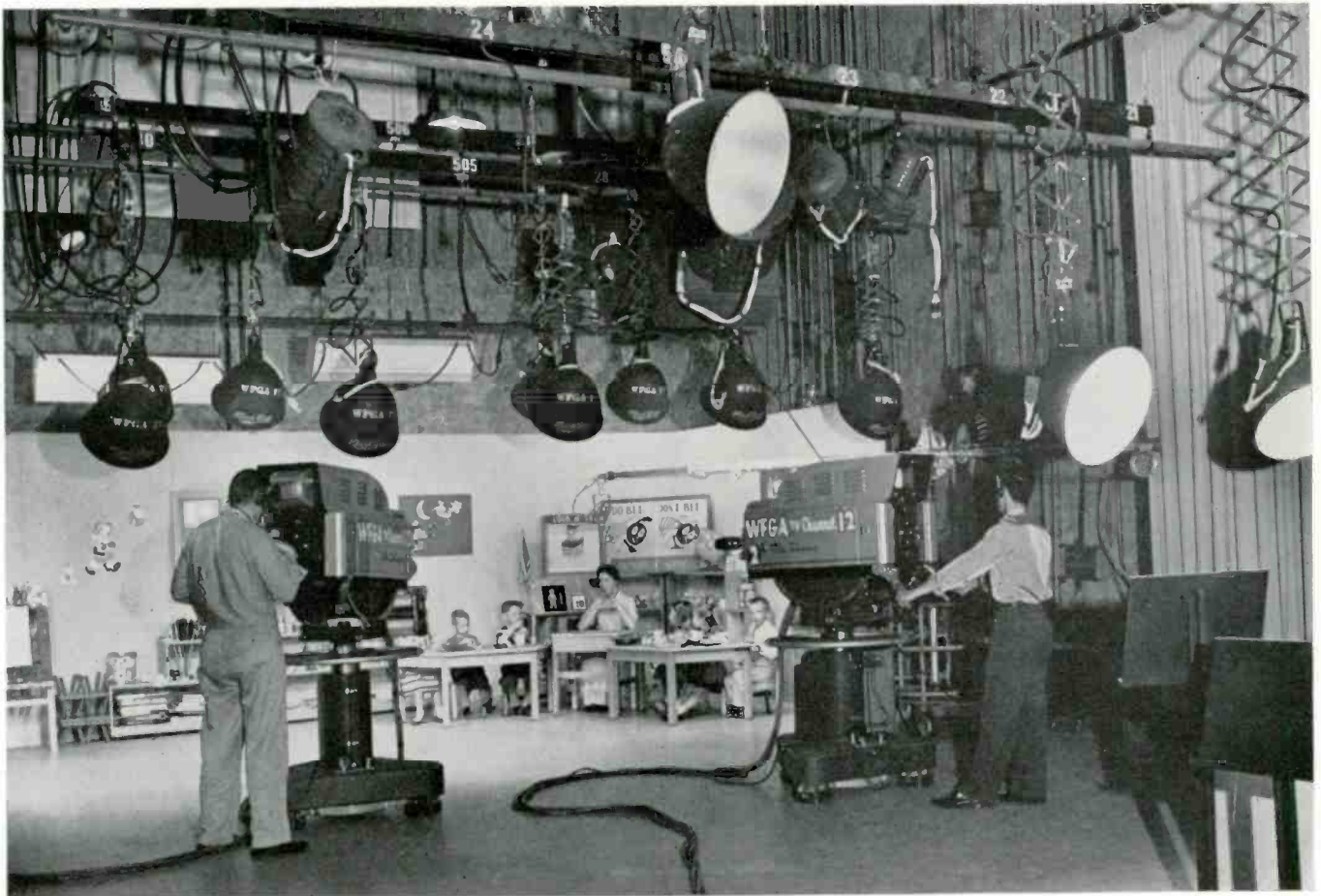
- c. Safely constructed and wired.
- d. The number and type of fixtures should be adequate to prevent the use of lamps of higher wattage than the units are designed for.
- e. Equipment should include a variety of accessories specifically made for the fixtures. These are barn doors, diffuser frames, etc. This is to prevent the use of improvised 'wired on' gadgets that may drop off or cause damage.
- f. Provide maximum light output per dollar invested.

Studio Lighting Techniques

Every television lighting system should be capable of providing the following functions. RCA has selected and makes available its line of Lighting Equipment to satisfy the various requirements set forth here:

1. Base or General Lighting.
2. Modeling Lighting.
3. Back Lighting.
4. Effects Lighting.

Base lighting is that uniform, wide angle illumination which covers the whole scene to be televised and is defined as uniform, diffuse illumination, approaching a shadowless



In this studio scene overhead spots and floods are manipulated to provide desired lighting effect.

condition, sufficient for a television picture of technical acceptability, and which may be supplemented by other lighting. The minimum level is limited to a value which will produce an acceptable signal-to-noise ratio with the studio camera used. The actual value of incident light required is also determined by the depth of field and normally ranges from 6 to 120 foot-candles for average lens stops for monochrome and 100 to 400 foot-candles for color. Productions may require even greater variations than this, and for our plans, we will specify 80 foot-candles for an average interior for monochrome and 240 foot-candles for color. This base or general light can be provided by incandescent floods (scoops), or long range scoops (for long distance throws). *Base lighting* can also be obtained by using the Fresnel spot lights at flood position.

Modeling light is directional light at an angle to the camera axis which develops forms in the scene. Shadows are then produced, and give an illusion of depth to the subject. This can be obtained by unbalanced base light without destroying the illusion of the space effect. More generally, however, Fresnel lens spotlights provided with diffusers and barn doors can effectively create the form and enhance the appearance of the scene. The intensity of this lighting should be 20 to 30 percent greater than the base light in the scene.

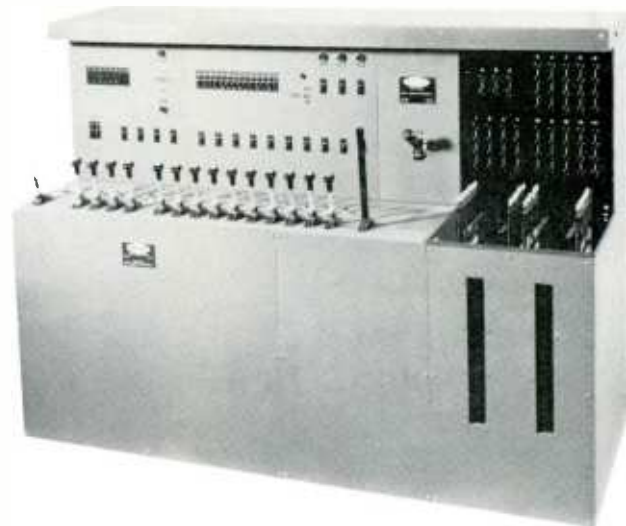
Back lighting. The purpose of back lighting is to separate the actors from the background. This is obtained by using spotlights at the rear of the set, directed from above. The level of this backlight should approach an intensity 50% greater than that of the base light, and should be applied with caution since light should never enter the television camera lens.

Effects lighting is specialized lighting which injects reality to the televised scene. Such effects as clouds, snow, rain, lightning, firelight, can be obtained by rear projection or by simple silhouettes in front of a light source. Many types of lighting equipment are available for special beam patterns which project light or shadows through windows, open doors or fireplaces. The background projector has been used more recently. It can project a simulated background which may be stationary as produced from a slide or moving objects from motion picture film. For proper picture quality, the highlights thus projected should be equal to or at least half of those of the live scene highlights.

The proper combination of these various functions of light can give the illusion of three dimensions to the television picture and impart the desired artistic results. Complete flexibility in all phases of the lighting system is necessary to satisfy the techniques of present day television.

Lighting Application Tools

Unobstructed flexibility of camera and mike boom is required on the studio floor; therefore, the lighting is done



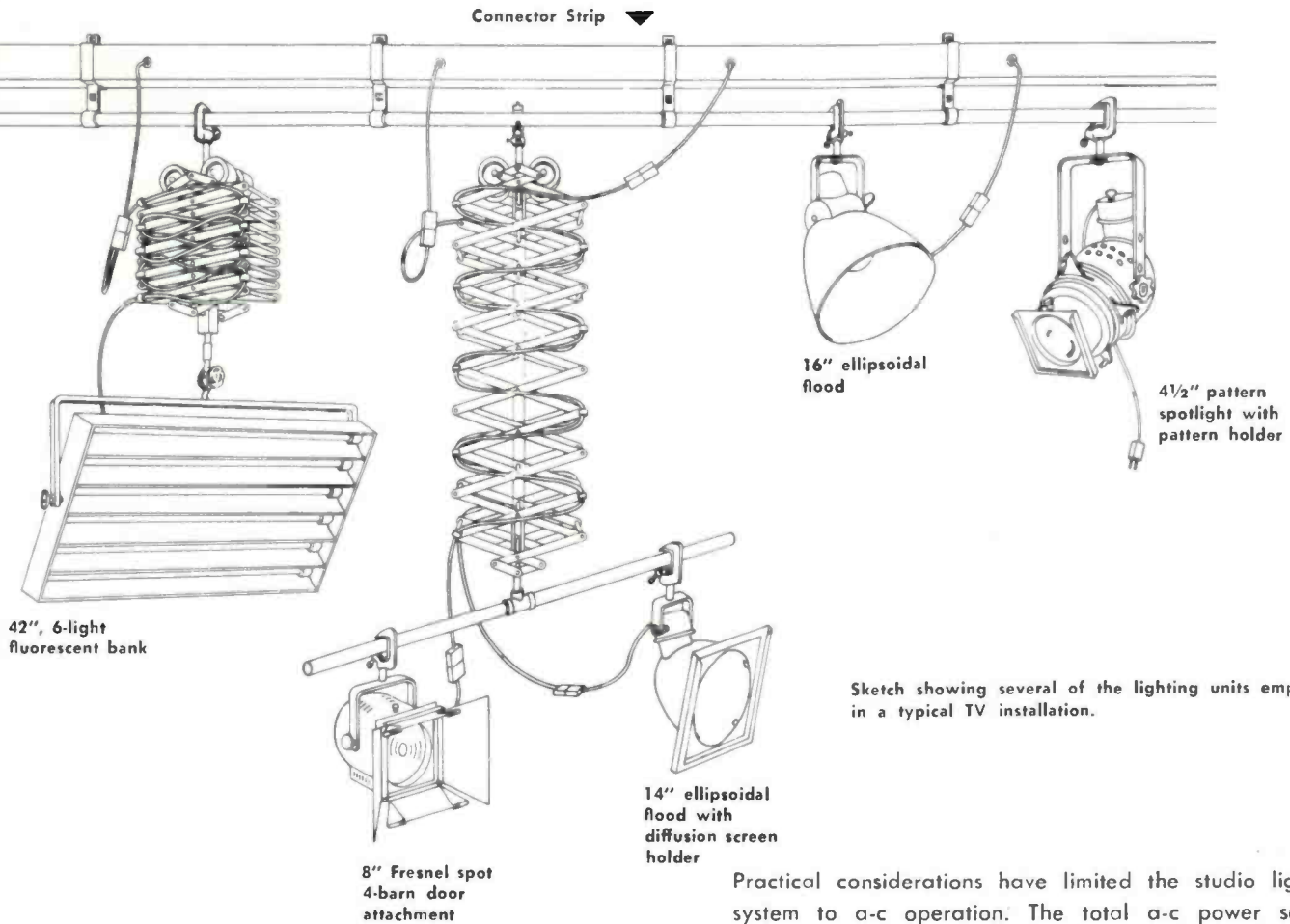
Custom combination auto-transformer board and patch panel where all the lighting load circuits terminate in "Saf-T-Plugs." The dimmers control female receptacles in the patch section. Fast easy selection and grouping of lighting loads is achieved in this low-cost assembly.

from overhead. The means of supporting the lighting fixtures is facilitated by the application tools—viz., grid-work and pantographs.

The ceiling height of 14 to 18 feet prompts the use of a primary-secondary type of grid structure using a 1¼-inch black iron pipe. The primary grid is installed as close to the ceiling as possible—allowing clearance for raceways, ducts, and sprinklers. From this permanent group of parallel pipes is suspended a secondary grid. The secondary pipes are suspended by means of double "C" clamps or chain from the primary pipes and are perpendicular to them. The criss-cross network formed should be on 6- to 8-foot centers to insure adequate facilities for suspension of fixtures. The secondary pipes allow flexibility, as they make it convenient to reposition a fixture at any point on the scene required. Normally, the resulting grid is spaced 12 to 14 feet from the studio floor. From this grid the fixtures can be hung directly, or through pantograph hangers.

Pantographs permit raising and lowering of lighting fixtures and when used with crossarms can support a number of fixtures. Current pantographs can support weights up to 60 pounds and allow for a vertical travel from 8½ to 12½ feet at maximum extensions. A number of pantographs supported from the grid have a great advantage for rapid vertical adjustment. Their most important use in the studio is the support of base lights which, for best pictures, should be approximately 8 feet from the floor.

For studios of ceiling heights above 16 feet a counter-weighted type of grid-work is recommended. This type of grid is described in Plan #3.



Sketch showing several of the lighting units employed in a typical TV installation.

Wiring and Control Devices

Mounted to the secondary pipes are the connector strips, each with 5 outlets. These outlets are pigtails of 3- or 4-foot cables with female stage connectors attached. A total of one ceiling outlet for every 20 square feet of working studio space should be provided in the studio.

From each connector strip, a 12-conductor cable brings the branch circuits directly, or through 4 by 4-inch duct to the studio lighting control. The control board is located on the studio floor so that the operator can view the scene or the control room for cues, and has sufficient switches and dimmers for the accurate and noiseless control of each outlet.

The switchboard should contain a master switch to make possible blackouts and control of everything but work lights. The power is fed to individually fused and switchable outgoing 20 amp. circuits—one for each ceiling outlet. With the addition of a dimmer board, even greater flexibility is obtained. Dimming makes possible special effects, transitions, and control of overall light level.

Practical considerations have limited the studio lighting system to a-c operation. The total a-c power service recommended for the switchboard input is 30 to 40 watts per square foot of working studio space from a 3-phase, 4-wire, 60-cycle system. In addition to this, a special floor outlet box is recommended. This outlet in the middle of the scenic studio area should have a 60-amp. female outlet and 3-pole switch to provide power for special high current equipment such as an electric range in the kitchen set.

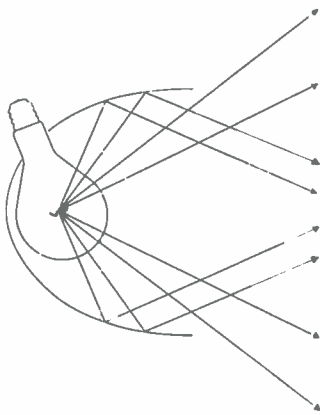
The wiring system of this studio should have, in addition, outlets and connectors of suitable uniformity to make possible complete interchangeability of cable, outlets, or instrument. An equipment ground, carried throughout the system, insures the safety of all personnel.

Lighting Sources

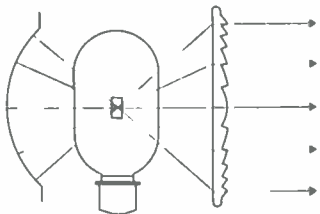
The scoop is a practical source to be considered for use in the TV studio. Several of these units on each scene can provide easily the desired wide angle base light. This light level will vary with the mood of the scene to be televised. When mounted on the pantograph hanger, they can be adjusted with the result that their beam strikes the scene at an angle no greater than 20 degrees and, with diffuser frames, give the proper breakup of the harsh light.

A number of Fresnel spotlights can provide the key and modeling light for the scenes. These units, together with suitable barn doors, can provide the proper, narrow-angled light to supply form for the scene. Their level should contribute a 20 to 30 percent increase in intensity above the average base lighting.

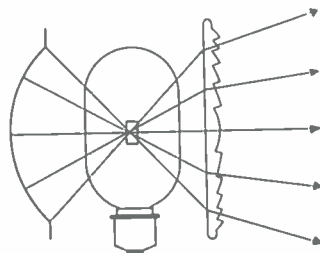
These spotlights can provide backlight of 50 percent greater intensity than the base light. The purpose of backlight is to separate the main actors from the background scenery.



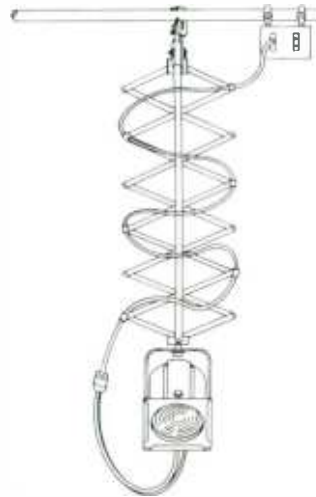
THE SCOOP: These 18-inch diameter, 750 to 2,000 watt wide angle, versatile floodlights provide efficient, soft, diffuse beam. Use with base and fill lights. Included are yoke, C-clamp and pin-connector. Also available are diffusers, cinemoid holder and pantographs.



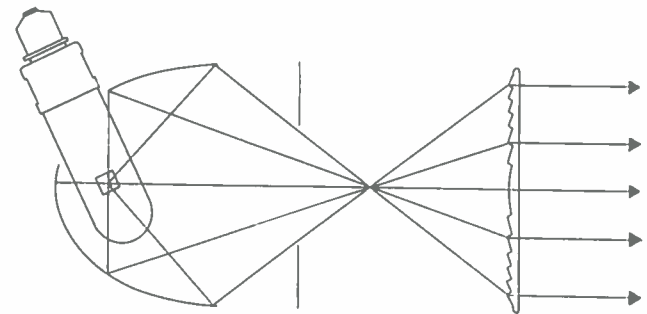
THE FRESNEL SPOT: This soft edge efficient spotlight is the single most valuable lighting instrument for TV usage. Spots rated 3-inch—150 watt, 6-inch—750 watt, 8-inch—2,000 watt, 12-inch—2,000 watt, 16-inch—5,000 watt, or 20-inch—10,000 watt provide variable beam spread in a smooth even field. Use with high and low key lighting, controlled fill lighting, or specials. Each spot includes, yoke, C-clamp, pin-connector. Also available are barn doors, "pole-op," rectangular beam lenses, "cookies," and "lite lifts."



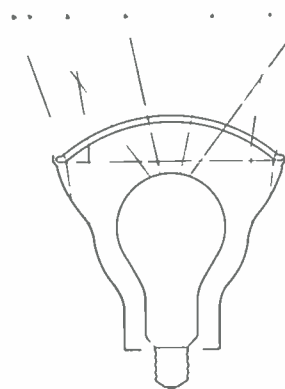
FOLLOW SPOTS: This is a useful specialized instrument available from 750 watts up to 5,000 watts. They provide a finely controlled beam of light with a hard-edge, and are recommended for use with follow spot, accent on star performer and special effect lights. They are provided with stand, yoke, iris, pin-connector and color booms, spread lenses and color wheels are available.



THE LIGHT-LIFT OR PANTOGRAPH: Negator springs permit automatic counter balance and height adjustment of these lighting fixtures. Light-Lifts are available for 12-15 pounds, 18-22 pounds, 26-30 pounds, 0-24 pounds, and 0-60 pound loads in either 7-foot or 12-foot extensions. They are used to quickly change the height or angle of a lamp, soften shadow when used with a fill-light scoop, or correct a shadow angle when used with a key-light fresnel.

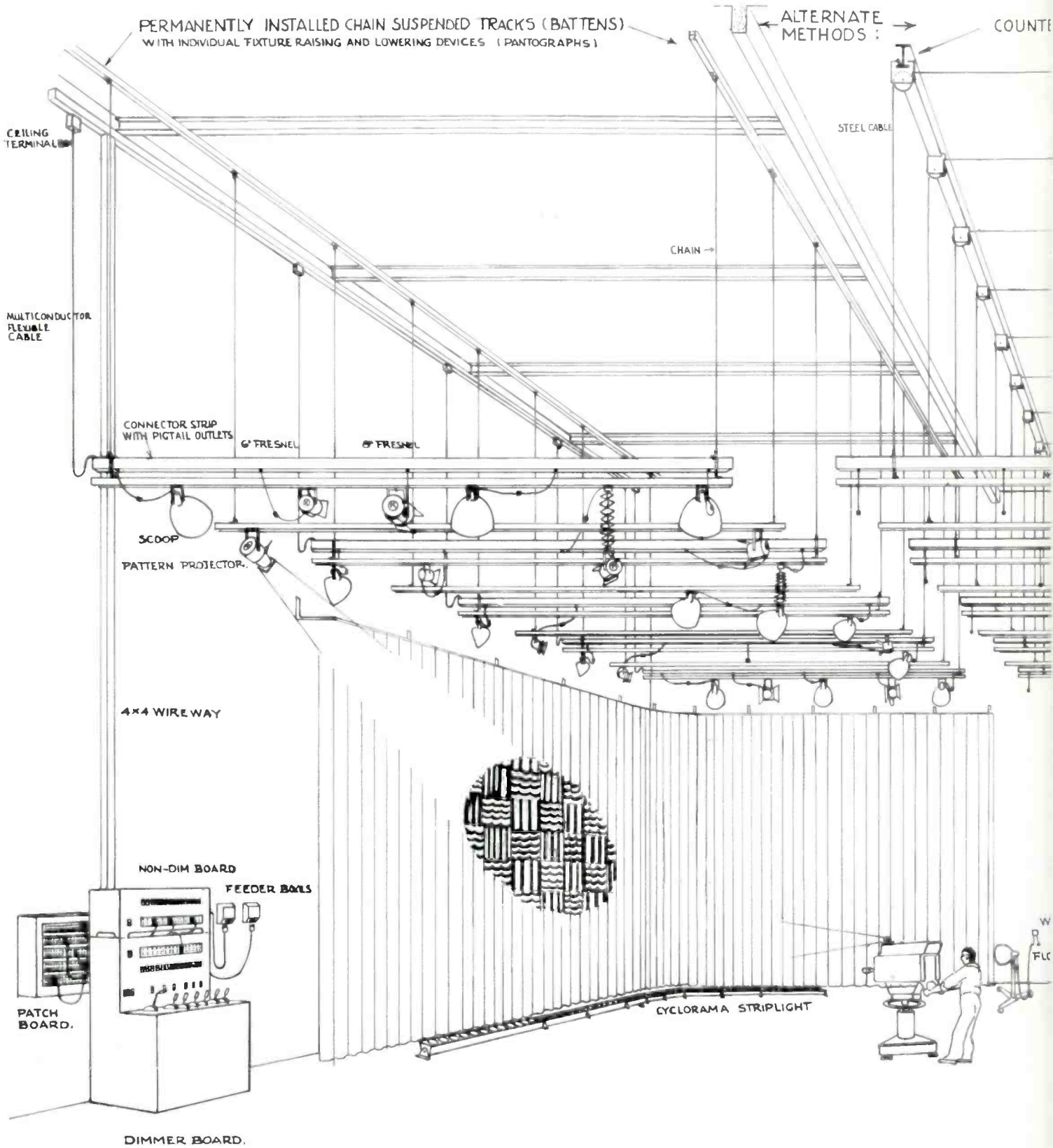


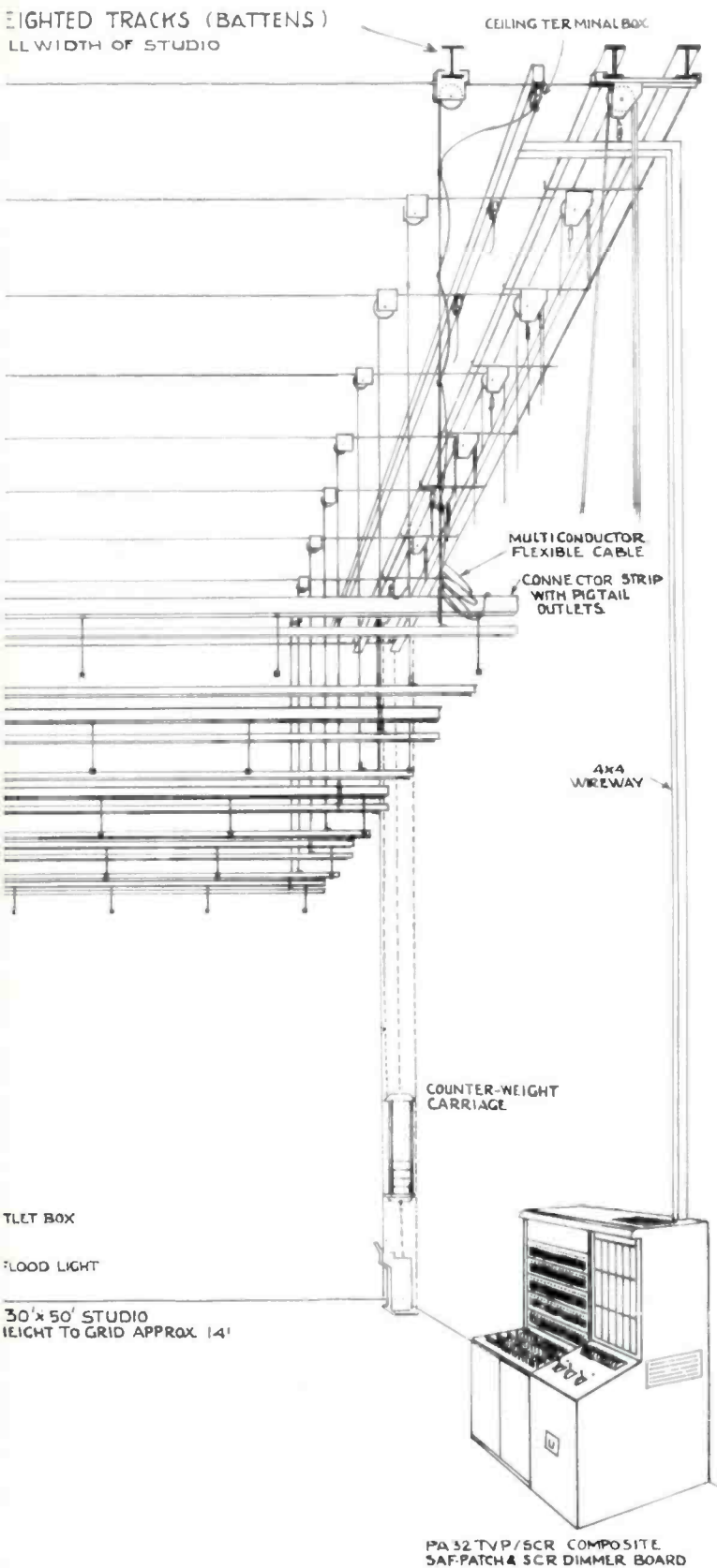
THE PATTERN PROJECTOR: This specialized unit is a controlled beam hard edge spotlight employing an ellipsoidal reflector and stepped or plano convex lens system. Available are 6-inch—750 watt, 8-inch—750 watt, 8-inch—2,000 watt, 8-inch—3,000 watt, 12-inch—5,000 watt units. They provide a clearly defined hard-edge beam. Gobos produce varied patterns on backgrounds. They can also be used with slash lights. The projectors include, yoke, C-clamp and pin-connector. Also available are patterns, variable lenses and iris.



THE STRIP LIGHT: A series of lamps are set in designed reflectors in an approved wire-way for efficient easy handling. Lamps, 6, 8 or 12 inches on center can be specified. These are used for background lighting, eye lighting, etc. Included are reflectors, trunions, leads and connectors. Color filters, roundels, cinemoid and clamps are useful accessories.

THE REAR SCREEN PROJECTOR: The rear screen projector has a one-to-one beam spread ratio and units of 2,000 watt, 2,100 watt 60 volt, 3,000 and 5,000 watt are available. They can be used as front or rear screen projectors. Each unit includes a stand and standard lens. Accessories available are automatic slide changers and super wide angle lens system.





Three Practical Equipment Plans

Obviously, each TV studio must be considered on the basis of its own size and the programming to be accomplished. However, included here are floor plans and equipment lists for three station plans. These plans will perhaps cover a majority of the applications met in actual practice.

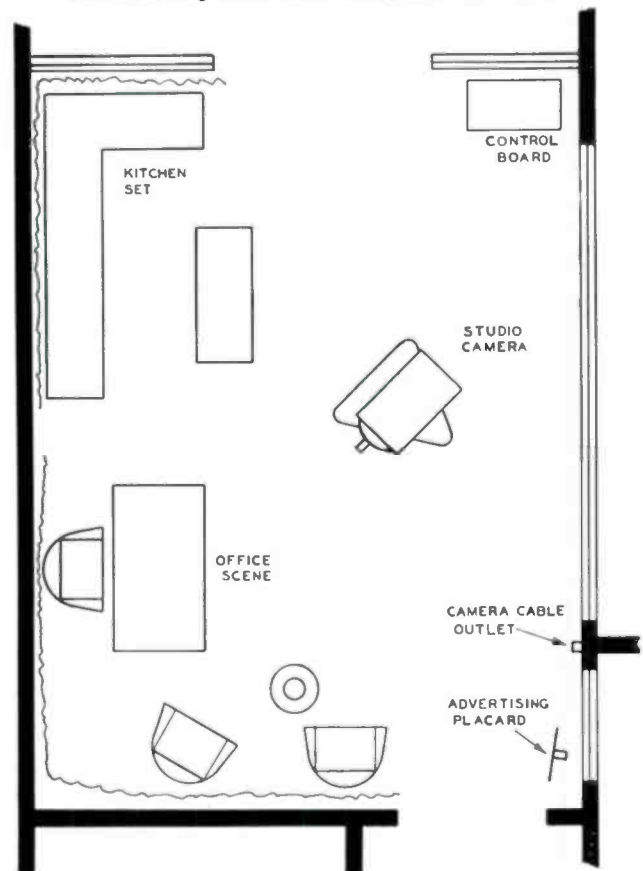
Plan #1

Portable Lighting Equipment Complement for a Semi-Permanent Studio (18' x 25', Two Scene)

In this plan, the studio will undoubtedly be used for repetitive type of programming. Local, unrehearsed shows such as panel discussions, interviews, local spots, kitchen shows or demonstrations will be predominant. Although the studio is a small 18 by 25-foot unit, it can accommodate a permanent kitchen set and an office scene. Space is also available for displaying the sponsor's products and advertising placards.

The lighting system for such a studio has previously been described from the standpoint of application tools, wiring and control devices, and sources. The equipment required for TV Studio Plan #1 is listed below.

Sketch showing studio scenic arrangement for Plan #1.



EQUIPMENT REQUIRED FOR PLAN #1

Qty.	Description	Stock Reference	
		Century	Kliegl
	FIXTURES (each with 3-wire, 3-pole connectors)		
4	Baby Scoop, 300-500 w.	1312GP	1122TVG
4	Scoop, 750-2000 w.	1318GP	1155TVG
2	3-Inch Fresnel Spotlight, 75-150 w.	523GP	44N3TVG
4	6-Inch Fresnel Spotlight, 250-750 w.	520GP	44N6TVG
4	8-Inch Fresnel Spotlight, 1000-2000 w.	570GP	44N8TVG
1	Follow Spotlight with Iris, 250-750 w.	1598GP	1365TVG/ Iris
1	Pattern Projector, 250-750 w.	1591TGP	1365PTVG
	ACCESSORIES		
4	Diffuser Frame, Baby Scoop	4410	1078C
4	Diffuser Frame, Scoop	4418R	1078X
1	Roll of Spun Glass Diffuser	SGD	S-85
1	4-Way Barn Door for 3-Inch Fresnel	2579	10803A
2	2-Way Barn Door for 6-Inch Fresnel	2570	1080
1	4-Way Barn Door for 6-Inch Fresnel	2580	1080A
2	2-Way Barn Door for 8-Inch Fresnel	2571	1081
1	Set of Patterns for Pattern Projector	2085/2071	1097TV
3	Roller Caster Floor Stands	TV3214	1421
5	Lightweight Pantograph Hangers	3280	111TV
5	Short Extension Cables	10RC/20PG	10E955G
3	Medium Extension Cables	25RC/20PG	25E955G
	WIRING AND CONTROL DEVICES (3-Wire System)		
2	Portable Connector Strip, with 25 ft. Cable and 5 outlets and load end boxes	6308/ 5-20PG/25'	2440TVG/ 25
2	Portable Connector Strip, with 35 ft. Cable and 5 outlets and load end boxes	6308/ 5-20GP/35'	2440TVG/ 35
1	Portable Switch, Dimmer, and Distribution Panel with a minimum of 18-20 amp outlets	DPKC6-6000/ PS22/FS	2417TVG

Plan #2

TV Lighting Equipment Complement for a Permanent Studio (approx. 22' x 34' x 14' Ceiling)

The studio of Plan #2 might be classified as a general utility or "workshop" type of studio. Unlike the Plan #1 studio, it is capable of handling somewhat more complex programming involving more frequent setup changes. Dramatic, planned, or restricted sequence programs will originate from this (22 by 34 by 14 to 18-foot high) studio.

To fulfill the requirements of present and future programming, the lighting arrangement for this studio must be as flexible as possible. A criss-cross pipe grid on 6-foot centers and spaced 12 to 14 feet from the floor is used. With such a network and spacing, it is always easy to relocate a fixture on a desired point in a scene. Besides the fixtures themselves, the grid also supports the connector strips and pantograph hangers. Since the latter brings the fixtures within arm's reach, they facilitate the adjustment of fixtures with a minimum amount of time and effort on the part of electricians or other production personnel.

Safety and flexibility in the studio wiring system is assured by the use of six connector strips. Each has five pigtail female outlets and is fed from a terminal box on a 4-inch duct through rubber cable. Spaced uniformly on the secondary pipes, they provide 30 ceiling outlets or approximately one outlet for every 30 square feet of studio space. Five other double outlet circuits are provided 1 to 2 feet from the floor on the walls. The adequate branch circuits available at the switchboard make it possible to always find a convenient outlet in the studio. A uniform type of connector throughout the lighting system is suggested to permit interchangeability.

All ceiling and floor outlets are wired to the switchboard where they are switchable or dimmable either collectively or individually, by a patchboard where each outlet is provided with a counterbalanced, retractable cord and male plug. They are patched into the desired bank of grouped female jacks, and, in turn, can be energized by breaker switches. The patching feature makes it possible to group all the fixtures associated with a particular scene to one

EQUIPMENT REQUIRED FOR PLAN #2

Qty.	Description	Stock Reference	
		Century	Kliegl
	FIXTURES (each with 3-wire, 3-pole connectors)		
6	Baby Scoop, 300-500 w.	1312GP	1122TVG
6	Scoop, 750-2000 w.	1318GP	1155TVG
3	3-Inch Fresnel Spotlight, 75-150 w.	523GP	44N3TVG
12	6-Inch Fresnel Spotlight, 250-750 w.	520GP	44N6TVG
5	8-Inch Fresnel Spotlight, 1000-2000 w.	570GP	44N8TVG
2	Follow Spotlight with Iris, 250-750 w.	1598GP	1365TVG/ Iris
2	Pattern Projector, 250-750 w.	1591TGP	1365PTVG
	ACCESSORIES		
6	Diffuser Frame, Baby Scoop	4410	1078C
6	Diffuser Frame, Scoop	4418R	1078X
1	Roll of Spun Glass Diffuser	SGD	S-85
1	4-Way Barn Door for 3-Inch Fresnel	2579	10803A
4	2-Way Barn Door for 6-Inch Fresnel	2570	1080
2	4-Way Barn Door for 6-Inch Fresnel	2580	1080A
2	2-Way Barn Door for 8-Inch Fresnel	2571	1081
2	Set of Patterns for Pattern Projector	2085/2071	1097TV
5	Roller Caster Floor Stands	TV3214	1421
8	Lightweight Pantograph Hangers	3280	111TV
2	Heavyweight Pantograph Hangers	3283	112TV
10	Short Extension Cables	10RC/20PG	10E955G
6	Medium Extension Cables	25RC/20PG	25E955G
	WIRING CONTROL DEVICES (3-Wire System)		
6	Connector Strips, with 5 outlets and 20 ft. cables	6308/ 5-20PG/20'	2432G/20
2	Wall Outlet, 2 way, 20 amp.	3018/2-20PG	2433G/2
1	Wall Outlet, 1-way 60 amp., 3 phase	3049	2405TVG/ 60
1	Switch, Dimmer, and Load Selection Control Board with a minimum of 30-20 amp. outlets	DPKC6-6000/ PS22/FS	2409TVG/ 2416TVG

master and dimmer. Lastly, the studio light control must be capable of supplying 25 KW of fused power or almost 30 watts per square foot of studio floor space.

From an engineering standpoint, the lighting sources must provide the proper quality and quantity of light needed to produce a good TV picture. Practically, it has been found that incandescents or a combination of fluorescents and incandescents can provide the quality of light to insure proper tonal rendition for monochrome cameras. Fluorescents cannot be mixed with incandescents for color cameras because of their wide difference in effective color temperature. The quantity of light reflected from the TV scene must be sufficient to allow the camera to produce a picture of acceptable signal-to-noise ratio. The average lighting level is 100 foot-candles for monochrome, but it is recommended that sufficient sources be available to produce about 400 foot-candles of incident light in order that there be proper flexibility in control and lens stops for future color productions.

Plan #2 (Alternate)

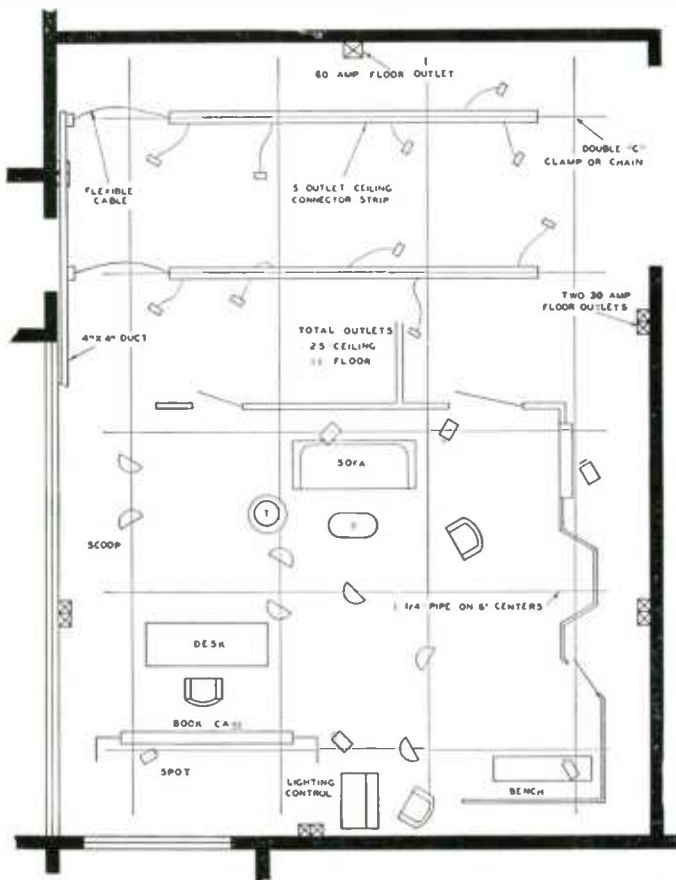
TV Lighting Equipment Complement for a Permanent Studio (approx. 30' x 50' x 27' Ceiling)

The television studio of "Plan #2 Alternate" is similar to Plan #2, except that this plan can accommodate two more scenes. In using a higher ceiling in a larger studio, a counterweighted batten is employed as shown in the sketch at left. "Plan #2 Alternate" studio is 30 by 50 feet and can also be classified as a workshop type of studio. Lighting equipment is listed below.

EQUIPMENT REQUIRED FOR ALTERNATE PLAN #2

Qty.	Description	Stock Reference Century	Kliegl
	FIXTURE (each with 3-wire, 3-pole connectors)		
10	Baby Scoop, 300-500 w.	1312GP	1122TVG
10	Scoop, 750-2000 w.	1318GP	1155TVG
4	3-Inch Fresnel Spotlight, 75-150 w.	523GP	44N3TVG
16	6-Inch Fresnel Spotlight, 250-750 w.	520GP	44N6TVG
8	8-Inch Fresnel Spotlight, 1000-2000 w.	570GP	44N8TVG
2	Fresnel Senior Spotlight, 2000 w.	572GP	44N12TVG
2	Striplight	QS84/ 4-500PG	606TVG/ 8
3	Follow Spotlight with Iris, 250-750 w.	1598GP	1345TVG/ Iris
3	Pattern Projector, 250-750 w.	1591TGP	1365PTVG
1	Follow Spotlight with Iris, 1000 w.	1522GP	1336TVG/ Iris
ACCESSORIES			
10	Diffuser Frame, Baby Scoop	4410	1078C
10	Diffuser Frame, Scoop	4418R	1078X
1	Roll of Spun Glass Diffuser	SGD	S-85
2	4-Way Barn Door for 3-Inch Fresnel	2579	10803A
6	2-Way Barn Door for 6-Inch Fresnel	2570	1080
2	4-Way Barn Door for 6-Inch Fresnel	2580	1080A
4	2-Way Barn Door for 8-Inch Fresnel	2571	1081
1	2-Way Barn Door for Senior Fresnel	2573	1082
2	Set of Patterns for Pattern Projector	2085/2071	1097TV
6	Roller Caster Floor Stands	TV3214	1421
8	Lightweight Pantograph Hanger	3280	111TV
4	Heavyweight Pantograph Hanger	3283	112TV
16	Short Extension Cable	10RC/20PG	10E955G
6	Medium Extension Cable	25RC/20PG	25E955G
WIRING AND CONTROL DEVICES			
14	12-ft. Connector strip with 5 outlets & 20-ft. of Cable	6312/ 5-20PG/20'	2431G/20
4	Wall Outlet, 2-way, 20 amp.	3018/2-20PG	2433G/2
1	Wall Outlet, 1-way, 60 amp., 3 phase	3049	2405TVG/ 60
1	Switch, Dimmer, and Load Selection Control Board with a minimum of 70-20 amp. outlets, 6-6 kw dims, 6-6 kv: non-dims, 1-200 amp. main switch	S61122CR	PA32TVP/ 74

NOTE LAYOUT IS SYMMETRICAL, UPPER HALF PLAN BEING CEILING ARRANGEMENT AND LOWER HALF SCENIC



Sketch showing the studio lighting arrangement for Plan #2.

Plan #3

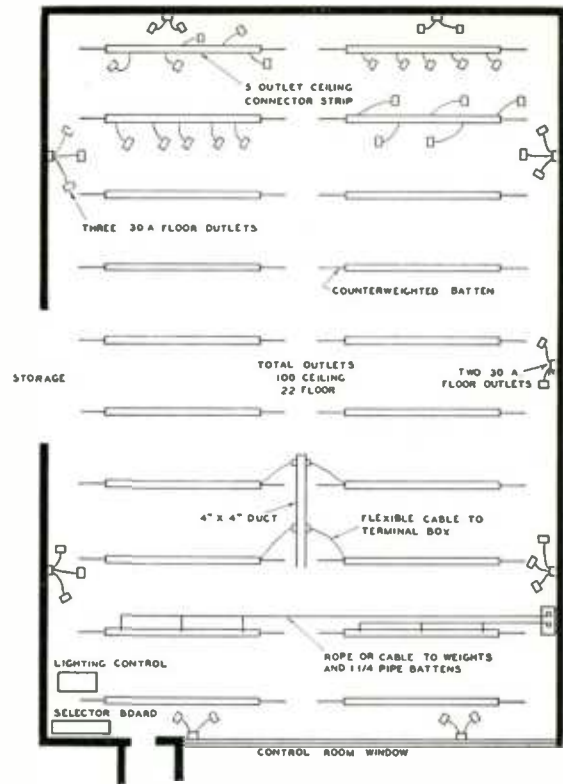
TV Lighting Equipment Complement for a Permanent Studio (approx. 40' x 60' x 27' Ceiling)

The studio of Plan #3 offers greater versatility than that of the previous plans described. It will originate a variety of dramatic shows and commercial sequences. Having a 40 by 60 foot working space, it requires approximately 100 branch circuits. Branch circuits may be grouped as scenery requires by means of a patch or rotary selector board. They, in turn, are switched and dimmed at the control board.

EQUIPMENT REQUIRED FOR PLAN #3

Qty.	Description	Century	Stock Reference Kliegl
FIXTURES (each with 3-way, 3-pole connectors)			
15	Boby Scoop, 300-500 w.	1312GP	1122TVG
15	Scoop, 750-2000 w.	1318GP	1155TVG
4	3-Inch Fresnel Spotlight, 75-150 w.	523GP	44N3TVG
20	6-Inch Fresnel Spotlight, 250-750 w.	520GP	44N6TVG
15	8-Inch Fresnel Spotlight, 1000-1500 w.	570GP	44N8TVG
3	12-Inch Fresnel Senior Spotlight, 2000 w.	572GP	44N12TVG
4	Striplight	QS84/ 4-500PG	606TVG/ 8
3	Follow Spotlight with Iris, 250-750 w.	1598GP	1365TVG/ Iris
4	Pottern Projector, 250-750 w.	1591TGP	1365PTVG
2	Follow Spotlight with Iris, 1000 w.	1522GP	1366TVG/ Iris
ACCESSORIES			
15	Diffuser Frome, Boby Scoop	4410	1078C
15	Diffuser Frome, Scoop	4418R	1078X
2	Roll of Spun Gloss Diffuser	SGD	S-85
2	4-Way Born Door for 3-Inch Fresnel	2579	10803A
8	2-Way Born Door for 6-Inch Fresnel	2570	1080
3	4-Way Born Door for 6-Inch Fresnel	2580	1080A
8	2-Way Born Door for 8-Inch Fresnel	2571	1081
1	2-Way Born Door for Senior Fresnel	2573	1082
2	Set of Potterns for Pottern Projector	2085/2071	1097TV
8	Roller Caster Floor Stands	TV3214	1421
12	Lightweight Pontograph Hanger	3280	111TV
6	Heavyweight Pontograph Hanger	3283	112TV
20	Short Extension Coble	10RC/20PG	10E955G
10	Medium Extension Coble	25RC/20PG	25E955G
WIRING AND CONTROL DEVICES			
20	15 ft. Connector Strip with 5 outlets	6315/ 5-20PG	619G/15/ 5
5	Wall Outlet, 2-way	3018/2-20PG	2433G/2
2	Wall Outlet, 1-way, 50 amp., 3 phase	3049	2405TVG/ 60
1	Switch, Dimmer, and Load Selection Control Board with a minimum of 100-20 amp. Circuits, 12-6000 w. dimmers and 1-200 amp. main switch	S61126CCR	PA33TVP/ 12/110

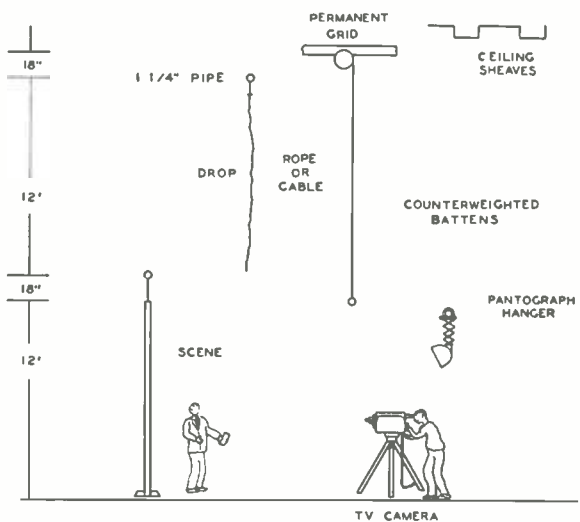
Sketch of Plan #3 studio (40 x 60) showing lighting arrangement.



Summary of Lighting Plans

Type	Size		Area (sq. ft.)	Outlets		Scenes
	Diam.	Ht.		Ceiling	Floor	
1 Comero Temporary	18x25	14	450	20	0	2
1 Comera Permanent	22x34	14	750	30	5	4
2 Comero Permanent	30x50	27	1500	60	9	6
3 Comera Permanent	40x60	27	2400	100	12	8

MINIMUM 27' CEILING



Studio arrangement for proper ceiling height to permit varying scenery set heights.

Custom TV Mobile Units



FEATURES

- Choice of standard truck, bus or trailer chassis
- Custom designed for any requirement—monochrome or color live pickup, tape production, film and program transmission
- Adequate horsepower and load capacity with maximum roadability
- Completely air conditioned with cooling and heating units
- Balanced weight distribution
- Bodies carefully engineered for efficient space utilization, operator comfort, and easy access to equipment
- Maximum equipment storage space
- Under floor wiring trench system provided
- Many optional features such as air suspension, camera roof platform, hydraulic lift, expansible sides, built-in generator
- All equipment installed and system tested, ready for use



Mobile studios-on-wheels meet varied studio needs. Above station WFBM-TV uses trailer to color telecast the 500 Festival Golf Tourney. At lower left, Station WMVS-TV has remote truck at the Wisconsin State Fair Park with members of the U.S. Navy Scuba diving team. Lower right, WERE's custom bus with turret in "recessed" position, is shown right in the center of things as a political parade and rally are staged in Cleveland.

USES

Since the early days of television, mobile units—a station's studio-on-wheels—have broadened the scope of TV programming, added dynamic impact to sponsor's commercials, and proved an effective public relations medium. It is impossible to bring all events, sponsors, and environment to the studio door, but with a complete mobile production facility it is possible to drive to the scene to be televised. Whether the TV coverage problem is a sporting event, emergency news item, parade, convention or remote pickup of a sponsor product, a mobile unit is ready at all times. The mobile unit can incorporate multiple camera chains, or many variations of other equipments including switching, tape, film and microwave facilities. As such, it can be used in conjunction with broadcast studio facilities thereby per-

mitting color or monochrome pickup and tape playback from existing facilities.

In producing commercials these same facilities can be transported to the sponsor's plant, or anywhere to capture the product story as it is used. In educational and other closed circuit applications the mobile unit adds another dimension of efficiency—that of obtaining the highest degree of equipment utilization.

An attractively styled mobile unit is an excellent promotional asset. The unit can reflect the image that the station or agency wishes to set in the community. Combined with the many functional features of interior design and adequate drive power "to get you there" the RCA Television Mobile Units offer the utmost in flexibility and efficiency.

DESCRIPTION

RCA Television Mobile Units are custom built vehicles designed to meet specific customer requirements including road conditions, environment and equipment layout needs. Since all States impose restrictions in length, height and weight of a vehicle, it is important to design a mobile unit to meet the laws of the State where it is to be licensed. When a unit is to be used interstate then a compromise may be required in order that the unit can travel freely cross-country. Road conditions will determine the horsepower, suspension, and other features affecting roadability. For example, mountain roads require large horsepower engines and transmissions while bumpy, off-highway driving may require air suspension instead of springs. In addition, the temperature and humidity expected to be encountered will determine the heating and cooling required inside the unit.

Years of experience by RCA in the design and construction of color and monochrome television mobile equipment are

reflected in the RCA series of custom trucks, buses, and trailers. Each is specially engineered to provide the facilities required, whether it be for originating, recording or playing back of TV programs and commercials. Each unit is carefully engineered for efficient space utilization, operator comfort, and easy access to equipment. There is ample operating area for the operating and maintenance personnel. Complete underside storage space is provided in order that each equipment can be quickly unloaded. Everything to assure smooth production and program versatility, including central control, is designed into the equipment.

RCA Mobile Units are provided with standard truck, bus or trailer chassis and custom bodies. Standard brand chassis assure engine maintenance and spare parts anywhere on the road. Custom bodies offer many advantages including wider body, no wheel boxes, better visibility, full size cab, firm door fits, versatile styling, underside storage compartments and recessed door handles and locks. Fiber-

TJ-70D Mobile Camera Production Unit showing distinctive step in forward roof line, fiberglass front end, and deluxe trim. Reinforced roof affords vantage point for use of field camera chain.



glass front end, special 2-inch insulation, acoustical perforated steel walls and ceiling, custom interior lighting, reinforced floors and roof, rear bumper formed into step, and many other custom extras can also be provided. They have the design advantage of stronger construction and longer life.

RCA offers the following mobile equipment groupings: TJ-70D Truck for TK-60 camera facilities, TJ-72A Truck for TV Tape Equipment, TJ-81A Bus for TK-14 camera chains, and TJ-91A Trailer for color camera field operations.

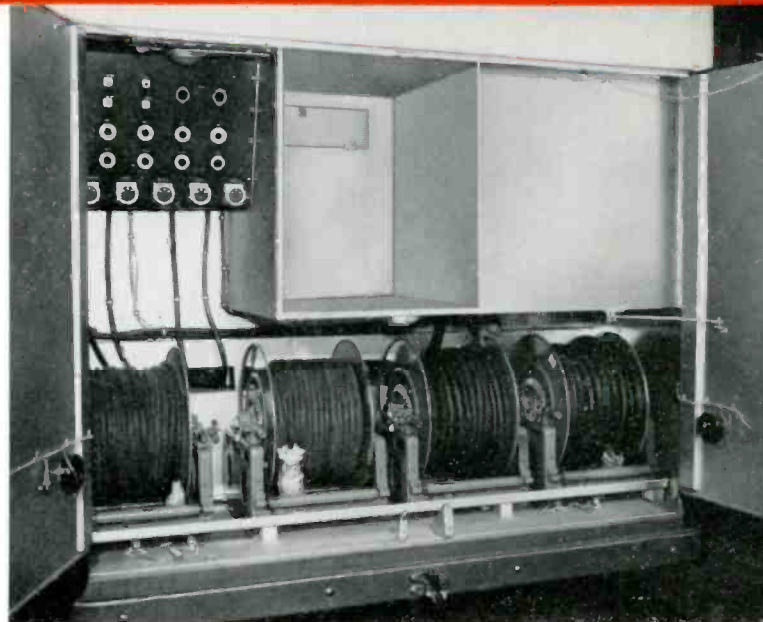
TJ-70 Mobile Truck

The RCA TJ-70D Television Mobile Unit is especially designed for the TV Station which depends heavily on its remote pickup programs. Incorporating the same conveniences as are found in studio installations, the TJ-70D Mobile Unit facilitates the origination of either elaborate or simple remote programs with minimum set-up time and provisions for up to four complete monochrome TV camera chains as well as video switching, audio and monitoring equipment.

The TJ-70D mobile unit consists essentially of a standard 1½ ton type International Harvester chassis on which is constructed a custom two-level body attractively styled and well-engineered for practical application of remote television pickups.

Operating Compartment

The Operating Compartment is in the forward end of the vehicle and is made up of two parts: The video operator's position, and the switching position. Entrance into this sec-



Rear view of TJ-70D showing cable entrance panels and four cable reels.

tion is made through the front doors. An attractive switching console is provided for the audio operator and program director. This switching console is in the front of the vehicle, facing the rear, and is on an elevated platform. From this console can conveniently be seen the monitors and camera control units which are mounted vertically in an equipment frame in the middle of the vehicle.

The front portion of the switching console is sloping so as to reduce to a minimum eye movement between picture



Interior view of the TJ-70D showing switching console overlooking the equipment frame and video position in the operating compartment.

monitors and switching controls. On one side of the switching console, space is provided for a BC-5B Studio Type Audio Console. The BC-5B Audio Console is mounted flush with the top surface of the sloping portion of the switching console. On the other side of the sloping portion of the switching console is provision for mounting either a TS-5A Program Switcher with an adjacent TS-2B Preview Switcher or if desired a TS-11 Switcher for more elaborate facilities. A hinged leaf-type extension is provided to extend the switching console across the entire width of the vehicle when more programming personnel are used. Thus, seating is provided for audio operator, the video switching position, and for program director.

On the sloping portion of the switching console, between the audio console and video switcher, is a small space designed to permit the installation of a desk telephone set connected to Carfone Communications equipment installed in the maintenance area. This is especially convenient for cueing. The entire front of the switching console is hinged to permit accessibility of any of the equipment mounted underneath, such as intercom power supply.

Flush mounted in a shelf in back of the audio position is a monitoring loudspeaker which is connected to the monitoring loudspeaker output of the BC-5B Audio Console. On either side of the operating compartment are two large windows. To prevent direct sunlight from falling on the face of the monitors, these windows are equipped with curtains. Two small adjustable spotlights for use in reading scripts are mounted on a swivel above the windows. These spotlights are so positioned that a minimum of stray light falls on the face of the picture monitors and a dimmer control is provided for the spotlight to permit adjustment of the light to any convenient level. An equipment frame is provided in the middle of the vehicle which separates the operating compartment from the maintenance compartment. In this equipment frame are located the camera control units, master monitor, picture monitors and sync generators, so arranged as to provide convenient operation by the video operator and easy visibility to the switcher position. All units in the equipment rack are mounted on slides, so that they may be withdrawn into the maintenance compartment while in operating condition. Maintenance work can then be done on the equipment without disturbing program personnel while the mobile unit is "on the air."

On the lower level of the equipment frame portholes are located for four camera control units and line master monitor. These are positioned so that the camera control units may be conveniently operated by the video operator sitting immediately in front of the equipment rack, while the monitors may be easily seen by the switching personnel in the forward elevated position. Above the camera control units in the equipment rack are provisions for two

14-inch picture monitors, one of which may be used for continuously monitoring program output and the other may be used as a preview monitor with a TS-2 Switcher. The preview monitor may be switched to any camera position, off-the-air signal, or microwave transmitter monitoring output. The use of the preview monitor and preview switcher provides facilities for previewing the next camera shot such as is desired in well rehearsed shows, or previewing the insertion of a commercial into the program. On either side of the two picture monitors there is space for two sync generators.

Facilities for switching to the standby sync generator can be provided through the location under the equipment rack of an automatic changeover switch. A clock with large sweep second hand is installed over the picture monitors in easy view of the program personnel.

Facilities for three inter-phone connection units are included in the vehicle at the audio operator, video switcher, and video operator positions. These provide convenient intercom facilities from the operating personnel to the cameramen.

A one and a half ton air conditioning system is located at the forward right side of the cab. To increase the efficiency of the air conditioning unit rubber gaskets are installed around the camera control units, monitors, etc. to isolate the program compartment from the maintenance compartment since only the operating section is cooled.

A 14-inch three-speed exhaust fan in the roof over a standard rack provides ventilation of the power supplies and other equipments located in the middle portion of the vehicle.

Rack space is located at the rear for mounting video distribution amplifiers, power supplies, off-the-air tuner and other rack equipment.

The camera heads and viewfinders are also stored in the rear while the vehicle is in motion.

Maintenance Compartment

The maintenance compartment is in the rear of the vehicle. A 55-inch by 33-inch table contains ample space for location of test equipment, and is especially convenient for emergency maintenance in the field. The maintenance compartment contains a rack to house the camera power supplies, WP-16B Power Supply and powerstat line corrector unit, or automatic voltage regulator, whichever is preferred. The camera power supplies are mounted on slides so that they may be conveniently withdrawn from the rear of the frame. Access to the roof is provided through a hatch over the table in the maintenance compartment. The location of the hatch at this point permits personnel to stand on the table and pass equipments through the hatch in the roof.

The microwave transmitter control, as well as the car-phone VHF intercommunications equipment, can be installed on the wall over the workbench. A hangup type microphone, connected in parallel with the VHF desk telephone in the operating compartment, permits maintenance personnel to communicate with the studio or transmitter station when orienting the microwave antenna.

Rear Storage Compartment

Outside compartments in the rear of the mobile unit are used to house four large cable storage reels, crank operated for easy operation. Over the cable reel compartment is a smaller compartment containing a panel on which are mounted the connectors for all cable connections for the truck, exclusive of power. On this connector panel are four camera cable connectors; one connector for microwave transmitter input; antenna connector for off-the-air monitoring receiver; three video connectors for external video monitors; two a-c receptacles for a-c external equipments and microphone receptacles for four microphone inputs; one remote input and one remote cue input. Set-up time is reduced to a minimum. Since the wiring from this connector panel is already connected to each of the associated equipments installed in the truck, all connections can be quickly made in this one compartment.

Power Connections

The incoming power connection is made through a hatch in the skirt of the truck adjacent to the entrance door. A central circuit breaker panel is provided for the isolation transformer and power-stat/line corrector. An a-c volt meter is provided on the switching console. Pushbuttons for remote control of the motor driven transformer are located in the switching console, adjacent to the voltmeter so that incoming voltage can be conveniently maintained constant at all times.

The rear bumper is reinforced to accommodate a pintle hook for attaching a power generating trailer.

The roof is reinforced to support the weight of personnel and operating equipment such as cameras and tripods. The roof surface is made of steel floor plate. Anchor loops are welded in the roof along the edges for lashing down the operating equipment. The parabolic reflector for the microwave equipment may be clamped to the roof for transporting. A metal pipe receptacle welded to the roof plate on the curb side will permit the insertion of a 1½-inch mast to support the off-the-air monitor receiving antenna. Storage facilities for this antenna are also provided on the roof.

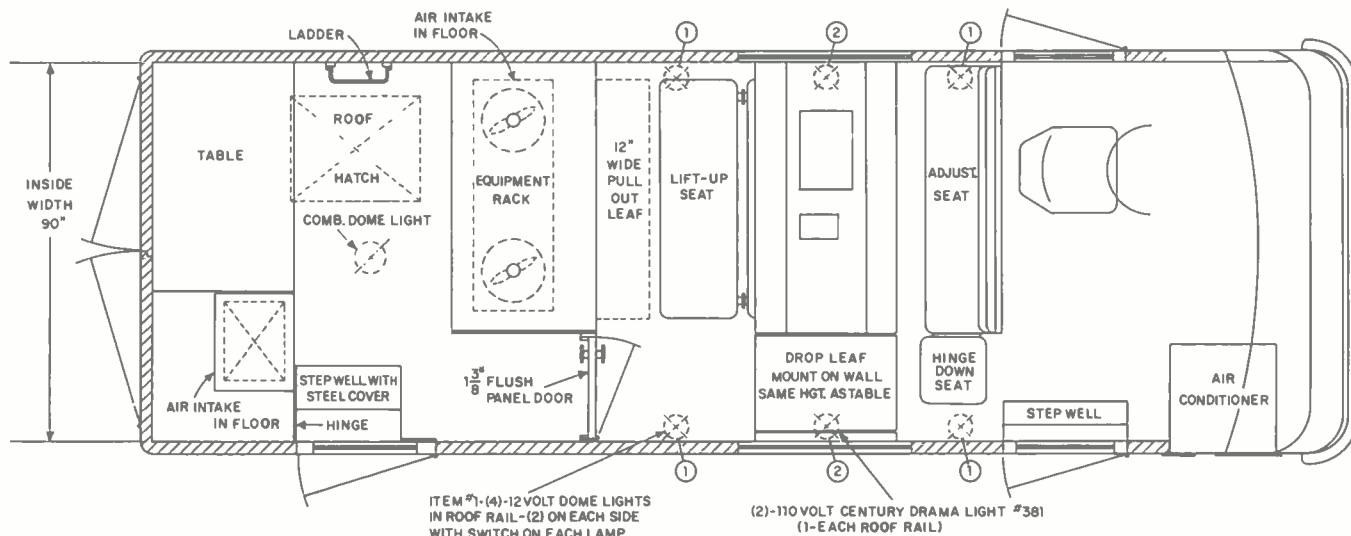
SPECIFICATIONS

Chassis.....Standard 1½ ton truck with heavy duty springs and shocks
 Tires.....8:25-20, 10 ply. Dual rear wheels
 Outside Dimensions:
 Length23' 9"
 Width7' 11½"
 Height11' 6"
 Inside Dimensions:
 Length (back of driver's seat).....16'
 Width7' 6"
 Height6' 8"
 Outside Finish.....Green and white (added cost for CB finish)
 Total Weight (with equipment).....Approx. 15,000 lbs.
 Body.....Custom built with step in forward top of roof, roof hatch, curb side door, two windows, and built-in work bench, production desk, and video control equipment frame, and roof deck

Equipment Supplied

1 TJ-70D Mobile Camera Unit. Includes: 1—air conditioner, 16,300 BTU per air output; 1—Power Stat Line Voltage Corrector, 15 KVA; 1—Power Isolation Transformer, 15 KVA; 1—Power Control Panel; 1—Power Cable, 100 foot; 1—set of equipment slides; 1—A-c Power cable and conduit installed; 4—cable reels, manual; 1—Blower for equipment rack; 1—fire extinguisher; 1—light control; 1—channel master TV receiving antenna; 1—A-c Voltage control panel with voltmeter; 1—Ten foot aluminum mast for TV antenna; 1—clock; 1—set of wiring, cables and connectors installed; 1—Entrance connection panel for Audia, Visual and Power Cables.

Floor plan of TJ-70D showing switcher console behind driver's seat, equipment frame after the pull out leaf, and table and equipment rack at extreme rear of truck.





TJ-72 Television Tape Truck shows exclusive front end design with channel trim.

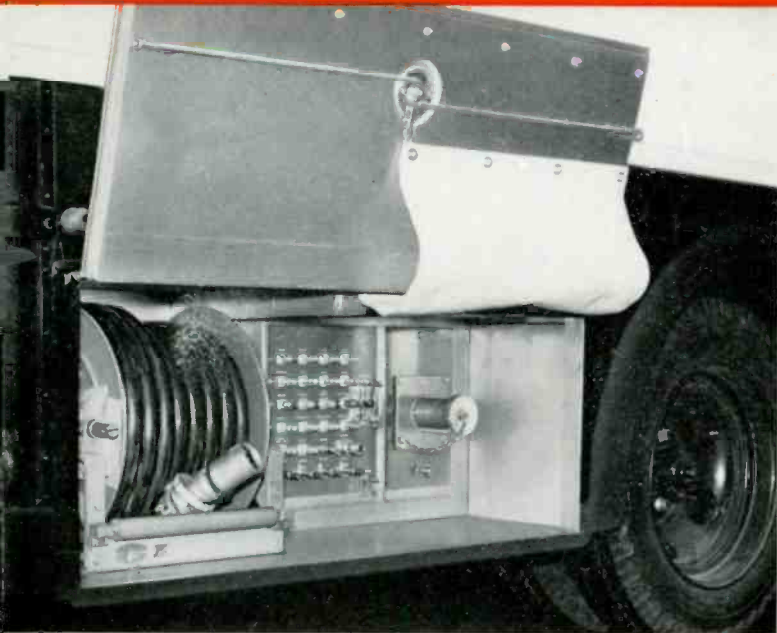
TJ-72 Television Tape Truck

The RCA Television Tape Mobile Unit is designed to serve as a complete mobile television recording facility including ample space for operation, maintenance, tape editing and tape storage. Designed for on-location recording of remote pickup events, the mobile tape unit is supplied completely equipped with either monochrome or color tape recorder equipment. The mobile unit greatly facilitates transporting tape facilities for on-spot pickups and can serve as a permanent tape recording studio.

The layout is planned for efficiency of operation and maintenance. The roomy interior of the tape mobile unit provides 16 feet of operation room behind the driver. The body interior measures 7 feet and 4 inches wide by 6 feet 10 inches high. The equipment space is ample for a complete TR-22 Tape Recorder and associated facilities with space provided for extra color and test items. Racks are provided to house audio facilities as well as cabinets and compartments for tape storage and areas for tape editing facilities, scopes, spare tape headwheel panel assembly, module extender and splicer. The custom body has a distinctive front design, complete trench system under the floor, three underside storage compartments, recessed locks and storage cabinets for accessory items including 3 cable reels. A-c power for the tape recorder is supplied from a 7.5 KVA isolation transformer. A 6.0 KVA electromechani-



TJ-72 interior as viewed through rear doors. Note Type TR-22 Television Tape Equipment with air conditioner and storage cabinet at left.



Rear curb-side compartment of TJ-72 houses power cable reel, audio/video entrance panel, and power panel with weatherproof flap.

cal voltage regulator is also supplied. The power distribution panel is conveniently located in the operating section. The body allows more than 5½ feet of extra space at the rear for carrying cameras for a small remote pick-up or on-spot recording of a commercial. The TR-22 equipment is securely and safely mounted. Screw clamps are used to

secure removable equipment such as monitors. Wedges are press fitted under the blower and compressor shock mounts of the TR-22 while in transit.

SPECIFICATIONS

Chassis.....	Standard 1½ ton truck with heavy duty springs and shocks
Tires.....	8:25-20, 10 ply. Dual rear wheels
Outside Dimensions:	
Length	23' 9"
Width	7' 11½"
Height	10' 6"
Inside Dimensions:	
Length (back of driver seat).....	16'
Width	7' 6"
Height	6' 9"
Outside Finish.....	To customer specification
Total Weight (with equipment).....	Approx. 14,000 lbs.
Body.....	Custom built with 3 underside storage compartments, dual short racks with formica work surface, and tape storage cabinet

Equipment Supplied

- 1 TJ-72A Mobile Tape Unit. Includes: 2—Air Conditioners, 18,000 BTU per air output; 1—Stabline Voltage Regulator, 6 KVA; 1—Power Isolation Transformer, 7.5 KVA; 1—Power Control Panel with a-c meter; 1—Power Cable, 75 foot; 1—A-c Power and conduit installed; 3—cable reels, manual; 1—Fire extinguisher; 1—Set of wiring, cables, and connectors installed; and 1—Entrance connection panel for Audio, Video, Control, and Power Cables.

An RCA custom bus design illustrating maximum utilization of all available space for equipment storage.





The 35-foot TJ-82 Mobile Bus showing RCA's exclusive front-end design and svelt styling which permits distinctive station channel trim.

TJ-82 Camera Bus

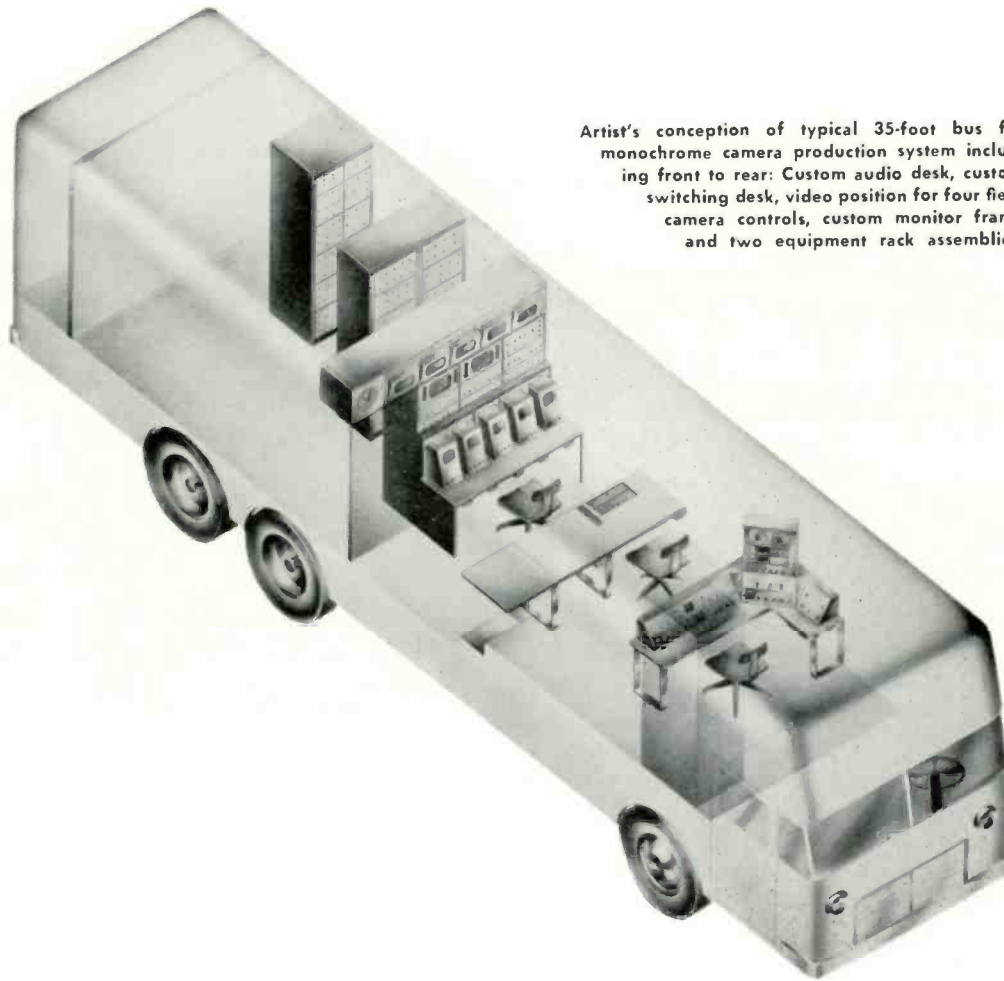
The 35-foot TJ-82 Mobile Bus is an ideal unit for transporting a complete monochrome camera production system. It can also be used for color TV field operation. This unit consists essentially of a standard commercially available bus chassis which is modified for tandem rear axles upon which is constructed a custom body, attractively styled and well engineered for practical application of remote television pickups. This Mobile Unit serves as a studio always ready to move when needed and ready for operation in a minimum of time. Space is provided for all essential equipment needed for the pickup of a remote television program. Such equipment includes cameras, synchronizing generator, switching facilities, power supplies, and a means for relaying the picture and sound information back to the station.

Those items normally operated from the control room of the unit, such as the camera controls, are transported in their operating position. Other items such as cameras, tripods, dollies, cable reels, and microwave transmitter have storage space allotted inside the vehicle for transportation.

The interior of the bus is divided in distinct operating areas, with ample space for the driver, audio and tape center, switching operator, and monitoring and control position. The rear of the mobile unit is given over to rack equipment, and the storage closets and cubicles.

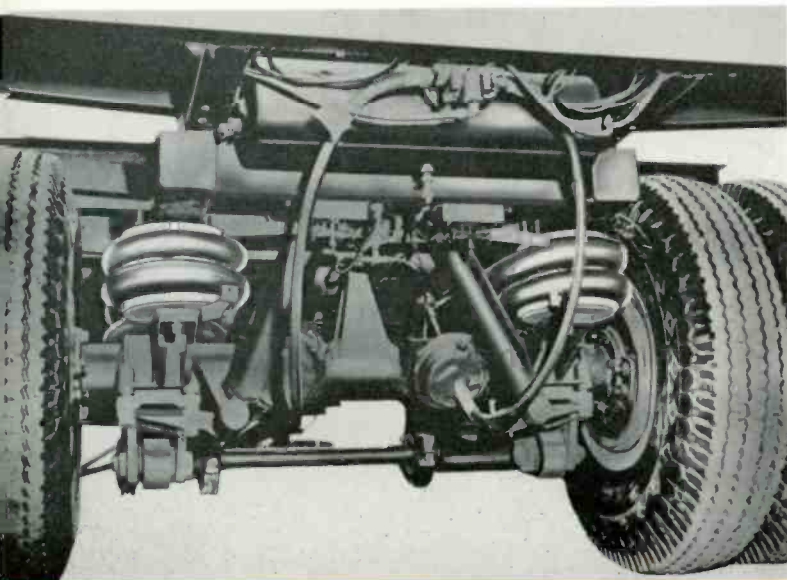
The typical TJ-82 bus has a body 35 feet long overall, about 8 feet wide and not to exceed 12½ feet high to meet legal requirements in all states. The body inside is about 29½ feet back of driver and 7½ feet wide by 7 feet 2½-inches high. Double doors at the rear provide access to air coolers and generators. The unit has perforated steel walls and ceiling, and 2-inch insulation with aluminum foil moisture barrier. It is completely air conditioned.

The custom body is susceptible to numerous design changes to meet custom installation requirements. Doors can be single or double type, steps portable or retractible, a wide choice of floorings, custom duct work throughout, custom lighting, trim, reinforced roof platform, special window and windshield glass, paint body of exterior and interior and trim to suit station preference, with many other minor details designed to provide the utmost in efficiency, safety and reliability.



Artist's conception of typical 35-foot bus for monochrome camera production system including front to rear: Custom audio desk, custom switching desk, video position for four field camera controls, custom monitor frame and two equipment rack assemblies.

Distinctive RCA air bag suspension system which provides air-smooth riding, automatic leveling and longer equipment life. Bellows shown are optional with any RCA custom mobile truck, bus, or trailer.



SPECIFICATIONS

Chassis.....Standard Bus modified for tandem rear axles with air suspension, heavy duty front shocks, power steering, air brakes, and dual 30 gal. gasoline tank

Tires.....10:00 x 20, on 7.50 V Rims

Outside Dimensions:

Length35'
 Width7' 11 1/2"
 Height12' 6"

Inside Dimensions:

Length (behind driver).....29' 6"
 Width7' 6"
 Height7' 2 1/2"

Outside Finish.....To customer specifications

Body.....Custom built with built-in power supply frame, video control equipment frame, storage compartments at rear, production and audio decks, windows to customer specifications, roof deck, and complete underside storage space.

Equipment Supplied

1 TJ-82A Mobile Camera Unit to include: 2—Air conditioners, 3 tons each, with ceiling duct system; 1—Power Isolation Transformer, 25 KVA; 1—Stabiline Voltage Regulator, 27.5 KVA; 1—Power Control Panel; 5—Cable reels; 1—Motor Generator, 40 KVA, installed in rear of bus; 1—Clock; 2—Fire Extinguishers; 1—Set of Equipment Slides; 1—A-c Power cable and conduit installed; 1—Set of wiring, cables and connectors installed; 1—Entrance connection panel for Audio, Video, and Power Cables; and 1—Power Cable, 100 feet.



Color Mobile Trailer, RCA Type TJ-92, also affirms distinctive RCA streamlined styling.

TJ-92 Color Mobile Trailer

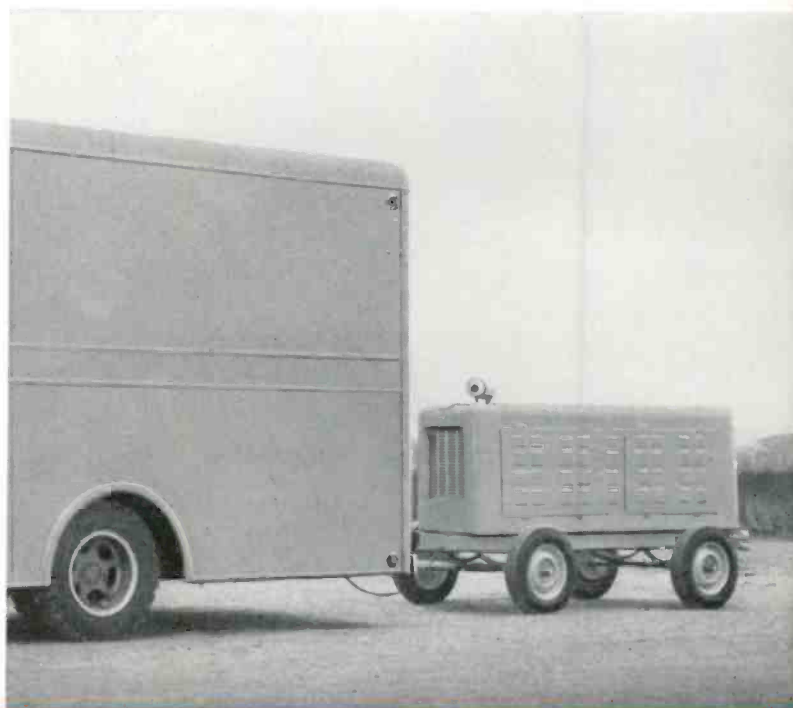
The RCA Color Mobile Trailer is expressly designed to accommodate up to four complete color camera chains as well as all necessary audio and video equipments required to originate a television remote pickup in color.

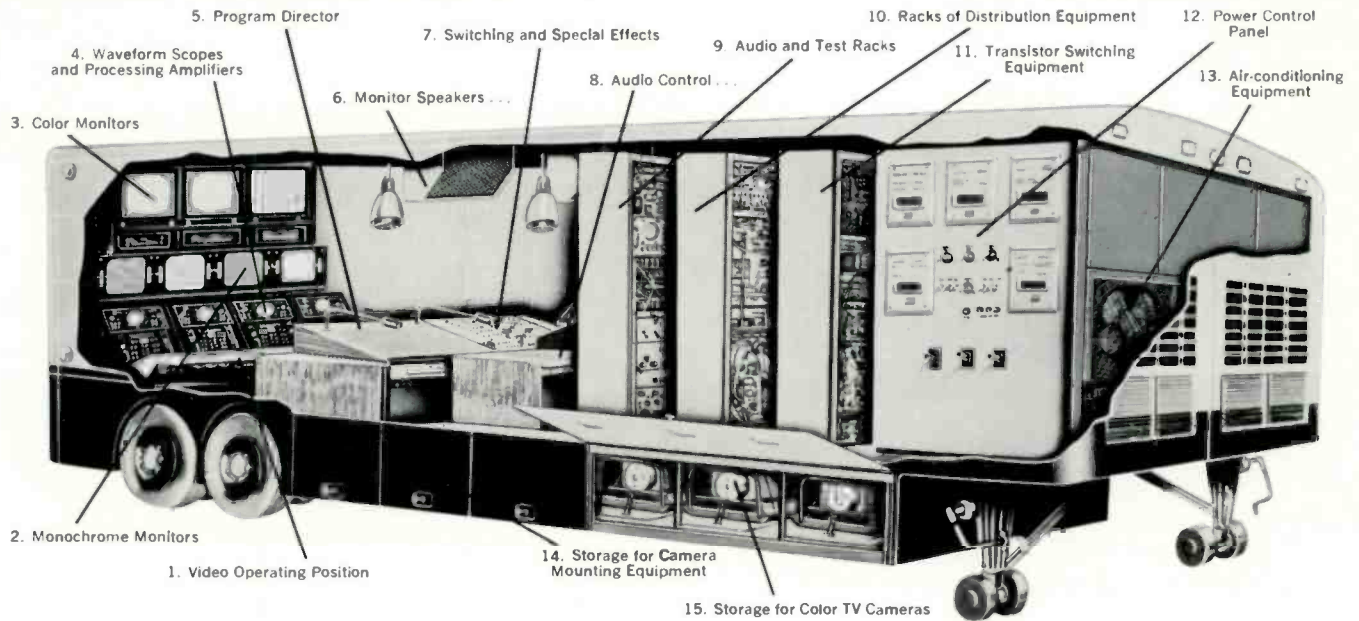
A trailer offers many advantages over bus or truck. Most significant is the fact that a trailer provides 5 to 8 feet more inside length for the same overall length. RCA trailers provide about 60 percent more cubic storage space than a truck or bus with a forward mounted engine, and 80 percent more than a bus with a pancake engine underneath. Furthermore, a tractor to pull the trailer to a new site can be rented instead of made a part of the capital investment. If a tractor is provided, it becomes an ideal place to mount the motor generator, since it can then be driven a distance away from the trailer to reduce noise.

In common with other RCA mobile units, the studio trailer is designed from the chassis up specifically for color television mobile use. The trailer consists of a standard 35-foot chassis with custom body built to be structurally sound and equipped for TV production requirements. The diamond steel roof is reinforced to permit its use as a camera mounting platform when on location. The outside walls are smooth, there are no wheel boxes, and the front is square with rounded corners. Typical facilities include king pin trailer hitch, air brakes, wire trench under floor, ceiling tie bars for equipment support, heavy-duty linoleum

floor covering, insulated walls and ceiling, installed interior lighting system, special access doors, curb-side door ladder, built-in power controls, and compartmentalized construction to house each unit of TV equipment.

Four-wheel trailer to house motor generator is practical answer to portable power source. Trailer can be driven a distance away from the mobile unit to reduce noise.





Artist's sketch of TJ-92 Mobile Trailer Unit to house live camera and production studio.

The Mobile Trailer is completely air conditioned by means of 17 tons cooling and 9 KW heating. Three heavy-duty 15 KVA Power transformers and three automatically controlled motor driven stabiline voltage regulators are provided. Recessed, covered power connectors are provided for connection of the trailer to commercial power sources.

SPECIFICATIONS

Chassis.....Custom semi-trailer chassis with tandem axle, air suspended, 35-foot with two speed, individually controlled landing gear.

Tires.....10:00 x 20

Outside Dimensions:

Length35'

Width7' 11 1/2"

Height12' 6"

Inside Dimensions:

Length34'

Width7' 6"

Height7' 2"

Outside Finish.....To customer specifications

Body.....Custom built with roof platform, winch, built-in audio desk and switching desk, and complete under-side storage compartments.

Equipment Supplied

1 TJ-92A Mobile Color Camera Trailer to include: 1—Air Conditioner with 17 tons cooling and 9 KW heating; 1—Air Duct System; 3—Power Isolation Transformer, 15 KVA; 3—Stabiline Voltage Regulator, 12 KVA; 1—Power Control Panel with meters; 2—Fire Extinguishers; 1—Set of Slides for Regulators; 4—Storage Dollies for cameras; 1—A-c Power Cables and conduit installed; 1—Set of wiring, cables, and connectors installed; 1—Power Entrance Panel; 1—Audio Entrance Panel; 1—Video Entrance Panel; 2—Power Cables, 100' each; and Lettering to customer specifications.

Summary

RCA's Engineering experience can be applied to your mobile problem and a design tailored to fit your needs. Our engineers and functional designers will work closely with your staff to develop maximum utility and practical layout with a minimum investment. Optional features available in truck, bus or trailer are:

Features	Advantages
Expansible Sides	Permit sides to open out to enlarge operating and maintenance area when at standstill.
Air Suspension	50 percent better ride. Automatic leveling provided.
Motor Generator	Built in or in trailer type (See trailer photo).
Air Conditioning	Complete cooling, heating and humidity control.

When asking for information refer to following designations:

TJ-70 Series Trucks (Front doors to rear of front wheels)

- TJ-71 10 ft. Usable space behind driver seat
- TJ-72 16 ft. Usable space behind driver seat
- TJ-73 20 ft. Usable space behind driver seat

TJ-80 Series Buses (Front door forward of front wheels)

- TJ-81 30 ft. Overall Length
- TJ-82 35 ft. Overall Length
- TJ-83 40 ft. Overall Length

TJ-90 Series Trailer (Requires Tractor for motive power)

- TJ-91 30 ft. Overall length less tractor
- TJ-92 35 ft. Overall length less tractor
- TJ-93 40 ft. Overall length less tractor

INDEX

4½-INCH IMAGE ORTHICON CAMERAS

<i>Page</i>	<i>Type Number</i>	<i>Description</i>	<i>MI Number</i>
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3-14	TK-60A	4½-Inch Image Orthicon TV Studio Camera Chain, 230 volts, 50 cycles	
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