

Ikegami HL-79D ENG/EFP Color TV Camera



The Ikegami HL-79D is a new generation, self-contained, hand-held ENG/EFP Broadcast Color Television Camera. Because the HL-79D optimizes the capabilities of the newly developed low capacity diode gun Plumbicon[®], the Picture output is of very high resolution and low noise. Greatly improved pre-amplifier helps to realize high signal-to-noise ratio of 57dB. Compared with today's conventional high-quality small cameras, it has significantly improved performance achieved at reduced operating power in a smaller and lighter configuration. The HL-79D retains the desirable low profile and low center of gravity provided in earlier Ikegami portable cameras and is physically short to optimize user mobility.

Approximately 6-hours* of continuous operation is possible with a silver zinc battery in the fully self-contained/self-powered mode of the camera. Its lightweight and well-balanced design assures minimum operator fatigue. All necessary features and interface capability are provided to permit systems integration and operation including a full array of remote operating controls. A 4½-inch electronic viewfinder (optional) is available in addition to the standard 1½-inch high-resolution viewfinder.

Usable video signals with correct colorimetry are achieved at extremely low-light levels by the use of optimized prism color separation optics, low noise video pre-amplifier and detail correction circuitry, as well as the availability of +18 dB

added video gain. Automatic Beam Control (ABC) circuitry greatly reduces comet-tailing of high-intensity objects by providing adequate beam control to stabilize highlights three to four stops in excess of normal peak white levels. To accommodate scenes with high contrast ratio, level suppression circuitry (knee control) combined with wide dynamic range video amplifiers permits reproduction of the bright background while amplifying information in the shadow areas of the same scene with full resolution and without added noise.

The HL-79D meets the SC-H phase criteria of EIA Standard RS-170A required to achieve correct

*Length of operation is a function of battery age, temperature, degree of charge, etc.

color framing. Both horizontal and vertical blanking pulse widths are adjustable to correct systems performance to meet FCC requirements.

The HL-79D delivers traditional Ikegami performance, quality and reliability.

At 11.2 pounds for camera, pick-up tubes and 1.5-inch high-resolution electronic viewfinder, the Ikegami HL-79D is the lightest new generation, self-contained, 3-tube prism optics broadcast quality color television camera available. The total weight of approximately 18 pounds includes a typical zoom lens (13X,

with auto-iris and servo-zoom control) and attachable plug-in 4-pound silver zinc or nicad +12V DC battery power supply. The HL-79D incorporates a full gamut of automatic features and provides state-of-the-art performance in terms of short-term and long-term stability, sensitivity, low-light level as well as wide dynamic range performance, signal-to-noise ratio, lack of shading, excellent colorimetry and general picture quality. The ruggedness and reliability characteristics of all Ikegami cameras has been retained in the HL-79D.

Design Considerations

Designed to meet the unique requirements of both Electronic News Gathering (ENG) and Electronic Field Production (EFP), the Ikegami HL-79D provides the quality-conscious program originator with a cost-effective answer to his equipment requirements.

Small size and weight, minimum power as well as low profile and proper balance were emphasized for the ENG applications. For EFP, superior performance and systems interface/control as well as necessary optional equipment are available.

Performance features

To achieve the superior performance necessary for sophisticated field production, various parameters were emphasized:

■ Prism Beamsplitter

BK-7 glass is utilized, resulting in better colorimetry, less ghosting and shading than high-index glass prisms of equivalent speed (f/1.4). Built in the prism is a quartz-filter compensating perfectly polarization.

■ Anti RFI

Thanks to physical improvements on the camera body, this camera can be used even where the field strength is strong.

■ Dynamic Beam Focus Circuit

Dynamic Beam Focus Circuit reduces tube beam landing

errors and improves corner modulation.

■ Shading Correction

To assure perfectly flat pictures, shading correction for both tubes and bias lights is provided. Adjustable sawtooth, parabolic and edge peaking correction in the horizontal and vertical scan directions are available.

■ Video Matrix

Colorimetry characteristics to match studio cameras is achieved through the use of a corrective video matrix.

■ Detail Correction

The contours-out-of-green signal, cored and sliced, is mixed into the R, G, B channels to result in optimum picture sharpness with minimum noise contribution.

■ Audio Facilities

An intercom amplifier is built into

the camera as well as a program audio amplifier.

■ Gamma Correction

Gamma Correction is continuously adjustable in each video channel to permit easy matching to other cameras.

■ R, G, B Outputs

Individual R, G, B outputs at standard level and impedance are available from the camera.

■ Gen-Lock

The Gen-Lock signal can be introduced in the camera via a BNC connector or the multi-pin cable connector. Horizontal pulse-timing range of -2 to $+5 \mu\text{sec}$ is available.

■ Return Video

External video can be viewed on the Viewfinder (either synchronous or non-synchronous composite video).

Automatic features

The HL-79D is a fully-automatic camera with features incorporated to permit an unskilled operator to master its operation in a few hours.

■ Auto Iris

Continuously and rapidly corrects the lens opening to compensate for changes in scene illumination intensity.

■ Auto White Balance

Activated on demand. Recycles

in 0.5 seconds. Corrects individual video amplifier gain to compensate for changes in scene color temperature illumination.

■ Auto Beam Control

Provides the necessary beam current to stabilize scene highlights exceeding normal white level; prevents comet-tailing.

■ Auto Black Stabilization

Video black level is continuously

stabilized against variations due to pick-up tube flare and dark current drift.

■ Auto Iris Closure

Automatically closes the lens iris when the camera is turned off or to standby protecting the camera tubes from damage due to illumination when the photoconductive surface is not scanned.

Operational conveniences

In addition to the automatic features, the HL-79D incorporates a host of additional features that assure operational convenience.

■ Rapid Automatic White Balance

Changes in scene color temperature illumination can be compensated in less than 0.5 seconds.

■ Level Suppression

Wide contrast range scenes can be accommodated through the use of wide dynamic range video amplifiers and level suppression circuitry (knee control).

■ Blanking Width Adjustment

To compensate for errors introduced into the recorded video signal by the recording/time base correction/editing process, both horizontal blanking width and vertical blanking width have made adjustable over a wide range.

■ White Balance Memory

White Balance is retained for over ten hours when the camera is turned off or to standby, or the power supply is disconnected.

■ Low Battery Voltage Indicator

A positive warning of low battery voltage is provided by a flashing LED in the viewfinder.

■ Standby Indicator

The viewfinder display incorporates an LED to indicate standby.

■ Single +12 VDC Power Supply

Operation from a simple external power supply or an automobile battery is possible.

■ Power Supply Options

The HL-79D can be powered from conventional battery belts and AC power supplies as well as attachable battery units. Also the camera can be powered from VTR battery if desired.

■ Color Bars

The color bars includes split white with 75% and 100% white as well as six hues, black, I and Q.

■ Separate Video Outputs

A separate monitoring output is provided, in addition to two isolated encoded video outputs and individual standard level/impedance R-G-B signals.

■ Viewfinder Peaking Circuit

The viewfinder display can be crispened to assist in attainment of sharp optical focus of the lens.

■ Dual Filter Wheels

Separate concentric filter wheels are provided for color temperature compensation and scene illumination correction.

■ Bias Light

Reduces lag at low light levels.

■ Paint Controls

Red and Blue Paint Pots are provided for color matching to other cameras.

■ Registration Controls

Centering trim pots, Red and Blue in Horizontal and Vertical are provided to check registration.

■ Standby/Operate Switch

A power-saving standby function is available. In "Standby," the camera draws 5% of normal power; return to "Operate" is accomplished in 3-4 seconds.

■ Video Level Indicator

For manual iris operation, an over-signal indicator (ZEBRA system) is super-imposed on the viewfinder display.

■ +9 dB, +18 dB Video Gain

For operation at extremely low light levels, as much as +18 dB extra video gain is available. Color

balance and black levels are retained at high gain; useful operation is possible down to 2 fc scene illumination.

■ Microphone Amplifier

A built-in amplifier is available for program audio signals.

■ External Video Input (Return Video)

Provision is made for viewing of an external synchronous or non-synchronous composite video input signal to the viewfinder.

■ Gen-Lock Input

Synchronization to external signal sources (composite color or black burst signal) is possible. Individual horizontal pulse timing and sub-carrier phase adjustments are available to facilitate proper timing of the camera's video output signal.

■ Viewfinder

The user sees a bright, high-resolution, well-regulated display in the viewfinder. For easier operation, the viewfinder is tiltable. Attachment of viewfinder to camera is simple positive plug-in — no cables required.

■ Viewfinder Indicators

Includes: Battery Status, Tally, Video Level (Zebra), Standby, White Balance, Gain Up Indication; When the gain control switch is set to +9dB or +18dB, the lamp lights on the viewfinder, preventing improper operation.

■ Master Pedestal Control

For matching to other signal sources, a master pedestal control is provided on proc. amp.

Maintenance conveniences

To make it easy to check out the camera, the HL-79D incorporates:

- Beam Alignment Controls.
- Synchronized Focus Wobble Circuitry for precision tube alignment.
- Deflection Overscan facility for accurate raster positioning.
- Calibrated Video Test Sawtooth voltages for video amplifier ad-

justment.

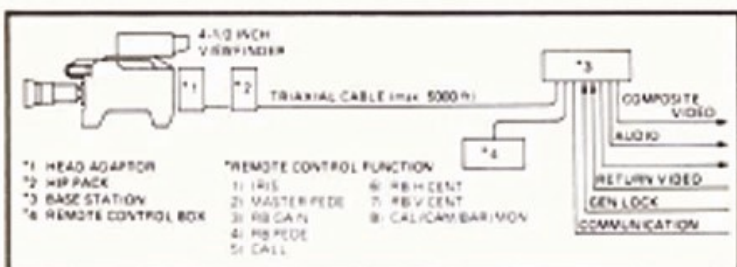
- Sealed and dust-free color splitting optics.
- Monitor Video Output separate from line video outputs.
- Monitor Video Output with negative green facility for precise registration.
- Individual shading adjustments for sawtooth, parabola and edge

peaking in H and V scan direction for pick-up tubes and bias lights.

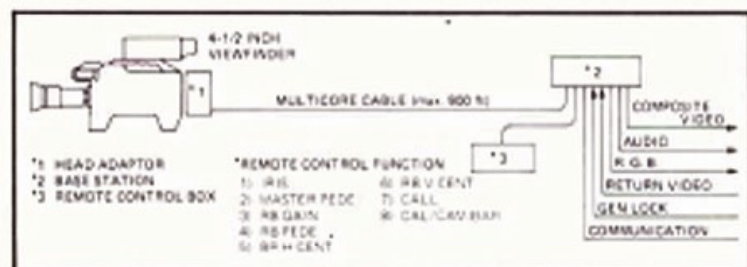
■ Geometry Correction

A geometry corrector circuit simplifies set-up of tube registration and also facilitates pick up tube replacement by permitting easy, precise adjustment of R/G/B registration.

Optional Systems Configuration



TA-79 Triax Cable System



MA-79 Multi-Core Cable System



Specifications

1.0 MECHANICAL

1.1 Dimensions:

3.5(W) x 6.7(H) x 13.4(D) inch
90(W) x 170(H) x 339(D) mm

1.2 Weight: 11.2 lbs., including 1 1/2-inch electronic viewfinder and pickup tubes, less lens and battery.

1.3 Lens Mount: Bayonet

1.4 Filter Complement:

ND	0	0.6	CAP
COLOR	3000°K	4200°K	5600°K

OPTIONAL ACCESSORIES

- a) Multi-Core Camera Cable Remote Control MA-79
- b) Triax Camera Cable Remote Control TA-79
- c) 4 1/2-inch Electronic Viewfinder
- d) Test Setup Box
- e) Lens Mount Adapter for HL-77 lenses
- f) 12X Zoom Lens
- g) 13X Zoom Lens

- h) 13X Zoom Lens with built-in 2X range extender
- i) 14X Zoom Lens with built-in 2X range extender
- j) 15X Zoom Lens
- k) Studio Controls for Zoom Lenses
- l) Remote Paint Box
- m) AC Power Pack with DC cable
- n) Batteries and Chargers

Specifications subject to change without notice.

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Specifications (continued)

2.0 ELECTRICAL

2.1 Input Voltage

- 2.1.1 DC (to camera from battery or A.C. Power Supply)
Nominal: 12 volts, negative grounded
Tolerance: 11-17 volts
or —

- 2.1.2 AC (to separate A.C. Power Supply for camera)
Nominal: 117 volts, single phase
Tolerance: $\pm 5\%$
Frequency: 50/60 Hz

2.2 Input Power

- 2.2.1 DC (to camera)
2.2.1.1 Normal Operation
23 watts (1.9 amps) at nominal input voltage
2.2.1.2 Standby Condition
1.2 watts
or —

- 2.2.2 AC (To AC Power Supply): 55 volt-amps at nominal input voltage.

2.3 Input Signals

- 2.3.1 Synchronization
2.3.1.1 Independent (Isolated Camera Mode)
None: Operates from built-in color sync generator.

- 2.3.1.2 Systems Mode (Gen-Lock Synchronization via BNC or multi-pin cable connector).

- 2.3.1.2.1 NTSC Color Composite (VBS) Signal:
1.0V (pp) positive, 75 ohms. Input voltage fluctuation of $-6\text{dB}/+3\text{dB}$.
or —

- 2.3.1.2.2 Black Burst/Sync (BBS) Signal: 0.45V (pp) negative, 75 ohms. Input voltage fluctuation of $-6\text{dB}/+3\text{dB}$.

- 2.3.2 External Video/Return Viewfinder feed (via multi-pin cable connector):
Synchronous or non-synchronous composite signal, 1.0V (pp) positive, 75 ohms.

- 2.3.3 Program Audio (via XLR connector):
Microphone output, -60dBm at high impedance.

- 2.3.4 Tally (via multi-pin cable connector):
24 Vdc or contact closure.

- 2.3.5 Intercom Audio (via ring/tip/sleeve jack): Microphone output, -10dB , 600 ohms, 2-wire system.

- 2.3.6 Remote Control Functions

- 2.3.6.1 Camera and Lens:

IRIS, with auto/manual switch;
MASTER PEDESTAL,
R-B GAIN,
R-B PEDESTAL,
R-B HORIZONTAL CENTERING,
R-B VERTICAL CENTERING,
CALL INDICATION,
CAL/BARS/CAM, SELECTION.

- 2.3.6.2 VTR: Start/Stop

- 2.4 Vertical Sweep Rate:

59.94 Hz

- 2.5 Horizontal Sweep Rate:

15.7342 kHz

- 2.6 Scanning:

525 lines
frame, 60 fields/second;
30 frames/second (2:1 interlace)

- 2.7 Sync & Blanking Waveform:

In accordance with EIA standard RS-170A

- 2.7.1 Horizontal Blanking Width:

Adjustable, 10.2 — 11.2 μsec

- 2.7.2 Vertical Blanking Width:
Programmable: 18, 19 or 20 lines

- 2.8 Pick-Up Device Types:

- 2.8.1 Low Capacity Diode Gun Plumbicons[®]

- 2.8.2 Diode Gun Plumbicons[®]

- 2.8.3 Broadcast Quality Plumbicons[®]

- XQ-1427

- 2.8.4 Broadcast Quality Saticon[®]

- 2.9 Optical System

- 2.9.1 Color Separation:
Sealed prism beam splitter with Red-Green-Blue outputs.
BK-7 low-shading and ghosting glass.
A quartz-filter built-in.

- 2.9.2 Effective Aperture:
The color separation optical system has an effective aperture sufficient to utilize the total light output of a lens with a geometric aperture of 1/1.4.

- 2.10 Sensitivity

- 2.10.1 Standard Illumination:
With a scene illumination of 2000 lux (187 foot candles) at 3000°K scene color temperature, 0dB video gain, a scene reflectance coefficient of 89.9%, the lens opening necessary to obtain a standard video signal of 0.7 volts non-composite shall be 1/5 or greater (higher f-number).

- 2.10.2 Master Gain Control:

- 0, $+9\text{dB}$, $+18\text{dB}$

- 2.10.3 Gain Control:
 $\pm 1\text{dB}$ in red and blue channels

- 2.10.4 Low Light Level Illumination:
Using an f/1.4 lens and $+18\text{dB}$ video gain, the standard signal level is obtained with a scene illumination of 20 lux or less (89.9% reflectance).

- 2.11 Signal-to-Noise Ratio:

- At 0dB Video Gain the signal-to-noise ratio of the output signal is typically 57 dB using Low Capacity Diode Gun Plumbicons measured under the following conditions:

Gamma: Off
Detail Correction: Off
Band Width: 4.5 MHz

- 2.12 Picture Fidelity:

- Measured with the following frequency response in each color channel:
50 Hz — 5.5 MHz: $\pm 1\text{dB}/-2\text{dB}$ (with respect to 100 kHz reference)

- 2.13 Luminance Signal Resolution

- Horizontal: 600 TV lines center

- 500 TV lines corners

- Vertical: 350 TV lines center

- 2.14 Detail Correction:

- Balanced Horizontal and 2H Vertical.

- 2.15 Automatic Lens Control

- 2.15.1 Automatic Iris:

- The detection circuit in the auto iris is capable of sensing peak video or APL or variable combinations of peak and APL.

- 2.15.2 Automatic Iris Closure:

- Closes iris to protect pick-up tubes from damage when unscanned (OFF or STANDBY).

- 2.16 Camera Cable:

- Camera Cable (between camera head and optional camera control unit) of the following types and maximum lengths shall be usable.

Multicore Cable: 300 meters maximum

Triax Cable: 1500 meters maximum

- 2.17 Overall System Delay

- 2.17.1 Encoded Signals

- 2.17.1.1 Sub-Carrier Phase:
Adjustable 360° with respect to the gen-lock input signal.

- 2.17.1.2 Horizontal Timing:
Adjustable $\pm 5\text{ } \mu\text{sec}/-2\text{ } \mu\text{sec}$ with respect to the gen-lock input signal.

- 2.17.2 R-G-B Signals:
Advanced approximately 0.7 μsec with respect to the encoded output.

- 2.18 Output Signals

- 2.18.1 Video

- 2.18.1.1 Encoded Video:
FCC/NTSC Encoded Color Signals, 1.0 Volt (pp) composite, positive polarity, 75 ohms. Separate isolated outputs available at — a) BNC connector and b) Multi-pin cable connector. In accordance with RS-170A and FCC Rule 73.682.

- 2.18.1.2 R-G-B Video:
Separate processed R-G-B color signals, 0.7V (pp) non-composite positive polarity, 75 ohms. Available at multi-pin cable connector.

- 2.18.1.3 Monitor Video:
Separate isolated output, available at BNC connector, 1.0V (pp) composite, positive polarity, 75 ohms. Selectable as follows: R, G, B, — G. Encoded.

- 2.18.1.4 Encoded Color Bars Signal:
Selectable in lieu of 2.18.1.1. Includes 75% and 100% white as well as 6 hues and black, I and Q.

- 2.18.1.5 Calibration Signal:
Horizontal rate sawtooth input to each R-G-B channel video amplifier, selectable in lieu of 2.18.1.1.

- 2.18.1.6 Audio

- 2.18.1.6.1 Program Audio Output:

- -20dBm , 600 ohms balanced.

- 2.18.1.6.2 Intercom Audio:

- 2-wire system.

- 2.19 R.F. Signal Output:

- None supplied

- 2.20 Registration Accuracy:

- 2.20.1 Zone 1 (within a circle having a diameter equal to 80% of picture height): Deviations of red and blue with respect to green; less than 0.1% of picture height.

- 2.20.2 Zone 2 (within a circle having a diameter equal to picture width): Deviations of red and blue with respect to green; less than 0.2% of picture height.

- 2.20.3 Zone 3 (outside of Zone 2): Deviations of red and blue with respect to green; less than 0.5% of picture height.

- 2.21 Geometric Distortion:

- Less than 1.5% of picture height at any point in the picture area (excluding lens errors).

- 2.22 Performance Stability:

- When the ambient temperature varies $\pm 10^\circ\text{C}$ ($\pm 18^\circ\text{F}$) from the set-up temperature in the range of 0°C to 40°C (32°F to 104°F), specifications are satisfied without re-adjustment.

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