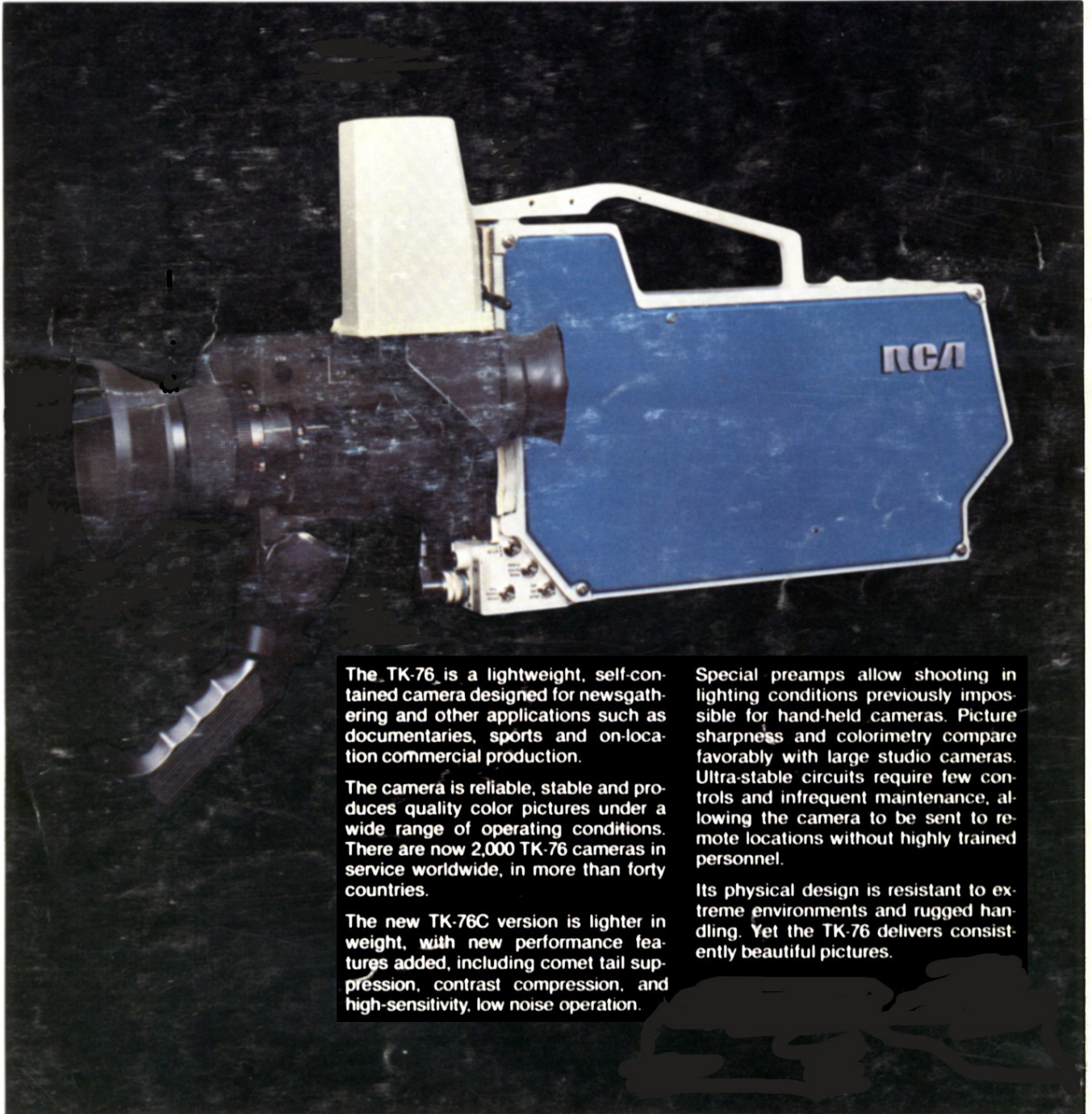


RCA

Portable
Color Camera

TK-76C



The TK-76 is a lightweight, self-contained camera designed for newsgathering and other applications such as documentaries, sports and on-location commercial production.

The camera is reliable, stable and produces quality color pictures under a wide range of operating conditions. There are now 2,000 TK-76 cameras in service worldwide, in more than forty countries.

The new TK-76C version is lighter in weight, with new performance features added, including comet tail suppression, contrast compression, and high-sensitivity, low noise operation.

Special preamps allow shooting in lighting conditions previously impossible for hand-held cameras. Picture sharpness and colorimetry compare favorably with large studio cameras. Ultra-stable circuits require few controls and infrequent maintenance, allowing the camera to be sent to remote locations without highly trained personnel.

Its physical design is resistant to extreme environments and rugged handling. Yet the TK-76 delivers consistently beautiful pictures.

TK-76C

NOW, THE NEW TK-76C

The new TK-76C version of this preferred portable camera adds more features for enhanced performance and improved picture quality, and the weight of the camera has been reduced by more than three pounds. Technical and operational improvements include a new system for comet tail suppression, extended remote control capabilities, contrast compression and high sensitivity/low noise operation.

Better performance with less weight results in extra value—which has always been a major feature of TK-76 cameras.

Automatic Features for Superb Picture Quality

The TK-76C is completely self-contained, with the feel and freedom of commonly used 16mm film cameras, and with numerous built-in features for achieving better creative results with less effort. Automatic features include Iris; White Balance, Flare Control and Comet Tail Suppression.

With the "automatics", professionals, as well as those less technically skilled in handling a camera quickly learn to concentrate on the picture rather than on camera manipulation.

Big Camera Features for Extra Picture Quality

Despite its small size, the TK-76C is endowed with big camera features that enable it to produce quality color pictures under a diversity of operating conditions. The camera incorporates both horizontal and vertical aperture correction. A comb filter and coring is used to reduce noise and minimize heterodyning with the subcarrier. Comet Tail Suppression (CTS) circuitry automatically suppresses picture overloads due to backlighting or specular reflections.

The TK-76 encoder produces a full bandwidth signal on any of four standards (NTSC, PAL, PAL-M, or SECAM IIB) for pickup by a portable VTR or by a microwave relay system.

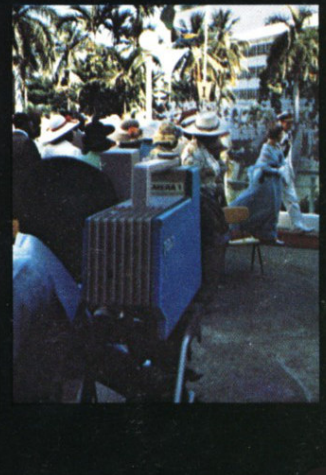
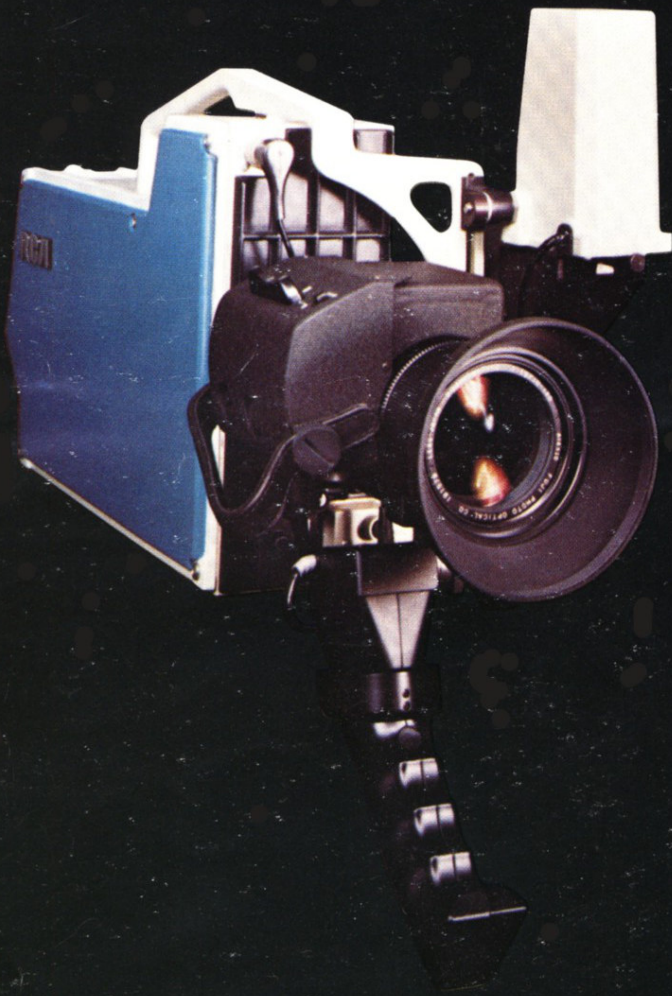
Flexible Systems for Field Production

The popularity and widespread use of the TK-76 as an ENG camera has overshadowed its use for more critical applications such as field production where remote control of the camera's video output is required. In truth, there are numerous accessories and ancillary equipments available that permit the TK-76 to be operated in a variety of flexible system arrangements. For example, a remote camera video control system using a multi-core cable with automatic equalization and timing for operation up to 3000 feet. Wireless and Triax systems are also available for added flexibility and versatility in EFP operations.

Operational, design and construction features of the TK-76C are documented on the following pages, and several basic system configurations are depicted.

TK-76 Does It All

With the TK-76, your crews can get to locations quickly and be ready for camera action in minutes, even seconds. You can handle news, sports, documentaries, public affairs and also commercial production assignments. There's little that you can't do effectively and economically with TK-76.



TK-76C

RUGGED CAMERA DESIGN PROTECTS REGISTRATION

Immediately apparent when taking an inside look at the TK-76 camera are its rugged design, construction and accessibility for service.

The entire TK-76C camera head is enclosed in a rugged unified cast magnesium housing. Cast magnesium side covers protect the camera against dust, moisture and RFI, using silver-impregnated gaskets. All operational switches and connectors are also sealed for protection against the elements. The yokes, prism and objective lens are mounted to a single T-frame casting which is shock-mounted from the frame to protect against misregistration and microphonics.

PRISM OPTICS AND BIAS LIGHTING

The camera prism optical system has a bias light that is an integral part of the prism. Since the TK-76C uses essentially the same spectral separation curves as other RCA cameras, camera-to-camera color matching can be obtained.

Camera Set-Up Adjustments

The right side camera cover interfaces with a heat transfer plate by means of beryllium-copper contact fingers. Camera set up adjustments are accessible through and identified on the plate. (1)

Accessibility for Maintenance

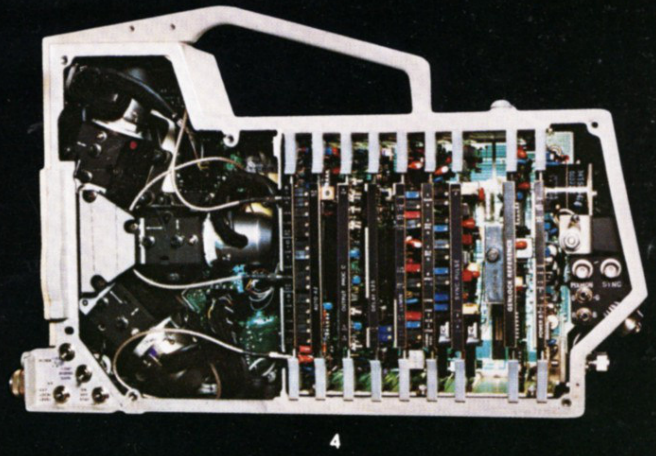
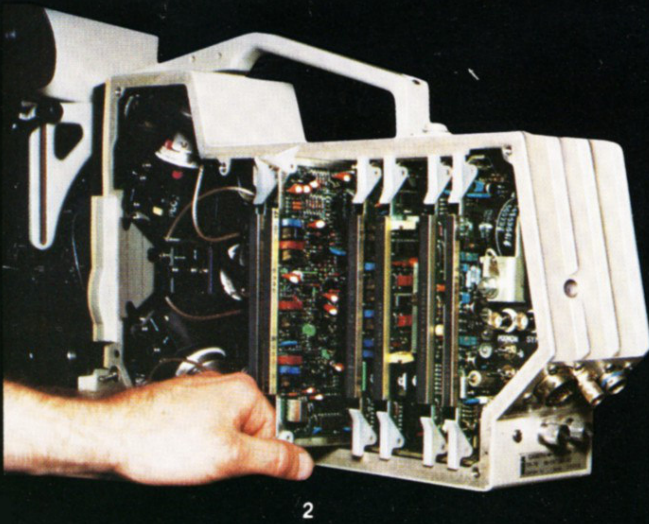
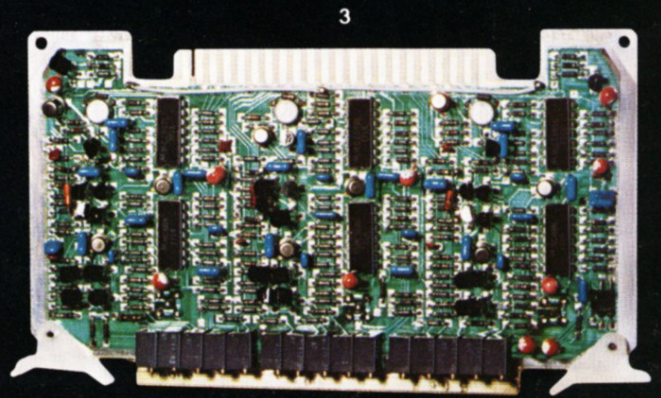
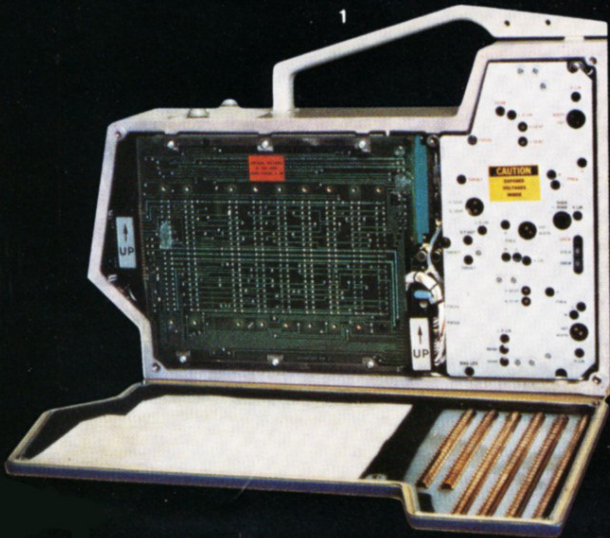
Camera circuit modules slide easily into connectors on the mother board, and are mechanically locked into place. (2)

Serviceable Construction

All circuitry is on neat, plug-in modules. Individual components are completely accessible for easy service. High-precision components are used throughout the camera for exceptional stability. (3)

Special Shock Mounting

Lens, prism, yokes, tubes, and pre-amps are mounted as a single unit so that precise registration may be maintained for extended periods in rugged use. (4)



AUTOMATIC FEATURES MAKE TK-76C EASY TO OPERATE

Automatic operating features simplify operation of the TK-76 portable for professional as well as less skilled operators. The lens iris may be controlled automatically or manually, with level indicators shown in the viewfinder. In the automatic mode the iris operates from the peak white video signal. Video black level is stabilized by feedback clamp circuits, and by the use of automatic flare correction.

A flesh-tone indicator is provided so that skin tones are properly exposed when lighting conditions are adverse to automatic iris operation. A toggle switch sets the mode of operation.

Comet Tail Suppression

In many types of shooting, particularly outdoors, lighting cannot be precisely controlled. Strong backlighting, high contrast light sources in the field of view, or specular reflections can degrade the picture.

If the iris is stopped down to eliminate these overloads, the interesting part of the picture becomes too dark. The TK-76C has an automatic CTS circuit which reduces such overloads without affecting normally lit areas of the picture. CTS can eliminate up to 16X overloads, depending on the tube type. CTS does not affect tube life.

Contrast Compression

Many television scenes involve lighting contrasts beyond the range that can be handled by the photoconductive tube/lens iris combination. This is particularly true at sporting events in low-angle daylight, where the proper iris setting for the bright areas leaves little or no detail in the shadows. The TK-76C has electronic circuitry to pull detail out of the poorly-lit areas without affecting highlights. This result is accomplished without desaturating the colors in either area. In the self-contained mode a toggle switch selects a fixed amount of contrast compression. In any of the various remote control modes, a continuously variable knob is provided.

High Sensitivity: +9 and +18 dB Gain Modes

For shooting in dim conditions where extra light cannot be provided, two different gain modes are available. In both modes, subcarrier trap filtering and other such techniques are employed to subjectively reduce noise, rather than the undesirable technique of bandwidth reduction. Improved circuitry stabilizes black balance in both modes. Since the TK-76C's normal mode S/N is an extremely high 54 dB, the result in these high-gain modes is an exceptionally useable picture down to 1 foot-candle and below.

Picture Quality Maintained Under Extreme Conditions

The TK-76 is set up at normal room temperatures yet gives usable pictures under wide extremes in ambient temperature. It will meet specifications from -20° to $+50^{\circ}\text{C}$ (-4°F to $+122^{\circ}\text{F}$). A usable picture is available in about ten seconds from a cold start.

Lightweight and Properly Balanced

The camera has the feel of 16mm film cameras. The flat bottom allows the cameraman to position the center of gravity directly over the shoulder regardless of which of the many lenses available is used. Several types of shoulder pads are available to accommodate a range of physiques.

Adjustable Viewfinder

The viewfinder is adjustable up and down and can swivel 360 degrees; thus the operator may position the eye piece to his exact preference.

The viewfinder incorporates a 1.5" diagonal kinescope which includes LED indicators that will provide the following information:

Tally • Camera Battery • VTR Battery and Tape Run-Out • Tape motion.

The basic camera is supplied with a wide angle viewer and a rubber eyecup.

Built-In Filter Wheel

A knob, located directly beneath the lens, controls the filter wheel which may be used to correct for outdoor lighting and to provide neutral density filters. A position is also provided for prism cap. If the user desires, optional star filters, fog filters, etc. may be used in place of the cap.

Lenses

More than 20 different lenses are available for this camera. In less than a minute, the camera operator may change the lens. The cable for the iris servo is disconnected and the locking ring simply moved to free the assembly.

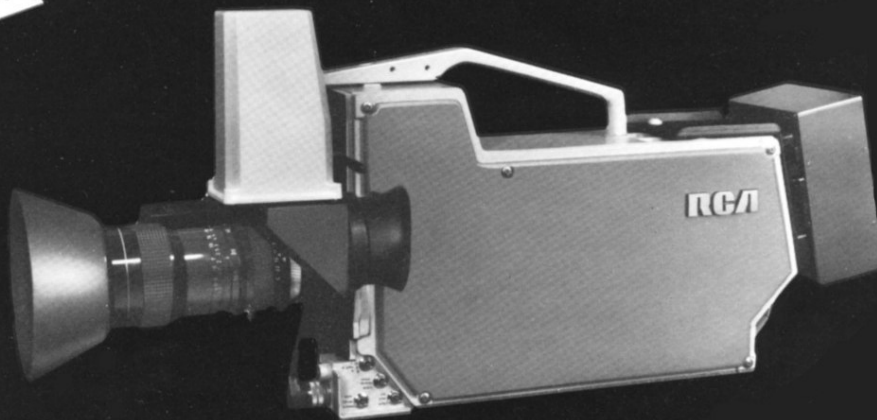
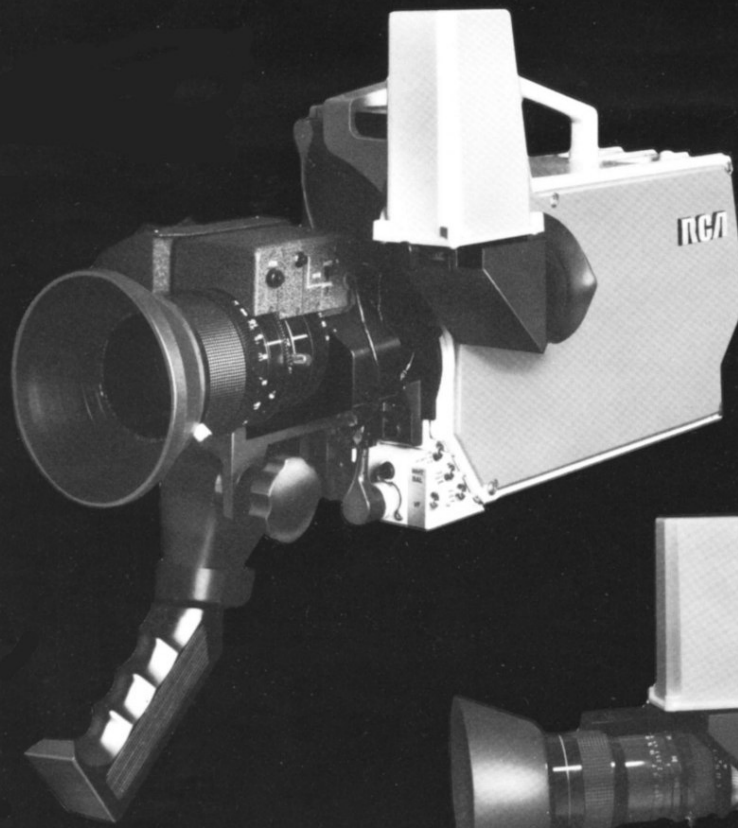
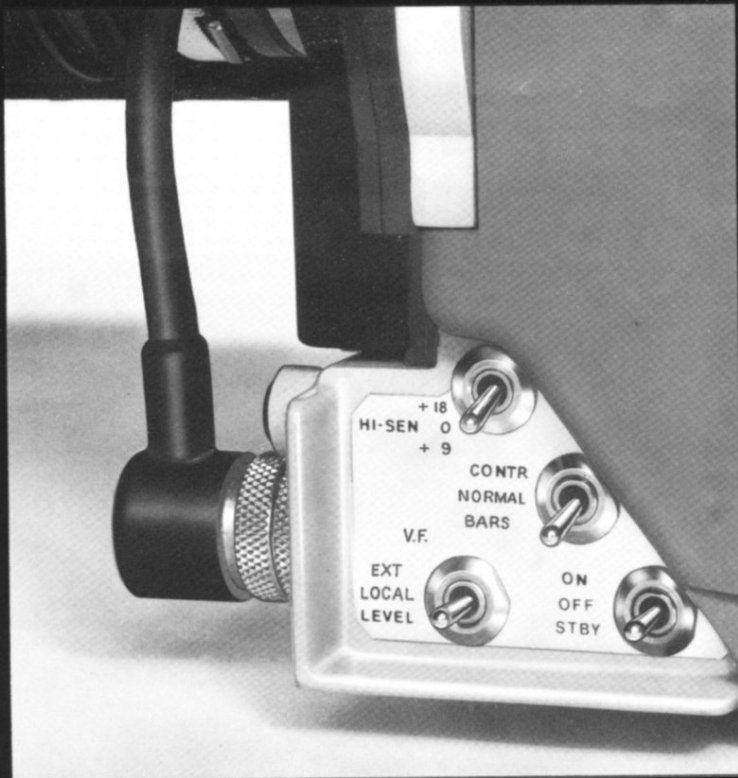
Power Sources

The TK-76 operates on +12 volts DC which makes it possible to utilize a variety of power sources. A battery belt, typical of the kind used with cine cameras and comfortable to wear, provides rechargeable battery power. The TK-76 camera may also be operated from vehicular or marine batteries for maximum versatility at low operating cost. The easy availability of 12 volt batteries throughout the world virtually eliminates the possibility that the users will find themselves without available power for the TK-76! Power can be taken directly from any 12V automobile type battery.

With an optional power adapter the TK-76 may also be operated from an AC power source.

Cable connectors are mounted at rear of the TK-76 housing for power input, a BNC connector for 75 ohm video output line, and a multiconductor cable connection for use with portable VTR equipment. The camera is also fused at this location. A spare fuse is provided.

For those who desire a clip-on battery instead of a belt, the TK-76C easily accepts either NiCad or Silver/Zinc clip-on batteries. The battery modules can be changed in seconds without tools of any kind.

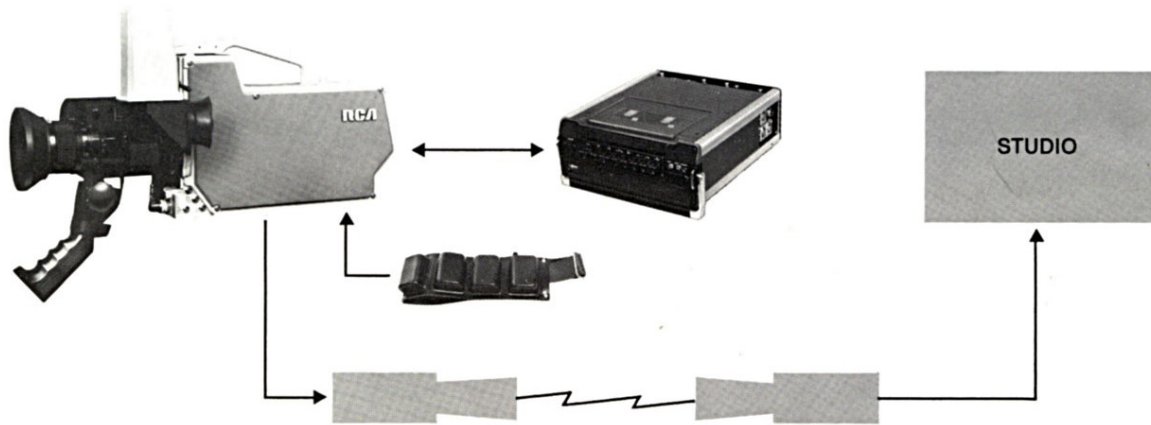


TK-76

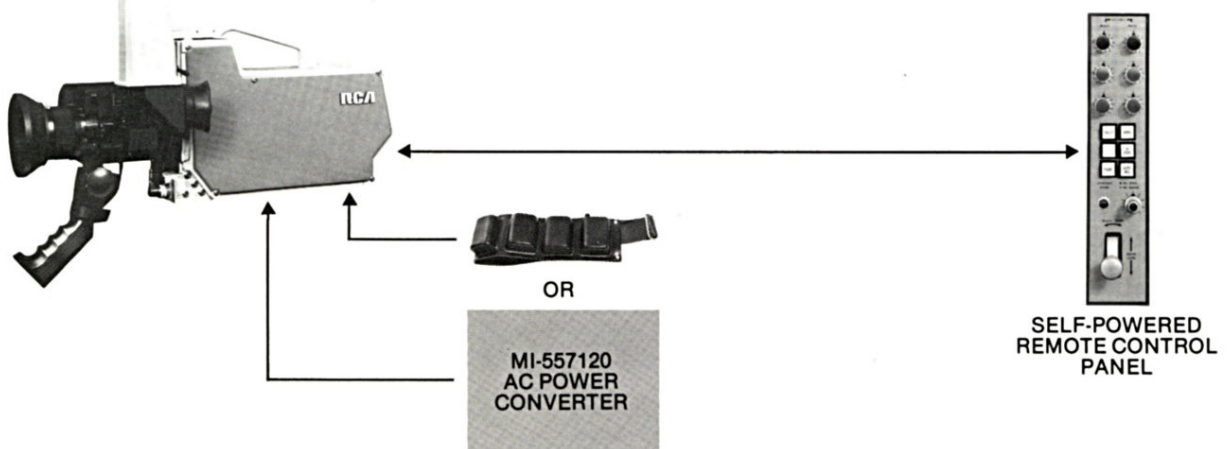
VERSATILE TK-76 CAMERA SYSTEMS

Among the advantages of the TK-76 camera is its adaptability to a wide range of system configurations. With available accessories, TK-76 systems can be as simple or sophisticated as user applications and budgets dictate—ranging from the most basic ENG set-up to systems providing full control of camera video functions with triax cable, as well as wireless field production systems. Depicted here is a representative sampling of system possibilities. RCA Representatives can assist in planning systems to meet specific application needs.

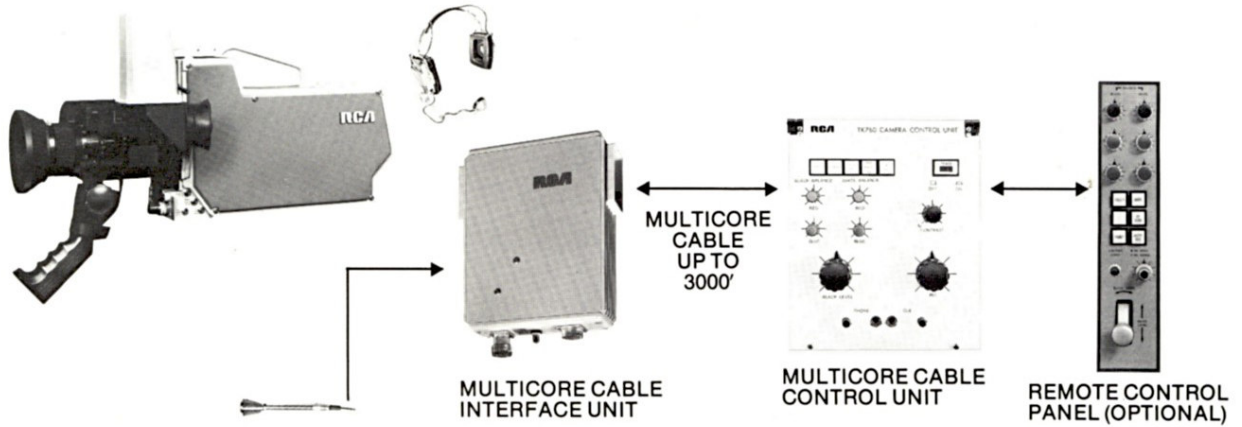
NEWS CAMERA SYSTEM



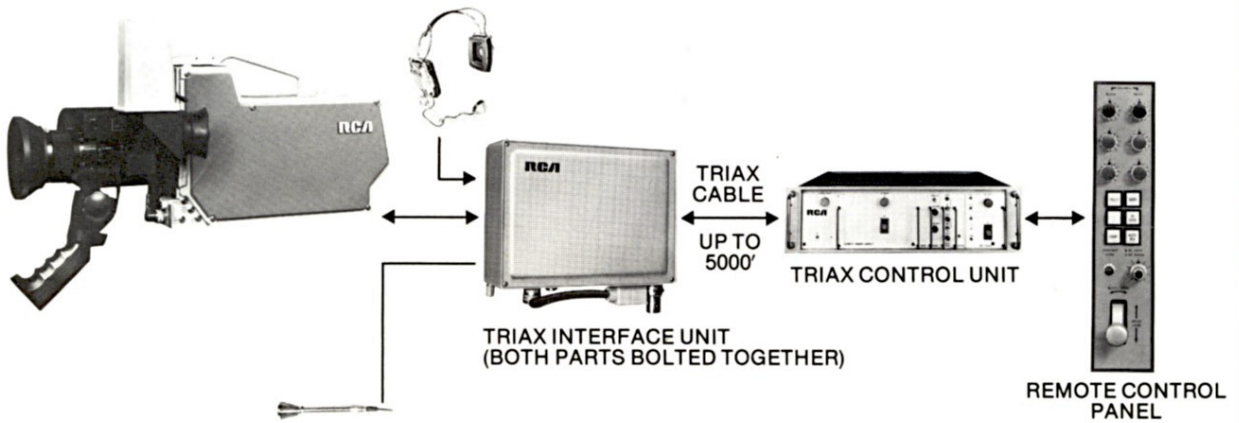
SIMPLE REMOTE CONTROL CAMERA



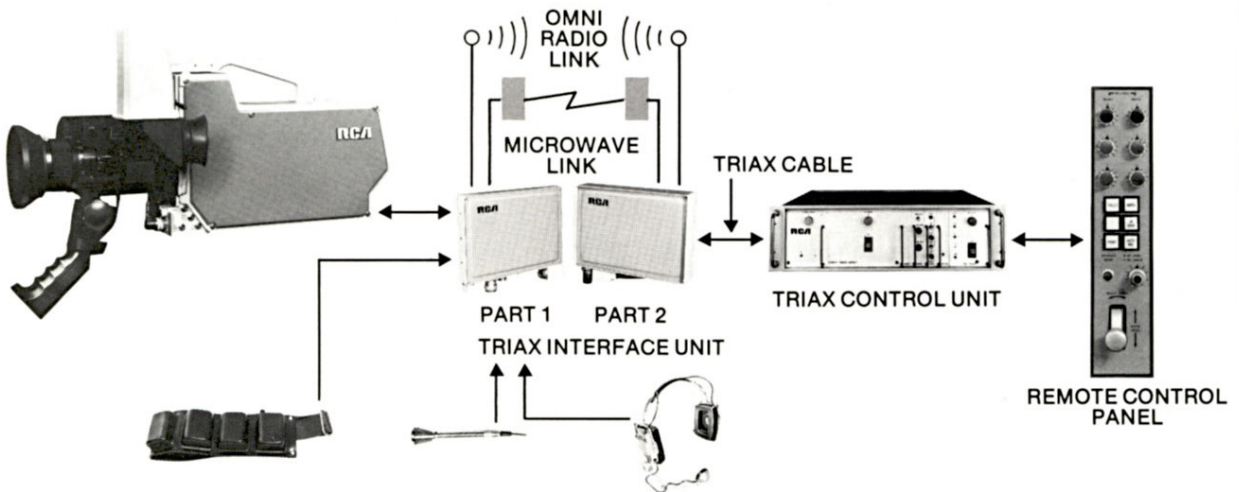
FIELD PRODUCTION CAMERA - MULTICORE CABLE



FIELD PRODUCTION CAMERA - TRIAX CABLE



FIELD PRODUCTION CAMERA - WIRELESS



TK-76C

TK-76 ACCESSORIES EXTEND CAMERA UTILIZATION

Belt-worn Camera Control Interface

The TK-76C can be connected to the compact TK-760 Camera Control Unit via a belt-worn interface unit. This unit provides power supply (eliminating the battery belt); intercom; an amplifier for an announcer's microphone, and equalization for return video to the viewfinder. The CCU provides automatic timing and automatic equalization for up to 3000 feet as well as control of the camera functions shown on the panel (right).

Joystick Remote Control

The "Joystick" Remote Control Panel combines black level and iris control in a single handle. Dimensions: 14 inches high x 3 inches wide. Six Remote Control Panels will fit side-by-side in a standard rack-width console mount.

Triax

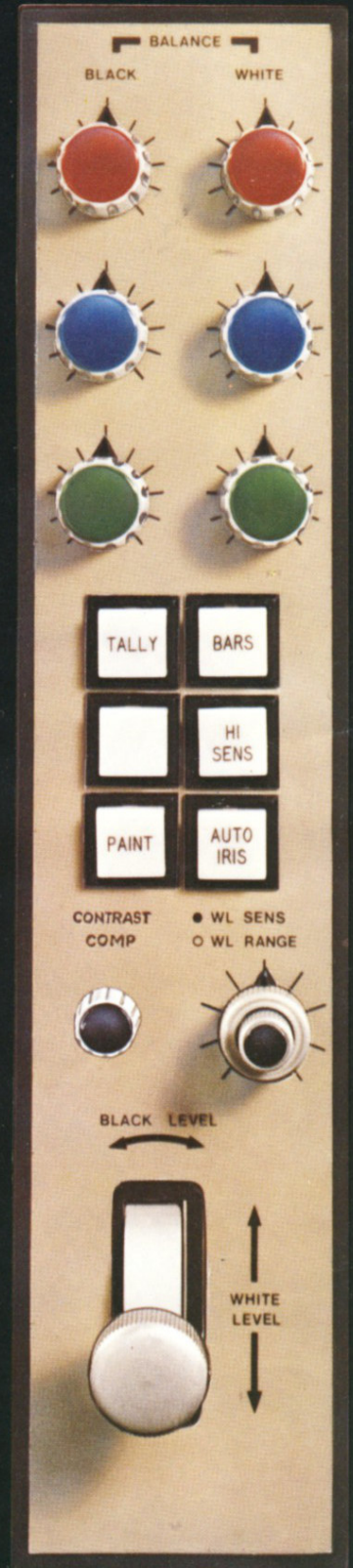
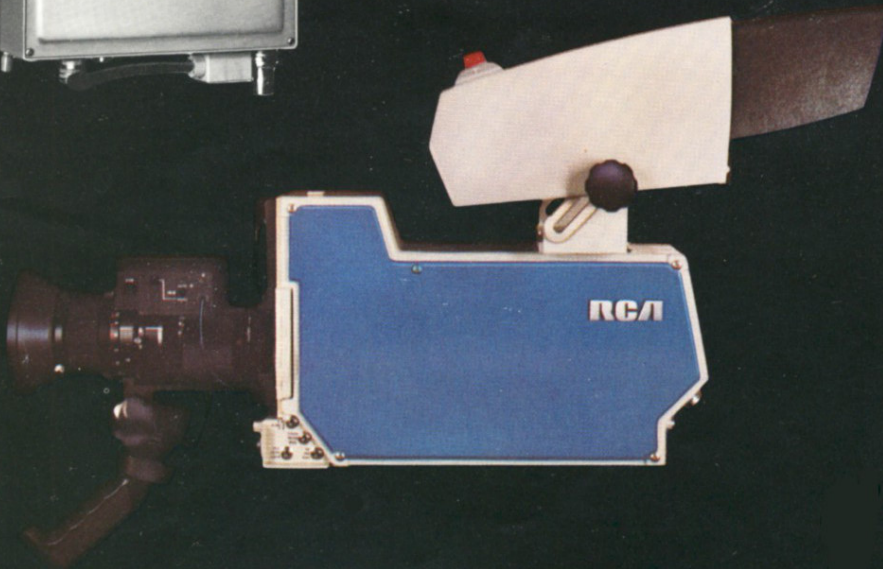
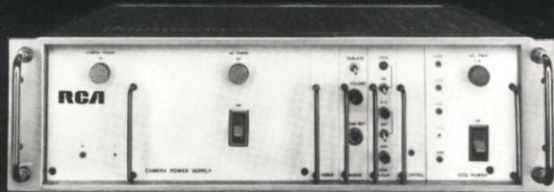
One of the problems with most conventional television camera systems is the multicore cable required for remote control. It cannot always operate over long enough distances for the user's application, and is not universal. In fact, it is different for nearly every camera now made. The TK-76C offers a triax cable adapter to overcome these problems.

Triaxial cable is simple, lightweight, and uses easy-to-repair connectors. It is a "common denominator" now buried in many stadiums, theaters, etc. A TK-76C equipped with triax adaptor can plug into any of these prewired locations without the need for laying out multicore cable each time the user visits the site. The triax adaptor multiplexes video, audio, power, intercom, and all control signals including genlock into an FM carrier, and transmits in both directions up to 5,000 feet over the simple triaxial cable.

An added benefit of the RCA triax system is its adaptability to totally wireless, fully remote-controlled operation. The electronic architecture of the triax interface unit is such that its two halves can be physically separated and "connected" by one microwave link (sending from camera) and one omni-radio link (receiving control back to the camera). The cameraman is free to wander anywhere within the range of the transmitters chosen, while the video operator still has full control and communication.

Tiltable Viewfinder

For EFP applications, an optional tiltable 5-inch (127 mm) viewfinder is available, making it more convenient for the cameraman to get the best viewing angle for any framing situation.





TK-760

TECHNICAL SUMMARY (Preliminary)

Scan Standards

EIA 525/60 fields
CCIR 625/50 fields

Color Standards

Types available for NTSC, PAL-B, PAL-M, or SECAM III B

Power Requirements

Nominal (11v-14v) 12v DC, negative ground 45 watts
AC Adapter 120/240v, 50/60 HZ

Contour Enhancement

Horizontal and vertical aperture equalization with comb filter to minimize noise and luminance-chrominance interference. Coring minimizes noise on base line. In-band peaking of the horizontal correction signal is used.

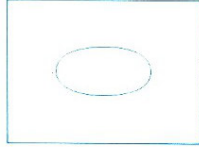
Shading Correction

Horizontal and vertical sawtooth axis shading for each video channel, as well as horizontal parabola shading.

Lens Servo Amplifiers Integral with zoom lens

Viewfinder

Screen Diagonal Dimension 1.5" (38mm)
Controls "Contrast", "Brightness"
Exposure Indicators (internally adjustable):
 Crosshatch 70%
 Inversion 100%
Automatic Iris Window Centered ellipse



Gamma 0.45 and 1.0

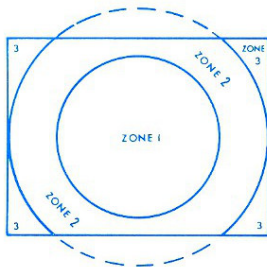
Sensitivity 125 footcandles (1250 lux) @ f/2.8
(with camera viewing a 60% reflectance Munsell white with 3200 °K illuminant)

Signal-to-Noise Ratio

NTSC/PAL-M 54 dB
PAL-B/SECAM 52 dB
(all standards measured at 1.0 gamma, aperture correction off, with camera capped after adjusting to above-defined sensitivity)

Registration Accuracy

Zone 1 (circle in center = 0.8 picture height) 0.1%
Zone 2 (circle in center = 1.0 picture width) 0.2%
Zone 3 (area outside Zone 2) 0.5%



(Excludes Registration Error in Lens)

Picture Geometry

Zone 1 (see Registration Accuracy) 0.5%
Zone 2 1.0%
Zone 3 2.0%
(Excludes geometry deviation in lens)

Environmental

Ambient Temperature Limits - 20 to + 50 deg. C
Ambient Relative Humidity 0 to 90% RH
Operational Altitude to 10,000 ft. (3048 m) ASL
Stability Specifications are met over a range of
 ± 20 °C from the set-up ambient temperature
RFI Immunity (approx.) Up to 10v/meter, 100 khz
to 600 MHz (generally, everywhere on the camera
surface except at the lens port)

Mechanical

Camera (less lens):

Height 10.5" (26.7 cm)
Width 4.3" (10.9 cm)
Depth (w/o lens) 16.0" (40.6 cm)
Weight 14.8 lbs. (6.7 kg)

Interface Unit (Hip Pack)

Height 10" (254 mm)
Width 9" (229 mm)
Depth 3.75" (95 mm)
Weight 7 lbs. (3.2 kg)

CCU (Multicore Cable)

Height 10.5" (267 mm)
Width 8.5" (216 mm)
Depth 3.75" (95 mm)
Weight 7 lbs. (3.2 kg)

Joystick Panel

Height 14" (356 mm)
Width 3" (76 mm)
Depth 3" (76 mm)
Weight 3.3 lbs. (1.5 kg)

Triax Interface Unit (Hip Pack)

Height 8.25" (210 mm)
Width 11.25" (286 mm)
Depth 3.75" (95 mm)
Weight 8.5 lbs. (3.9 kg)

Triax CCU

Height 5.3" (135 mm)
Width 19" (483 mm)
Depth 16" (406 mm)
Weight 57 lbs. (25.9 kg)

Genlock:

Input Black burst or composite video
Horizontal Phase Adjustment:
 NTSC ± 2.5 μsec
 PAL-B ± 2.5 μsec
 PAL-M ± 2.5 μsec
 SECAM ± 5 μsec

Blanking Adjustment (NTSC):

H 9.6-11.5 μsec
V 17-21 lines

RCA reserves the right to modify the design or change specifications without notice.



TK-76: QUALITY PERFORMANCE KEEPS IT THE PREFERRED PORTABLE

Routine and unusual applications abound for TK-76 cameras. A host of custom and off-the-shelf accessories have been developed to increase the utilization of the camera on land, seas and in the air.

With 2,000 TK-76 cameras in service, we have an ample background of user experience to share. See your RCA Representative for expert assistance in selecting cameras and ancillary equipment for your needs.



RCA Broadcast Systems

Front and Cooper Streets, Camden, New Jersey 08102, U.S.A.

Form 3J6144