# HITACHI KOKUSAI ELECTRIC AMERICA, LTD

# Industrial Video Systems
# Camera Reference Catalog 6-06

## The Company

**Hitachi Kokusai Electric, Ltd.** is a subsidiary of the **Hitachi Group**, and is a manufacturer of information related systems. **Hitachi Kokusai** provides dynamic and innovated integration of technologies from the fields of imaging, video, data, communications, and measurement. Formed in 1963, and headquartered in Woodbury, New York, **Hitachi Kokusai Electric America Ltd.** is a supplier of television cameras and related video equipment to the broadcast, industrial, medical, scientific, and telecommunications markets.

## Quality Commitment

**Hitachi Kokusai Electric America Ltd.** specializes in miniaturized solid state cameras that are used in a wide variety of applications. From single units to OEM quantities, **Hitachi** is committed to manufacturing cameras to the highest quality standards. All of the cameras in the product line are manufactured under quality control certification in accordance with the ISO 9002 international standards. This assures the end user of a quality product that works properly "out of the box". All **Hitachi** cameras carry a one year parts and labor warranty as a further assurance of quality.

Tokyo Head Office

**Hitachi Kokusai Electric America, Ltd.**
Headquarters, Woodbury, NY

## Technical Support

**Hitachi Kokusai Electric America Ltd.** provides technical and engineering support for their entire product line. Technical support is available from each regional office, as well as the headquarters staff, to assist the end user with application and specialized engineering support in integrating cameras into each specific vision application. Further, **Hitachi Kokusai** system engineering expertise can be marshaled to provide factory automation systems such as automated inspection systems for the production line, medical systems which make use of compact, high performance cameras, electronic conferencing systems, and video information transmission systems. Working together with other manufacturers and vendors of related video equipment, **Hitachi** can provide the information and equipment necessary to perform the desired tasks.

## Camera Selection

To aid in selecting the right camera for your application, **Hitachi** has put together the following product guide. By determining the factors important to your application, such as color or monochrome, camera size and weight, resolution, sensitivity, and type of output, along with any special requirements such as high speed capture or extended integration, you can use the product descriptions and specifications to find a camera suited to your needs. In the rare instance where you may have needs not addressed by the current product line, contact **Hitachi** engineering support to aid you with defining the needs for your specific camera project. Due to the ongoing development of new products for the changing marketplace, **Hitachi** may have a camera in the design or development stages that will meet your requirements. For OEM quantities, **Hitachi** will work closely with your engineers to develop a product designed specifically to your needs. In addition to cameras, **Hitachi** can provide standard and custom cables, power supplies, camera adaptors, frame grabbers, software, lenses and optical filters necessary to integrate the camera into the vision system.

**HITACHI**
**Inspire the Next**


The **Hitachi Kokusai** products described in this brochure are manufactured at a factory which has received quality control system certification in accordance with the ISO international standards.

# HITACHI
## Camera Selector Guide

## Progressive Scan
Monochrome Color

### Standard
**KP-F2A**
Near IR, 1/3" CCD
**KP-F30**
Analog, 60 f / s. 1/3" CCD
**KP-F30SCL**
Mini CameraLink, 1/3" CCD
**KP-F32F**
IEEE 1394.b, 1/2" CCD
**KP-F33**
Analog, 30 f / s, 1/3" CCD
**KP-F37**
Analog, 70 f / s, 1/3" CCD
**KP-F38**
Analog, 80 f / s, 1/3" CCD
**KP-F80**
XGA Resolution, Analog Out
**KP-F83F**
IEEE 1394.b, XGA Resolution

### MegaPixel
**KP-F100B**
LVDS Digital, 15 f / s
**KP-F100B-CL**
CameraLink, 15 f / s
**KP-F120**
LVDS Digital, 30 f / s
**KP-F120-CL**
CameraLink, 30 f / s
**KP-F120F**
IEEE-1394, 15 f / s
**KP-F140F**
IEEE-1394.b, SXGA, 15 f / s
**KP-F200CL**
CameraLink, 2M Pixels
**KP-F200SCL**
Mini CameraLink, 2M Pixels

### 1 CCD Color
**KP-FD30**
Analog RGB, Y/C, 1/2" CCD
**KP-FD30M**
Frame Memory, 60 f/s
**KP-FD30CL**
CameraLink, 60 f/s
**KP-FD32F**
IEEE 1394.b, VGA, 60 f/s
**KP-F120C**
Megapixel CameraLink
**KP-FD140F**
IEEE 1394.b. SXGA, 15 f/s

### 3 CCD Color
**HV-F22F**
IEEE 1394, SXGA, 7.5 f/s
**HV-F22CL**
CameraLink, 15 f/s
**HV-F31F**
IEEE 1394, XGA, 15 f/s
**HV-F31CL**
CameraLink, 30 f/s

## OEM Board Cameras

**BE-101B** 1/2" CCD
**BE-IR20** Near IR, Ext Sync, 1/2"
**BE-IR21** Near IR, 1/2" CCD
**BE-301B** 1/3" CCD
**BE-IR30** Near IR, Ext Sync, 1/3"
**BE-IR31** Near IR, 1/3" CCD
**BE-D20** 1/3" color board camera

## Interlace
Monochrome Color

**KP-M1AN**
2/3" CCD, Compact Camera
**KP-MB1AN**
Remote Head, 2/3" CCD
**KP-MC1AN**
Side View, 2/3" CCD
**KP-M2AN**
1/2" CCD, Compact Camera
**KP-MC2AN**
Side View, 1/2" CCD
**KP-M2RN**
Near IR, 1/2" CCD
**KP-M20**
Ultra Compact, 1/2" CCD
**KP-M3AN**
1/3" CCD Compact Camera
**KP-M3RN**
Near IR, 1/3" CCD
**KP-M30**
Ultra Compact, 1/3" CCD

**HIGH SENSITIVITY**
**KP-E500**
EM CCD, Ultra High Sensitivity

### 1 CCD Color
**KP-D20A**
1/3" CCD, Y/C Out
**KP-D20B**
1/2" CCD, Y/C Out
**KP-FD30**
RGB, YC Out

**HIGH SENSITIVITY**
**KP-D531**
High Sensitivity, D/N Mode
**KP-D590**
High Sensitivity, Y/C out
**KP-D591**
High Sensitivity
**KP-DE500**
EM CCD, Ultra High Sensitivity

### 3 CCD Color
**HV-D27A**
Remote Head, 1/2' CCD
**HV-D37A**
Remote Head, 1/3" CCD
**HV-D30**
Component Out, 1/3" CCD

**HITACHI**
Imaging, Vision, Security



For More Information Please Call Aegis Electronic Group, Inc. * (888) 687-6877 Phone * aegisg2@aegiselect.com * http://www.aegis-elec.com

# Monochrome Interlace Scan
# KP-M1A, KP-M2A, KP-M3A Series


## KP-M1A, M2A, M3A

- **Compact and Lightweight**
- **Choice of Image Format: 2/3", 1/2", 1/3"**
- **Choice of Camera Body Design**
- **High Resolution**
- **High Sensitivity**
- **Multiple Step Electronic Shutter**
- **Internal or External Sync Modes**
- **Field or Frame Integration Modes**
- **Field-on-Demand Mode**

## Specifications

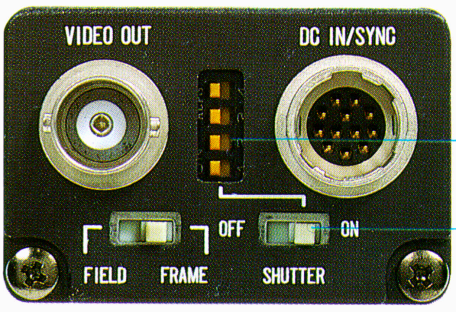
| | KP-M1A | KP-M2A | KP-M3A |
|---|---|---|---|
| Imager: | 2/3" | 1/2" | 1/3" |
| | Interline transfer CCD | | |
| Pixels: | 768x494 | 768x494 | 768x494 |
| Cell Size: | 11.64x13.5 | 8.4x9.8 | 6.35x7.4 |
| Resolution: | 570 TV lines | | |
| Std. Illum. | 400 lux at F8.0 | | |
| Min. Illum. | 0.3 lux at f1.4 | | |
| S/N: | 56 db | | |
| Gamma: | 0.45 or 1.0 selectable | | |
| Integration: | Field or Frame Selection | | |
| Trigger: | Field-on-Demand or Asynchronous Reset | | |
| Sync: | Internal / External | | |
| AGC: | On / Off | | |
| Shutter: | 1/60 - 1/10000 | | |
| Output: | RS-170 1.0 V p-p | | |
| Power: | 12 volts DC | | |
| Size: ( W x H x D ) | 44 x 29 x 72 mm | | |
| Weight: | 120 grams | | |
| Lens: | C - Mount | | |

The **KP-M** series of black and white cameras with their compact size and light weight, are ideal for machine vision and other industrial applications. Aluminum die castings provide for a rugged camera that is resistant to vibration. The use of high grade image sensors provide excellent resolution and sensitivity. Standard features include multiple step electronic shutter, field-on-demand, asynchronous re-set, and internal or external sync. For improved vertical resolution, the cameras offer the choice of field or frame integration. Switches are provided for gamma correction and AGC. All connections can be made through the use of the standard 12 pin Hirose connector, in addition a BNC connector is provided for video output. Additional versions of the camera include, the **KP-MC1A** (side view), and the **KP-MB1A** (compact head separated type). The field-on-demand feature found on the **KP-M1A, KP-M2A and KP-M3A**, allows an image to be output immediately after a trigger pulse. All versions are available in EIA or CCIR formats.




The **KP-MB series** offers a compact head that can be separated up to 1 meter from the camera body.

The **KP-MC series** has the imager rotated by 90 degrees from normal to allow mounting where front to back depth is critical.


**KP-M Series Rear Panel**

### Frame Grabbers:

For interface of the camera to a particular frame grabber, contact the local Hitachi representative.

# Ultra Compact Monochrome Interlace Scan
# KP-M20 / KP-M30


The **KP-M20** and **KP-M30** are ultra compact monochrome cameras that feature high sensitivity, high resolution, and high performance. External switches permit easy selection of the various modes of operation for the cameras, while the ultra compact size enables use in situations where space is limited. A single 12 pin Hirose connector provides all camera input and output signals as well as power. An aluminum die cast body provides a solid and rugged platform with improved anti-vibration performance that is ideal for use in extreme conditions. Standard features include a multi step electronic shutter for imaging fast moving objects, field or frame integration for improved sensitivity or vertical resolution, and a selectable gain mode for improved sensitivity in low light.

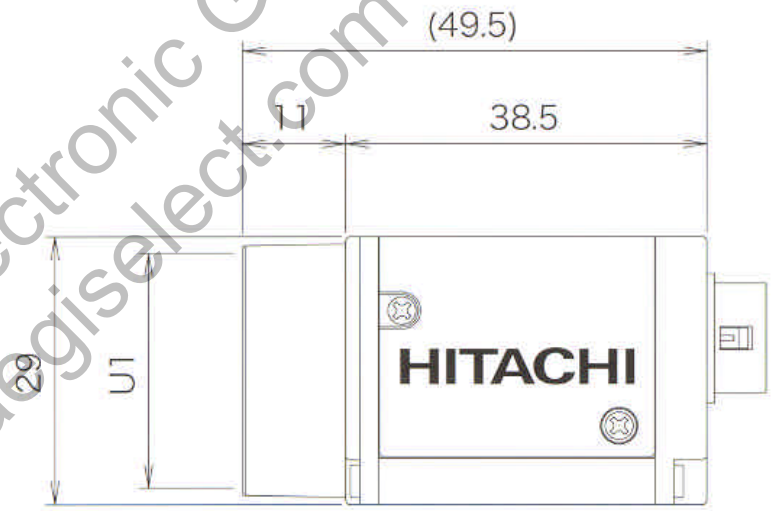
## KP-M20, KP-M30

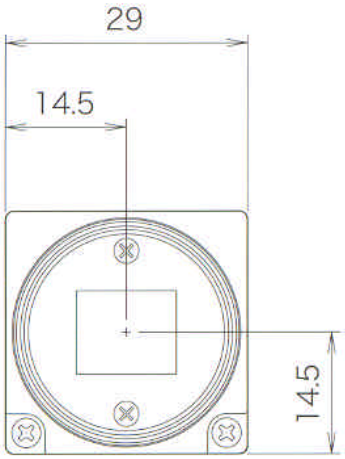
- **Ultra Compact and Lightweight**
- **Choice of 1/2" or 1/3" Format CCD**
- **High Resolution**
- **High Sensitivity**
- **Multi-step Electronic Shutter**
- **Internal or External Sync Modes**
- **Frame or Field Integration Modes**
- **External Mode Selection Switches**
- **Single Cable Connection**

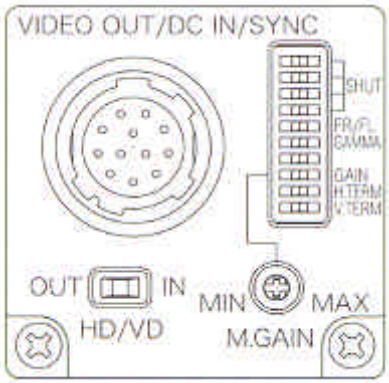
## Specifications

| | KP-M20 | KP-M30 |
|---|---|---|
| Imager: | 1/2" | 1/3" |
| | Interline transfer CCD | |
| Pixels: | 768x494 | 768x494 |
| Cell Size: | 8.4 x 9.8 | 6.35 x 7.4 |
| Resolution: | 570 TV lines | |
| Min. Illum. | 0.3 lux at f1.4 | |
| S/N: | 60 db | |
| Gamma: | 0.45 or 1.0 selectable | |
| Integration: | Field or Frame selectable | |
| Sync: | Internal or External | |
| | Auto selection | |
| Gain: | AGC / Manual / Fixed | |
| Shutter: | 1/60 - 1/10000 | |
| Output: | RS-170 1.0 V p-p | |
| Power: | 12 volts DC | |
| Size: ( W x H x D ) | 29 x 29 x 38.5 mm | |
| Weight: | 55 grams | |
| Lens: | C - Mount | |

## Dimensions and Rear View




**DIP Switch Selection**

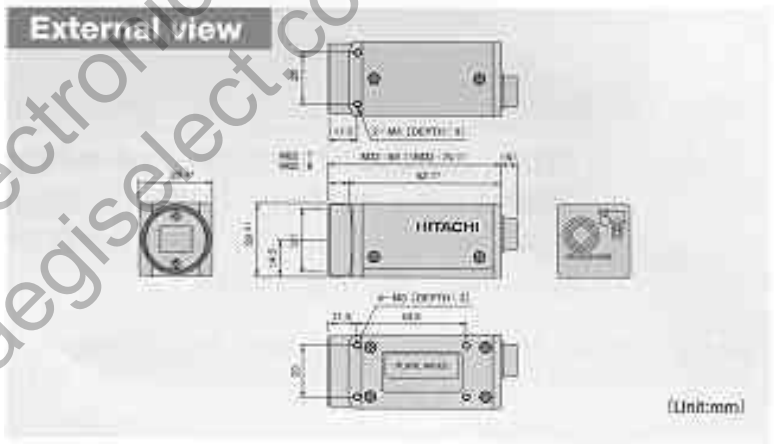
1 ~ 4 : Select the shutter speed.
5 : Select the frame or field integration
6 : Select γ correction ON / OFF
7 : NC
8 : Select the gain
9 : HD 75 Ω terminal select switch.
0 : VD 75 Ω terminal select switch.

# Monochrome Interlace Scan
# KP-M22 / KP-M32


The **KP-M22** and **KP-M32** are compact monochrome cameras that feature high sensitivity, high resolution, and high performance. Similar in performance and capabilities to the **KP-M1A**, **KP-M2A**, and **KP-M3A** series of cameras, the **KP-M22** and **KP-M32** feature a 29mm square body for use in applications where space is limited. A single 12 pin Hirose connector provides all camera input and output signals as well as power. An aluminum die cast body provides a solid and rugged platform with improved anti-vibration performance that is ideal for use in extreme conditions. Standard features include a multi step electronic shutter for imaging fast moving objects, field or frame integration for improved sensitivity or vertical resolution, and a field-on-demand mode ideal for capturing images at a desired timing.

## KP-M22, KP-M32

- **Compact and Lightweight**
- **Choice of 1/2" or 1/3" Format CCD**
- **High Resolution**
- **High Sensitivity**
- **Multi-step Electronic Shutter**
- **Internal or External Sync Modes**
- **Frame or Field Integration Modes**
- **Field-on-Demand Mode**
- **Single Cable Connection**

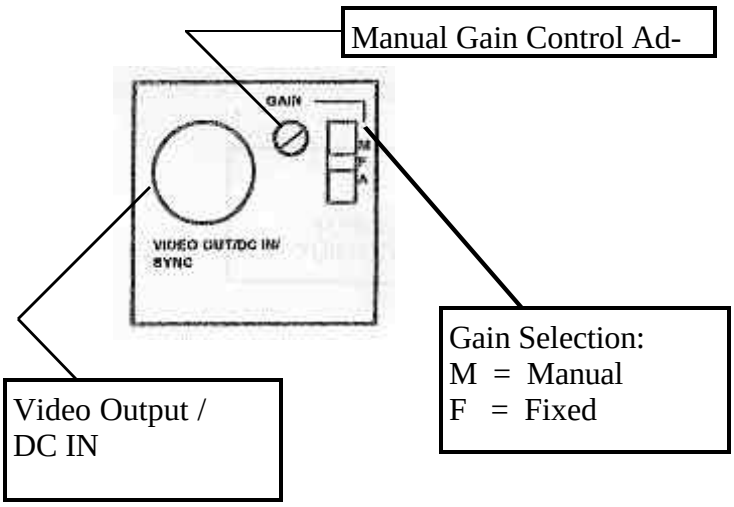





## Specifications

| | KP-M22 | KP-M32 |
|---|---|---|
| Imager: | 1/2" | 1/3" |
| | Interline transfer CCD | |
| Pixels: | 768x494 | 768x494 |
| Cell Size: | 8.4 x 9.8 | 6.35 x 7.4 |
| Resolution: | 570 TV lines | |
| Min. Illum. | 0.3 lux at f1.4 | |
| S/N: | 56 db | |
| Gamma: | 0.45 or 1.0 selectable | |
| Integration: | Field or Frame selectable | |
| Sync: | Internal or External | |
| | Auto selection | |
| Trigger: | Field-on-Demand | |
| Gain: | AGC / Manual / Fixed | |
| Shutter: | 1/60 - 1/10000 | |
| Output: | RS-170 1.0 V p-p | |
| Power: | 12 volts DC | |
| Size: ( W x H x D ) | 29 x 29 x 62 mm | |
| Weight: | 100 grams | |
| Lens: | C - Mount | |

**KP-M22 / KP-M32 Rear**



# Near Infrared Camera
# KP-M2R, KP-M3R

## Near Infared Camera
## KP-M2R, KP-M3R

- **Near IR Sensitivity Above 900 nm**
- **Peak Sensitivity at 510 nm**
- **Compact Rugged Design**
- **High Resolution**
- **Multiple Step Electronic Shutter**
- **Internal or External Sync Modes**
- **Frame or Field Integration**
- **Field-on-Demand Mode**

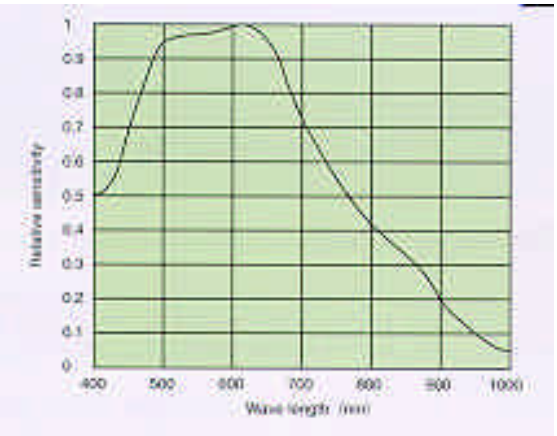
The **KP-M2R** is 1/2 inch CCD monochrome camera, while the **KP-M3R** is a 1/3 inch format CCD camera. Both are useful into the near infrared spectrum. Peak sensitivity of the camera occurs at 640 nanometers compared with a conventional camera whose peak sensitivity occurs at 510 nanometers. Useful sensitivity of the **KP-M2R and KP-M3R** extends above 900 nanometers, making it useful for applications ranging from microscopy to image processing systems. A high horizontal resolution of 570 TV lines and a S/N of 56 db provide detailed images with low noise, in a compact rugged package. Standard features include a multiple step electronic shutter, internal or external synchronization, field or frame integration mode, and a field-on-demand function. Using the field-on-demand feature the timing and length of an exposure can be accurately controlled. The field-on-demand can function in the one trigger, two trigger, fixed shutter, and external shutter modes of operation, allowing easy integration into machine vision systems.

## Specifications

| | KP-M2R | KP-M3R |
|---|---|---|
| Imager: | Interline transfer CCD | |
| Sensing Area: | 6.45 x 4.84 mm | 4.8 x 3.6 mm |
| Pixels: | 768x494 | 768 x 494 |
| Cell Size: | 8.4 x 9.8 | 6.35 x 7.4 |
| Resolution: | 570 TV lines | |
| Sensitivity: | 200Lux f4.0 3200K | |
| Min. Illum. | 0.3 lux at f1.4 | |
| S/N: | 56 db | |
| Gamma: | 0.45 or 1.0 selectable | |
| Integration: | Field or Frame Selection | |
| AGC: | On / Off | |
| Shutter: | 1/60 - 1/10000 | |
| Sync: | Internal / External HD / VD drive | |
| Output: | RS-170 1.0 V p-p | |
| Power: | 12 volts DC 180ma | |
| Size: ( W x H x D ) | 44 x 29 x 72 mm | |
| Weight: | 120 grams | |
| Lens: | C - Mount | |

## KP-M2R, KP-M3R Spectral Response

The graph below shows the relative spectral response characteristics of the **KP-M2R, and KP-M3R.** The vertical axis indicates relative sensitivity, while the horizontal axis indicates wavelength in nanometers.

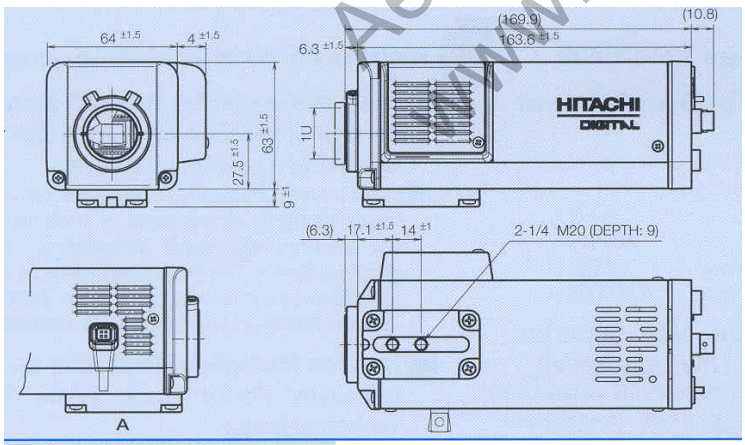


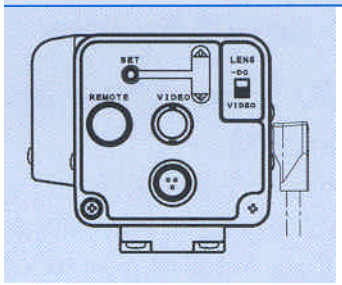
# Ultra High Sensitivity Camera
# KP-E500


Designed for use in extremely low light levels the **KP-E500** high sensitivity camera was designed using a EM-CCD that eliminates the problems that are inherent with Image Intensifier Tubes, such as lag an burn-in. The EM (electron multiplying) CCD allows the camera to operate in a full motion mode at light levels down to 0.0003 lux. For even greater sensitivity, the camera features an accumulation mode of operation, where the CCD can accumulate charge for up to 64 times normal, allowing operation in light levels as low as 0.000005 lux. A built in memory permits continuous image output, even in the accumulation mode of operation. To improve picture quality in low light levels, thermoelectric cooling is used on the CCD to reduce the effects of dark current, while a selectable DNR (digital noise reduction) circuit is used to reduce repetitive noise on a line by line basis. Features include manual or Electronic Shutter modes, and adjustments for image quality. An output for an auto iris lens is provided. An on-screen menu system permits easy adjustment of all camera settings, and a RS-232 remote is provided for remote control.

## Ultra High Sensitivity
## KP-E500

- **High Sensitivity EM-CCD**
- **0.0003 lux Sensitivity with Full Motion**
- **0.000005 lux Sensitivity in Still Mode**
- **Extended Integration Time of 2 to 64 Times**
- **Thermoelectric Cooling for the CCD**
- **Digital Noise Reduction DNR**
- **Auto Electronic Shutter (AES)**
- **On Screen Menu System**
- **RS-232C Remote Control for all Functions**




### Specifications

| | |
|---|---|
| Imager: | 1/2 inch EM-CCD |
| Pixels: | 658 x 489 |
| Cell Size: | 10 x 10 |
| Resolution: | 480 TV lines |
| Illum. Range: | 0.00015 - 100,000 lux at f1.4 |
| Color Full Motion: | 0.0003 lux |
| Color Accumulation Mode: | 0.000005 lux |
| S/N: | 50 db |
| Backlight Correction: | Auto / Manual |
| Integration: | Selectable up to 64 times |
| Gain: | Manual / AGC |
| Shutter: | 1/60 - 1/2000 or AES |
| Noise Reduction: | On, Auto/Manual, Off |
| Character Gen: | 22 alphanumeric |
| Signal Process: | 10 bit DSP |
| Power: | 12 volts DC |
| Output: | VBS |
| Size: (W x H x D) | 78 x 63 x 170 mm |
| Weight: | 610 grams |
| Lens: | C / CS mount |

# Near Infrared Camera
# KP-F2A


## Near Infared Progressive Scan Camera KP-F2A

- **Peak Sensitivity of 760 nm**
- **Useable Sensitivity Above 1000 nm**
- **30 Frames per Second KP-F2A**
- **High Resolution**
- **Internal or External Sync Mode**
- **Fixed Gain or AGC**
- **Multiple Step Electronic Shutter**
- **Frame-on-Demand**

The **KP-F2A** features a 1/3 inch progressive scan microlens IT CCD that has a spectral response that extends into the near infared region. Peak sensitivity occurs at approximately 760 nanometers, while useful sensitivity extends above 1000 nanometers. The use of progressive scanning provides improved vertical resolution and reduces horizontal smear in moving objects. The use of square pixels can reduce processing time in vision systems. Designed for use in the medical, microscope, and machine vision markets, the **KP-F2A** extends the range of imaging into the near IR region. A multiple step electronic shutter with a range up 1/10,000 second can be selected to "stop action" on moving objects. With the field-on-demand function, the start of an exposure and the length of the exposure can be accurately controlled. The video is immediately output at the end of the exposure. The **KP-F2A** has a single progressive scan output at 30fps.

The **KP-F2B** has been discontinued.

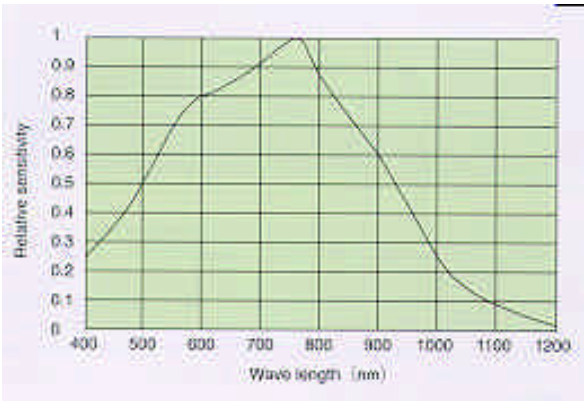


## Specifications

| | |
|---|---|
| Imager: | 1/3 inch Frame Transfer CCD |
| Pixels: | 658 x 496 |
| Cell Size: | 7.4 x 7.4 |
| Resolution: | 500 TV lines Horizontal |
| | 485 TV lines Vertical |
| Sensitivity: | 30 lux f4.0 3200 K |
| Min. Illum: | 0.3lux at f1.4 |
| S/N: | 50 db |
| Gain: | Fixed or AGC |
| Sync: | Internal or External |
| Gamma: | 0.45 or 1.0 Selectable |
| Shutter: | 1/30 - 1/10,000 second |
| Trigger: | Field-on-Demand |
| Output: | Single 30 fps 1.0 Vp-p |
| Power: | 12 Volts DC |
| Size: ( W x H x D ) | 44 x 44 x 110 mm |
| Weight: | 200 grams |
| Lens: | C-Mount |

## KP-F2A
## Spectral Response

The graph below shows the relative spectral response characteristics of the **KP-F2.** The vertical axis indicates relative sensitivity, while the horizontal axis indicates wavelength in nanometers.



# Ultra Compact Analog Progressive Scan KP-F30


## 1/3 Inch Ultra Compact Progressive Scan Camera KP-F30

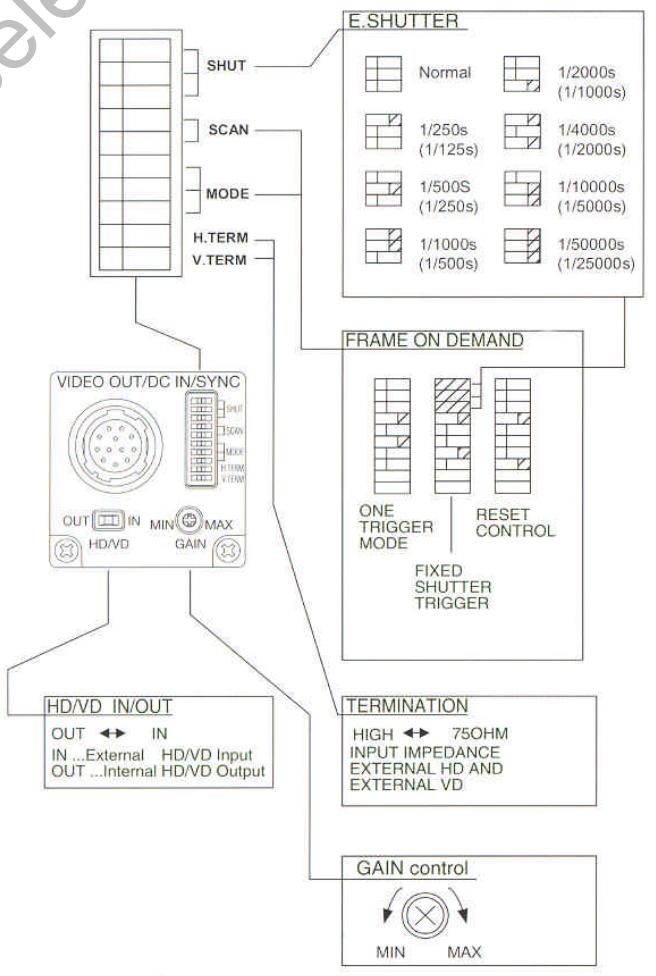
- **Ultra Compact Rugged Design**
- **Single Output Connection**
- **Dual Speed 60 Frames / Second**
- **Multiple Step Electronic Shutter**
- **Internal or External Sync Modes**
- **Fixed / Manual / Auto Gain Mode**
- **Frame-on-Demand Mode**
- **External Mode Selection Switches**

## Specifications

| | |
|---|---|
| Imager: | 1/3 inch Interline type Progressive Scan CCD |
| Pixels: | 659 x 494 |
| Cell Size: | 7.4 x 7.4 |
| Aspect Ratio: | 4 : 3 |
| Scan Mode: | Progressive |
| Resolution: | 500 TV lines |
| Min. Illum: | 0.7 lux at f1.4 |
| S / N: | 50 db |
| Gamma: | 1.0 |
| Gain: | Manual, Fixed, or AGC |
| Shutter: | 8 steps 1/30 - 1/50000 |
| Sync: | Internal / External |
| Trigger: | Frame-on-Demand 3 modes One Trigger, Fixed Shutter, Reset Control |
| Output: | 60 F/s 1.0 Volts p-p |
| Power: | 12 volts DC 2.4 watts |
| Size: (W x H x D) | 29 x 29 x 38.5 mm |
| Weight: | 55 grams |
| Lens: | C-Mount |

Designed for use in factory automation and industrial vision systems, the **KP-F30** features an ultra compact size, square pixels, and progressive scan to provide high vertical resolution of moving objects. Featuring a single output connection, the **KP-F30** can operate at 60 frames per second, with 500 lines of horizontal resolution. Standard features include external switch selection for all modes of operation, with an eight step electronic shutter featuring a maximum speed of 1/50,000 second, internal or external sync modes, and fixed, manual or automatic gain control. A frame-on-demand function is available for capturing moving objects at a desired timing. In the one trigger mode of operation, the rising edge of the trigger pulse starts the exposure, the durration of the trigger pulse controls the integration time, and the falling edge of the trigger pulse resets vertical sync and delivers the triggered image. The camera can also be operated in a fixed shutter mode or a reset control mode.

### Arrangement of Switches



# Ultra Compact Progressive Scan KP-F30SCL


## 1/3 Inch Ultra Compact Progressive Scan Camera KP-F30SCL

- **Ultra Compact Rugged Design**
- **Small CameraLink Output Connection**
- **Dual Speed 60 Frames / Second**
- **Multiple Step Electronic Shutter**
- **Internal or External Sync Modes**
- **Fixed / Manual / Auto Gain Mode**
- **Frame-on-Demand Mode**
- **External Mode Selection Switches**

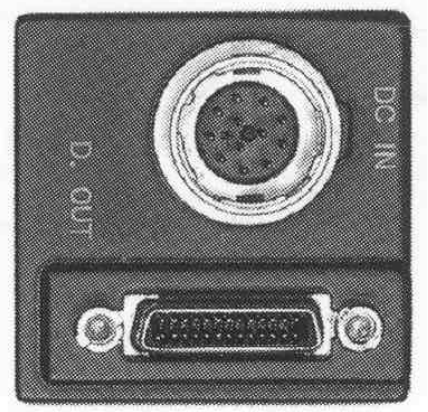
Designed for use in factory automation and industrial vision systems, the **KP-F30SCL** features an ultra compact size, square pixels, and progressive scan to provide high vertical resolution of moving objects. Featuring a CameraLink output using a small connector, the **KP-F30SCL** can operate at 60 frames per second, with 500 lines of horizontal resolution. Standard features include external switch selection for all modes of operation, with an eight step electronic shutter featuring a maximum speed of 1/50,000 second, internal or external sync modes, and fixed, manual or automatic gain control. A frame-on-demand function is available for capturing moving objects at a desired timing. In the one trigger mode of operation, the rising edge of the trigger pulse starts the exposure, the durration of the trigger pulse controls the integration time, and the falling edge of the trigger pulse resets vertical sync and delivers the triggered image. The camera can also be operated in a fixed shutter mode or a reset control mode.



## Specifications

| | |
|---|---|
| Imager: | 1/3 inch Interline type Progressive Scan CCD |
| Pixels: | 659 x 494 |
| Cell Size: | 7.4 x 7.4 |
| Aspect Ratio: | 4 : 3 |
| Scan Mode: | Progressive |
| Resolution: | 500 TV lines |
| Min. Illum: | 0.7 lux at f1.4 |
| S / N: | 50 db |
| Gamma: | 1.0 |
| Gain: | Manual, Fixed, or AGC |
| Shutter: | 8 steps 1/30 - 1/50000 |
| Sync: | Internal / External |
| Trigger: | Frame-on-Demand 3 modes One Trigger, Fixed Shutter, Reset Control |
| Output: | CameraLink (Small Connector) |
| Power: | 12 volts DC 2.4 watts |
| Size: (W x H x D) | 29 x 29 x 38.5 mm |
| Weight: | 55 grams |
| Lens: | C-Mount |

KP-F30SCL with Mini-CameraLink



# Compact VGA Progressive Scan KP-F32F

**IEEE-1394.b**
***Firewire® 800***


## 1/2 Inch Compact VGA Progressive Scan Camera KP-F32F

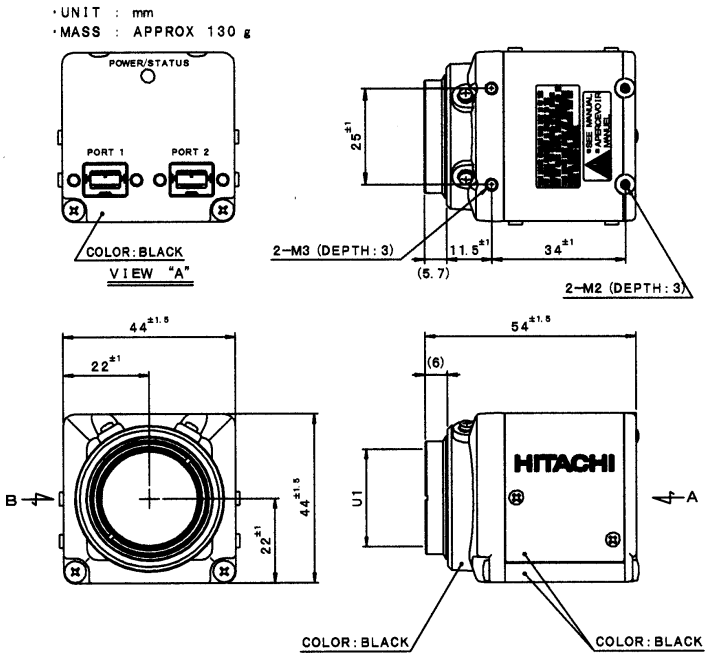
- **Compact Rugged Design**
- **IEEE-1304.b (Firewire 800 ) Output 2 Ports**
- **Dual Speed 60 Frames / Second**
- **VGA 640 x 480 Resolution**
- **Multiple Step Electronic Shutter**
- **Fixed / Manual / Auto Gain Mode**
- **Frame-on-Demand Mode**

Designed for use in factory automation and industrial vision systems, the **KP-F32F** features a compact size, square pixels, and progressive scan to provide high vertical resolution of moving objects. Featuring a IEEE-1394.b output the **KP-F32F** can operate at 60 frames per second, with VGA resolution of 640 x 480 pixels. Two IEEE-1394.b output ports are provided on the rear of the camera allowing loop through to another camera. The camera is compliant with Digital Camera Specification IIDC1394 Ver,1.31, and can operate at 800 / 400 / 200 Mbps, with an image format of Mono 8 or Mono 16. Standard features include an eight step electronic shutter featuring a maximum speed of 1/100,000 second, selectable gamma with LUT (look up table) and fixed, manual or automatic gain control. A frame-on-demand function is available for capturing moving objects at a desired timing. In the one trigger mode of operation, the rising edge of the trigger pulse starts the exposure, the durration of the trigger pulse controls the integration time, and the falling edge of the trigger pulse resets vertical sync and delivers the triggered image. The camera can also be operated in a fixed shutter mode or a reset control mode.



## Specifications

| | |
|---|---|
| Imager: | 1/2 inch Interline type Progressive Scan CCD |
| Pixels: | 659 x 494 |
| Cell Size: | 9.9 x 9.9 |
| Aspect Ratio: | 4 : 3 |
| Scan Mode: | Progressive |
| Resolution: | VGA 640 x 480 |
| Min. Illum: | 10 lux at f1.4 |
| Gamma: | 1.0 or LUT |
| Gain: | Manual, Fixed, or AGC |
| Shutter: | 8 steps 1/60 - 1/100000 |
| Trigger: | Frame-on-Demand 3 modes One Trigger, Fixed Shutter, Reset Control |
| Output: | IEEE-1394.b (Firewire 800) IIDC1394 Ver,1.31 800 / 400 / 200 Mbps |
| Image Format: | Mono 8 / Mono 16 |
| Power: | 12 volts DC 3.5 watts |
| Size: (W x H x D) | 44 x 44 x 54 mm |
| Weight: | 130 grams |
| Lens: | C-Mount |



# Ultra Compact Analog Progressive Scan KP-F33


## 1/3 Inch Ultra Compact Progressive Scan Camera KP-F33

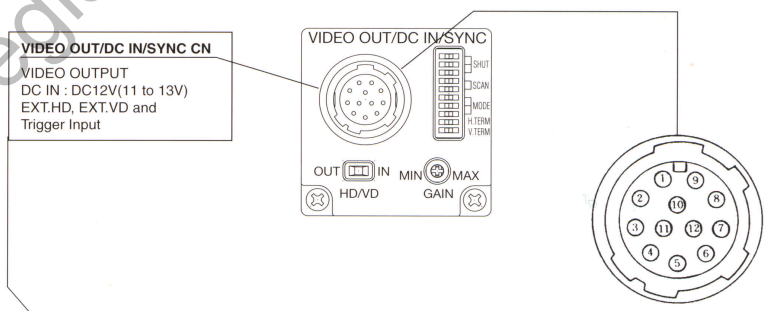
- **Ultra Compact Rugged Design**
- **Single Output Connection**
- **30 Frames / Second**
- **Multiple Step Electronic Shutter**
- **Internal or External Sync Modes**
- **Fixed / Manual / Auto Gain Mode**
- **Frame-on-Demand Mode**
- **External Mode Selection Switches**

## Specifications

Imager: 1/3 inch Interline type Progressive Scan CCD
Pixels: 659 x 494
Cell Size: 7.4 x 7.4
Aspect Ratio: 4 : 3
Scan Mode: Progressive
Resolution: 500 TV lines
Min. Illum: 0.7 lux at f1.4
S / N: 50 db
Gamma: 1.0
Gain: Manual, Fixed, or AGC
Shutter: 8 steps 1/30 - 1/50000
Sync: Internal / External
Trigger: Frame-on-Demand 3 modes One Trigger, Fixed Shutter, Reset Control
Output: 30 F/s 1.0 Volts p-p
Power: 12 volts DC 2.4 watts
Size: (W x H x D) 29 x 29 x 38.5 mm
Weight: 55 grams
Lens: C-Mount

Designed for use in factory automation and industrial vision systems, the **KP-F33** features an ultra compact size, square pixels, and progressive scan to provide high vertical resolution of moving objects. Featuring a single output connection, the **KP-F33** operates at 30 frames per second, with 500 lines of horizontal resolution. Standard features include external switch selection for all modes of operation, with an eight step electronic shutter featuring a maximum speed of 1/50,000 second, internal or external sync modes, and fixed, manual or automatic gain control. A frame-on-demand function is available for capturing moving objects at a desired timing. In the one trigger mode of operation, the rising edge of the trigger pulse starts the exposure, the durration of the trigger pulse controls the integration time, and the falling edge of the trigger pulse resets vertical sync and delivers the triggered image. The camera can also be operated in a fixed shutter mode or a reset control mode.

### VIDEO OUT/DC IN/SYNC connector




| Pin No. | Internal sync mode | External sync mode | | | | |
|---|---|---|---|---|---|---|
| | | External HD/VD | Frame on demand | | | |
| | | | ONE Trigger | Fixed shutter | Reset control | Partial(optionally) |
| 1 | GND | GND | GND | GND | GND | GND |
| 2 | 12VDC | 12VDC | 12VDC | 12VDC | 12VDC | 12VDC |
| 3 | GND (Pin 4) | GND (Pin 4) | GND (Pin 4) | GND (Pin 4) | GND (Pin 4) | GND (Pin 4) |
| 4 | Video out | Video out | Video out | Video out | Video out | Video out |
| 5 | GND (Pin 6) | GND (Pin 6) | GND (Pin 6) | GND (Pin 6) | GND (Pin 6) | GND (Pin 6) |
| 6 | - | HD IN/OUT | HD IN/OUT | HD IN/OUT | HD IN/OUT | HD IN/OUT |
| 7 | - | VD IN/OUT | Trigger IN | Trigger IN | Trig/VD IN | Trigger IN |
| 8 | GND (Pin 9) | GND (Pin 9) | GND (Pin 9) | GND (Pin 9) | GND (Pin 9) | GND (Pin 9) |
| 9 | NC | NC | NC | NC | NC | NC |
| 10 | GND (Pin 7) | GND (Pin 7) | GND (Pin 7) | GND (Pin 7) | GND (Pin 7) | GND (Pin 7) |
| 11 | - | - | - | - | Trigger B IN | - |
| 12 | GND (Pin 11) | GND (Pin 11) | GND (Pin 11) | GND (Pin 11) | GND (Pin 11) | GND (Pin 11) |

# Ultra Compact Analog Progressive Scan KP-F37


## 1/3 Inch Ultra Compact Progressive Scan Camera KP-F37

- **Ultra Compact Rugged Design**
- **Single Output Connection**
- **70 Frames / Second**
- **Multiple Step Electronic Shutter**
- **Internal or External Sync Modes**
- **Fixed / Manual / Auto Gain Mode**
- **Frame-on-Demand Mode**
- **External Mode Selection Switches**

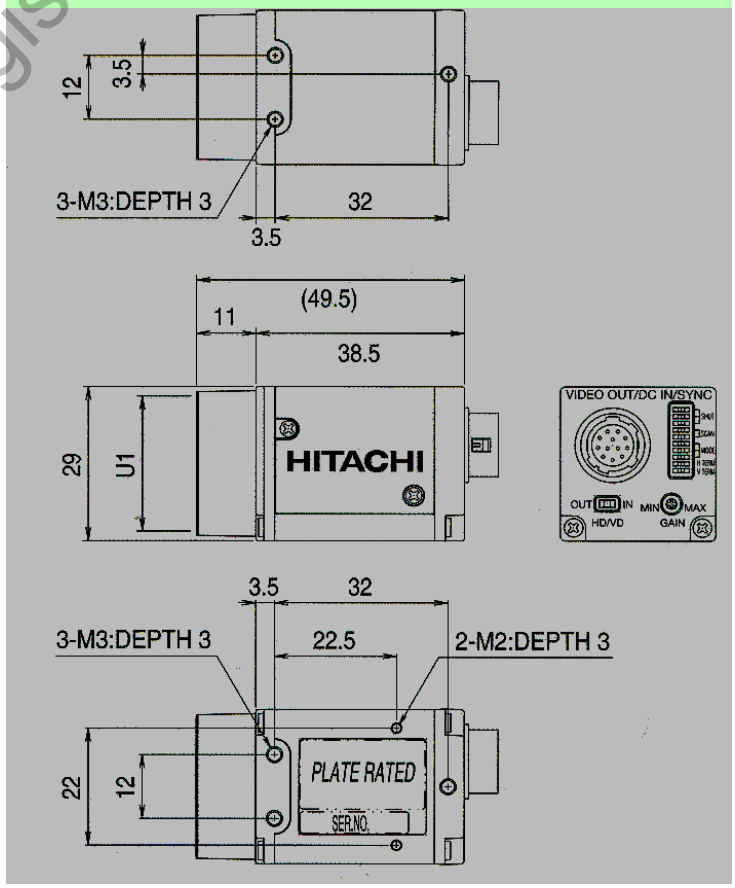
## Specifications

| | |
|---|---|
| Imager: | 1/3 inch Interline type Progressive Scan CCD |
| Pixels: | 659 x 494 |
| Cell Size: | 7.4 x 7.4 |
| Aspect Ratio: | 4 : 3 |
| Scan Mode: | Progressive |
| Resolution: | 500 TV lines |
| Min. Illum: | 1.0 lux at f1.4 |
| S / N: | 50 db |
| Gamma: | 1.0 |
| Gain: | Manual, Fixed, or AGC |
| Shutter: | 8 steps 1/70 - 1/58000 |
| Sync: | Internal / External |
| Trigger: | Frame-on-Demand 3 modes One Trigger, Fixed Shutter, Reset Control |
| Output: | 70 F/s 1.0 Volts p-p |
| Power: | 12 volts DC 2.4 watts |
| Size: (W x H x D) | 29 x 29 x 38.5 mm |
| Weight: | 55 grams |
| Lens: | C-Mount |

Designed for use in factory automation and industrial vision systems, the **KP-F37** features an ultra compact size, square pixels, and progressive scan to provide high vertical resolution of moving objects. Featuring a single output connection, the **KP-F37** operates at 70 frames per second, with 500 lines of horizontal resolution. Standard features include external switch selection for all modes of operation, with an eight step electronic shutter featuring a maximum speed of 1/58,000 second, internal or external sync modes, and fixed, manual or automatic gain control. A frame-on-demand function is available for capturing moving objects at a desired timing. In the one trigger mode of operation, the rising edge of the trigger pulse starts the exposure, the durration of the trigger pulse controls the integration time, and the falling edge of the trigger pulse resets vertical sync and delivers the triggered image. The camera can also be operated in a fixed shutter mode or a reset control mode.



## Dimensions



# Ultra Compact Analog Progressive Scan KP-F38


## 1/3 Inch Ultra Compact Progressive Scan Camera KP-F38

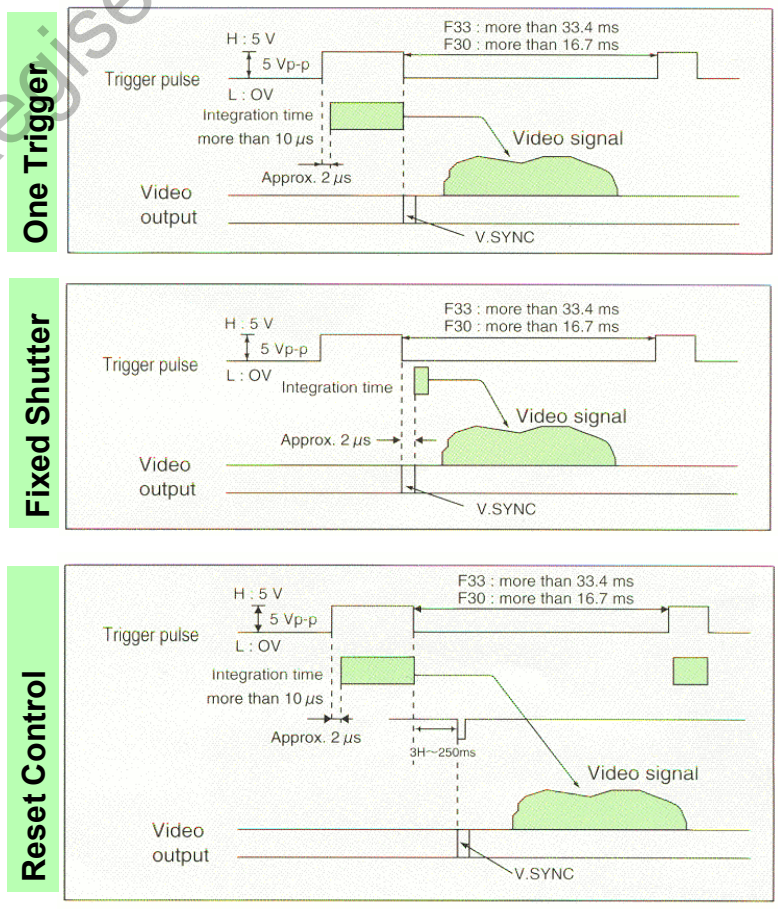
- **Ultra Compact Rugged Design**
- **Single Output Connection**
- **80 Frames / Second**
- **Multiple Step Electronic Shutter**
- **Internal or External Sync Modes**
- **Fixed / Manual / Auto Gain Mode**
- **Frame-on-Demand Mode**
- **External Mode Selection Switches**

## Specifications

| | |
|---|---|
| Imager: | 1/3 inch Interline type Progressive Scan CCD |
| Pixels: | 659 x 494 |
| Cell Size: | 7.4 x 7.4 |
| Aspect Ratio: | 4 : 3 |
| Scan Mode: | Progressive |
| Resolution: | 500 TV lines |
| Min. Illum: | 1.0 lux at f1.4 |
| S / N: | 50 db |
| Gamma: | 1.0 |
| Gain: | Manual, Fixed, or AGC |
| Shutter: | 8 steps 1/80 - 1/66000 |
| Sync: | Internal / External |
| Trigger: | Frame-on-Demand 3 modes One Trigger, Fixed Shutter, Reset Control |
| Output: | 80 F/s 1.0 Volts p-p |
| Power: | 12 volts DC 2.4 watts |
| Size: (W x H x D) | 29 x 29 x 38.5 mm |
| Weight: | 55 grams |
| Lens: | C-Mount |

Designed for use in factory automation and industrial vision systems, the **KP-F38** features an ultra compact size, square pixels, and progressive scan to provide high vertical resolution of moving objects. Featuring a single output connection, the **KP-F38** operates at 80 frames per second, with 500 lines of horizontal resolution. Standard features include external switch selection for all modes of operation, with an eight step electronic shutter featuring a maximum speed of 1/66,000 second, internal or external sync modes, and fixed, manual or automatic gain control. A frame-on-demand function is available for capturing moving objects at a desired timing. In the one trigger mode of operation, the rising edge of the trigger pulse starts the exposure, the durration of the trigger pulse controls the integration time, and the falling edge of the trigger pulse resets vertical sync and delivers the triggered image. The camera can also be operated in a fixed shutter mode or a reset control mode.

### Frame-on-Demand Mode of Operation



# Ultra Compact High Resolution Analog Progressive Scan KP-F80

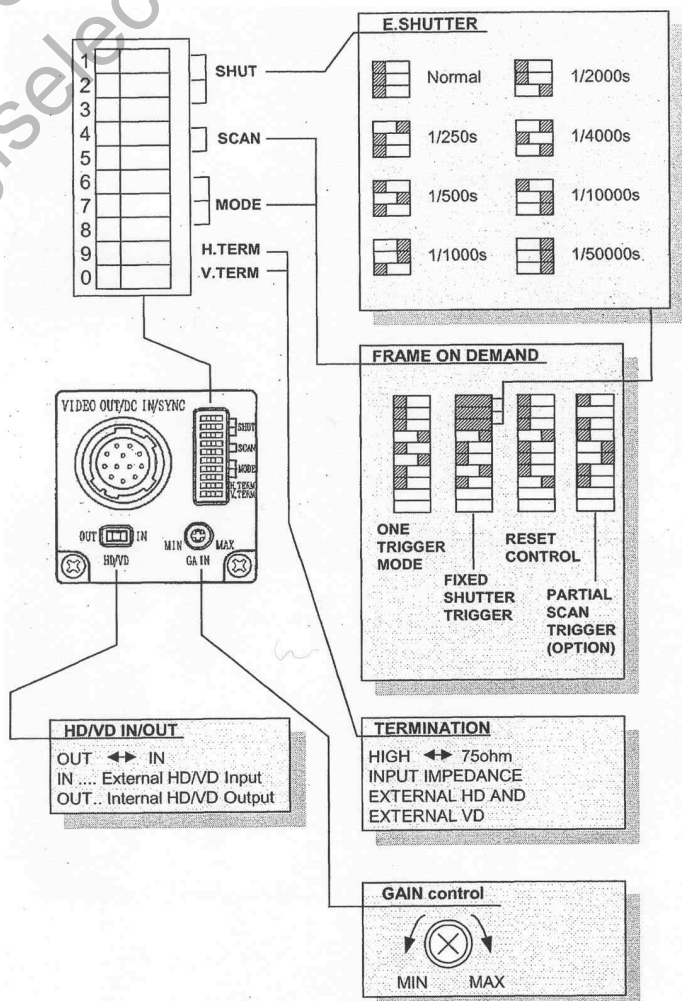

## 1/3 Inch High Resolution Progressive Scan Camera KP-F80

- **High Resolution 800 TV lines**
- **Ultra Compact Rugged Design**
- **30 Frames / Second**
- **Multiple Step Electronic Shutter**
- **Internal or External Sync Modes**
- **Fixed / Manual / Auto Gain Mode**
- **Frame-on-Demand Mode**
- **External Mode Selection Switches**

## Specifications

| | |
|---|---|
| Imager: | 1/3 inch Interline type Progressive Scan CCD |
| Pixels: | 1034 x 779 |
| Cell Size: | 4.65 x 4.65 |
| Aspect Ratio: | 4 : 3 |
| Scan Mode: | Progressive |
| Resolution: | 800 TV lines |
| Min. Illum: | 1.0 lux at f1.4 |
| S / N: | 54 db |
| Gamma: | 1.0 |
| Gain: | Manual, Fixed, or AGC |
| Shutter: | 8 steps 1/30 - 1/50000 |
| Sync: | Internal / External |
| Trigger: | Frame-on-Demand 3 modes One Trigger, Fixed Shutter, Reset Control |
| Output: | 30 F/s 1.0 Volts p-p |
| Power: | 12 volts DC 2.2 watts |
| Size: (W x H x D) | 29 x 29 x 38.5 mm |
| Weight: | 55 grams |
| Lens: | C-Mount |

Designed for use in factory automation and industrial vision systems, the **KP-F80** features high resolution in an ultra compact size, square pixels, and progressive scan to provide high vertical resolution of moving objects. Featuring a single output connection, the **KP-F80** operates at 30 frames per second, with 800 lines of horizontal resolution. Standard features include external switch selection for all modes of operation, with an eight step electronic shutter featuring a maximum speed of 1/50,000 second, internal or external sync modes, and fixed, manual or automatic gain control. A frame-on-demand function is available for capturing moving objects at a desired timing. In the one trigger mode of operation, the rising edge of the trigger pulse starts the exposure, the durration of the trigger pulse controls the integration time, and the falling edge of the trigger pulse resets vertical sync and delivers the triggered image. The camera can also be operated in a fixed shutter mode or a reset control mode.



# Compact XGA Progressive Scan KP-F83F

**IEEE-1394.b**
***Firewire® 800***


## 1/3 Inch Compact XGA Progressive Scan Camera KP-F83F

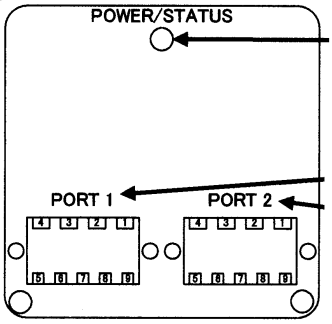
- **Compact Rugged Design**
- **IEEE-1304.b (Firewire 800 ) Output 2 Ports**
- **30 Frames / Second**
- **XGA 1024 x 768 Resolution**
- **Multiple Step Electronic Shutter**
- **Fixed / Manual / Auto Gain Mode**
- **Frame-on-Demand Mode**

## Specifications

Imager: 1/3 inch Interline type Progressive Scan CCD
Pixels: 1037 x 779
Cell Size: 4.65 x 4.65
Aspect Ratio: 4 : 3
Scan Mode: Progressive
Resolution: XGA 1024 x 768
Min. Illum: 5 lux at f1.4
Gamma: 1.0 or LUT
Gain: Manual, Fixed, or AGC
Shutter: 8 steps 1/60 - 1/100000
Trigger: Frame-on-Demand 3 modes
One Trigger, Fixed Shutter, Reset Control
Output: IEEE-1394.b (Firewire 800)
IIDC1394 Ver,1.31 800 / 400 / 200 Mbps
Image Format: Mono 8 / Mono 16
Power: 12 volts DC 3.2 watts
Size: (W x H x D) 44 x 44 x 54 mm
Weight: 130 grams
Lens: C-Mount

Designed for use in factory automation and industrial vision systems, the **KP-F83F** features a compact size, square pixels, and progressive scan to provide high vertical resolution of moving objects. Featuring a IEEE-1394.b output the **KP-F83F** can operate at 60 frames per second, with VGA resolution of 640 x 480 pixels. Two IEEE-1394.b output ports are provided on the rear of the camera allowing loop through to another camera. The camera is compliant with Digital Camera Specification IIDC1394 Ver,1.31, and can operate at 800 / 400 / 200 Mbps, with an image format of Mono 8 or Mono 16. Standard features include an eight step electronic shutter featuring a maximum speed of 1/100,000 second, selectable gamma with LUT (look up table) and fixed, manual or automatic gain control. A frame-on-demand function is available for capturing moving objects at a desired timing. In the one trigger mode of operation, the rising edge of the trigger pulse starts the exposure, the durration of the trigger pulse controls the integration time, and the falling edge of the trigger pulse resets vertical sync and delivers the triggered image. The camera can also be operated in a fixed shutter mode or a reset control mode. A CD ROM with the driver and viewer programs is provided with the camera.

REAR PANEL




LED status

| LED | Green | Yellow |
|---|---|---|
| Power ON | light on | light off |
| Transmission | blink off | blink on |
| Transmission pause | blink on | blink off |

②IEEE1394b connector
③IEEE1394b connector

Signal connection to IEEE 1394.b(PORT1/PORT2)

| | | |
|---|---|---|
| 1 | TPB− | SERIAL DATA |
| 2 | TPB+ | |
| 3 | TPA− | |
| 4 | TPA+ | |
| 5 | TPA(R) | SHIELD GND |
| 6 | VG | POWER GND |
| 7 | I/O | *Programmable I/O |
| 8 | VP | POWER +12V |
| 9 | TPB(R) | SHIELD GND |

Viewer Soft Setting(PORT1/PORT2)

| *Programmable I/O | In | Out |
|---|---|---|
| Trigger | O | O |
| VD | O | O |
| Strobe (Flash) | × | O |

# Mega Pixel Progressive Scan
# KP-F100B


## 2/3 Inch 1392 x 1040 Pixel, Digital Output KP-F100B

- **1.45 Million Pixels**
- **Progressive Scan with Square Pixels**
- **10 bit Single Channel Digital Output**
- **15 F/s normal, 60 F/s in 4 times accelerated mode**
- **RS-644 ( LVDS ) Digital Output**
- **Multiple Step Electronic Shutter**
- **Frame-on-Demand Mode**
- **Internal or External Sync Mode**
- **RS-232C Remote Control**

The **KP-F100B** is a monochrome high resolution progressive scan camera featuring an LVDS output with 10 bit digital video. A separate input is provided for RS-232C remote control. The trigger control lines, external drives and power use the standard 12 pin Hirose connector. Designed for machine vision and image processing systems, the camera is capable of producing 15 frames at full vertical resolution, or 60 frames per second in the 4 times accelerated mode of operation of progressively scanned video, from the 1.45 million pixel CCD array. Square pixels make for an easy interface with vision and measurement systems. A frame on demand function allows images captured by use of an external trigger to be output immediately. An analog and a LVDS output are provided. The LVDS digital output allows direct interface with image processing systems, eliminating the A/D converter in the image processor. A multi step electronic shutter along with external H and V drive inputs, provide for ease of use in systems applications.

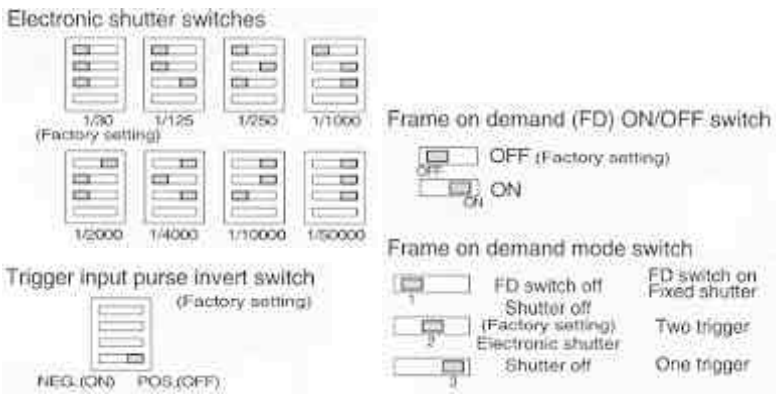
### Specifications

| | |
|---|---|
| Imager: | 2/3 inch Interline type Progressive Scan CCD |
| Pixels | 1392 x 1040 |
| Cell Size: | 6.45 x 6.45 |
| Aspect Ratio: | 4 : 3 |
| Sensitivity: | 400 lux at f4.0 3200K |
| S/N: | 50 db |
| Gamma: | 0.45 or 1.0 ( Analog Out ) |
| AGC: | On / Off ( Analog Out ) |
| Shutter: | 1/30 - 1/50000, eight steps |
| Sync: | Internal / External |
| Trigger: | Frame on Demand - 3 modes |
| Output: | Analog 1.0 V p-p 75 ohms<br>RS-644 ( LVDS ) output<br>10 bit single c. 20.2 MHz |
| Remote: | RS-232C |
| Power: | 12 volts DC 300 ma |
| Size: | ( W x H x D) 44 x 44 x78 mm |
| Weight: | 200 Grams |
| Lens: | C-Mount |

### Signal connections to D. OUT (26 pin)

| Pin No. | Signal | Pin No. | Signal | Pin No. | Signal |
|---|---|---|---|---|---|
| 1 | DATA0-H | 10 | DATA4-L | 19 | DATA9-H |
| 2 | DATA0-L | 11 | DATA5-H | 20 | DATA9-L |
| 3 | DATA1-H | 12 | DATA5-L | 21 | VD-H |
| 4 | DATA1-L | 13 | DATA6-H | 22 | VD-L |
| 5 | DATA2-H | 14 | DATA6-L | 23 | HD-H |
| 6 | DATA2-L | 15 | DATA7-H | 24 | HD-L |
| 7 | DATA3-H | 16 | DATA7-L | 25 | CLK-H |
| 8 | DATA3-L | 17 | DATA8-H | 26 | CLK-L |
| 9 | DATA4-H | 18 | DATA8-L | Shield | GND |

### Rear Panel Switches



# Mega Pixel Progressive Scan KP-F100BCL


## 2/3 Inch 1392 x 1040 Pixel, Digital Output KP-F100BCL

- **1.45 Million Pixels**
- **Progressive Scan with Square Pixels**
- **10 bit Single Channel Digital Output**
- **15 F/s normal, 60 F/s in 4 times accelerated mode**
- **CameraLink Output**
- **Multiple Step Electronic Shutter**
- **Frame-on-Demand Mode**
- **Internal or External Sync Mode**
- **RS-232C Remote Control**

The **KP-F100BCL** is a monochrome high resolution progressive scan camera featuring a CameraLink output that includes 10 bit digital video, RS-232C remote control and trigger control lines. Designed for machine vision and image processing systems, the camera is capable of producing 15 frames at full vertical resolution, or 60 frames per second in the 4 times accelerated mode of operation of progressively scanned video, from the 1.45 million pixel CCD array. Square pixels make for an easy interface with vision and measurement systems. A frame on demand function allows images captured by use of an external trigger to be output immediately. An analog and a CameraLink output are provided. The CameraLink output allows direct interface with image processing systems, eliminating the A/D converter in the image processor. A multi step electronic shutter along with external H and V drive inputs, provide for ease of use in systems applications. The **KP-F100BCL** also features an RS-232C remote control port for control of all camera functions.

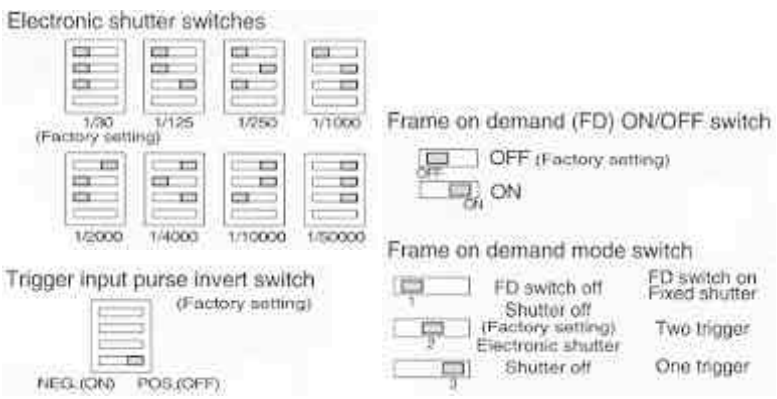
### Specifications

| | |
|---|---|
| Imager: | 2/3 inch Interline type Progressive Scan CCD |
| Pixels | 1392 x 1040 |
| Cell Size: | 6.45 x 6.45 |
| Aspect Ratio: | 4 : 3 |
| Sensitivity: | 400 lux at f4.0 3200K |
| S/N: | 50 db |
| Gamma: | 0.45 or 1.0 ( Analog Out ) |
| AGC: | On / Off ( Analog Out ) |
| Shutter: | 1/30 - 1/50000, eight steps |
| Sync: | Internal / External |
| Trigger: | Frame on Demand - 3 modes |
| Output: | Analog 1.0 V p-p 75 ohms<br>CameraLink output<br>10 bit single c. 20.2 MHz |
| Remote: | RS-232C |
| Power: | 12 volts DC 300 ma |
| Size: | ( W x H x D) 44 x 44 x78 mm |
| Weight: | 200 Grams |
| Lens: | C-Mount |

### CameraLink Output

| Pin No. | Signal | Pin No. | Signal |
|---|---|---|---|
| 1 | GND | 14 | GND |
| 2 | TXOUT 0 (−) | 15 | TXOUT 0 (+) |
| 3 | TXOUT 1 (−) | 16 | TXOUT 1 (+) |
| 4 | TXOUT 2 (−) | 17 | TXOUT 2 (+) |
| 5 | TXCLKOUT (−) | 18 | TXCLKOUT (+) |
| 6 | TXOUT 3 (−) | 19 | TXOUT 3 (+) |
| 7 | RX (+) | 20 | RX (−) |
| 8 | TX (−) | 21 | TX (+) |
| 9 | TRIG·A/VD (−) [CC1 (−)] | 22 | TRIG·A/VD (+) [CC1 (+)] |
| 10 | TRIG·B (+) [CC2 (+)] | 23 | TRIG·B (−) [CC2 (−)] |
| 11 | EXT·HD (−) [CC3 (−)] | 24 | EXT·HD (+) [CC3 (+)] |
| 12 | NC [CC4 (+)] | 25 | NC [CC4 (−)] |
| 13 | GND | 26 | GND |

### Rear Panel Switches

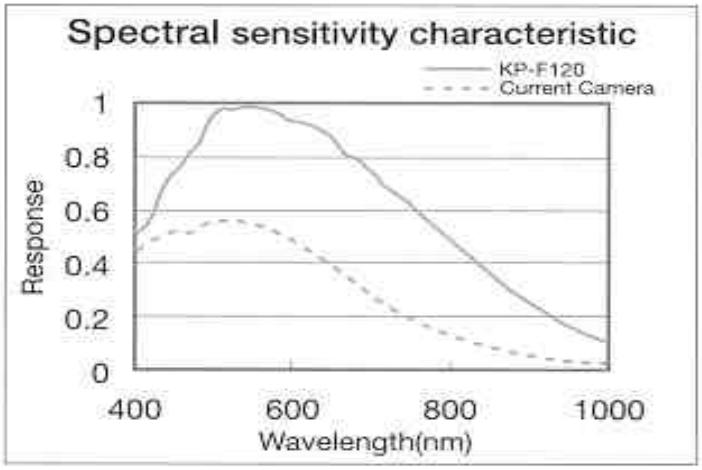


# Near IR Progressive Scan KP-F120

**LVDS, CameraLink, IEEE-1394, RGB Color Outputs Available**


## 1.45 Million Pixel Digital Output KP-F120

- **Near IR Sensitivity**
- **Spectral Response Extends above 1000 nm**
- **2/3 inch 1.45 Million Pixel CCD**
- **1392 (H) x 1040 (V) Pixels**
- **Frame rates of 30, 60 or 120 Frames / second**
- **Progressive Scan with Square Pixels**
- **Dual Channel 10 bit RS-644 (LVDS) Output**
- **Optional CameraLink or IEEE-1394 outputs**
- **Multiple Step Electronic Shutter**
- **Frame-on-Demand Mode**
- **Partial Scan Mode**
- **RS-232C Remote Control**
- **C-Mount Optics**
- **Compact Size**




Featuring a 2/3 inch 1.45 Million Pixel Progressive Scan CCD, the **KP-F120** combines high resolution and high sensitivity with good spectral response. Useable in the Near IR range, the spectral response extends above 1000 nm. Providing a standard aspect ratio of 4 : 3 the CCD features square pixels. Through the use of advanced IC technology, the camera is able to provide a multitude of features in a compact size. The dual channel 10 bit RS-644 (LVDS) digital output makes for ease of interface with standard frame grabbers. For use in high performance machine vision systems, the camera features a Frame-on-Demand mode that allows an image to be captured and output immediately following the use of a trigger pulse. For even higher frame rates the **KP-F120** features a partial scan mode where the scan can start at the top or the center of the frame and continue for the chosen number of lines (16H to 512H). For ease of use, the **KP-F120** has an RS-232C remote control port that allows remote control of all camera operating functions. The camera is also available with a CameraLink output, as the **KP-F120-CL**.



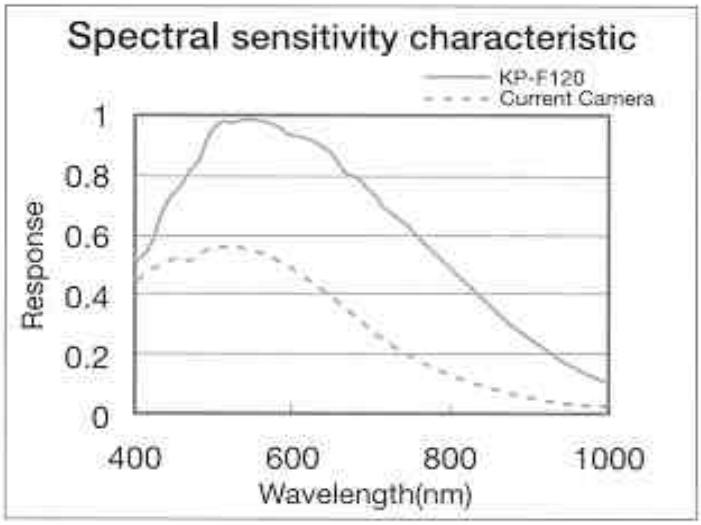
## Specifications

| | |
|---|---|
| Imager: | 2/3 inch Interline type Progressive Scan CCD |
| Pixels: | 1392 x 1040 |
| Cell Size: | 6.45 x 6.45 |
| Aspect Ratio: | 4 : 3 |
| Sensitivity: | 400 lux at f4.0 3200K |
| S/N: | 54 db |
| Gamma: | 0.45 or 1.0 ( Analog Out ) |
| AGC: | On / Off ( Analog Out ) |
| Shutter: | 1/30 - 1/50000, eight steps |
| Sync: | Internal / External |
| Trigger: | Frame on Demand - 4 modes |
| Partial Scan: | Upper or Middle<br>16H, 32H, 64H, 128H, 256H, 512H |
| Output: | Analog: 1.0 V p-p 75 ohms<br>Digital: RS-644 (LVDS)<br>10 bit dual ch.<br>Optional CameraLink, USB 2.0 or IEEE-1394 Outputs |
| Power: | 12 volts DC 500 ma |
| Size: | (W x H x D) 58 x 58 x 48 mm |
| Weight: | 200 Grams |
| Lens: | C-Mount |

# Mega Pixel Near IR Progressive Scan KP-F120CL


## 1.45 Million Pixel Digital Output KP-F120CL

- **Near IR Sensitivity**
- **Spectral Response Extends above 1000 nm**
- **2/3 inch 1.45 Million Pixel CCD**
- **1392 (H) x 1040 (V) Pixels**
- **30, 60, or 120 frames / second**
- **Progressive Scan with Square Pixels**
- **CameraLink output**
- **Multiple Step Electronic Shutter**
- **Frame-on-Demand Mode**
- **Partial Scan Mode**
- **RS-232C Remote Control**
- **C-Mount Optics**
- **Compact Size**




Featuring a 2/3 inch 1.45 Million Pixel Progressive Scan CCD, the **KP-F120CL** combines high resolution and high sensitivity with good spectral response. Useable in the Near IR range, the spectral response extends above 1000 nm. Providing a standard aspect ratio of 4 : 3 the CCD features square pixels. Through the use of advanced IC technology, the camera is able to provide a multitude of features in a compact size. The CameraLink digital output makes for ease of interface with standard frame grabbers. For use in high performance machine vision systems, the camera features a Frame-on-Demand mode that allows an image to be captured and output immediately following the use of a trigger pulse. For even higher frame rates the **KP-F120CL** features a partial scan mode where the scan can start at the top or the center of the frame and continue for the chosen number of lines (16H to 512H). For ease of use, the **KP-F120CL** features RS-232C remote control through the CameraLink interface, allowing remote control of all camera operating functions. The camera is also available with LVDS, IEEE-1394 or RGB color outputs.



## Specifications

| | |
|---|---|
| Imager: | 2/3 inch Interline type Progressive Scan CCD |
| Pixels: | 1392 x 1040 |
| Cell Size: | 6.45 x 6.45 |
| Aspect Ratio: | 4 : 3 |
| Sensitivity: | 400 lux at f4.0 3200K |
| S/N: | 54 db |
| Gamma: | 0.45 or 1.0 ( Analog Out ) |
| AGC: | On / Off ( Analog Out ) |
| Shutter: | 1/30 - 1/50000, eight steps |
| Sync: | Internal / External |
| Trigger: | Frame on Demand - 4 modes |
| Partial Scan: | Upper or Middle<br>16H, 32H, 64H, 128H, 256H, 512H |
| Output: | Analog: 1.0 V p-p 75 ohms<br>Digital: CameraLink Output<br>10 bit dual ch. |
| Power: | 12 volts DC 500 ma |
| Size: | (W x H x D) 58 x 58 x 48 mm |
| Weight: | 200 Grams |

# Mega Pixel Near IR Progressive Scan
# KP-F120F


## 1.45 Million Pixel Digital Output
## KP-F120F

- **Near IR Sensitivity**
- **Spectral Response Extends above 1000 nm**
- **2/3 inch 1.45 Million Pixel CCD**
- **1392 (H) x 1040 (V) Pixels**
- **15, 60, or 120 frames / second**
- **Progressive Scan with Square Pixels**
- **IEEE-1394 output**
- **Multiple Step Electronic Shutter**
- **Frame-on-Demand Mode**
- **Partial Scan Mode**
- **Remote Control via IEEE-1394 port**
- **C-Mount Optics**
- **Compact Size**

**KP-F120F** includes IEEE-1394 driver and demo software.

**Requirement:** Intel Celeron 533 MHz or more.

**Memory:** 256 MB or more.

**System:** Microsoft Windows 98SE, ME, 2000, XP.

**Interface:** OHCI IEEE-1394 Interface PCI Board.
OHCI IEEE-1394 Interface PC Card.

**Display Adapter:** 24 bit RGB color or more.

**KP-120F SDK:** A software development kit is available for those wishing to write custom software.

Featuring a 2/3 inch 1.45 Million Pixel Progressive Scan CCD, the **KP-F120F** combines high resolution and high sensitivity with good spectral response. Useable in the Near IR range, the spectral response extends above 1000 nm. Providing a standard aspect ratio of 4 : 3 the CCD features square pixels. Through the use of advanced IC technology, the camera is able to provide a multitude of features in a compact size. The IEEE-1394 digital output makes for ease of interface with a personal computer. For use in high performance machine vision systems, the camera features a Frame-on-Demand mode that allows an image to be captured and output immediately following the use of a trigger pulse. For even higher frame rates the **KP-F120F** features a partial scan mode where the scan can start at the top or the center of the frame and continue for the chosen number of lines (16H to 512H). For ease of use, the **KP-F120F** features remote control through the IEEE-1394 interface, allowing remote control of all camera operating functions. The camera is also available with CameraLink, LVDS, or RGB color outputs.


**IEEE-1394 Rear**



## Specifications

| | |
|---|---|
| Imager: | 2/3 inch Interline type Progressive Scan CCD |
| Pixels: | 1392 x 1040 |
| Cell Size: | 6.45 x 6.45 |
| Aspect Ratio: | 4 : 3 |
| Sensitivity: | 400 lux at f4.0 3200K |
| S/N: | 54 db |
| Gamma: | 0.45 or 1.0 ( Analog Out ) |
| AGC: | On / Off ( Analog Out ) |
| Shutter: | 1/30 - 1/50000, eight steps |
| Sync: | Internal / External |
| Trigger: | Frame on Demand - 4 modes |
| Partial Scan: | Upper or Middle 16H, 32H, 64H, 128H, 256H, 512H |
| Output: | Digital: IEEE-1394 |
| Power: | 12 volts DC 500 ma |
| Size: | (W x H x D) 58 x 58 x 48 mm |
| Weight: | 200 Grams |
| Lens: | C-Mount |

# Mega Pixel Near IR Progressive Scan KP-F120C

Color


## 1.45 Million Pixel Digital Output KP-F120C

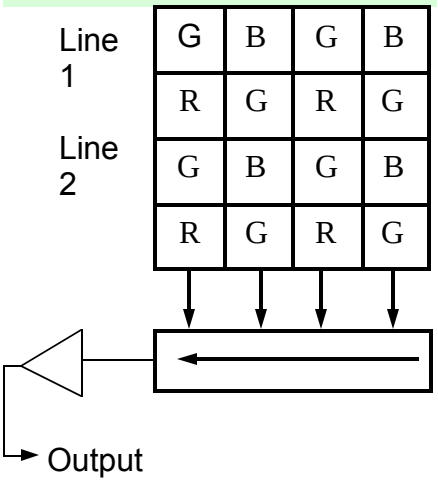
- **Near IR Sensitivity**
- **Spectral Response Extends above 1000 nm**
- **2/3 inch 1.45 Million Pixel CCD**
- **1392 (H) x 1040 (V) Pixels**
- **15, 60, or 120 frames / second**
- **Progressive Scan with Square Pixels**
- **RS-644 ( LVDS ) 8 bit single channel output**
- **Multiple Step Electronic Shutter**
- **Frame-on-Demand Mode**
- **Partial Scan Mode**
- **Remote Control via RS-232C port**
- **C-Mount Optics**
- **Compact Size**

Featuring a 2/3 inch 1.45 Million Pixel Progressive Scan CCD, the **KP-F120C** combines high resolution and high sensitivity with good spectral response. Useable in the Near IR range, the spectral response extends above 1000 nm. Providing a standard aspect ratio of 4 : 3 the CCD features square pixels. Through the use of advanced IC technology, the camera is able to provide a multitude of features in a compact size. The LVDS 8 bit digital output makes for ease of interface with a majority of frame grabbers. For use in high performance machine vision systems, the camera features a Frame-on-Demand mode that allows an image to be captured and output immediately following the use of a trigger pulse. For even higher frame rates the **KP-F120C** features a partial scan mode where the scan can start at the top or the center of the frame and continue for the chosen number of lines (16H to 512H). For ease of use, the **KP-F120C** features an RS 232C remote control port, allowing remote control of all camera operating functions. The camera is also available with CameraLink, LVDS, or IEEE-1394 outputs.



### KP-F120C Bayer Filter Structure

The KP-F120C outputs raw Bayer Filter Color Data that is combined in the frame grabber to produce a color image. Below is a partial diagram showing the output structure of the CCD with the Bayer Filter.




### Specifications

| | |
|---|---|
| Imager: | 2/3 inch Interline type Progressive Scan CCD |
| Pixels: | 1392 x 1040 |
| Cell Size: | 6.45 x 6.45 |
| Aspect Ratio: | 4 : 3 |
| Sensitivity: | 400 lux at f4.0 3200K |
| S/N: | 54 db |
| Gamma: | 0.45 or 1.0 ( Analog Out ) |
| AGC: | On / Off ( Analog Out ) |
| Shutter: | 1/30 - 1/50000, eight steps |
| Sync: | Internal / External |
| Trigger: | Frame on Demand - 4 modes |
| Partial Scan: | Upper or Middle 16H, 32H, 64H, 128H, 256H, 512H |
| Output: | Digital: LVDS 8 bit single channel |
| Power: | 12 volts DC 500 ma |
| Size: | (W x H x D) 58 x 58 x 48 mm |
| Weight: | 200 Grams |
| Lens: | C-Mount |

# MegaPixel SXGA Progressive Scan KP-F140F

**IEEE-1394.b**
***Firewire®800***


## 1/2 Inch Megapixel SXGA Progressive Scan KP-F140F

- **Compact Rugged Design**
- **IEEE-1304.b (Firewire 800 ) Output 2 Ports**
- **15 Frames / Second**
- **SXGA 1360 x 1024 Resolution**
- **Multiple Step Electronic Shutter**
- **Fixed / Manual / Auto Gain Mode**
- **Frame-on-Demand Mode**

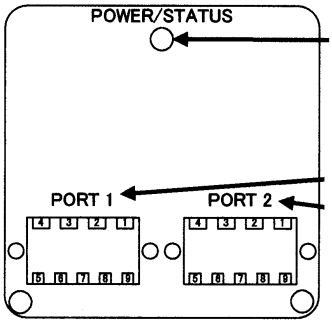
## Specifications

Imager: 1/2 inch Interline type Progressive Scan CCD
Pixels: 1392 x 1040
Cell Size: 4.65 x 4.65
Aspect Ratio: 4 : 3
Scan Mode: Progressive
Resolution: SXGA 1360 x 1024
Min. Illum: 5 lux at f1.4
Gamma: 1.0 or LUT
Gain: Manual, Fixed, or AGC
Shutter: 8 steps 1/60 - 1/100000
Trigger: Frame-on-Demand 3 modes
One Trigger, Fixed Shutter, Reset Control
Output: IEEE-1394.b (Firewire 800)
IIDC1394 Ver,1.31 800 / 400 / 200 Mbps
Image Format: Mono 8 / Mono 16
Power: 12 volts DC 4.1 watts
Size: (W x H x D) 44 x 44 x 54 mm
Weight: 130 grams
Lens: C-Mount

Designed for use in factory automation and industrial vision systems, the **KP-F140F** features a compact size, square pixels, and progressive scan with megapixel resolution to provide high vertical resolution of moving objects. Featuring a IEEE-1394.b output the **KP-F140F** can operate at 15 frames per second, with SXGA resolution of 1360 x 1024 pixels. Two IEEE-1394.b output ports are provided on the rear of the camera allowing loop through connections with another camera. The camera is compliant with Digital Camera Specification IIDC1394 Ver,1.31, and can operate at 800 / 400 / 200 Mbps, with an image format of Mono 8 or Mono 16. Standard features include an eight step electronic shutter featuring a maximum speed of 1/100,000 second, selectable gamma with LUT (look up table) and fixed, manual or automatic gain control. A frame-on-demand function is available for capturing moving objects at a desired timing. In the one trigger mode of operation, the rising edge of the trigger pulse starts the exposure, the durration of the trigger pulse controls the integration time, and the falling edge of the trigger pulse resets vertical sync and delivers the triggered image. The camera can also be operated in a fixed shutter mode or a reset control mode. A CD ROM with the driver and viewer programs is provided with the camera.



REAR PANEL




LED status

| LED | Green | Yellow |
|---|---|---|
| Power ON | light on | light off |
| Transmission | blink off | blink on |
| Transmission pause | blink on | blink off |

②IEEE1394b connector
③IEEE1394b connector

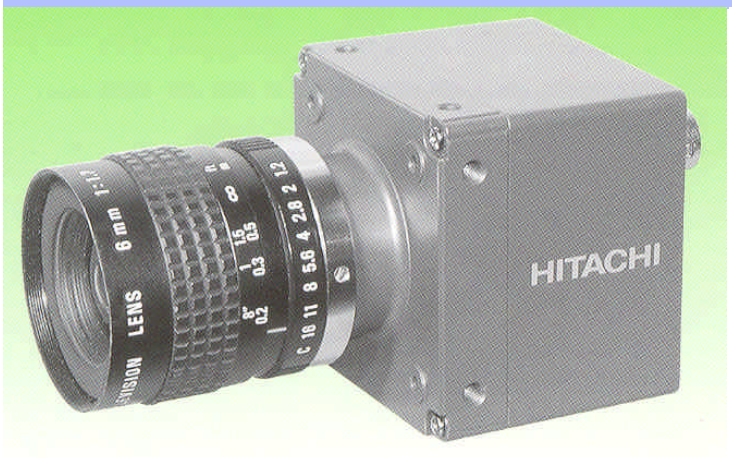
Signal connection to IEEE 1394.b(PORT1/PORT2)

| | | |
|---|---|---|
| 1 | TPB− | SERIAL DATA |
| 2 | TPB+ | |
| 3 | TPA− | |
| 4 | TPA+ | |
| 5 | TPA(R) | SHIELD GND |
| 6 | VG | POWER GND |
| 7 | I/O | *Programmable I/O |
| 8 | VP | POWER +12V |
| 9 | TPB(R) | SHIELD GND |

Viewer Soft Setting(PORT1/PORT2)

| *Programmable I/O | In | Out |
|---|---|---|
| Trigger | ○ | ○ |
| VD | ○ | ○ |
| Strobe (Flash) | × | ○ |

# 2.01 Mega Pixel Progressive Scan KP-F200CL



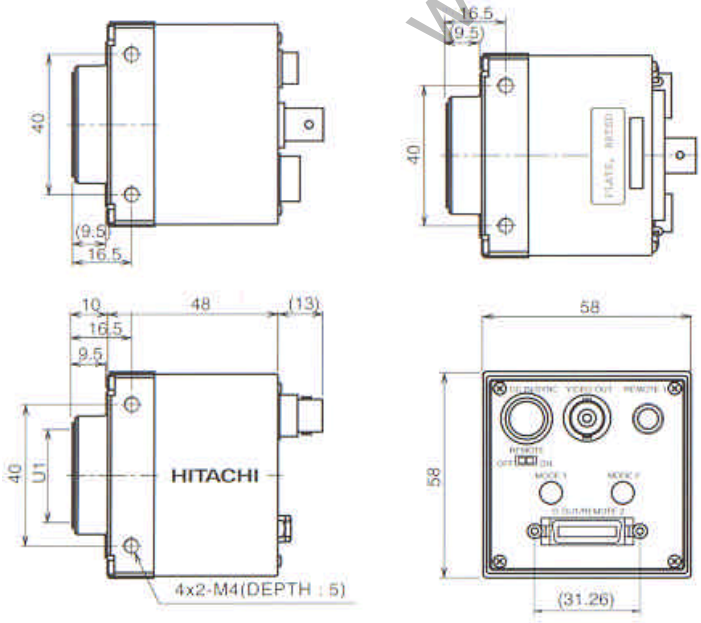

## 2.01 Million Pixel Digital Output KP-F200CL

- **1/2 inch 2.01 Million Pixel CCD**
- **1628 (H) x 1236 (V) Pixels**
- **24, 48, or 96 frames / second**
- **Progressive Scan with Square Pixels**
- **CameraLink output**
- **Multiple Step Electronic Shutter**
- **Frame-on-Demand Mode**
- **Partial Scan Mode**
- **RS-232C Remote Control**
- **C-Mount Optics**
- **Compact Size**

Featuring a 1/2 inch 2.01 Million Pixel Progressive Scan CCD, the **KP-F200CL** combines high resolution and a host of versatile functions in a compact light weight package. Providing a standard aspect ratio of 4 : 3 the CCD features square pixels. The CameraLink digital output makes for ease of interface with standard frame grabbers. For use in high performance machine vision systems, the camera features a Frame-on-Demand mode that allows an image to be captured and output immediately following the use of a trigger pulse. For even higher frame rates the **KP-F200CL** features a partial scan mode where the scan can start at the top or the center of the frame and continue for a selected number of lines (16H to 512H). For ease of use, the **KP-F200CL** features RS-232C remote control through the CameraLink interface, allowing remote control of all camera operating functions. Two rotary control switches, one for camera mode operation, and one for camera gain, along with a slide switch for remote ON/OFF selection, allow the camera to be easily configured to the specific imaging application.



## Dimensions




## Specifications

| | |
|---|---|
| Imager: | 1/2 inch Interline type Progressive Scan CCD |
| Pixels: | 1628 x 1236 |
| Cell Size: | 4.4 x 4.4 |
| Aspect Ratio: | 4 : 3 |
| Sensitivity: | |
| S/N: | |
| Gamma: | 1.0 |
| Shutter: | 1/30 - 1/50000, eight steps |
| Sync: | Internal / External |
| Trigger: | Frame on Demand - 3 modes |
| Partial Scan: | Upper or Middle 16H, 32H, 64H, 128H, 256H, 512H |
| Output: | Digital: CameraLink Output 10 bit dual ch. |
| Power: | 12 volts DC 450 ma |
| Size: | (W x H x D) 58 x 58 x 48 mm |
| Weight: | 220 Grams |
| Lens: | C-Mount |

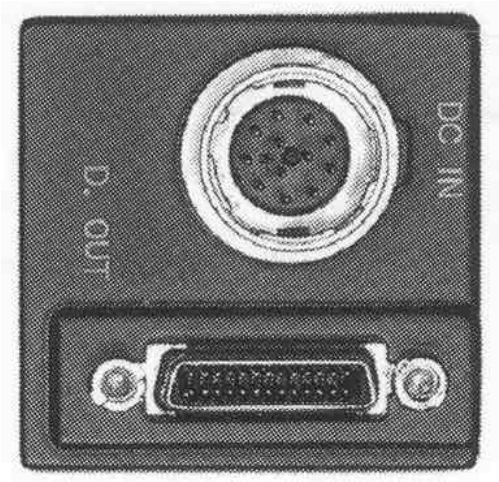
# 2.01 Mega Pixel Progressive Scan KP-F200SCL

Featuring a 1/2 inch 2.01 Million Pixel Progressive Scan CCD, the **KP-F200SCL** combines high resolution and a host of versatile functions in an ultra compact light weight package. Providing a standard aspect ratio of 4 : 3 the CCD features square pixels. The CameraLink digital output utilizing a small connector makes for ease of interface with standard frame grabbers. For use in high performance machine vision systems, the camera features a Frame-on-Demand mode that allows an image to be captured and output immediately following the use of a trigger pulse. For even higher frame rates the **KP-F200SCL** features a partial scan mode where the scan can start at the top or the center of the frame and continue for a selected number of lines (16H to 512H). For ease of use, the **KP-F200SCL** features RS-232C remote control through the CameraLink interface, allowing remote control of all camera operating functions.

## 2.01 Million Pixel Digital Output KP-F200SCL

- **1/2 inch 2.01 Million Pixel CCD**
- **1628 (H) x 1236 (V) Pixels**
- **24, 48, or 96 frames / second**
- **Progressive Scan with Square Pixels**
- **CameraLink Output with Small Connector**
- **Multiple Step Electronic Shutter**
- **Frame-on-Demand Mode**
- **Partial Scan Mode**
- **RS-232C Remote Control**
- **C-Mount Optics**
- **Compact Size**



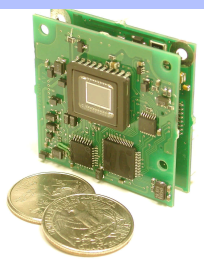



## Specifications

| | |
|---|---|
| Imager: | 1/2 inch Interline type Progressive Scan CCD |
| Pixels: | 1628 x 1236 |
| Cell Size: | 4.4 x 4.4 |
| Aspect Ratio: | 4 : 3 |
| Sensitivity: | |
| S/N: | |
| Gamma: | 1.0 |
| Shutter: | 1/30 - 1/50000, eight steps |
| Sync: | Internal / External |
| Trigger: | Frame on Demand - 3 modes |
| Partial Scan: | Upper or Middle 16H, 32H, 64H, 128H, 256H, 512H |
| Output: | Digital: CameraLink Output 10 bit per pixel |
| Power: | 12 volts DC 450 ma |
| Size: | (W x H x D) 29 x 29 x 29 mm |
| Weight: | 53 Grams |
| Lens: | C-Mount |

# Hitachi Board Cameras

**Hitachi Denshi America Ltd.**



## 1/2 Inch IT CCD
## BE-101B

The **BE-101B** is a compact and lightweight monochrome board camera designed for OEM imaging applications. The camera has excellent sensitivity and resolution, in a small package size. For greater size reduction, the camera features a piggy-back board design, to reduce the footprint of the camera by 50%. Standard features include internal or external sync, electronic shutter, field or frame integration, along with selectable gamma and AGC. A source of power and optics are all that is needed to complete the package. Special modification requests are accepted dependent upon quantities ordered.

### Specifications

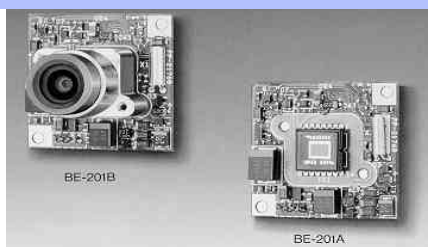
Imager: 1/2 inch Interline transfer CCD
Pixels: 768 x 494
Cell Size: 8.4 x 9.8
Resolution: 570 TV lines
Min. Illum: 0.25 lux at f1.4
S/N: 50 db
Gamma: 0.45 or 1.0 selectable
Integration: Field or Frame selection
AGC: On / Off
Shutter: 1/60 - 1/10000
Output: RS-170 1.0 V p-p
Power: 12 volts DC
Size: ( W x H x D ) 45 x 45 x 20 mm
Weight: 25 grams

## 1/2 Inch FT CCD Near Infared Sensitive
## BE-IR20 / 21

The **BE-IR20/21** are compact and lightweight monochrome board cameras with extended sensitivity and spectral response above 1000 nanometers, allowing use in the near IR range. The cameras are an excellent choice for OEM applications requiring extended spectral response in a very small package. The cameras require only a DC source of power and the optics needed for the application. The **BE-IR20** is an internal sync model, while the **BE-IR21** is for use with external sync. Standard features include selectable gamma and AGC, along with a multiple speed electronic shutter, and field or frame integration.

### Specifications

Imager: 1/2 inch Interline transfer CCD
Pixels: 768 x 494
Cell Size: 8.4 x 9.8
Resolution: 570 TV lines
Min. Illum: 0.3 lux at f1.4
S/N: 56 db
Gamma: 0.45 or 1.0 selectable
Gain: Normal, or AGC
Shutter: AES, 1/60 - 1/10000 8 step
Output: RS-170 1.0 V p-p
Power: 9 volts DC
Size: ( W x H x D ) 34 x 34 x 20 mm
Weight: 60 grams




## 1/4 Inch IT CCD
## BE-211B

The **BE-211B** is Hitachi's most compact board camera, designed for observation and image processing OEM applications. The "B" version of the camera is provided with a lens mount. A 2.5 mm, 3.8 mm, or a 6.0 mm lens can be ordered as an option. Only a DC source of power is required for operation. Standard features include an automatic electronic shutter, selectable gamma, AGC, and field or frame integration.

### Specifications

Imager: 1/4 inch Interline transfer CCD
Pixels: 510 x 492
Cell Size: 7.15 x 5.55
Resolution: 380 TV lines
Min. Illum: 0.5 lux at f1.4
S/N: 46 db
Gamma: 0.45 or 1.0 selectable
AGC: Max. 18 db
Shutter: AES
Output: RS-170 1.0 V p-p
Power: 9.0 volts DC
Size: ( W x H x D ) 25 x 25 x 16 mm
Weight: 22 grams

### Additional Models

**BE-212B** The **BE-212B** is the same as the **BE-211B** with the addition of external H and V drives.

**BE-301B** The **BE-301B** features a 1/3 inch CCD and is similar to the **BE-211B**. Instead of a stacked two board arrangement, the **BE-301B** uses a single circuit board measuring 32 x 32 mm. The **BE-301B** has the same features and specifications as the **BE-211B**, with the exception of the CCD size.

**OEM Products** As a manufacturer of OEM cameras, **Hitachi** recognizes the need for product design to suit unique and individual applications. **Hitachi** will work closely with your designers and applications engineers to produce a camera for that specific need, on a quantity OEM basis. With over 40 years in the camera business, and a wide range of OEM products in a variety of markets, **Hitachi** has the expertise to design and manufacture a product in a timely manner to meet the exacting requirements of the OEM market. Should a modification to an existing camera prove to be cost effective, **Hitachi** will offer that as an alternative, if desired. Private labeling and packaging is available for all quantity OEM products. Additional help can be provided with custom cable requirements, mechanical configurations, lenses and optical filters. For additional information contact **Hitachi** at 516-921-7200.

# Board Camera Chart

## Hitachi Denshi America Ltd.

| | BE-101B | BE-201A/B | BE-211A/B | BE-212A/B | BE-301A/B | BE-IR20<br>BE-IR30 | BE-IR21<br>BE-IR31 |
|---|---|---|---|---|---|---|---|
| **CCD** | 1/2 inch | 1/4 inch | 1/4inch | 1/4inch | 1/3inch | 1/2inch<br>1/3 inch | 1/2inch<br>1/3 inch |
| **No. of Boards** | 2 | 1 | 2 | 2 | 1 | 2 | 2 |
| **Board Size** | 45 x 45 x 20 | 32 x 32 x 11 | 25 x 25 x 16 | 25 x 25 x 16 | 32 x 32 x 11 | 32 x 32 x 20 | 32 x 32 x 20 |
| **Lens Mount** | C- Mt. Option | Microlens Mt. B version | Microlens Mt. B version | Microlens Mt. B version | Microlens Mt. B version | C-Mt. Option | C-Mt. Option |
| **Internal Sync** | Yes | Yes | Yes | No | Yes | Yes | No |
| **External H/V Drives** | Yes | No | No | Yes | No | No | Yes |
| | | | | | | | |
| **Resolution** | 570 | 380 | 380 | 380 | 380 | 570 | 570 |
| **Pixels** | 768 x 494 | 510 x 492 | 510 x 492 | 510 x 492 | 510 x 492 | 768 x 494 | 768 x 494 |
| **Pixel Pitch** | 8.4 x 9.8 | 7.15 x 5.55 | 7.15 x 5.55 | 7.15 x 5.55 | 9.6 x 7.5 | 8.4 x 9.8<br>6.35 x 7.4 | 8.4 x 9.8<br>6.35 x 7.4 |
| **S/N** | 56 | 46db | 46db | 46db | 46db | 56db | 56db |
| **Min. Illum.** | 0.3lux f1.4 | 0.5lux f1.4 | 0.5lux f1.4 | 0.5lux f1.4 | 0.5lux f1.4 | 0.3lux f1.4 | 0.3lux f1.4 |
| **Gamma** | 0.45 / 1 | 0.45 / 1 | 0.45 / 1 | 0.45 / 1 | 0.45 / 1 | 0.45 / 1 | 0.45 / 1 |
| **AGC** | On / Off | On / Off | On / Off | On / Off | On / Off | On / Off | On / Off |
| **Max AGC** | 18db | 18db | 18db | 18db | 18db | 32db | 32db |
| **Shutter (AES)** | On / Off | AES<br>On / Off | AES<br>On / Off | AES<br>On / Off | AES<br>On / Off | AES<br>On / Off | AES<br>On / Off |
| **Fixed Shutter 8 Steps** | 1/60 - 1/10,000 | 1/60 – 1/10000 | 1/60 – 1/10000 | 1/60 – 1/10000 | 1/60 – 1/10000 | 1/60 – 1/10000 | 1/60 – 1/10000 |
| **Field / Frame Integration** | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Power** | 12 volts DC | 9 volts DC | 9 volts DC | 9 volts DC | 9 volts DC | 9 volts DC | 9 volts DC |
| **Output** | RS170A | RS-170 | RS-170 | RS-170 | RS-170 | RS-170 | RS-170 |
| **Availability** | Current | Discontinued | Discontinued | Discontinued | A Version Discontinued | Current | Current |



The BE-101B is a two board camera with a new sensor and more pixels. Size 45 x 45 x 20 mm.

The **BE-IR30** and **BE-IR31** have the same features and performance as the BE-IR20 and BE-IR21, with the exception of the CCD size. The **BE-IR30** and **BE-IR31** feature a 1/3 inch format CCD.

***Note:*** *Zero ohm jumper resistors are inserted or removed on the circuit boards to change the gamma setting, AGC mode, AES mode, field / frame integration mode, and fixed shutter speeds. For OEM quantity orders, the customer should specify their requirements. Changing these jumpers in the field requires soldering or unsoldering* ***very*** *small chip components.*

# Compact Color Camera With Integrated 25X Zoom Lens Z-25

## 1/4 Inch Compact Color Zoom Camera Z-25

- **Compact Self Contained Color Zoom Camera**
- **Integrated 25 times 3.8 to 95mm Zoom Lens**
- **8 times Digital Zoom Mode**
- **Digital Signal Processing (DSP)**
- **Auto Electronic Shutter (AES)**
- **Auto Tracking White Balance (ATW)**
- **Backlight Compensation**
- **Selectable AGC**
- **Day / Night Mode**
- **Integration Mode for Low Light Operation**
- **Composite and Y/C Outputs**
- **RS-232C Remote Control Interface**

The **Z25** is a compact single CCD color camera featuring a 1/4 inch format Super HAD CCD with 380K effective pixels, providing 470 TV lines of resolution. The camera features an integrated 25 times zoom lens with a focal length of 3.8 to 95mm. In addition an 8 times digital zoom can be selected to increase the effective focal length of the camera. A selectable Day / Night mode allows the camera to achieve a sensitivity of 1.0 lux in the color mode, or 0.1 lux in the monochrome mode.
For even greater sensitivity the camera features a field integration mode of 128 times allowing image reproduction in light levels as low as 0.01 lux. Standard features include Auto Electronic Shutter, Back Light Compensation, selectable AGC modes, and selectable White Balance Modes. An RS-232C port is available for remote control of the camera. The camera operates form 12 volts DC and consumes a maximum of 7.5 watts of power.



## Specifications

| | |
|---|---|
| Imager: | 1/4 inch interline transfer Super HAD CCD |
| Pixels: | 768 x 494 |
| Resolution: | 470 TV lines |
| Min. Ilum: | 1.0 lux at f1.6 color mode<br>0.1 lux at f1.6 monochrome |
| S/N: | 48 db |
| Gamma: | 0.45 |
| AGC: | On / Off / AUTO selectable |
| Integration: | 128 times (sensitivity 0.01 lux) |
| Shutter: | 28 steps 1/60 - 1/10,000 |
| AES: | Off / On |
| White Balance: | ATW / Preset |
| Backlight Comp: | On / Off / Auto |
| Outputs: | RS-170 1.0 V and Y / C |
| Power: | 12 volts DC |
| Size: (W x H x D) | 69 x 73 x 122 mm |
| Weight: | 630 grams |
| Lens: | 3.8 to 95mm 25X optical Zoom<br>f1.6 (wide) to f3.7 (telephoto) |
| Angle of View: | 51.8° to 2.2° (Horizontal)<br>39.1° to 1.6° (Vertical) |
| Focus Range: | 1.0 meter to Infinity |
| Digital Zoom: | 8 times |

# High Performance DSP Color Cameras
# KP-D20A / B

## Compact DSP Color Camera
## KP-D20 A / B

- **1/3 inch (KP-D20A) or 1/2 inch (KP-D20B)**
- **High Quality Optical Path**
- **480 TV Lines of Resolution**
- **50 db S/N**
- **0.3 lux Minimum Sensitivity (KP-D20B)**
- **Digital Signal Processing (DSP)**
- **On Screen Menu System**
- **Auto Tracking White Balance (ATW)**
- **Auto Electronic Shutter (AES)**
- **Backlight Correction**
- **2 H Enhancer for Sharp Picture Quality**
- **Digital Zoom**
- **RS-232C Remote Control Port**
- **Composite and Y/C outputs**
- **Output for Auto Iris Lens**


The **KP-D20 A** and **KP-D20B** are compact color cameras featuring 3rd generation digital signal processing (DSP). The **KP-D20A** has a 1/3 inch format CCD with a minimum sensitivity of 0.8 lux, while the **KP-D20B** features a 1/2 inch format CCD with a minimum sensitivity of 0.3 lux. Both cameras feature 480 TV Lines of resolution and are designed with a high quality optical path making them ideal for use in microscopy and high precision image processing systems. Designed for use with CS or C Mount lenses with an adaptor allow easy interfacing with the optics of the vision system. An On Screen Menu system allows for easy selection and adjustment of all camera parameters. Digital adjustments are also provided for video level, black level, chroma level, and enhancement level. Once set, the parameters are maintained in an EEPROM until overwritten. Standard features include three choices for white balance (ATW, Auto, Manual), Multiple Step Electronic Shutter or AES, Backlight Correction, a 2 H Enhancer for improving the sharpness of the picture, and a digital zoom feature. A composite and a Y/C output are available to match the requirements of the vision system.



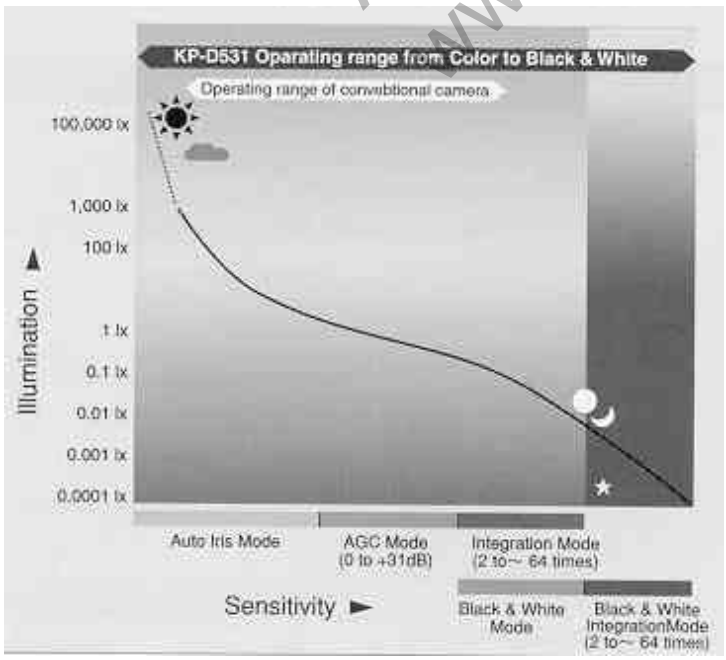
## Specifications

| | KP-D20A | KP-D20B |
|---|---|---|
| Imager: | 1/3 inch KP-D20A | 1/2 inch KP– D20B |
| | Interline transfer CCD with microlens | |
| Pixels: | 768 x 494 | |
| Cell Size: | 6.35 x 7.4 | 8.4 x 9.8 |
| Resolution: | 480 TV lines | |
| Min. Ilum: | 0.8 lux at f1.2 | 0.3 lux at f1.2 |
| S/N: | 50 db | |
| DSP: | 10 bit | |
| Gamma: | 0.45 or 1.0 selectable | |
| AGC: | On / Off selectable max gain | |
| Shutter: | 10 steps 1/60 - 1/30,000 | |
| AES: | Off / On | |
| White Balance: | ATW / Auto / Manual | |
| Polarity: | Positive or Negative Picture Polarity | |
| Backlight: | 9 Area Backlight Compensation | |
| Outputs: | RS-170 1.0 V p-p & Y/C | |
| Digital Zoom: | 4 X | |
| Power: | 12 volts DC approx. 300 ma | |
| Size: | (W x H x D) 44 x 44 x 49 mm | |
| Weight: | 130 grams | |
| Lens: | CS or C Mount with Adaptor | |

# High Sensitivity DSP Color Camera
# KP-D531


## 1/2 Inch High Sensitivity DSP Color KP-D531

- **Illumination Range of 0.02 to 100,000 lux**
- **Extended Integration Time of 2 to 64 Times**
- **Auto-Change Integration Mode**
- **Digital Signal processing (DSP)**
- **Thermoelectric Cooling for the CCD**
- **Digital Noise Reduction DNR**
- **Auto Tracking White Balance (ATW)**
- **Auto Electronic Shutter (AES)**
- **Backlight Correction**
- **On Screen Menu System**
- **Positive or Negative Picture Polarity**
- **RS-232C Remote Control for all Functions**
- **Electronic Zoom, with Pan / Tilt Function**




The **KP-D531** features an auto-change integration mode for use in low light observation, at levels down to 0 .02 lux. With auto-change integration, the IR cut filter is removed and the camera is switched to a monochrome mode to improve sensitivity. By using a combination of CCD exposure time and field memory, sensitivity is increased by 64 times compared with a conventional single CCD camera. Thermoelectric cooling is used on the CCD to reduce the effects of dark current noise at long exposure times. Digital signal processing is employed, and enables new functions such as noise reduction, backlight compensation, automatic sensitivity switching, auto change integration, positive or negative output, and a 2H enhancer for a sharp picture. Automatic color tracking can maintain proper color balance with changing light levels and color temperature. A four times electronic zoom with pan and tilt feature is standard, and allows magnification of the picture even when a standard lens is used.



### Specifications

Imager: 1/2 inch IT CCD with microlens
Pixels: 768 x 494
Cell Size: 8.4 x 9.8
Resolution: 480 TV lines
Illum. Range: 0.02 - 100,000 lux at f1.2
S/N: 50 db
Auto-Change Integration Mode:
Color 0.2 lux, Monochrome 0.02 lux
Integration: Selectable up to 64 times
Backlight Correction: Auto / Manual
Gain: Manual / AGC
Shutter: 1/60 - 1/30000 or AES
Noise Reduction: On / Off
ATW Range: 2500K to 8000K
Electronic Zoom: 4 times with pan / tilt
Character Gen: 24 alphanumeric
Signal Process: 9 bit DSP
Power: 117Vac
Output: VBS
Size: (W x H x D) 64 x 63 x 122 mm
Weight: 600 grams
Lens: C / CS mount ES type

# High Sensitivity DSP Color Camera
# KP-D590

## High Sensitivity 1/2 Inch Color KP-D590

The **KP-D590** is a DSP camera designed for low light observation, at levels down to 0 .001 lux. Ideal for use in fluorescence and darkfield imaging systems, the camera uses a combination of CCD exposure time and field memory, to improve sensitivity as compared with a conventional single CCD camera. A maximum integration time of 8 seconds is available, allowing use in extremely low light situations. Thermoelectric cooling is used on the CCD to reduce the effects of dark current noise at long exposure times. Digital signal processing is employed, and enables new functions such as digital noise reduction, backlight compensation, automatic sensitivity switching, positive or negative output, and a 2H enhancer for a sharp picture. White balance modes include memory, auto tracking white, and manual, where the user can adjust red and blue gains. A four times electronic zoom with pan and tilt feature is standard, and allows magnification of the picture even when a standard lens is used.

## Remote Control Unit RC-C590

The **RC-C590** is a dedicated remote control unit supplied with the **KP-D590** camera. Ideal for use in microscopy systems the **RC-C590** allows remote control of the camera's automatic gain control (AGC), digital noise reduction (DNR), and long term integration functions. Long term integration can be remotely adjusted in 16 steps, allowing the user to control the scene exposure, without going to the menu on the rear of the camera, and possibly disturbing the camera position. When AGC is selected to ON, the cameras gain limit can be adjusted using the camera menu. For use in low light levels the auto mode of integration can be selected. When selected, the camera will integrate up to the maximum amount set by the manual integration switch. In the auto mode the maximum integration time is limited to two seconds. When AGC and the auto mode of integration are both selected, gain is first added to the limit set in the camera. The integration function is then used as required to produce a proper video output signal. In the manual mode of integration, the maximum integration time is eight seconds. A dedicated nine foot remote cable is provided on the **RC-C590** for connection to the **KP-D590** camera. The unit receives its power directly from the camera.



## Specifications KP-D590

| | |
|---|---|
| Imager: | 1/2 inch IT CCD with microlens |
| Pixels: | 768 x 494 |
| Cell Size: | 8.4 x 9.8 |
| Resolution: | 480 TV lines |
| Illum. Range: | 0.001 - 100,000 lux at f1.2 |
| S/N: | 50 db |
| Backlight Correction: | Auto / Manual |
| Integration: | Selectable up to 8 seconds |
| Gain: | Manual / AGC |
| Shutter: | 1/60 - 1/10000 |
| Noise Reduction: | On / Off |
| ATW Range: | 2500K to 8000K |
| Electronic Zoom: | 4 times with pan / tilt |
| Signal Process: | 9 bit DSP |
| Power: | 12Vdc |
| Output: | VBS, Y/C |
| Size: | (W x H x D) 64 x 68 x 160 mm |
| Weight: | 600 grams |

## Specifications RC-C590

| | |
|---|---|
| DNR: | On / Off |
| AGC: | On / Off |
| Integration Mode: | Auto / Manual |
| Integration Steps: | 16 steps, nom (0.16) 0.03, 0.06, 0.12, 0.25, 0.5, 1.0, 1.3, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0 sec. |
| Cable: | Captive, 9 foot |

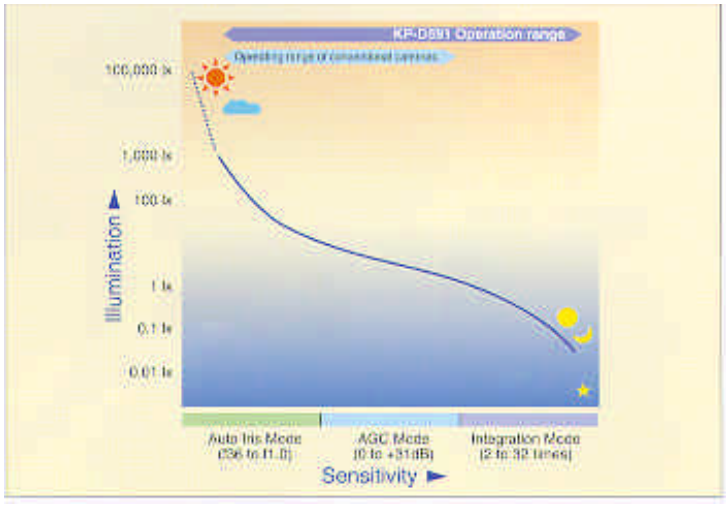
# High Sensitivity DSP Color Camera
# KP-D591


## 1/2 Inch High Sensitivity DSP
## KP-D591

- **Illumination Range of 0.01 to 100,000 lux**
- **Extended Integration Time of 2 to 64 Times**
- **Digital Signal processing (DSP)**
- **Thermoelectric Cooling for the CCD**
- **Digital Noise Reduction DNR**
- **Auto Tracking White Balance (ATW)**
- **Auto Electronic Shutter (AES)**
- **Backlight Correction**
- **On Screen Menu System**
- **Positive or Negative Picture Polarity**
- **RS-232C Remote Control for all Functions**
- **Electronic Zoom, with Pan / Tilt Function**

The **KP-D591** is designed for low light observation, at levels down to 0 .01 lux. By using a combination of CCD exposure time and field memory, sensitivity is increased by 64 times compared with a conventional single CCD camera. Thermoelectric cooling is used on the CCD to reduce the effects of dark current noise at long exposure times. Digital signal processing is employed, and enables new functions such as noise reduction, backlight compensation, automatic sensitivity switching, positive or negative output, and a 2H enhancer for a sharp picture. Automatic color tracking can maintain proper color balance with changing light levels and color temperature. A four times electronic zoom with pan and tilt feature is standard, and allows magnification of the picture even when a standard lens is used.





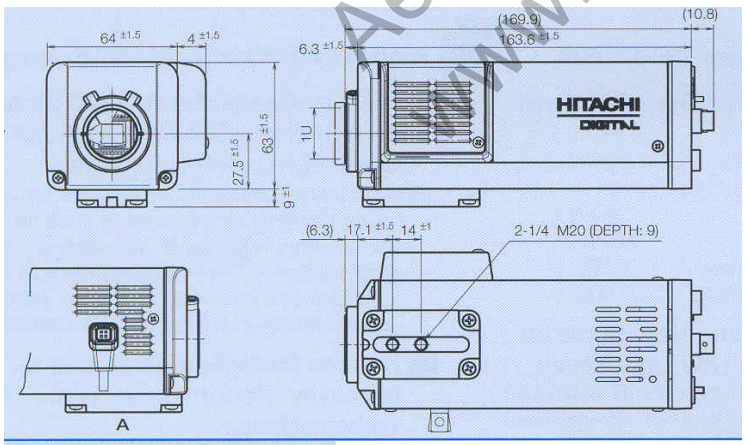

### Specifications

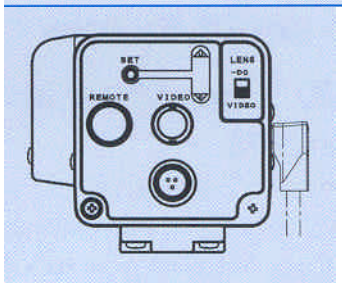
| | |
|---|---|
| Imager: | 1/2 inch IT CCD with microlens |
| Pixels: | 768 x 494 |
| Cell Size: | 8.4 x 9.8 |
| Resolution: | 480 TV lines |
| Illum. Range: | 0.01 - 100,000 lux at f1.2 |
| S/N: | 50 db |
| Backlight Correction: | Auto / Manual |
| Integration: | Selectable up to 64 times |
| Gain: | Manual / AGC |
| Shutter: | 1/60 - 1/30000 or AES |
| Noise Reduction: | On / Off |
| ATW Range: | 2500K to 8000K |
| Electronic Zoom: | 4 times with pan / tilt |
| Character Gen: | 24 alphanumeric |
| Signal Process: | 9 bit DSP |
| Power: | 117Vac |
| Output: | VBS |
| Size: | (W x H x D) 64 x 63 x 122 mm |
| Weight: | 740 grams |
| Lens: | C / CS mount ES type |

# Ultra High Sensitivity DSP Color Camera KP-DE500


## Ultra High Sensitivity DSP Color KP-DE500

- **High Sensitivity EM-CCD**
- **Illumination Range of 0.00015 to 100,000 lux**
- **Extended Integration Time of 2 to 64 Times**
- **Digital Signal processing (DSP)**
- **Thermoelectric Cooling for the CCD**
- **Digital Noise Reduction DNR**
- **Auto Tracking White Balance (ATW)**
- **Auto Electronic Shutter (AES)**
- **Backlight Correction**
- **On Screen Menu System**
- **RS-232C Remote Control for all Functions**




Designed for use in extremely low light levels the **KP-DE500** color camera was designed using a EM-CCD that eliminates the problems that are inherent with Image Intensifier Tubes, such as lag an burn-in. The EM (electron multiplying) CCD allows the camera to operate in a full color motion mode at light levels down to 0.009 lux. For even greater sensitivity, the camera features a color accumulation mode of operation, where the CCD can accumulate charge for up to 64 times normal, allowing operation in light levels as low as 0.00015 lux. A built in memory permits continuous full color image output, even in the accumulation mode of operation. To improve picture quality in low light levels, thermoelectric cooling is used on the CCD to reduce the effects of dark current, while a selectable DNR (digital noise reduction) circuit is used to reduce repetitive noise on a line by line basis. Features include selectable Backlight Compensation with 9 modes, three modes of White Balance, manual or Auto Electronic Shutter modes, and adjustments for image quality. An output for an auto iris lens is provided. An on-screen menu system permits easy adjustment of all camera settings, and a RS-232 remote is provided for remote control.



### Specifications

| | |
|---|---|
| Imager: | 1/2 inch EM-CCD |
| Pixels: | 658 x 489 |
| Cell Size: | 10 x 10 |
| Resolution: | 480 TV lines |
| Illum. Range: | 0.00015 - 100,000 lux at f1.4 |
| Color Full Motion: | 0.009 lux |
| Color Accumulation Mode: | 0.00015 lux |
| S/N: | 50 db |
| Backlight Correction: | Auto / Manual |
| Integration: | Selectable up to 64 times |
| Gain: | Manual / AGC |
| Shutter: | 1/60 - 1/2000 or AES |
| Noise Reduction: | On, Auto/Manual, Off |
| White Balance: | ATW, AWC, Manual |
| Character Gen: | 22 alphanumeric |
| Signal Process: | 10 bit DSP |
| Power: | 12 volts DC |
| Output: | VBS |
| Size: (W x H x D) | 78 x 63 x 170 mm |
| Weight: | 610 grams |
| Lens: | C / CS mount |

# VGA Progressive Scan RGB Color Camera KP-FD30


## 1/2 Inch VGA Progressive Scan RGB color Camera KP-FD30

- **Primary Color Filter**
- **60 frames / second Progressive Scan Output**
- **HD 15 pin VGA output connector**
- **Frame / Field-On-Demand Mode**
- **Digital Signal processing (DSP)**
- **NTSC mode with VBS, Y/C, & RGB outputs**
- **Auto Tracking White Balance (ATW)**
- **Auto Level Control (ALC)**
- **Auto Electronic Shutter (AES)**
- **On Screen Menu System**
- **RS-232C Remote Control for all Functions**
- **Output for Auto Iris Lens**

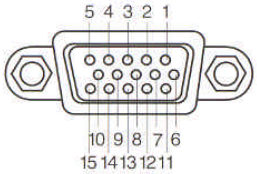
Designed around a progressive scan CCD with a primary RGB color filter, the **KP-FD30** produces high quality images for use in image processing systems, copy stands, microscopy and medical applications. The **KP-FD30** can output progressive scan VGA images at 60 frames per second from the standard 15 pin HD connector allowing the camera to be connected directly to a computer monitor, and NTSC images with 440 TV lines of resolution at 30 frames per second for traditional equipment. The NTSC output can be selected as composite, Y/C, or RGB. Incorporating advanced features such as ATW to maintain proper color temperature with changing light levels, ALC to maintain proper output levels by controlling the lens iris, AES and AGC, and a Frame / Field-on-Demand mode featuring a one trigger and fixed shutter mode of operation, the camera can be configured to the requirements of the imaging task. The camera is also available with a CameraLink output as the **KP-FD30CL**.



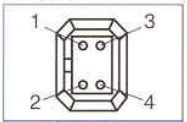
High-Density 15pin connector plug:KEC-15p(Housing)

| Pin No. | Signal | Pin No. | Signal | Pin No. | Signal |
|---|---|---|---|---|---|
| 1 | R/C OUT | 6 | VIDEO GND | 11 | GND |
| 2 | G/Y OUT | 7 | VIDEO GND | 12 | RXD |
| 3 | B/VBS OUT | 8 | VIDEO GND | 13 | HD IN/HD OUT/SYNC OUT |
| 4 | WE OUT | 9 | UNREG +12 V IN | 14 | VD IN/VD OUT |
| 5 | GND | 10 | TRIG IN | 15 | TXD |

(Pin contact JK-SP2140)(Cover JK-C151C)



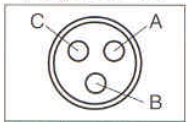

Lens connector
(Plug:E4-191J-100)




| Pin No. | Signal |
|---|---|
| 1 | Damp ⊖ |
| 2 | Damp ⊕ |
| 3 | Drive ⊕ |
| 4 | Drive ⊖ |

VIDEO optionally

12V IN connector
(Plug:R03-P3F)




| Pin No. | Signal |
|---|---|
| A | GND |
| B | +12 V IN |
| C | N.C. |

## Specifications

| | |
|---|---|
| Imager: | 1/2 inch Progressive CCD |
| Pixels: | 659 x 494 |
| Cell Size: | 9.9 x 9.9 |
| Resolution: | Progressive: VGA 640 x 480<br>NTSC: 440 TV lines |
| Min. Illum: | 10.0 lux at f1.4 |
| S/N: | 50 db |
| AGC: | Off / On adjustable limit |
| Shutter: | 1/60 - 1/10000, AES, Variable |
| ALC: | AES, Lens Iris, AGC<br>Selectable Area |
| White Bal: | ATW / Manual / Preset |
| DSP: | 9 bits |
| Enhancer: | 5H enhancer processing |
| External Sync: | HD / VD |
| Trigger: | Frame/Field-on-Demand |
| Outputs: | Progressive: RGB VGA<br>NTSC: VBS, Y/C, RGB |
| Size: (W x H x D) | 58 x 58 x 48 |
| Power: | 12 volts DC, 360ma |
| Weight: | 220 g |
| Lens: | C or CS Mount |

# VGA Progressive Scan RGB Color Camera With Frame Memory KP-FD30M


## 1/2 Inch VGA Progressive Scan RGB color Camera KP-FD30M

- **Primary Color Filter**
- **60 frames / second Progressive Scan Output**
- **HD 15 pin VGA output connector**
- **Frame / Field-On-Demand Mode**
- **Built-in Frame Memory**
- **Digital Signal processing (DSP)**
- **NTSC mode with VBS, Y/C, & RGB outputs**
- **Auto Tracking White Balance (ATW)**
- **Auto Level Control (ALC)**
- **Auto Electronic Shutter (AES)**
- **RS-232C Remote Control for all Functions**
- **Output for Auto Iris Lens**

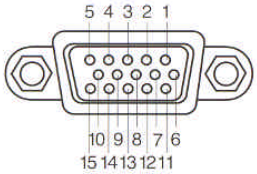
Designed around a progressive scan CCD with a primary RGB color filter, the **KP-FD30M** produces high quality images for use in image processing systems, microscopy and medical applications. A built-in frame memory allows the camera to be used in a machine vision application without the use of a frame grabber. A trigger signal stores the last frame of video in the camera memory where it is continually read out until the next trigger. The **KP-FD30M** can output progressive scan VGA images at 60 frames per second from the standard 15 pin HD connector allowing the camera to be connected directly to a computer monitor, and NTSC images with 440 TV lines of resolution at 30 frames per second for traditional equipment. The NTSC output can be selected as composite, Y/C, or RGB. Incorporating advanced features such as ATW to maintain proper color temperature with changing light levels, ALC to maintain proper output levels by controlling the lens iris, AES and AGC, and a Frame / Field-on-Demand mode featuring a one trigger and fixed shutter mode of operation, the camera can be configured to the requirements of the imaging task.



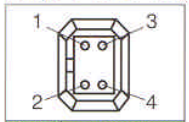
High-Density 15pin connector plug:KEC-15p(Housing)

| Pin No. | Signal | Pin No. | Signal | Pin No. | Signal |
|---|---|---|---|---|---|
| 1 | R/C OUT | 6 | VIDEO GND | 11 | GND |
| 2 | G/Y OUT | 7 | VIDEO GND | 12 | RXD |
| 3 | B/VBS OUT | 8 | VIDEO GND | 13 | HD IN/HD OUT/SYNC OUT |
| 4 | WE OUT | 9 | UNREG +12 V IN | 14 | VD IN/VD OUT |
| 5 | GND | 10 | TRIG IN | 15 | TXD |

(Pin contact JK-SP2140)(Cover JK-C151C)



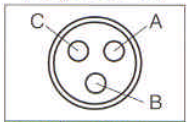

Lens connector
(Plug:E4-191J-100)




| Pin No. | Signal |
|---|---|
| 1 | Damp ⊖ |
| 2 | Damp ⊕ |
| 3 | Drive ⊕ |
| 4 | Drive ⊖ |

VIDEO optionally

12V IN connector
(Plug:R03-P3F)




| Pin No. | Signal |
|---|---|
| A | GND |
| B | +12 V IN |
| C | N.C. |

## Specifications

| | |
|---|---|
| Imager: | 1/2 inch Progressive CCD |
| Pixels: | 659 x 494 |
| Cell Size: | 9.9 x 9.9 |
| Resolution: | Progressive: VGA 640 x 480<br>NTSC: 440 TV lines |
| Min. Illum: | 10.0 lux at f1.4 |
| S/N: | 50 db |
| AGC: | Off / On adjustable limit |
| Shutter: | 1/60 - 1/10000, AES, Variable |
| ALC: | AES, Lens Iris, AGC<br>Selectable Area |
| White Bal: | ATW / Manual / Preset |
| DSP: | 9 bits |
| Enhancer: | 5H enhancer processing |
| External Sync: | HD / VD |
| Trigger: | Frame/Field-on-Demand |
| Outputs: | Progressive: RGB VGA<br>NTSC: VBS, Y/C, RGB |
| Size: (W x H x D) | 58 x 58 x 48 |
| Power: | 12 volts DC, 360ma |
| Weight: | 220 g |
| Lens: | C or CS Mount |

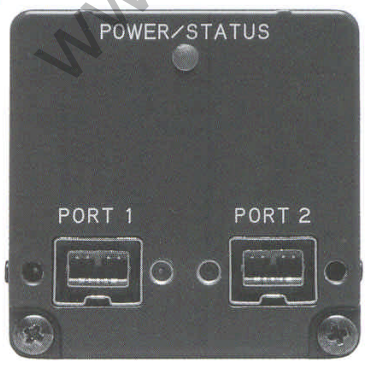
# Progressive Scan Color Camera KP-FD32F

**IEEE-1394.b**
***Firewire®800***


## 1/2 Inch Progressive Scan RGB color Camera KP-FD32F

- **Primary RGB Color Filter**
- **IEEE-1394.b output**
- **60 frames per second**
- **656 x 492 Effective Pixels**
- **Frame-On-Demand Mode**
- **Built-in Frame Memory with Time Stamp**
- **Digital Signal processing (DSP)**
- **6 Vector Color Corrector**
- **Auto Tracking White Balance (ATW)**
- **Auto Level Control (ALC)**
- **Auto Electronic Shutter (AES)**

Rear View




**Included Accessories:**

CD ROM with operation manual and driver / viewer software.

**Minimum System Requirements:**

Pentium 4 1.0GHz
Windows 2000 / XP
512 MB RAM
Display Card with 24 bit RGB

Designed for use in machine vision, microscopy and medical applications, the **KP-FD32F** features the latest IEEE.1394.b interface for high speed data transfer between the camera and the PC. Featuring a 1/2 inch progressive scan CCD with 656 x 492 effective pixels and a Bayer RGB filter, the camera is able to produce excellent image quality at 60 frames per second. Standard features include selectable image size, ATW or Memory mode for white balance, adjustable gamma, AES or manual shutter modes, a six vector color corrector, adjustable color saturation, sharpness and brightness. A frame-on-demand mode utilizing the IEEE-1394.b connection is provided, allowing the camera to capture images at a precise timing. A driver along with software to view and control the camera is provided. Multiple cameras can be used simultaneously through the use a of daisy chain connection.



## Specifications

| | |
|---|---|
| Imager: | 1/2 inch Progressive CCD |
| Pixels: | 656 x 492 |
| Cell Size: | 9.9 x 9.9 |
| Frame Rate: | 60 F/s RGB24 |
| Min. Illum: | 20.0 lux at f1.4 |
| AGC: | Off / On adjustable limit |
| Shutter: | 1/60 - 1/100K, AES, Variable |
| ALC: | Average/ Peak & Average Selectable Area |
| White Bal: | ATW / Manual / Preset |
| Gamma: | OFF / LUT (1024 steps) |
| Color Masking: | Off / On 6 Vector |
| External Sync: | HD / VD |
| Trigger: | Frame-on-Demand |
| Memory: | 10 Frame with Time Stamp |
| Outputs: | Progressive: RGB 24, YUV (4:2:2), YUV (4:1:1), Raw 8, Raw 16 |
| Interface: | IEEE-1394.b (Firewire 800) |
| Image Size: | Selectable 656 x 492 or 640 x 480 |
| Size: (W x H x D) | 44 x 44 x 54 |
| Power: | DC 8 to 30 volts (IEEE-1394) |
| Weight: | 130 g |
| Lens: | C Mount |

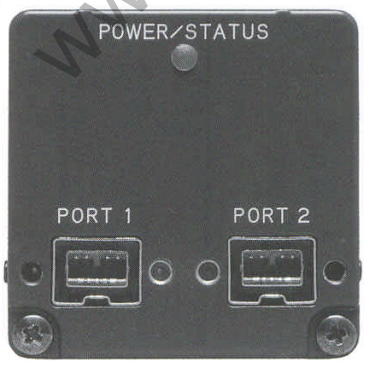
# MegaPixel Progressive Scan Color Camera KP-FD140F

**IEEE-1394.b**
***Firewire®800***


## 1/2 Inch Progressive Scan RGB color Camera KP-FD140F

- **Primary RGB Color Filter**
- **IEEE-1394.b output**
- **15 frames per second**
- **1392 x 1040 Effective Pixels**
- **Frame-On-Demand Mode**
- **Built-in Frame Memory with Time Stamp**
- **Digital Signal processing (DSP)**
- **6 Vector Color Corrector**
- **Auto Tracking White Balance (ATW)**
- **Auto Level Control (ALC)**
- **Auto Electronic Shutter (AES)**

Rear View




**Included Accessories:**

CD ROM with operation manual and driver / viewer software.

**Minimum System Requirements:**

Pentium 4 1.0GHz
Windows 2000 / XP
512 MB RAM
Display Card with 24 bit RGB

Designed for use in machine vision, microscopy and medical applications, the **KP-FD140F** features the latest IEEE.1394.b interface for high speed data transfer between the camera and the PC. Featuring a 1/2 inch progressive scan CCD with an impressive 1.45 million pixels (1392H x 1040V) and a Bayer RGB filter, the camera is able to produce excellent image quality at high resolution. Standard features include selectable image size, ATW or Memory mode for white balance, adjustable gamma, AES or manual shutter modes, a six vector color corrector, adjustable color saturation, sharpness and brightness. A frame-on-demand mode utilizing the IEEE-1394.b connection is provided, allowing the camera to capture images at a precise timing. A driver along with software to view and control the camera is provided. Multiple cameras can be used simultaneously through the use a of daisy chain connection.



## Specifications

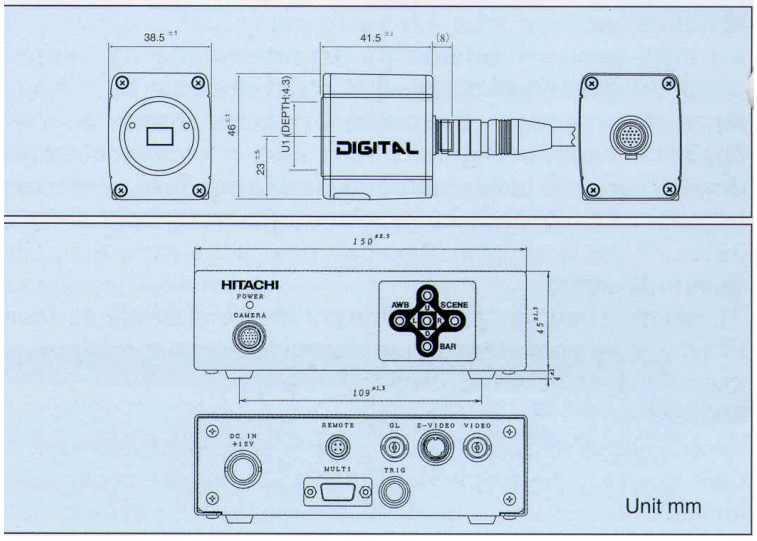
| | |
|---|---|
| Imager: | 1/2 inch Progressive CCD |
| Pixels: | 1392 x 1040 |
| Cell Size: | 4.65 x 4.65 |
| Frame Rate: | 15 F/s RGB24 |
| Min. Illum: | 25.0 lux at f1.4 |
| AGC: | Off / On adjustable limit |
| Shutter: | 1/15 - 1/100K, AES, Variable |
| ALC: | Average/ Peak & Average Selectable Area |
| White Bal: | ATW / Manual / Preset |
| Gamma: | OFF / LUT (1024 steps) |
| Color Masking: | Off / On 6 Vector |
| External Sync: | HD / VD |
| Trigger: | Frame-on-Demand |
| Memory: | 10 Frame with Time Stamp |
| Outputs: | Progressive: RGB 24, YUV (4:2:2), YUV (4:1:1), Raw 8, Raw 16 |
| Interface: | IEEE-1394.b (Firewire 800) |
| Image Size: | Selectable 1392 x 1040, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480 |
| Size: (W x H x D) | 44 x 44 x 54 |
| Power: | DC 8 to 30 volts (IEEE-1394) |
| Weight: | 130 g |
| Lens: | C Mount |

# 3 CCD Remote Head DSP Color Camera HV-D27A

## 1/2" Remote Head 3 CCD Color Camera HV-D27A

- **Remote Head 2 Piece Design**
- **800 TV Lines of Resolution**
- **12 bit A/D Converters for RGB**
- **Digital Signal Processing**
- **4 Application Files for Storage of Setup Menus**
- **6 Vector Color Correction**
- **Adjustable Chroma Level**
- **Digital Noise Reduction**
- **Auto Tracking White Balance Mode**
- **Auto Level Control, Auto Electronic Shutter**
- **Auto Knee**
- **Field or Frame Integration**
- **Composite, Y/C, RGB or Y/R-Y/B-Y outputs**
- **Genlock**
- **RS-232C Remote Control for all Functions**
- **Pixel Correction**

## Dimensions




The **HV-D27A** is a two piece color camera featuring a compact lightweight camera head with 3 one half inch CCD's, and Hitachi's 3rd generation of Digital Signal Processing (DSP). Designed for microscopy, medical imaging, and other areas requiring a very small head, the camera provides excellent performance with a full complement of features. 12 bit A/D converters provide 4096 levels of gray and improved color fidelity. A full menu system for selecting and setting camera operational parameters is available, once selections are made they can be stored to one of three scene files. Front panel selection at the CCU allows easy recall of a particular scene file. Digital Signal Processing (DSP) is used to provide stability as well as additional features such as six vector color correction, ultra gain, selectable light metering and long term integration. Complete control of all camera parameters is available through the RS-232C port on the camera. Cable lengths between the camera head and CCU can be up to 20 meters.



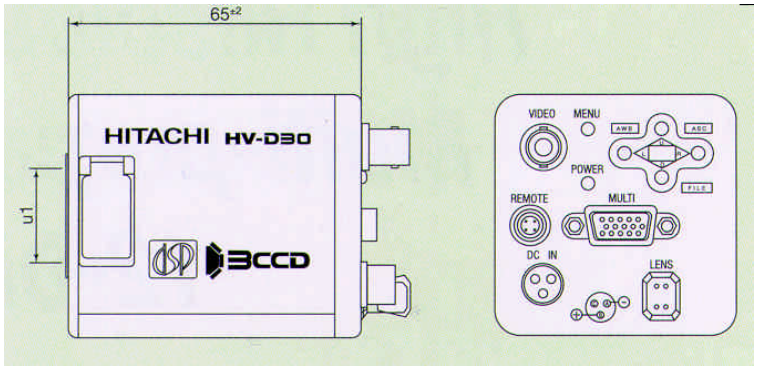
### Specifications

| | |
|---|---|
| Imager: | 3 1/2 inch IT Microlens CCD's |
| Pixels: | 768 x 494 ( 3 ) |
| Resolution: | 800 TV Lines |
| Sensitivity: | 2000 lux f8.0 |
| S/N: | 62db |
| Gain: | 0 - 20 db or auto level (ALC ) |
| Shutter: | 1/60 - 1/10000 or AES |
| Lock Scan: | 1/60.38 - 1/251.5 1H steps |
| Gamma: | 0.35 or 1.0 selectable |
| White Bal: | ATW / Memory / Preset |
| Masking: | 6 vector saturation and hue |
| Auto Knee: | On / Off |
| Contrast: | Off / Normal / High |
| Integration: | Field / Frame 1/60 - 8 sec. |
| DNR: | Off / Mode 1 / Mode 2 |
| Genlock: | VBS, BB, or H and V drive |
| Color Bars: | SMPTE |
| Outputs: | VBS, Y/C, Y/R-Y/B-Y, RGB |
| Remote: | RS-232C |
| Lens Mount: | C-Mount |
| Power: | 12 volts DC approx. 10.5 Watts |
| Size: | (W x H x D) 38.5 x 46 x 48 mm Head<br>150 x 45 x 170 mm CCU |
| Weight: | 90 grams Head<br>930 grams CCU |

# 3 CCD High Performance DSP Color Camera HV-D30


## 1/3" Compact 3CCD Color Camera HV-D30

- **800 TV Lines of Resolution**
- **Digital Signal Processing**
- **4 Scene Files for Storage of Setup Menus**
- **6 Vector Color Correction**
- **Adjustable Chroma Level**
- **Digital Noise Reduction**
- **Auto Tracking White Balance Mode**
- **Auto Level Control**
- **Auto Electronic Shutter**
- **Auto Knee**
- **Field or Frame Integration**
- **Long Term Integration 1/30 to 8 seconds**
- **Composite, Y/C, RGB or Y/R-Y/B-Y outputs**
- **Genlock**
- **RS-232C Remote Control for all Functions**




**HV-D30 Side and Rear Views**

Featuring a 3rd generation DSP circuit with 3 million gates, the HV-D30 provides exceptional performance in a compact size. A 12 bit A/D is used to convert the analog output of the CCD's to the digital signal for processing by the DSP. 800 TV lines of resolution and a 64 db signal to noise ratio result in outstanding picture quality. Automatic shading compensation is provided to compensate for unwanted color shifts caused by interaction of the C-mount lens and prism assembly. Automatic gain control and auto tracking white balance modes can be selected so the camera can operate properly under a wide range of illumination levels and color temperature levels. A six vector color corrector is provided and allows adjustment of the hue and saturation of the 3 primary and 3 secondary colors. A wide selection of detail functions is provided, including a flesh tone detail circuit. Four scene files are provided for setup, storage and recall of all camera parameters. An RS-232C port allows complete control of all camera functions from a remote location.



### Specifications

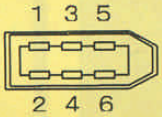
| | |
|---|---|
| Imager: | 3 1/3 inch IT Microlens CCD's |
| Pixels: | 768 x 494 ( 3 ) |
| Resolution: | 800 TV Lines |
| Sensitivity: | 2000 lux f9.5 |
| S/N: | 64db |
| Shading: | Automatic Compensation |
| Gain: | 0 - 24 db or auto level (ALC ) |
| Shutter: | 1/60 - 1/100,000 or AES |
| Lock Scan: | 1/60.38 - 1/100,000 1H steps |
| Gamma: | 0.35 or 1.0 selectable |
| White Bal: | ATW / Memory / Preset |
| Masking: | 6 vector saturation and hue |
| Auto Knee: | On / Off |
| Contrast: | Off / Normal / High |
| Integration: | Field / Frame 1/60 - 8 sec. |
| DNR: | Off / Mode 1 / Mode 2 |
| Trigger: | Field-on-Demand Mode |
| Genlock: | VBS, BB, or H and V drive |
| Color Bars: | SMPTE |
| Outputs: | VBS, Y/C, Y/R-Y/B-Y, RGB |
| Remote: | RS-232C |
| Lens Mount: | C-Mount |
| Power: | 12 volts DC approx. 4 Watts |
| Size: | (W x H x D) 65 x 65 x 80 mm |
| Weight: | 400 grams |

# 3 CCD Progressive Scan XGA Color Camera HV-F31F


## 1/3" Progressive Scan XGA 3CCD Color Camera HV-F31F

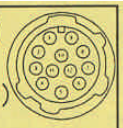
- **1/3 inch Progressive Scan 3 CCD**
- **XGA (1024 x 768) resolution**
- **15 frames per second**
- **IEEE-1394 IIDC (Ver. 1.30) Output**
- **Digital Signal Processing**
- **4 Scene Files for Storage of Setup Menus**
- **6 Vector Color Correction**
- **Adjustable Chroma Level**
- **Auto Tracking White Balance Mode**
- **Auto Level Control**
- **Auto Electronic Shutter**
- **Auto Knee**
- **Auto Shading Correction**
- **Long Term Integration 1/30 to 4 seconds**
- **Outputs: XGA (YUV, 15 fps or RGB, 7.5 fps)**
  **SVGA (YUV, 30 fps or RGB , 15 fps)**
- **Internal or External Sync Mode**
- **Frame-on-Demand Mode**
- **RS-232C Remote Control for all Functions**

■IEEE1394
(HV-F33F/F22F)
DDX 製 DSUB－BRG42-T12




| | |
|---|---|
| 1 | +12V IN |
| 2 | GND |
| 3 | TPB－ |
| 4 | TPB＋ |
| 5 | TPA－ |
| 6 | TPA＋ |

■12 ピン(common)
HIROSE
HR10A-10R-12PB(01)



| | | | |
|---|---|---|---|
| 1 | GND | 7 | VD IN |
| 2 | +12V IN | 8 | GND |
| 3 | GND | 9 | TRIG(H) |
| 4 | FLASH OUT | 10 | TRIG(C) |
| 5 | GND | 11 | +12V IN |
| 6 | HD IN | 12 | GND |

Incorporating 3 1/3 inch 800,000 pixel progressive scan CCD's the **HV-F31F** produces excellent image quality with high vertical resolution for use in medical, microscopy, and other image processing applications. The IEEE-1394 interface allows easy connection with a computer permitting resolution in the XGA or SVGA ranges. The frame rate, bits per pixel and resolution are related and can be selected to best meet the imaging requirements. Featuring a 3rd generation DSP, the **KP-F31F** incorporates ATW, ASC, AES, ALC, auto knee, flare correction, 6 vector color correction, and 4 scene files for the setup and storage of all camera operational parameters. The camera also features a long integration mode for use in low light levels, and a frame-on-demand mode for use in vision systems. In the frame-on-demand mode, a strobe signal is output at the end of the trigger pulse. An industry standard 12 pin Hirose connector is used for external sync, trigger input, and strobe output signals. Power can be input through the 12 pin Hirose or through the IEEE-1394 connector.



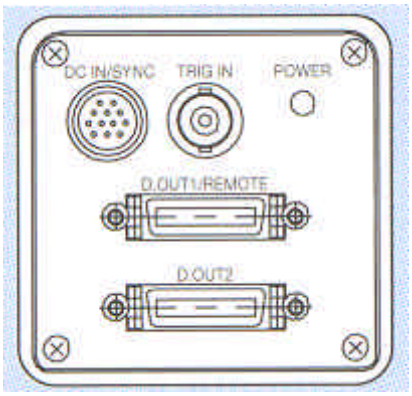
### Specifications

| | |
|---|---|
| Imager: | 3 1/3 inch Progressive CCD's |
| Pixels: | 1024 x 768 ( 3 ) |
| Resolution: | XGA 1024 x 768, or SVGA 800 x600 |
| Sensitivity: | 2000 lux f5.6 |
| Shading: | Automatic Compensation |
| Gain: | 0 - 12 db or auto level (ALC ) |
| Shutter: | 1/30 - 1/100,000 or AES |
| Lock Scan: | 1/30 - 1/100,000 1H steps |
| Gamma: | 0.45 or 1.0 selectable |
| White Bal: | ATW / Memory / Preset |
| Masking: | 6 vector saturation and hue |
| Auto Knee: | On / Off |
| Contrast: | Off / Normal / High |
| Integration: | 1/30 - 4 sec |
| Trigger: | Frame-on-Demand Mode, 1 Trig. |
| Sync: | Internal / External H and V drive |
| Outputs: | IEEE-1394 IIDC (Ver. 1.30) |
| | Selectable Positive or Negative Image |
| Remote: | RS-232C |
| Lens Mount: | C-Mount |
| Power: | 12 volts DC approx. 8 Watts |
| Size: | (W x H x D) 65 x 65 x 130 mm |
| Weight: | 600 grams |

# 3 CCD Progressive Scan XGA Color Camera
# HV-F31CL


## 1/3" Progressive Scan XGA 3CCD Color Camera HV-F31CL

- **1/3 inch Progressive Scan 3 CCD**
- **XGA (1024 x 768) resolution**
- **30 frames per second**
- **10 bit CameraLink Output ( medium configuration)**
- **Digital Signal Processing**
- **4 Scene Files for Storage of Setup Menus**
- **6 Vector Color Correction**
- **Adjustable Chroma Level**
- **Auto Tracking White Balance Mode**
- **Auto Level Control**
- **Auto Electronic Shutter**
- **Auto Knee**
- **Auto Shading Correction**
- **Long Term Integration 1/30 to 4 seconds**
- **Outputs: XGA (RGB, 30 fps)**
- **Internal or External Sync Mode**
- **Frame-on-Demand Mode**
- **RS-232C Remote Control for all Functions**




**HV-F31CL CameraLink Output**

900 Mbps dual connector, medium configuration.

700 Mbps single connector, base configuration.

Incorporating 3 1/3 inch 800,000 pixel progressive scan CCD's the **HV-F31CL** produces excellent image quality with high vertical resolution for use in medical, microscopy, and other image processing applications. The CameraLink interface allows easy connection with a frame grabber and allows the camera to operate at a full 30 fps, with full XGA resolution. RGB data is output at 30 bits per pixel enabling 1024 shades of gray for each channel. Featuring a 3rd generation DSP, the **KP-F31CL** incorporates ATW, ASC, AES, ALC, auto knee, flare correction, 6 vector color correction, and 4 scene files for the setup and storage of all camera operational parameters. The camera also features a long integration mode for use in low light levels, and a frame-on-demand mode for use in vision systems. In the frame-on-demand mode, a strobe signal is output at the end of the trigger pulse. An industry standard 12 pin Hirose connector is used for power, external sync, trigger input, and strobe output signals. Camera control is provided via the CameraLink connection.



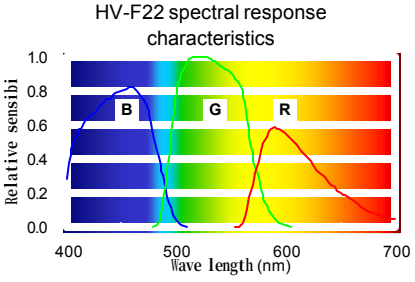
### Specifications

| | |
|---|---|
| Imager: | 3 1/3 inch Progressive CCD's |
| Pixels: | 1024 x 768 ( 3 ) |
| Resolution: | XGA 1024 x 768 |
| Sensitivity: | 2000 lux f5.6 |
| Shading: | Automatic Compensation |
| Gain: | 0 - 12 db or auto level (ALC ) |
| Shutter: | 1/30 - 1/100,000 or AES |
| Lock Scan: | 1/30 - 1/100,000 1H steps |
| Gamma: | 0.45 or 1.0 selectable |
| White Bal: | ATW / Memory / Preset |
| Masking: | 6 vector saturation and hue |
| Auto Knee: | On / Off |
| Contrast: | Off / Normal / High |
| Integration: | 1/30 - 4 sec |
| Trigger: | Frame-on-Demand Mode, 1 Trig. |
| Sync: | Internal / External H and V drive |
| Outputs: | CameraLink 30 bits per pixel |
| | Selectable Positive or Negative Image |
| Remote: | RS-232C |
| Lens Mount: | C-Mount |
| Power: | 12 volts DC approx. 8 Watts |
| Size: | (W x H x D) 65 x 65 x 130 mm |
| Weight: | 600 grams |

# 3 CCD Progressive Scan SXGA Color Camera HV-F22F


## 1/2" Progressive Scan SXGA 3CCD Color Camera HV-F22F

- **1/2 inch Progressive Scan 3 CCD**
- **SXGA (1360 x 1024) resolution**
- **7.5 frames per second**
- **IEEE-1394 IIDC (Ver. 1.30) Output**
- **Digital Signal Processing**
- **4 Scene Files for Storage of Setup Menus**
- **6 Vector Color Correction**
- **Adjustable Chroma Level**
- **Auto Tracking White Balance Mode**
- **Auto Level Control**
- **Auto Electronic Shutter**
- **Auto Knee**
- **Auto Shading Correction**
- **Long Term Integration 1/30 to 4 seconds**
- **Outputs:**
  - **SXGA 1280 x 960 (YUV or RGB 7.5 fps)**
  - **SXGA 1360 x 1024 (YUV or RGB 7.5 fps)**
  - **VGA 640 x 480 (YUV or RGB 30 fps)**
- **Internal or External Sync Mode**
- **Frame-on-Demand Mode**
- **RS-232C Remote Control for all Functions**




Incorporating 3 1/2 inch 1.45 million pixel progressive scan CCD's the **HV-F22F** produces excellent image quality with high vertical resolution for use in medical, microscopy, and other image processing applications. The IEEE-1394 interface allows easy connection with a computer permitting resolution in the SXGA or VGA ranges. The frame rate, bits per pixel and resolution are related and can be selected to best meet the imaging requirements. Featuring a 3rd generation DSP, the **KP-F22F** incorporates ATW, ASC, AES, ALC, auto knee, flare correction, 6 vector color correction, and 4 scene files for the setup and storage of all camera operational parameters. The camera also features a long integration mode for use in low light levels, and a frame-on-demand mode for use in vision systems. In the frame-on-demand mode, a strobe signal is output at the end of the trigger pulse. An industry standard 12 pin Hirose connector is used for external sync, trigger input, and strobe output signals. Power can be input through the 12 pin Hirose or through the IEEE-1394 connector.



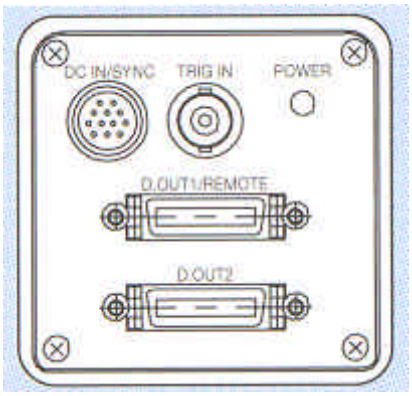
### Specifications

| | |
|---|---|
| Imager: | 3 1/2 inch Progressive CCD's |
| Pixels: | 1360 x 1024 ( 3 ) |
| Resolution: | SXGA 1360 x 1024 or 1280 x 960 |
| | VGA 640 x 480 |
| Sensitivity: | 2000 lux f8.0 |
| Shading: | Automatic Compensation |
| Gain: | 0 - 12 db or auto level (ALC ) |
| Shutter: | 1/15 - 1/100,000 or AES |
| Lock Scan: | 1/15 - 1/100,000 1H steps |
| Gamma: | 0.45 or 1.0 selectable |
| White Bal: | ATW / Memory / Preset |
| Masking: | 6 vector saturation and hue |
| Auto Knee: | On / Off |
| Contrast: | Off / Normal / High |
| Integration: | 1/15 - 4 sec |
| Trigger: | Frame-on-Demand Mode, 1 Trig. |
| Sync: | Internal / External H and V drive |
| Outputs: | IEEE-1394 IIDC (Ver. 1.30) |
| | Selectable Positive or Negative Image |
| Remote: | RS-232C |
| Lens Mount: | C-Mount |
| Power: | 12 volts DC approx. 8 Watts |
| Size: | (W x H x D) 65 x 65 x 130 mm |
| Weight: | 600 grams |

# 3 CCD Progressive Scan SXGA Color Camera
# HV-F22CL


## 1/2" Progressive Scan SXGA 3CCD Color Camera HV-F22CL

- **1/2 inch Progressive Scan 3 CCD**
- **SXGA (1360 x 1024) resolution**
- **15 frames per second**
- **CameraLink Output**
  **( medium configuration )**
- **Digital Signal Processing**
- **4 Scene Files for Storage of Setup Menus**
- **6 Vector Color Correction**
- **Adjustable Chroma Level**
- **Auto Tracking White Balance Mode**
- **Auto Level Control**
- **Auto Electronic Shutter**
- **Auto Knee**
- **Auto Shading Correction**
- **Long Term Integration 1/30 to 4 seconds**
- **Output: SXGA 1280 x 960 ( RGB 15 fps)**
- **Internal or External Sync Mode**
- **Frame-on-Demand Mode**
- **RS-232C Remote Control for all Functions**




**HV-F22CL**
**CameraLink Output**
900 Mbps dual connector, medium configuration.

700 Mbps single connector, base configuration.

Incorporating 3 1/2 inch 1.45 million pixel progressive scan CCD's the **HV-F22CL** produces excellent image quality with high vertical resolution for use in medical, microscopy, and other image processing applications. The CameraLink interface allows easy connection with a frame grabber and allows the camera to operate at 15 fps, with full SXGA resolution. RGB data is output at 30 bits per pixel enabling 1024 shades of gray for each channel. Featuring a 3rd generation DSP, the **KP-F22CL** incorporates ATW, ASC, AES, ALC, auto knee, flare correction, 6 vector color correction, and 4 scene files for the setup and storage of all camera operational parameters. The camera also features a long integration mode for use in low light levels, and a frame-on-demand mode for use in vision systems. In the frame-on-demand mode, a strobe signal is output at the end of the trigger pulse. An industry standard 12 pin Hirose connector is used for power, external sync, trigger input, and strobe output signals. Camera control is handled via the CameraLink interface.

### Specifications

| | |
|---|---|
| Imager: | 3 1/2 inch Progressive CCD's |
| Pixels: | 1360 x 1024 ( 3 ) |
| Resolution: | SXGA 1360 x 1024 |
| Sensitivity: | 2000 lux f8.0 |
| Shading: | Automatic Compensation |
| Gain: | 0 - 12 db or auto level (ALC ) |
| Shutter: | 1/15 - 1/100,000 or AES |
| Lock Scan: | 1/15 - 1/100,000 1H steps |
| Gamma: | 0.45 or 1.0 selectable |
| White Bal: | ATW / Memory / Preset |
| Masking: | 6 vector saturation and hue |
| Auto Knee: | On / Off |
| Contrast: | Off / Normal / High |
| Integration: | 1/15 - 4 sec |
| Trigger: | Frame-on-Demand Mode, 1 Trig. |
| Sync: | Internal / External H and V drive |
| Outputs: | CameraLink 30 bits per pixel |
| | Selectable Positive or Negative Image |
| Remote: | RS-232C |
| Lens Mount: | C-Mount |
| Power: | 12 volts DC approx. 8 Watts |
| Size: | (W x H x D) 65 x 65 x 130 mm |
| Weight: | 600 grams |

# Eagle PT-50 Pan / Tilt System


## Eagle PT-50 Pan / Tilt Head

- **Quiet Operation**
- **On Board Computer Controlled**
- **Proportional Speed Control**
- **Vector Solving of Pan / Tilt Commands**
- **Serial RS-485 Control**
- **Adjustable Preset Speeds**
- **Adjustable End Limits**
- **Normal or Inverted Operation**
- **Supplies 12 volt DC Power for Camera**
- **PC Control Software Available**
- **Optional Camera Control Module**
- **Optional Component Video Output**
- **Optional SDI Output**

The **Eagle PT-50** is a high quality, light weight pan / tilt head designed for quiet operation with a maximum weight limit of 6 pounds. Its quiet operation and small size permits use in teleconferencing, city council meetings, churches, medical documentation, and entertainment venues. Ideally suited for use with the **HV-D30** and **Fujinon R11** series lenses, the **PT-50** can provide complete camera and lens control through the use of the optional **PT-CCB-50** camera control chip. Normal or inverted operation is possible, and to eliminate the need for strain relief on the system cables, all external connections are made to the stationary base of the pan / tilt head. Power, video, and control signals are passed through the base to the camera. For simplified installation a pre-built camera power and control harness along with an adjustable camera mount is provided with each unit. Pan and tilt limits can be set electronically from the controller to limit movement in desired directions. A single joystick on the **PT-C55** provides proportional speed control for pan / tilt and focus, while a rocker switch provides proportional speed control for zoom. Three coarse speed control ranges are user selectable to meet the requirements of the imaging task. The **PT-50** is compatible with most **Eagle** accessories, allowing the use of different controllers, power supplies, shot boxes, modem control, and power and control splitters.



### PT-50 Specifications

| | |
|---|---|
| Maximum Load: | 6 pounds |
| Pan Range: | ±179 degrees |
| Tilt Range: | ±45 degrees |
| Pan / Tilt Speed: | 0 to 15 degrees per second / variable |
| Accuracy: | ± 5 arc minutes (0.08 degrees) |
| Noise Level: | Less than 30 dBA |

## Eagle PT-C55 Pan / Tilt Controller

- **Controls up to 8 Pan / Tilt Heads**
- **Stores 20 Presets per Head**
- **Provides Complete Camera Control—Requires camera control module in p/t head**
- **Proportional Speed Control of Pan / Tilt, with 3 Selectable Speed Ranges**
- **Proportional Speed Control for Zoom / Focus**
- **Auto or Manual Lens Iris control**

# Eagle PT-101 Pan / Tilt System


## Eagle Pan / Tilt Head PT-101

- **Stepper Motors Provide Quiet Operation**
- **Heavy Duty Worm Gear Operation**
- **On Board Computer Controlled**
- **Proportional Speed Control**
- **Vector Solving of Pan / Tilt Commands**
- **Serial RS-485 Control - Maximum 32 Units**
- **Storage for 128 Presets per Unit**
- **Adjustable Preset Speeds**
- **Adjustable End Limits**
- **Normal or Inverted Operation**
- **Supplies 12 volt DC Power for Camera**
- **PC Control Software Available**
- **Optional Camera Control Module**

**Eagle** pan/tilt units are compact, rugged motorized pan/tilt systems designed for use in teleconference, distance learning, and point of view shots from buildings or towers. The pan tilt head is environmentally sealed for reliable long term operation. Heavy duty worm drive gears provide reliable and precise movement for the pan and tilt functions, while gear reduction provides for a high torque rating in a compact design. Proportional speed control is provided for the pan, tilt, zoom and focus functions, allowing the operator to change a functions speed during a move. Vector solving of commands, allows the pan and tilt functions to operate together to arrive smoothly at the desired end point. Serial control communications to the pan/tilt head is provided by an RS-485 communications line, providing line lengths of up to 5000 feet, and allowing up to 32 pan/tilt heads to be controlled by a single control unit. A dedicated microprocessor in the pan/tilt head processes all received commands and allows the controller to communicate with another unit, while the previous unit is processing commands. Each pan/tilt head can store up to 128 presets which are retained in non-volatile memory, so presets are not lost when power is removed from the unit. End limits can be assigned and set for the pan, tilt, zoom and focus functions. Three coarse speed ranges can be selected, once selected, proportional speed control operates for that range. This allows the user to tailor the response of the unit to the application. Each unit operates from a single 24 volt DC power supply, and is factory configured to work with the desired camera and lens combination, eliminating setup time and installation errors. Normal, inverted or face down mounting of the unit is possible to suit the desired application and installation.



## Specifications

| | |
|---|---|
| PT-101: | For all HV-C and HV-D series cameras. |
| Load Limit: | 12 pounds |
| Pan Range: | 360 degrees |
| Tilt Range: | 240 degrees |
| Maximum Pan Speed: | 30 degrees / sec |
| Maximum Tilt Speed: | 30 degrees / sec |
| Resolution: | ±5 Arc Minutes |
| Camera Power: | 12 V DC at 5A |
| Lens Power: | 7.5 or 12 V DC |
| Enviroment: | Indoor |
| Interface: | RS-485 |
| Input Voltage: | 24 V DC 4.5A |

## Accessories

**PT-EE-S** Small all weather environmental enclosure for the camera includes a sun shield and blower for complete camera protection.

**PT-EE-L** Large all weather environmental enclosure for use with the HV-D3 includes a sun shield and blower for complete camera protection.

**PT-PS-3** 24 Volt DC, 6.5 amp power supply for PT-101.

# Eagle Pan / Tilt Controllers

## Pan / Tilt Controller Model PT-C

The **PT-C** is a stand alone dedicated control unit for the **Eagle** pan/tilt head. The **PT-C** features dual proportional speed control joysticks for the operation of pan/tilt and zoom/focus. Operating on RS-485 communications, the **PT-C** can control up to 16 pan/tilt heads. A 2 line by 20 character back-lit LCD display provides the current function and status of the pan/tilt head being controlled. Storage of up to 64 presets can be set for each pan/tilt head in the system. Using the numeric keypad, the desired preset can be recalled for each pan/tilt unit. A "gang" function is available that can send all pan/tilt heads in the system to the same numeric preset. The numeric keypad and function keys can be used to select coarse speed ranges for pan/tilt, and zoom/focus, as well as for the setting of end limits. The **PT-C** is designed for table top operation and includes a wall mount power supply for internal electronics.

## Camera Control Unit Model PT-CC

The **PT-CC** is an optional accessory designed to work with the **PT-C** using the same RS-485 line to communicate with the pan/tilt head and the camera electronics. The **PT-CC** connects directly to and receives power from the **PT-C**. An optional **PT-CCB** is required to convert the RS-485 commands from the **PT-CC** to RS-232C commands for camera control. The **PT-CCB** is factory installed in the **Eagle** pan/tilt head at the time the system is ordered. The camera control unit can control up to 16 cameras and provides complete control of all camera functions that are available for remote control. Dedicated slide pots are provided for control of the lens iris and camera black level. In manual iris mode, the slide control allows full range of iris operation, while in the auto iris mode the slide control provides an override of the auto iris setting by ± 1 f stop. Switches and LED indicators are provided for selection of iris mode and control of auto white and auto black balance, detail level, shutter speeds, camera/bar operation, red and blue paint controls, and genlock timing functions. Additional camera functions can be selected using the option buttons.




## Combined Pan / Tilt and Camera Controller PT-C55

The **PT-C55** is a controller that combines the functions of pan / tilt and camera control in one unit. Designed to control up to 8 pan tilt units, the **PT-C55** through the use of dedicated menu buttons provides complete access and control of all camera menus and operating functions. Convenient front panel push buttons allow easy selection of 20 presets for each of the 8 cameras the unit is capable of controlling. A single joystick with a rotary top knob provides proportional speed control of pan, tilt, and focus. A rocker switch is used to provide proportional speed control for zoom. Dedicated switches provide easy control of AWB and ABB, along with Red and Blue gain and black level.

# Hitachi Monochrome Camera Selector

| Camera | Image Size | Pixels | Resolution | Sensitivity | S / N | Lens Mount | Progressive Scan | 2 Piece design | AES | AGC | F/Fr on Demand | R/R Mode | Field / Frame | HD / VD Drive | Shutter | Integration | Frame Rate | Square Pixels | Power | VBS Output | Digital Output | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KP-M1A | 2/3" | 768 x 493 | 570 | 0.3 f1.4 | 56 | C | | | | Y | Y | Y | Y | Y | Y | O | 30 | | 12 | Y | | Additional Types. External gain, Long Integration |
| KP-MB1A | 2/3" | 768 x 493 | 570 | 0.5 f1.4 | 56 | C | | Y | | Y | | Y | Y | Y | Y | | 30 | | 12 | Y | | 2 Piece, Compact head Seperated Type |
| KP-MC1A | 2/3" | 768x493 | 570 | 0.5 f1.4 | 56 | C | | | | Y | | Y | Y | Y | Y | | 30 | | 12 | Y | | Side View type KP-M1 |
| KP-M2A | 1/2" | 768 x 494 | 570 | 0.5 f1.4 | 56 | C | | | | Y | Y | Y | Y | Y | Y | | 30 | | 12 | Y | | Same form factor as KP-M1, AGC or fixed gain, selectable gamma |
| KP-M2R | 1/2" | 768 x 494 | 570 | 0.3 f1.4 | 56 | C | | | | Y | Y | Y | Y | Y | Y | | 30 | | 12 | Y | | Near IR Sensitive, Field-on-Demand |
| KP-M3A | 1/3" | 768 x 494 | 570 | 0.5 f1.4 | 56 | C | | | | Y | Y | Y | Y | Y | Y | | 30 | | 12 | Y | | Same form factor as KP-M1, AGC or fixed gain, selectable gamma |
| KP-M3R | 1/3" | 768 x 494 | 570 | 0.5 f1.4 | 56 | C | | | | Y | Y | Y | Y | Y | Y | | 30 | | 12 | Y | | Near IR Sensitive, Field-on-Demand |
| KP-M20 | 1/2" | 768 x 494 | 570 | 0.3 f1.4 | 60 | C | | | | Y | Y | | | Y | Y | | 30 | | 12 | y | | Ultra compact 29 x 29 39.5mm |
| KP-M22 | 1/2" | 768 x 494 | 570 | 0.3 f1.4 | 56 | C | | | | Y | Y | Y | Y | Y | Y | | 30 | | 12 | Y | | Compact Design, Single 12 pin Hirose Connector on rear |
| KP-M30 | 1/3" | 768 x 494 | 570 | 0.3 f1.4 | 60 | C | | | | Y | Y | | | Y | Y | | 30 | | 12 | y | | Ultra compact 29 x 29 39.5mm |
| KP-M32 | 1/3" | 768 x 494 | 570 | 0.3 f1.4 | 56 | C | | | | Y | Y | Y | Y | Y | Y | | 30 | | 12 | Y | | Compact Design, Single 12 pin Hirose Connector on rear |
| KP-F2A | 1/2" | 658 x 496 | 500 | 0.3 f1.4 | 50 | C | Y | | | Y | Y | Y | | Y | Y | Y | 30 | Y | 12 | Y | | Near IR, 30 frame per second progressive scan, single output |
| KP-F30 | 1/3" | 659 x 494 | 500 | 0.2 f1.4 | 50 | C | Y | | | Y | | | | Y | Y | | 60 | Y | 12 | | | Ultra compact 29 x 29 39.5mm, Partial Scan, Frame-on-Demand |
| KP-F30SCL | 1/3" | 659 x 494 | 500 | 0.2 f1.4 | 50 | C | Y | | | Y | | | | Y | Y | | 60 | Y | 12 | | Y | Ultral Compact Camera with Mini CameraLink Output Connector |
| KP-F32F | 1/2" | 656 x 494 | | 10 f1.4 | | C | Y | | Y | Y | Y | | | Y | Y | Y | 60 | Y | 12 | | Y | IEEE-1394.b output, LUT for Gamma, Memory with time stamp |
| KP-F33 | 1/3" | 659 x 494 | 500 | 0.2 f1.4 | 50 | C | Y | | | Y | | | | Y | Y | | 30 | Y | 12 | | | Ultra compact 29 x 29 39.5mm, Partial Scan, Frame-on-Demand |
| KP-F37 | 1/3" | 659 x 494 | 500 | 1.0 f1.4 | 50 | C | Y | | | Y | | | | Y | Y | | 70 | Y | 12 | | | Ultra compact 29 x 29 39.5mm, Frame-on-Demand |
| KP-F38 | 1/3" | 659 x 494 | 500 | 1.0 f1.4 | 50 | C | Y | | | Y | | | | Y | Y | | 80 | Y | 12 | | | Ultra compact 29 x 29 39.5mm, Frame-on-Demand |
| KP-F80 | 1/3" | 1034 x 768 | 800 | 1.0 f1.4 | 54 | C | Y | | | Y | | | | Y | Y | | 30 | Y | 12 | | Y | High Resolution, Ultra Compact, Frame-on-Demand |
| KP-F83F | 1/3" | 1037 x 779 | | 5.0 f1.4 | 50 | C | Y | | Y | Y | | | | Y | Y | | 30 | Y | 12 | | Y | IEEE-1394.b output, LUT for Gamma, Memory with time stamp |
| KP-F100B | 2/3" | 1392 x 1040 | | 1.0 f1.4 | 50 | C | Y | | | Y | Y | Y | | Y | Y | | 15 | Y | 12 | Y | Y | LVDS out, Partial Scan, Quad Seed Mode, RS-232C Remote |
| KP-F100BCL | 2/3" | 1392 x 1040 | | 1.0 f1.4 | 50 | C | Y | | | Y | Y | Y | | Y | Y | | 15 | Y | 12 | Y | Y | CameraLink out, Partial Scan, Quad Seed Mode, RS-232C Remote |
| KP-F120 | 2/3" | 1392 x 1040 | | 1.0 f1.4 | 50 | C | Y | | | Y | Y | Y | | Y | Y | | 30 | Y | 12 | Y | Y | Near IR, LVDS output, Partial Scan, RS-232C Remote, Compact |
| KP-F120CL | 2/3" | 1392 x 1040 | | 1.0 f1.4 | 50 | C | Y | | | Y | Y | Y | | Y | Y | | 30 | Y | 12 | Y | Y | Near IR, CameraLink, Partial Scan, RS-232C Remote, Compact |
| KP-F120F | 2/3" | 1392 x 1040 | | 1.0 f1.4 | 50 | C | Y | | | Y | Y | Y | | Y | Y | | 15 | Y | 12 | Y | Y | Near IR, IEEE-1394 interface, Partial Scan, Remote Control |
| KP-F140F | 1/2" | 1392 x 1040 | | 5 f1.4 | | C | Y | | Y | Y | Y | | | | Y | | 15 | Y | 12 | | Y | IEEE-1394.b output, LUT for Gamma, Memory with time stamp |
| KP-F200CL | 1.1/8 | 1628 X 1236 | | | | C | Y | | | | Y | | | Y | Y | | 24 | Y | 12 | | Y | 2 MegaPixel, Partial Scan, Frame-on-Demand, RS-232C remote |
| KP-F200SCL | 1.1/8 | 1628 X 1236 | | | | C | Y | | | | Y | | | Y | Y | | 24 | Y | 12 | | Y | Ultral Compact Camera with Mini CameraLink Output Connector |
| KP-E500 | 1/2" | 658 x 496 | 480 | 0.0003 f1.4 | 50 | C/CS | | | Y | Y | | | | | Y | Y | 30 | | 12 | Y | | Ultra Sensitivity, 0.000005 lux f1.4 in still mode |

Custom modifications to meet customer requirements can be accommondated, dependent on the quanity of cameras being ordered.

For camera compatibility and interface with various frame grabbers, contact the local Hitachi office.

For availability of CCIR or PAL versions, or for additional information on camera features, contact the local Hitachi Office.

Los Angeles 310-328-6116 New York 516-921-7200 Midwest 817-490-5124



For More Information Please Call Aegis Electronic Group, Inc. * (888) 687-6877 Phone * aegisg2@aegiselect.com * http://www.aegis-elec.com

# HITACHI Color Camera Selection Guide

| Camera | Type | Image Size | Pixels | CCD's | Resolution | Sensitivity | S / N | Lens Mount | DSP | AES | AGC | ATW | BLC | CCD Cooling | F/Fr on Demand | Field / Frame | Genlock | HD / VD Drive | Shutter | Integration | Pos / Neg Output | RS-232C | Frame Rate | Power | VBS Output | Y/C Output | RGB Output | Y, R-Y, B-Y Out | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KP-D20A | C | 1/3" | 768 x 494 | 1 | 480 | 0.8 f1.2 | 50 | C/CS | Y | Y | Y | Y | Y | | | | | | Y | | Y | Y | 30 | 12 | Y | Y | | | High Quality Optical path, Compact Design |
| KP-D20B | C | 1/2" | 768 x 494 | 1 | 480 | 0.3 f1.2 | 50 | C/CS | Y | Y | Y | Y | Y | | | | | | Y | | Y | Y | 30 | 12 | Y | Y | | | High Quality Optical path, Compact Design |
| KP-D531 | C | 12" | 768 x 494 | 1 | 480 | 0.02f1.2 | 50 | C/CS | Y | Y | Y | Y | Y | Y | | | | | Y | Y | Y | | 30 | AC | Y | Y | | | Auto-Change Integration Mode |
| KP-D590 | C | 12" | 768 x 494 | 1 | 480 | 0.01f1.2 | 50 | C/CS | Y | Y | Y | Y | Y | Y | | | | | Y | Y | Y | | 30 | 12 | Y | Y | | | Integration up to 64 times |
| KP-D591 | C | 12" | 768 x 494 | 1 | 480 | 0.01f1.2 | 50 | C/CS | Y | Y | Y | Y | Y | Y | | | | | Y | Y | Y | | 30 | AC | Y | | | | Integration up to 64 times |
| KP-DE500 | C | 1/2" | 658 x 496 | 1 | 480 | 0.009 f1.4 | 50 | C/CS | Y | Y | Y | Y | Y | Y | | | | | Y | Y | | | 30 | 12 | Y | | | | Ultra High Sensitivity, 0.00015 lux f1.4 |
| KP-FD30 | C | 1/2" | 659 x 494 | 1 | 440 | 1.0 f1.4 | 50 | C | Y | Y | Y | Y | Y | | Y | Y | | Y | Y | | | Y | 60 | 12 | Y | Y | Y | | RGB Filter, Prog Scan / Interlace Out |
| KP-FD30CL | C | 1/2" | 659 x 494 | 1 | 440 | 1.0 f1.4 | 50 | C | Y | Y | Y | Y | Y | | Y | Y | | Y | Y | | | Y | 60 | 12 | | | | | CameraLink Output 10 bits per pixel |
| KP-FD30M | C | 1/2" | 659 x 494 | 1 | 440 | 1.0 f1.4 | 50 | C | Y | Y | Y | Y | Y | | Y | Y | | Y | Y | | | Y | 60 | 12 | Y | Y | Y | | RGB Filter, Prog Scan / Interlace Out, Memory |
| KP-FD32F | C | 1/2" | 656 x 492 | 1 | VGA | 20 f1.4 | | C | Y | Y | Y | Y | Y | | Y | | | | Y | | | | 60 | | | | | | IEEE-1394.b output High Speed VGA |
| KP-FD140F | C | 1/2" | 1392 x 1024 | 1 | SXGA | 25 f1.4 | | C | Y | Y | Y | Y | Y | | Y | | | | | | | | 15 | | | | | | IEEE-1394.b output Megapixel SXGA |
| KP-F120C | C | 2/3" | 1392 x 1040 | 1 | | 1.0 f1.4 | 50 | C | | | | | | | Y | | | Y | Y | Y | | Y | 15 | 12 | | | Y | | 1.45 million pixel 8 bit LVDS digital output |
| HV-D27 | C | 1/2" | 768 x 494 | 3 | 800 | 2000 f9.5 | 63 | C | Y | Y | Y | Y | | | Y | Y | Y | Y | Y | Y | Y | Y | 30 | 12 | Y | Y | Y | Y | Remote compact Head, 3 Application Files |
| HV-D30 | C | 1/3" | 768 x 494 | 3 | 800 | 2000 f8.0 | 64 | C | Y | Y | Y | Y | Y | | Y | Y | Y | Y | Y | Y | Y | Y | 30 | 12 | Y | Y | Y | Y | 4 Application files, 6 vector color corrector |
| HV-F22F | C | 1/2" | 1360 x 1024 | 3 | SXGA | 2000 f8.0 | | C | Y | Y | Y | Y | Y | | Y | | | Y | Y | Y | Y | | 8 | 12 | | | | | SXGA Progressive Scan, Frewire Interface |
| HV-F22CL | C | 1/2" | 1360 x 1024 | 3 | SXGA | 2000 f8.0 | | C | Y | Y | Y | Y | Y | | Y | | | Y | Y | Y | Y | | 8 | 12 | | | | | SXGA Progressive Scan, CameraLink |
| HV-F31F | C | 1/3" | 1024 x 768 | 3 | XGA | 2000 f5.6 | | C | Y | Y | Y | Y | Y | | Y | | | Y | Y | Y | Y | | 15 | 12 | | | | | XGA Progressive Scan, Firewire Interface |
| HV-F31CL | C | 1/3" | 1024 x 768 | 3 | XGA | 2000 f5.6 | | C | Y | Y | Y | Y | Y | | Y | | | Y | Y | Y | Y | | 15 | 12 | | | | | XGA Progressive Scan, CameraLink |

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Hitachi Color Camera Selector

# Hitachi Camera Accessories

| HITACHI Camera Accessories | | KP-M1A, M2A, M3A | KP-MB1, MC1 | KP-M2R, KP-M3R | KP-M20 / M30 | KP-M22, KP-M32 | KP-F2A | KP-F30 / F30SCL | KP-F33, F37,F38 | KP-F80 | KP-F100B, F100BCL | KP-F120, KP-F120CL | KP-F120F | KP-F120C | KP-F200CL | KP-F200SCL | KP-D20A, KP-D20B | KP-D590 | KP-D531, D591 | KP-FD30, FD30M | HV-D27A, 37A | HV-D30 | HV-F22F, F22CL | HV-F31F, F31CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Power Supplies | 45601-C1 | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ☺ | | | ☺ | ☺ | ☺ | | |
| | 45601-C4 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | | | | | ☺ | ☺ |
| | 45601-C5 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | | | | | ☺ | ☺ |
| | 45601-C9 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | | | | | | | | | | | | |
| | 45601-C15 | | | | | | | | | | | | | | | | | | | ☺ | | ☺ | | |
| | AP12-C1 | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ☺ | | | | | ☺ | | |
| | AP12-C4 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | | | | | | |
| | AP12-C7 | | | | | | | | | | | | | | | | | | | | ☺ | | | |
| | AP-60AU | | | | | | | | | | | | | | | | | | | | ☺ | | | |
| Junction Box | JU-M1A | ★ | ★ | ★ | | ★ | | | | | ★ | ★ | ★ | ★ | ★ | | | | | | | | | |
| | JU-F1 | | | | | | ★ | ★ | | | | | | | | | | | | | | | | |
| | JU-F30 | | | | ★ | | | ★ | ★ | ★ | | | | | | ★ | | | | | | | | |
| Level Converter | JU-C20 | | | | | | | | | | | | | | | | | | | | ✹ | | | |
| | JU-Z2 | | | | | | | | | | | | | | | | | | | | ✹ | | | |
| Cables | C201 KS | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | | | | | | | | |
| | C501 KS | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | | | | | | | | |
| | C102 KS | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | ★ | | | | | | | | |
| | C201RK | | | | | | ☺ | | | | | | | | | | | | | | | | | |
| | C501RK | | | | | | ☺ | | | | | | | | | | | | | | | | | |
| | CK-301KAJ | | | | | | | | | | | | | | | | | | | | ☺ | | | |
| | CK-102KAJ | | | | | | | | | | | | | | | | | | | | ☺ | | | |
| | CK-202KAJ | | | | | | | | | | | | | | | | | | | | ☺ | | | |
| | C9D232C-6 | | | | | | | | | | | | | | | | ☺ | | | | ☺ | ☺ | | |
| | C9D232CF-6 | | | | | | | | | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | | | | | | |
| | C9DRGB | | | | | | | | | | | | | | | | | | | | ☺ | | | |
| | C15HDYC-15 | | | | | | | | | | | | | | | | | | | | | ☺ | | |
| | C15HDx5-15PR | | | | | | | | | | | | | | | | | | | | | ☺ | | |
| | C15HDx5-15 | | | | | | | | | | | | | | | | | | | | | ☺ | | |
| | C15HDx7-15 | | | | | | | | | | | | | | | | | | | ☺ | | ☺ | | |
| | CSV10 | | | | | | | | | | | | | | | | ☺ | ☺ | | | ☺ | | | |
| | CSV20 | | | | | | | | | | | | | | | | ☺ | ☺ | | | ☺ | | | |
| | C-152-RC2 | | | | | | | | | | | | | | | | | | | | ✹ | ✹ | | |
| | C-302-RC2 | | | | | | | | | | | | | | | | | | | | ✹ | ✹ | | |
| | C-602-RC2 | | | | | | | | | | | | | | | | | | | | ✹ | ✹ | | |
| | C-103-RC2 | | | | | | | | | | | | | | | | | | | | ✹ | ✹ | | |
| | C26PIG | | | | | | | | | | ☺ | | | | | | | | | | | | | |
| | C50PIG | | | | | | | | | | | ☺ | ☺ | ☺ | ☺ | ☺ | | | | | | | | |



★ Junction Boxes require a camera cable and a power supply in order to power the camera.

✹ Remote Control Units and Level Converters require a cable to work with the camera

☺ These items require no additional interface components.

# Hitachi Camera Accessories

| HITACHI Camera Accessories | | KP-M1A, M2A, M3A | KP-MB1, MC1 | KP-M2R, KP-M3R | KP-M20 / M30 | KP-M22, KP-M32 | KP-F2 | KP-F30 / KP-F30SCL | KP-F33, F37, F38 | KP-F80 | KP-F100B, F100BCL | KP-F120, KP-F120CL | KP-F120F | KP-F120C | KP-F200CL | KP-F200SCL | KP-D20A, KP-D20B | KP-D590 | KP-D531, KP-D591 | KP-FD30, FD30M | HV-D27A, 37A | HV-D30 | HV-F22F, HV-F22CL | HV-F31F, HV-F31CL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tripod Adapter | TA-M1 | ☺ | ☺ | ☺ | | | ☺ | | | | ☺ | | | | | | | | | | | | | |
| | TA-D20 | | | | | | | | | | | | | | | | ☺ | | | | | | | |
| | TA-F3 | | | | | ☺ | | ☺ | | | | | | | | | | | | | | | | |
| | TA-F30 | | | | ☺ | | | ☺ | ☺ | ☺ | | | | | | ☺ | | | | | | | | |
| | TA-F120 | | | | | | | | | | | ☺ | ☺ | ☺ | ☺ | | | | | ☺ | | | | |
| | Cs to C Mount | | | | | | | | | | | | | | | | ☺ | | | | | | | |
| | 2XHE Extender | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | | | | |
| | EX Tube | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | | | | |
| Lens Plug | E4-191J-100 | | | | | | | | | | | | | | | | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ |
| Dummy Glass | ARC1214 | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | | | | | | | | |
| Remote Unit | RC-C580 | | | | | | | | | | | | | | | | | ☺ | | | | | | |
| | RC-Z3 | | | | | | | | | | | | | | | | | | | | ★ | ★ | | |
| 12-pin Plug | HR10A-10P-12S | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | | | | | | |
| 6-pin Plug | HR10A-7P-6S | | | | | | ☺ | | | | ☺ | ☺ | | ☺ | ☺ | ☺ | | | | | | | | |
| 4-pin Plug | HR10A-7P-4P | | | | | | | | | | | | | | | | ☺ | | | ☺ | ☺ | ☺ | ☺ | ☺ |

★ Junction Boxes require a camera cable and a power supply in order to power the camera.

✸ Remote Control Units and Level Converters require a cable to work with the camera.

☺ These items require no additional interface components

# Frame Grabber Compatibility

| | Active Slicon | Alacron | Applied Silicon | BitFlow Inc. | Coreco | Data Translation | EDT | Epix | Euresys | Foresight Imaging | ImageNation | InSync Technologies | Integral | Matrox | MuTech | National Instruments | PDI | Scion | Sharp | Titan ystems |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KP-M1A, M2A, M3A | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ |
| KP-MB1 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ |
| KP-MC1A, MC2A | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ |
| KP-M2R, M3R | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ |
| KP-M20, M30 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ |
| KP-M22, M32 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ |
| KP-F1A | | ☺ | | ☺ | ☺ | | | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ | |
| KP-F2 | | ☺ | | ☺ | ☺ | | | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ | |
| KP-F3, F3W | | ☺ | | ☺ | ☺ | | | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ | |
| KP-F30, KP-F33 | | ☺ | | ☺ | ☺ | | | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ | |
| KP-F37,F38, F80 | | ☺ | | ☺ | ☺ | | | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ | |
| KP-F100, F100A | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | | ☺ | ☺ | ☺ | | | | ☺ |
| KP-F100B | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | | ☺ | ☺ | ☺ | | | | ☺ |
| KP-F100UV | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | | ☺ | ☺ | ☺ | | | | ☺ |
| KP-F102 | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ | ☺ | | ☺ | ☺ | ☺ | | | | ☺ |
| KP-F100C | ☺ | | | ☺ | | | | ☺ | ☺ | | | | | | | | | | | |
| KP-F110 | ☺ | ☺ | | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | | | ☺ | | ☺ | | | | ☺ |
| KP-F120 | ☺ | ☺ | | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | | | ☺ | | ☺ | | | | ☺ |
| KP-D8 | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ |
| KP-D20A / B | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ |
| KP-D50 | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ |
| KP-D580, D590 | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ |
| KP-D581, D591 | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ |
| KP-FD30 | | | | | | | | | | | | | | | | | | | | |
| HV-C20 | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ |
| HV-D25 | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ |
| HV-D27 / D27A | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ |
| HV-D37 / D37A | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | ☺ |
| HV-D30 | ☺ | ☺ | | ☺ | ☺ | ☺ | | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | | | ☺ |
| HV-F22CL | | | | ☺ | ☺ | | ☺ | | ☺ | | | | | | | | | | | |
| HV-F31CL | | | | ☺ | ☺ | | ☺ | | ☺ | | | | | | | | | | | |



For complete compatibility of a particular frame grabber with a given camera please contact the Regional Hitachi Sales Manager or the frame grabber manufacturer. The chart only indicates basic compatibility between the camera and the frame grabber. It does not mean that all functions are supported, or that the combination is suitable for a particular application.

# HITACHI KOKUSAI ELECTRIC AMERICA,

# White Balance

The ability of the camera to adjust to a particular color temperature of light, and make a white object appear white on the monitor is the function of the white balance circuit in the camera. There are several methods that are commonly used to accomplish white balance.

Most modern color television cameras have three basic modes of white balance. For proper operation, and to obtain the correct results, it is important to know when to use a particular mode.

1. **Preset White Balance**: In this mode, the camera is balanced for white, under light that normally has a color temperature of 3200 degrees Kelvin. This is the typical factory adjustment when the camera is set for white balance, and corresponds to the light normally used in TV studios. Operation of the camera under light that is the same color temperature, as that used in the factory, will produce proper color balance, and good color rendition.

2. **Memory White Balance**: In this mode of operation, the camera is pointed at a white object, and the auto white button is pressed. The camera then automatically adjusts the red and blue gains to produce white. This method is normally used for white balance, due to the fact, that it also takes into account any effect the color temperature of the light may have on the object being shot. Depending on the camera, this mode of operation has a large range of color balance, and can handle light with color temperatures from approximately 2000 to 5800 degrees Kelvin.

3. **Auto Tracking White**: In this mode of operation, the camera attempts to make the brightest object in the picture white. The red and blue gain are constantly and automatically adjusted by the camera to account for differences in the color temperature of the light. This mode is useful for long shots, and when the camera must shoot between different color temperatures of light, without being white balanced. There is a drawback to this mode, in that it will attempt to make the brightest object in the scene white. Should the scene not contain any white object, but rather a light colored object, the camera will make this white. This will cause all of the color reproduction of the camera to be incorrect.



For use on pan/tilt systems where the color temperature of the light might vary, and the majority of the shots are wide angle, the Auto Tracking White Balance mode might be used. For tight shots or to maintain the best color balance, the Memory mode of white balance should be used. In this case the white balance function should be performed whenever the scene illumination or color temperature of the light changes.

For microscope applications, it is recommended that the memory mode of white balance be used. The camera should be white balanced under the illumination level that will be used for the slide. The slide should be removed, leaving a pure path of light to the camera. The camera would then be white balanced, by pressing the auto white button. The slide can then be inserted in the path, and the colors should then be correct. If the light intensity is changed, the camera may need to be white balanced again, because normally the color temperature of the light will change with its intensity.

# Terms and Definitions

**Asynchronous Reset** Asynchronous reset, switch selectable on the **KP-M1A** and optional on the **KP-M2** and **KP-M3**, allows the cameras vertical drive to be reset by an external pulse. This allows an external source such as a vision system, to determine when the camera should begin its scan, such that the scanned image will be in the center of the desired field. After the image is scanned, the cameras drive is reset, and the field of video is output. There is normally a one field delay with this mode of operation.

**ATW** Auto tracking white balance allows the color camera to maintain proper white balance under changing color temperature levels. The video signal is continuously sampled, and adjustment is performed on the separate color amplifiers to correct for variations in changing color temperature of the light, to ensure that the brightest part of the picture remains white.

**Backlight Correction (BLC)** When a strong light source or reflection exists in a scene, the auto iris on the lens will adjust for the brightest part of the scene, resulting in a dark unclear picture. With BLC, the bright portion of the picture will be ignored for determination of the auto iris setting. This will result in the dark areas being made brighter, while the white suppression circuit will compress the bright area, while maintaining detail. BLC can be set to On or OFF, in the ON mode the area of acceptance can often be varied.

**Electronic Shutter** The electronic shutter works by controlling the amount of time, in fixed steps, that the CCD array is allowed to accumulate charge. The higher the shutter speed, the less exposure time for the CCD array. This is useful for capturing high speed objects without the blurring, that would occur at a normal exposure time. Higher shutter speeds result in lower sensitivity.

**Field on Demand** The **KP-M and KP-F Series** of cameras feature the Field on Demand function. This allows the cameras vertical drive to be reset, and an image to be captured and output immediately after an input pulse. This eliminates the one field delay that is associated with asynchronous reset cameras.

**Field and Frame Integration** In the field mode of integration two adjacent rows of pixels are combined together, and then shifted out as a single line. Pixel rows 1 and 2 are combined to form line one, pixel rows 3 and 4 are combined to form line 3, etc. Pixel rows 2 and 3 are then combined to form line 2, etc. The odd number lines are output first, (field one) followed by the even numbered lines, (field two). In the frame mode of integration, the odd numbered rows of pixels are output first (field one), followed by the even numbered rows of pixels, (field two). Adjacent rows of pixels are not combined. The field mode of integration offers increased sensitivity, a desirable benefit for use with vision systems. The frame mode of integration, offers increased vertical resolution, approximately 40% better than the field mode of integration.

**Internal or External Sync** In the internal sync mode of operation, a crystal controlled oscillator is used to generate the required horizontal and vertical drive pulses. These are added together to form the composite sync signal that is then added to the video to produce the RS-170 composite video output. When external horizontal and vertical drive pulses are input to the camera, the camera will automatically switch from internal to external sync mode. Automatic sensing is also performed, if a composite sync signal is input to the camera. External synchronization is desirable if the camera needs to be "locked" to the frame grabber or processor, so that the video output of the camera is in time with the video processing.

**IR Filter** An IR filter is usually placed in front of the CCD array to limit the amount of infared light that is allowed to strike the CCD. The infared filter acts as a low pass filter for light, allowing only the visible spectrum of light to strike the CCD. For special applications, the IR filter can be removed, to extend the spectral response into the near infared region. The camera can then produce a useable, but reduced output level above the 800 nanometer range, known as the near IR range.

**Spectral Response** The visible light spectrum ranges from 400 to 750 nanometers. Above this the near infred spectrum starts at 750 nanometers and extends to 3 micrometers. While all CCD cameras can produce acceptable pictures in the visible light range, Hitachi has developed two new cameras, the **KP-M2R** and the **KP-F2A/B**, with extended sensitivity into the near infared range. With their extended range, these cameras open new possibilies for medical, microscopy, and machine vision applications.

**Termination** For best picture quality it is necessary that the monitor is properly terminated. Usually this is accomplished by placing the termination switch to the ON position, or by use of an external terminating resistor. On some newer monitors the termination is automatic. In each case, if the mointor is connected at the end of a single cable run, it should be terminated in 75 ohms. If the monitor is used in a loop-thru configuration, it should be unterminated.



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