

14bit A/D SDTV Production Digital Broadcast Color Television Camera Presentation

HITACHI SK-900



Features of SK-900

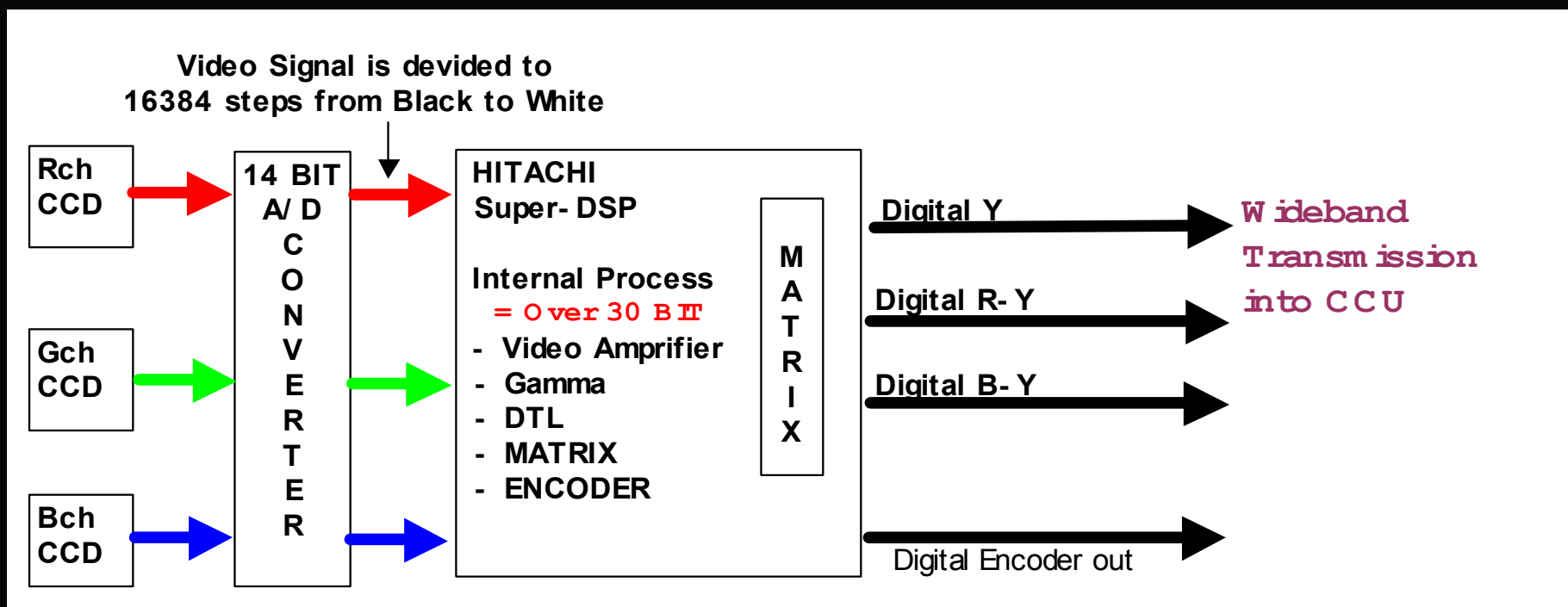
- 14-bit Analog to Digital Converter
- Hitachi's latest generation DSP
- 1.2 Million Pixels CCD
- 5 ECC Filter and Optical Filter
- Gray Scale Auto Setup
- Setup card
- Low VF position (optionally)



Technical Features: 14bitADC

14-bit Analog to Digital converters

- RGB CCDs' outputs are converted Analog to Digital by **14-bit (=16384 steps)** with High dynamic range



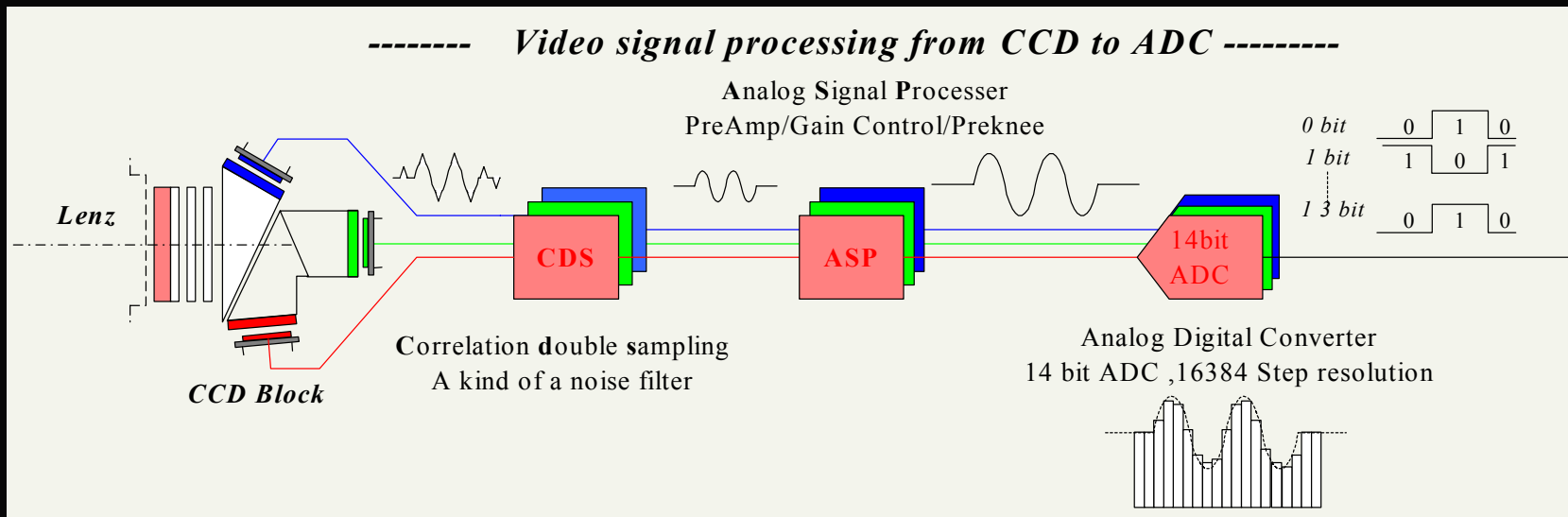
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Technical Features: 14-bit Analog to Digital Converter

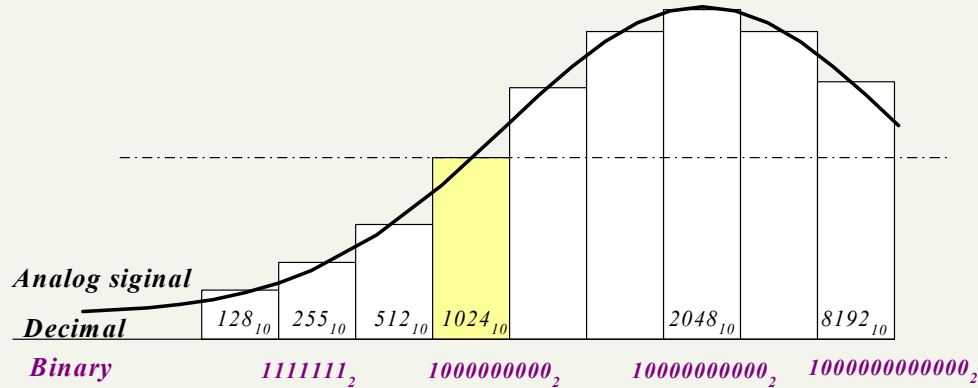


● 14-bit ADC with newest DSP

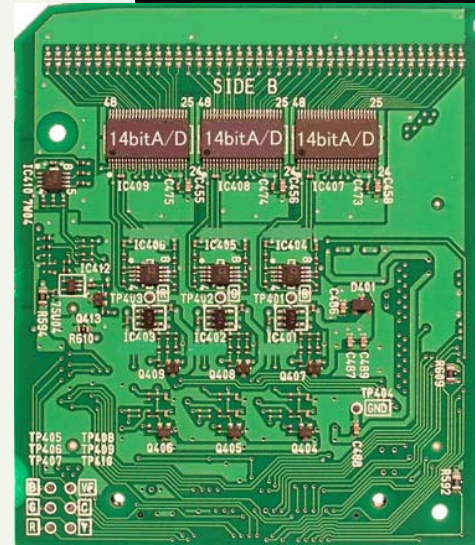
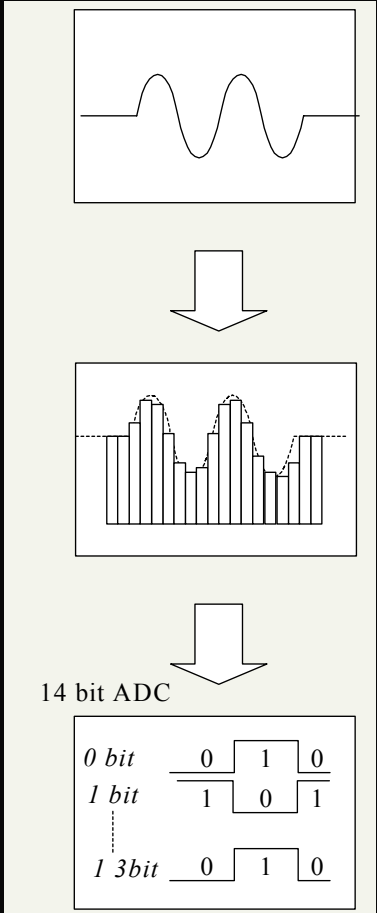


Convert from analog to digital

----- Theory of Convert from analog to digital -----



	100000_2	10000000_2		
0 bit	0	1	0	0
1 bit	0	1	0	0
2 bit	0	1	0	0
3 bit	0	1	0	0
4 bit	0	1	0	0
5 bit	0	1	0	0
6 bit	0	1	0	0
7 bit	1	0	0	0
8 bit	0	0	1	0
9 bit	0	0	0	1
10 bit	0	0	0	0
11 bit	0	0	0	0
12 bit	1	0	0	0
13 bit	0	0	0	1



Technical Features: DSP

● Fourth Generation DSP for Broadcast camera.



- Hitachi is leading developer for High performance CPU & DSP in Broadcast Fields
- Hitachi's latest generation **0.18 μ m VLSIC** processor with over 3 million gates.
- **Over 30-bit internal processing** to achieve dynamic range with superb video stability
- **Maintenance Free**

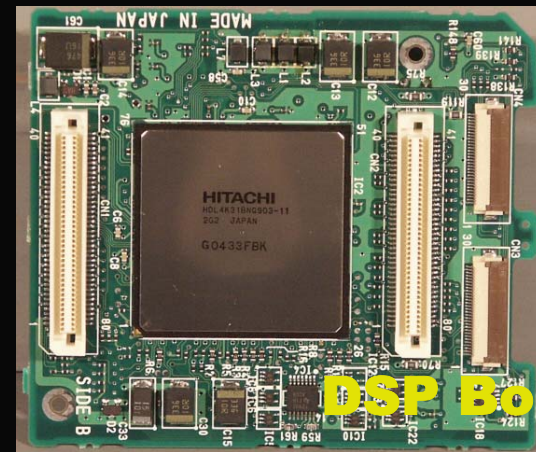


Hitachi DSP Device

Technical Features: DSP

● What is advantage Hitachi's DSP ??

- Video output from CCD can be processed to Encoder **Without Video Loss**
- Only one chip of DSP can perform as 4 to 5 Analog Circuit boards
- **NO Adjustment** is necessary with potentiometer for Maintenance
- Daily video adjustment & setup can be controlled easily via MENU or Remote Control Panel



DSP Board



Analog Boards

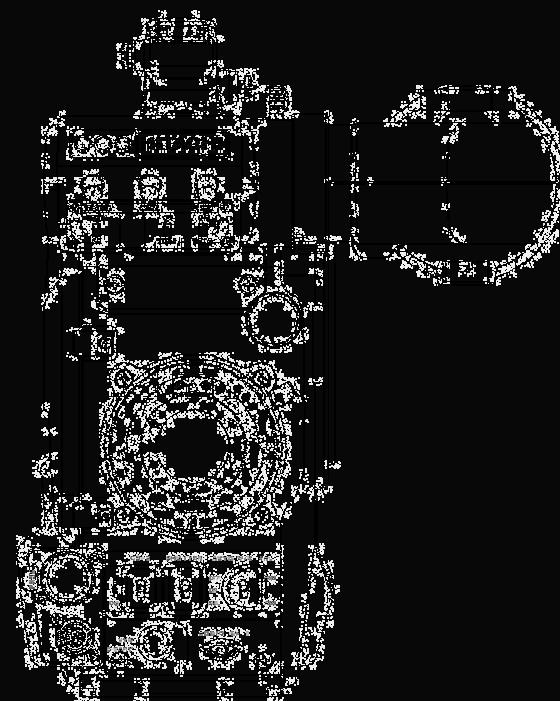
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DSP Function of SK-900



- Automatic flesh-tone detection
 - Dual flesh-tone settings
 - Flesh-tone masking
- DTL
 - High Chroma DTL
 - Variable Detail Frequency
- Masking
 - 6 Vector Color Correction
 - Linear Matrix
- Gamma
 - Special Gamma



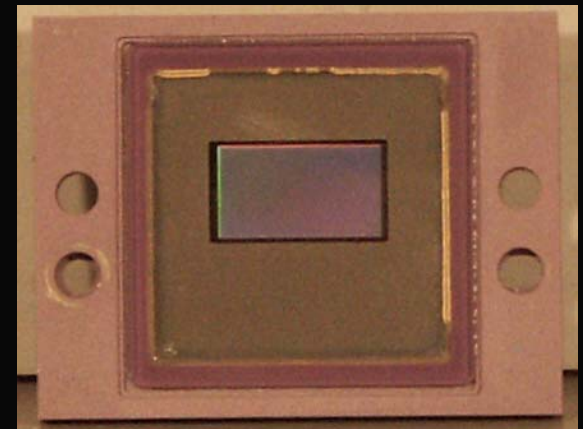
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Technical Features: CCD

● Employment of Super-IT CCD.

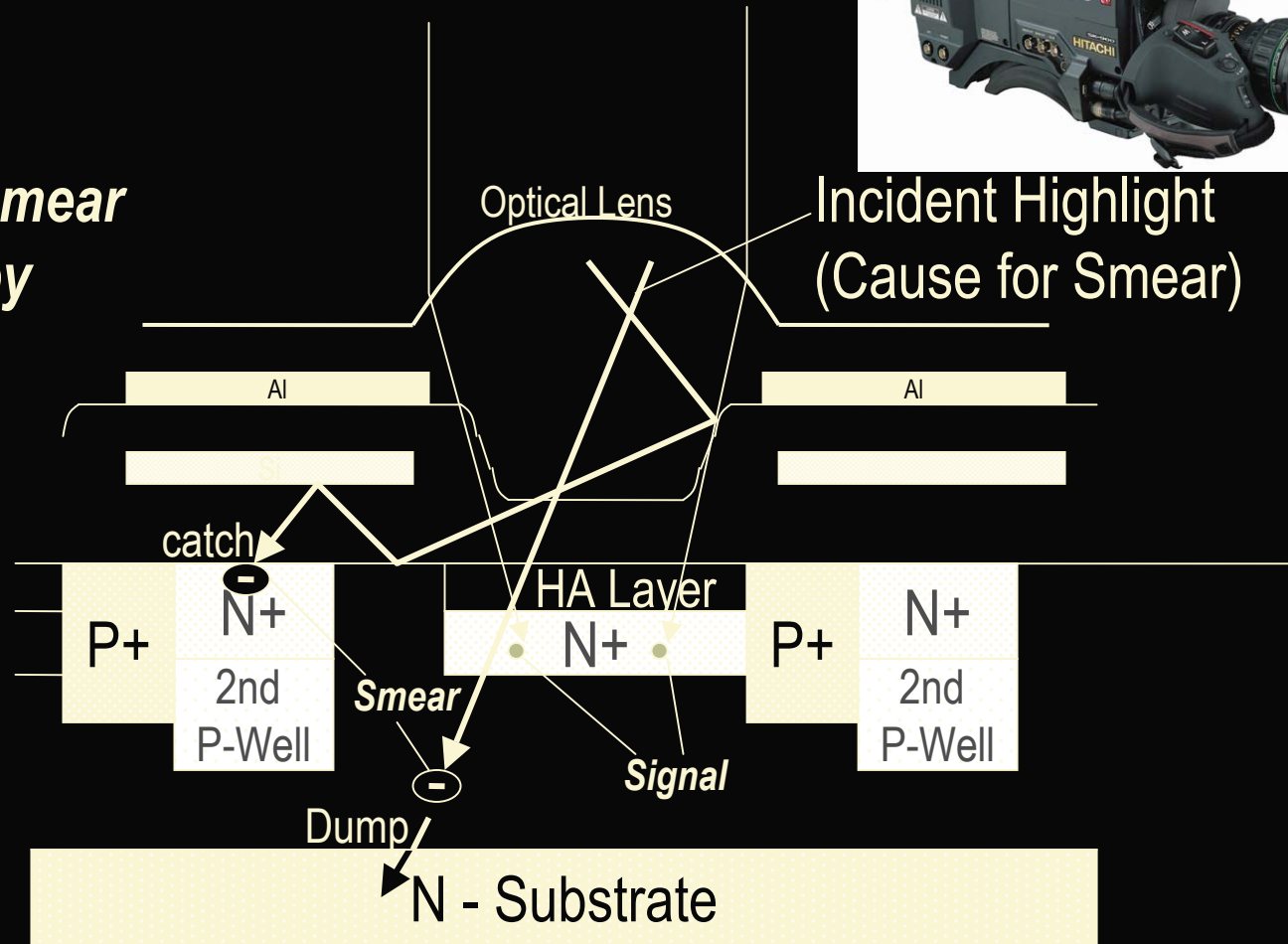
- Format: 2/3-inch, Inter-Line Transfer, 16:9/ 4:3 switchable aspect ratio.
- Array: **1.2 Million Pixels**
1038(H) X 1188(V).
 - Increased by 2X amount of vertical pixels.
 - Dynamic range & SNR improvement complement performance of NEW 14-bit ADCs plus DSP.
 - Vertical Smear better than FIT sensor.
 - H-resolution is maintained at 850TVL(4:3).



Vertical Smear Reduction



Try to catch Smear noise signal by several way

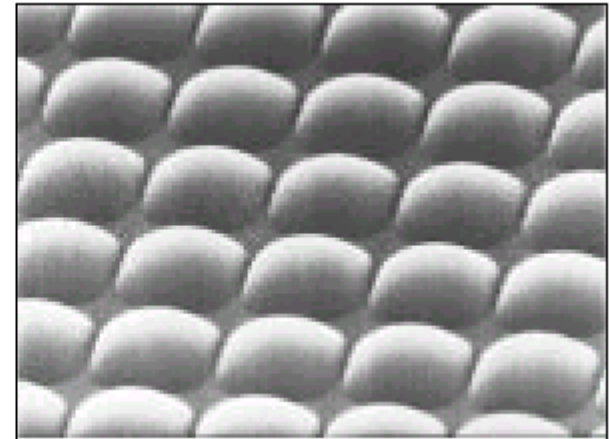
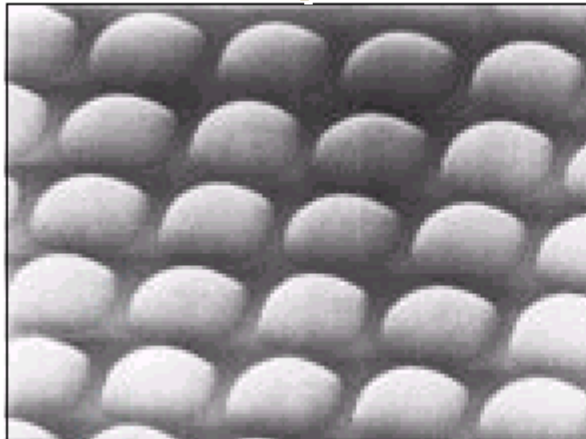


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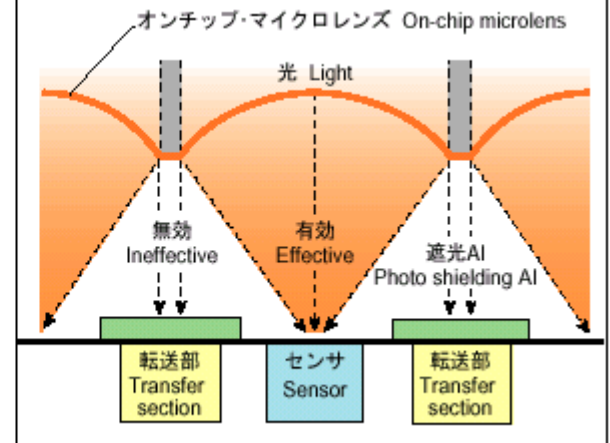
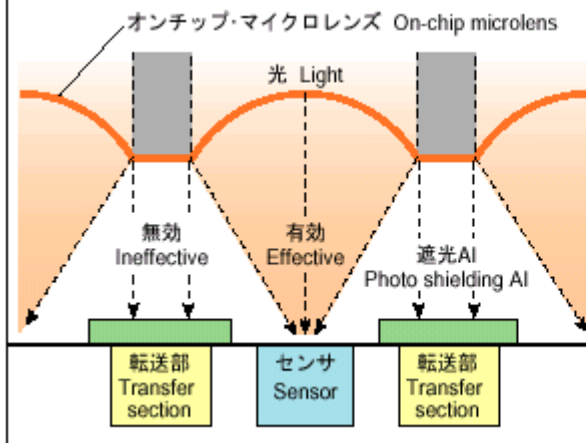
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IT CCD / Super-IT CCD structure

**On-chip
Micro-lens**



**CCD Sensor
Structure**



IT CCD

Super-IT CCD

Super-IT CCD optimizes the shape of on-chip Micro-lenses in order to minimize the invalid area between micro-lenses on each pixel, which thereby minimizes the lost incident light. By doing so we have improved the sensitivity per unit of area, despite reducing the unit pixels.

User Features & Benefits

ECC Filter Electric Color Compensating



● 5 ECC Filter

- 3200K, 4300K, 5600K, 6300K, 8000K

● 1 Optical Filter Disk (OPT FIL) & electric Filter (ECC FIL) as combination use

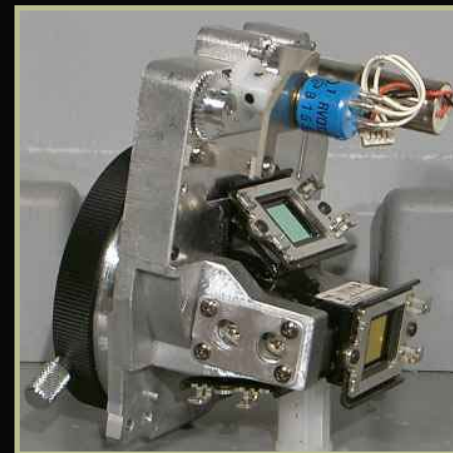
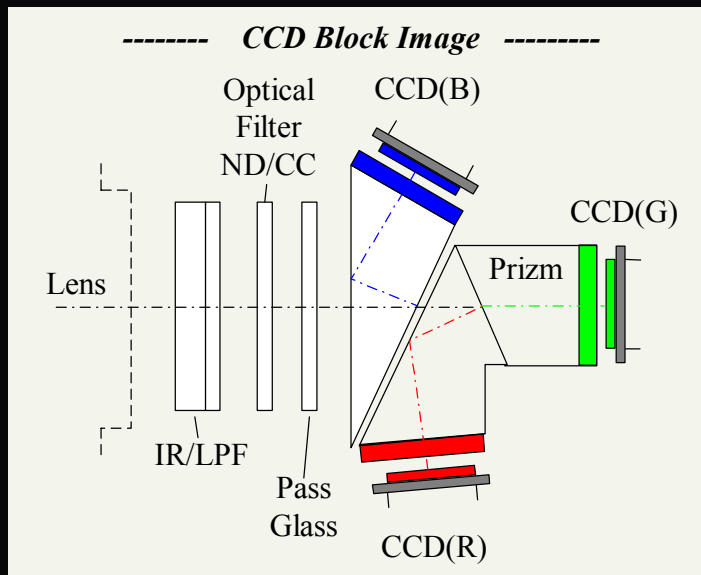


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- 1 optical filter disk with servo motor
 - 3200K, 5600K+1/16ND, 5600K, 5600K+1/64ND



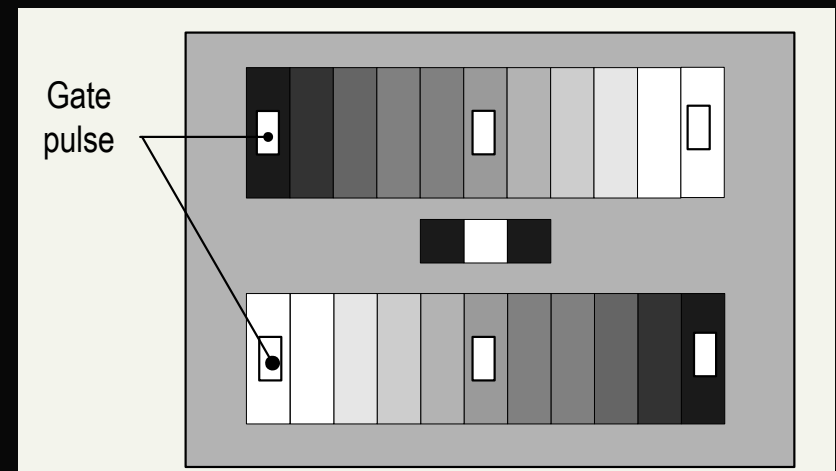
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User Features & Benefits

● Gray Scale Auto Setup

- Automatically samples White, Gamma, Flare for precise alignment through the lens.
- **No special chart is needed**
- **Quick setup is possible with several sets of camera at the same time**



User Features & Benefits

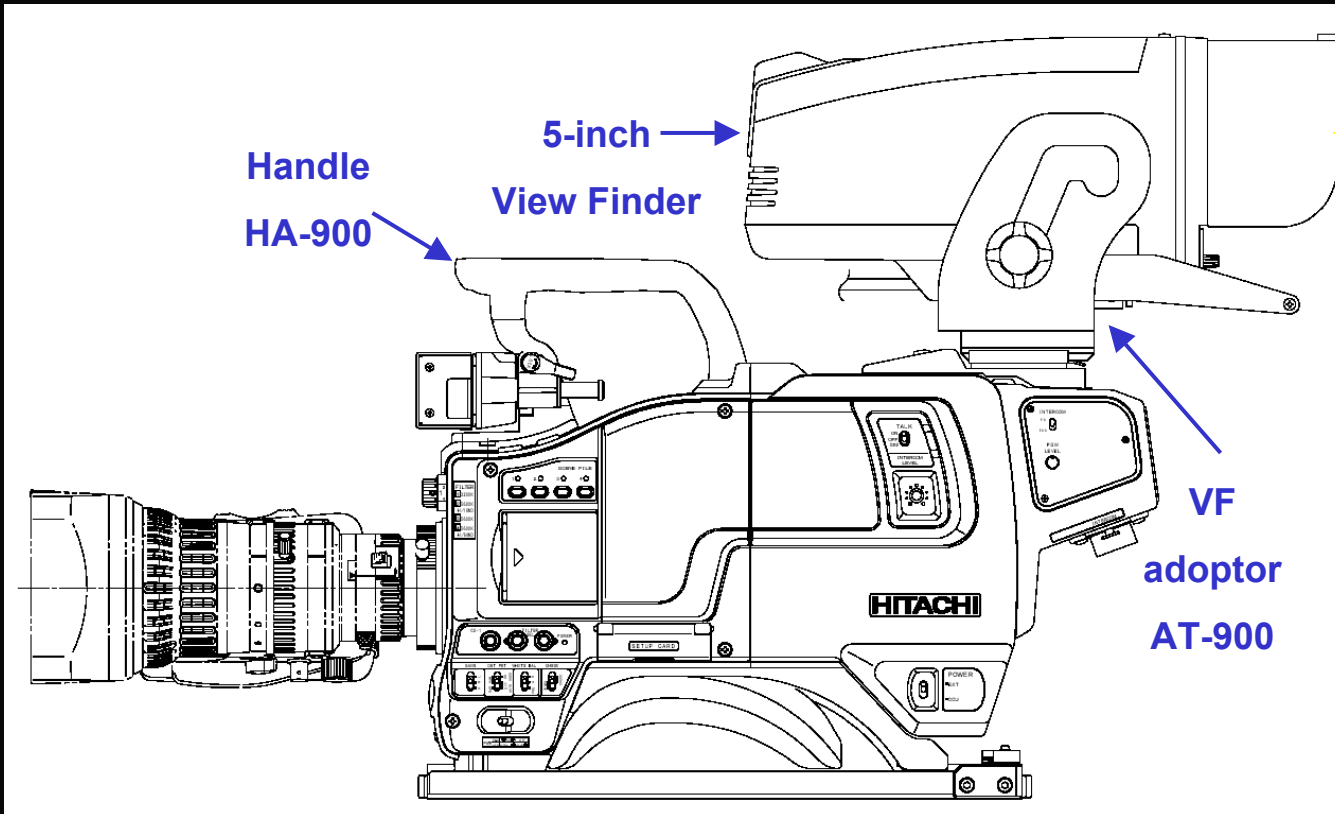
Setup card



- Setup card for camera setting menu data
- A small size general purpose memory card (Compact Flash 2M to 64M) can be used as , the setup card.

User Features & Benefits

Low position 5-inch View Finder



Low position

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Basic Specifications

● Camera Head



- **850TVL** H-resolution in 4:3, >800TVL in 16:9.
- **>80%** Depth of Modulation in 16:9 and >70% in 4:3 aspect ratio @ 5MHz.
- **>65dB** Signal to Noise ratio(DNR on).
- **F11 @ 2000 lux** standard sensitivity & 0.25 lux minimum sensitivity (F1.4 lens & +42dB gain).
- **-140dB Vertical Smear.**

User Features & Benefits

● NEW Triax System model TU/CX-Z3A

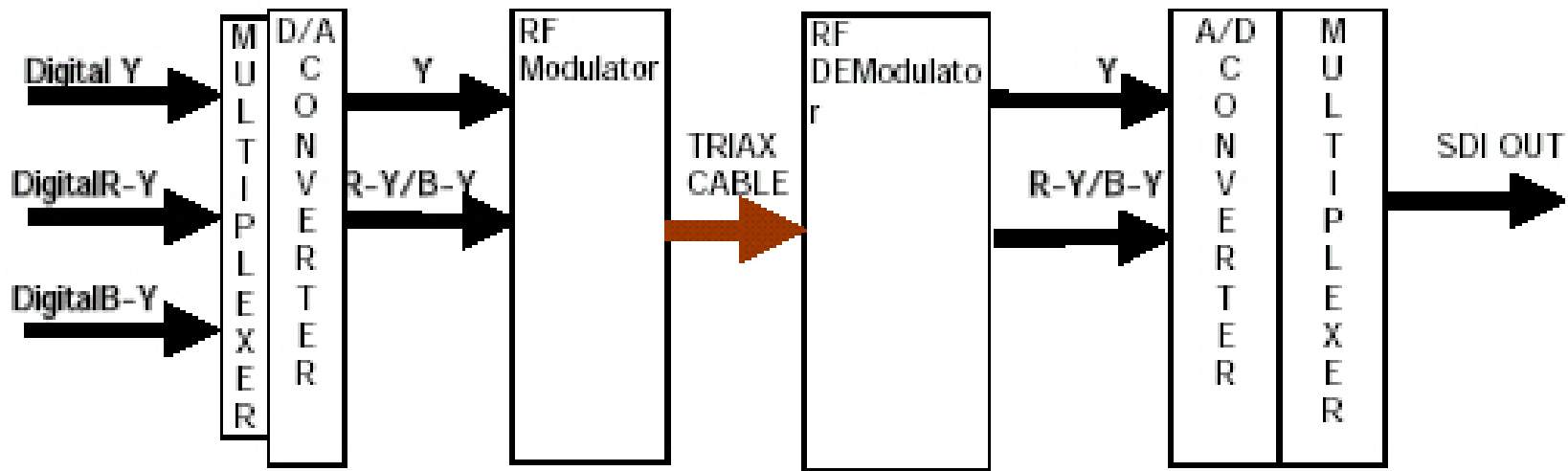


- Component Analog FM-modulated.
- Wideband: Y=10MHz & R-Y, B-Y (5MHz)
- 1900 Meter max. usable cable length.



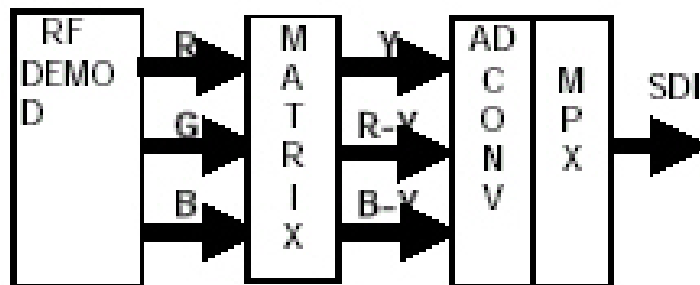
- High Picture quality from CCD & DSP transmits into CCU without Video Loss
- Component Transmission is most idealistic way for SDI output

Hitachi Wideband Component Transmission System

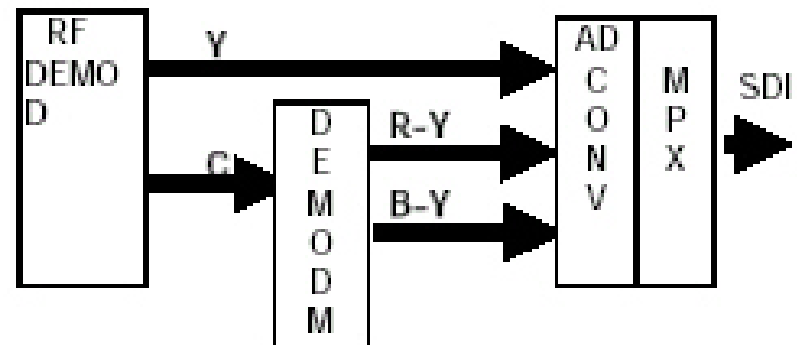


CX-Z3A Camera Adaptor

TX-Z3A CCU

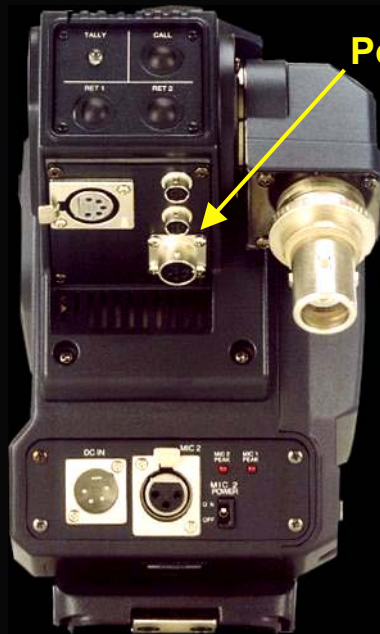


RGB Transmission



Y/C Transmission

System Components



Prompter
Power AC out

CP-7



SDI option slot



Camera Head Triax
Adaptor CX-Z3A

CCU TX-Z3A
Front View w/ CP-7
Integrated Control Panel

CCU TX-Z3A
Rear View w/o D1-Z3 SDI
option board installed

User Features & Benefits



● Digital PCM Audio for
2 x MIC input and 2 x INCOM

• Other maker's Digital studio Camera



Only Video signal processed by Digital

• Hitachi DSP Studio Camera



Both Video & Audio signals are processed
..... by Digital to improve total programming

Conclusions



- The SK-900 camera system has been designed for Highest-picture creation from CCD to Video Transmission Super-IT CCD, 14bitADC, DSP & Wideband Triax system
- The SK-900 is a world-class camera system that incorporates the latest digital technologies in consideration with total studio programming .
- Hitachi's Broadcast TV cameras always targets future operating renovation by employment of unique Microwave & Device Technologies



Thank you!

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