

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

**HITACHI** **Z-3500**



# Features of Z-3500



- Newest 14-bit Analog to Digital Converter
- Hitachi's latest generation DSP
- 5 ECC Filter and Optical Filter
- Gray Scale Auto Setup
- Setup card
- New SDI output Camera base station
- Wide band Triax transmission

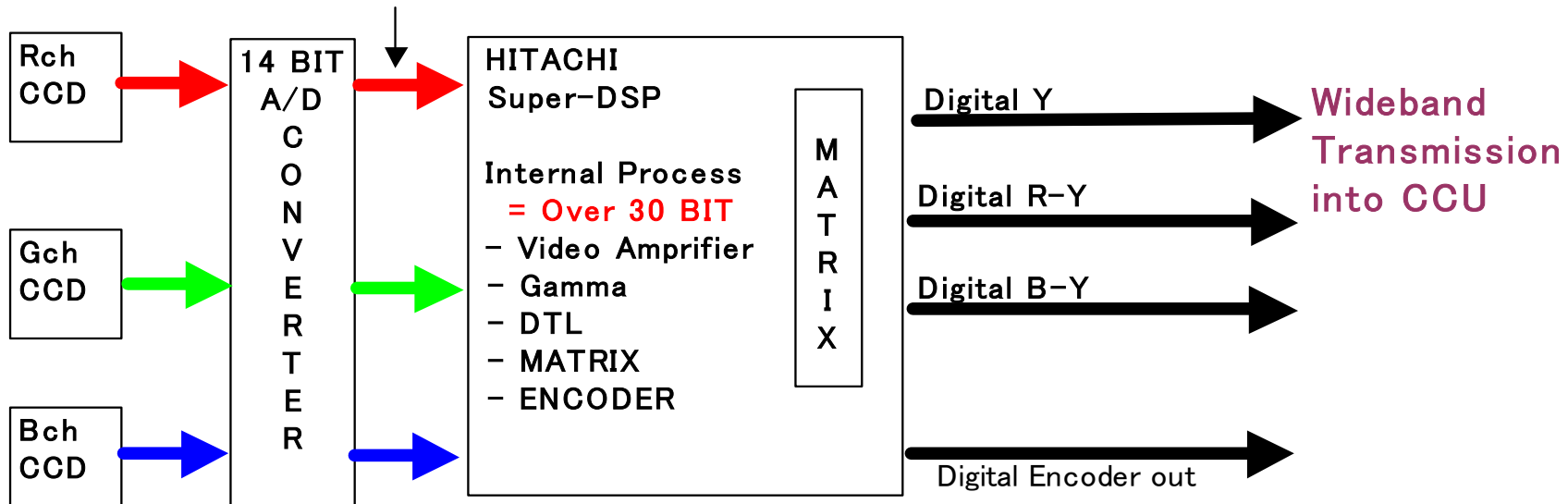
# Technical Features: 14bitADC

## 14-bit Analog to Digital converters

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



Video Signal is divided to 16384 steps from Black to White

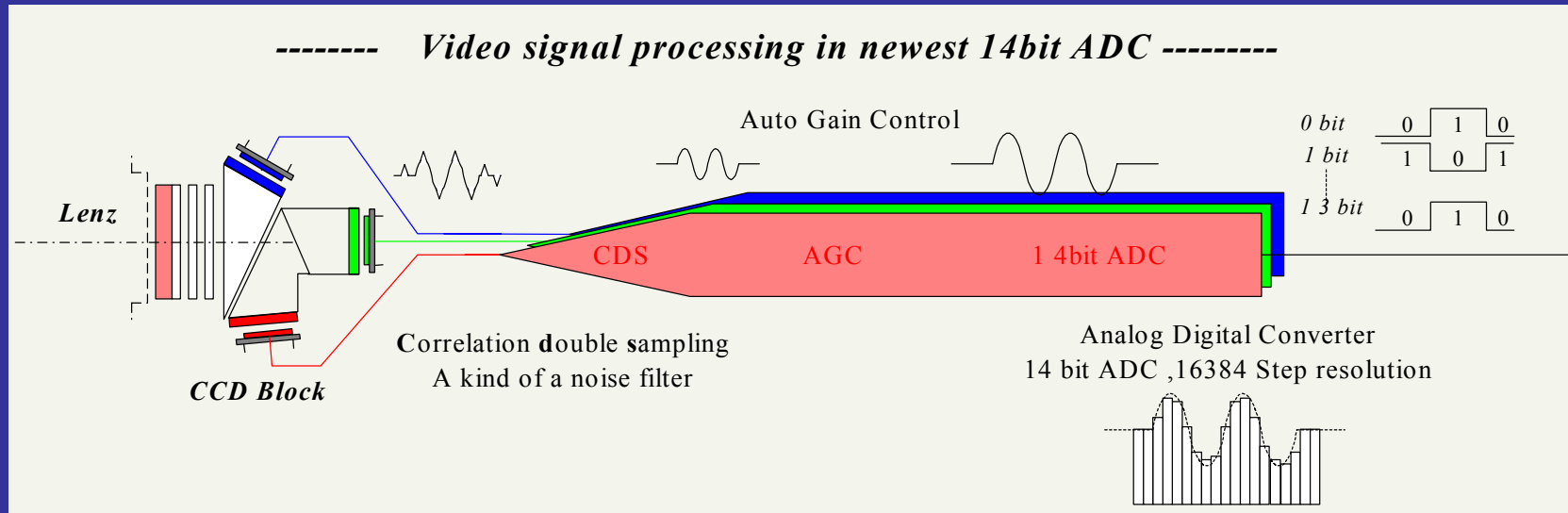


**HITACHI**

# Technical Features: 14-bit Analog to Digital Converter

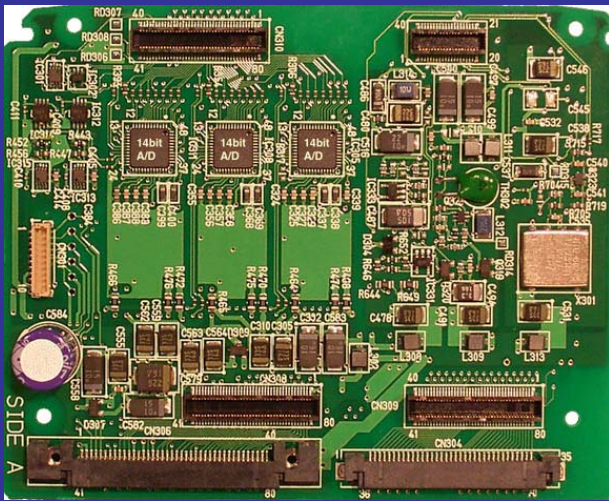


Newest 14-bit ADC integrate Analog process in 1 chip

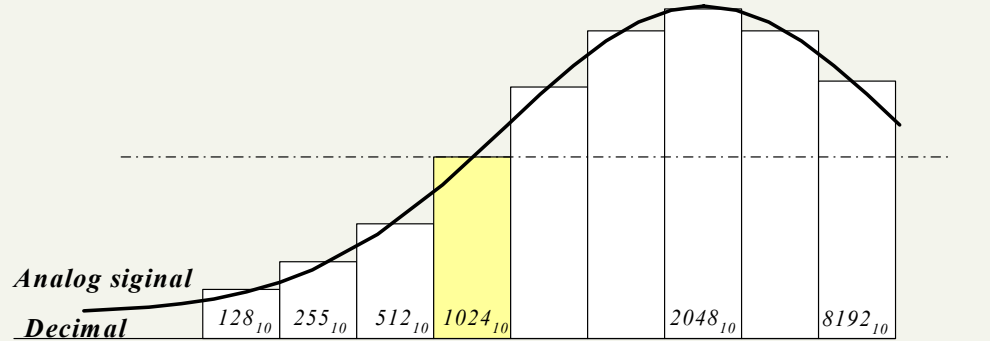


# Convert from analog to digital

# HITACHI



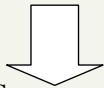
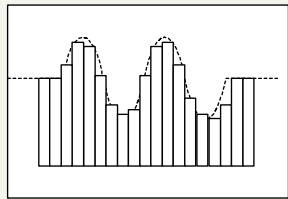
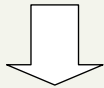
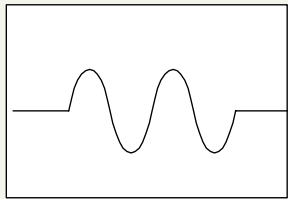
----- Theory of Convert from analog to digital -----



Binary  $111111_2$      $100000000_2$      $1000000000_2$      $100000000000_2$

$10000_2$      $1000000_2$

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



14 bit ADC

0 bit	0	1	0
1 bit	1	0	1
...			
13 bit	0	1	0

# Technical Features: DSP

## ● Fourth Generation DSP for television camera.

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



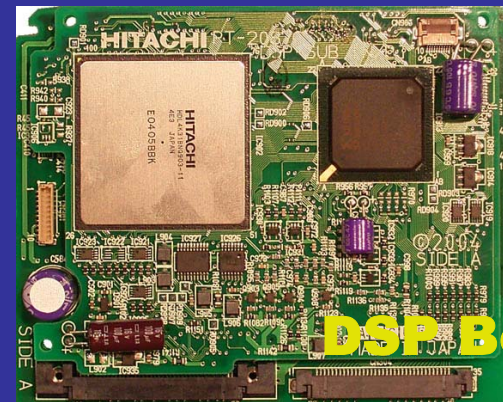
Hitachi DSP Device



# 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**



**Current**

**Analog Boards**

**HITACHI**

All Rights Reserved, Copyright©2004, Hitachi Kokusai Electric Inc.

# DSP Function of Z-3500

## 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





# Technical Features:CCD

## ● Employment of Super-IT CCD.

- Format: 2/3-inch, Inter-Line Transfer
  - Dynamic range & SNR improvement complement performance of NEW 14-bit ADCs plus DSP.
  - Vertical Smear better than FIT sensor.
  - H-resolution is maintained at 900TVL(4:3).



# 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



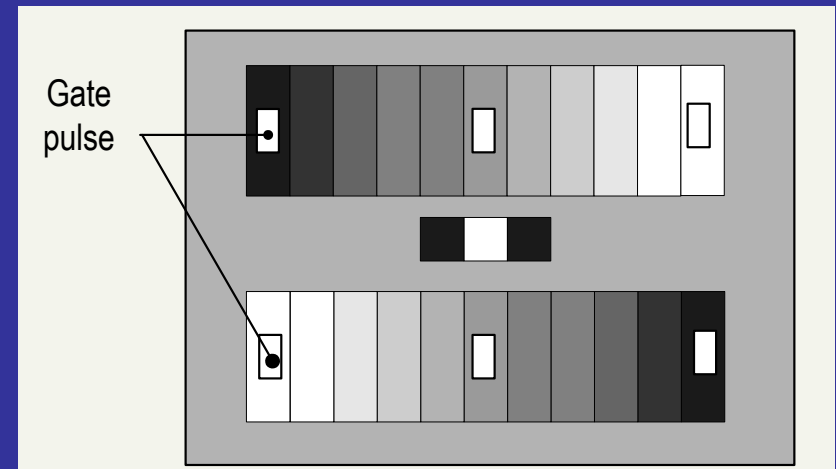
**HITACHI**

All Rights Reserved, Copyright©2004, Hitachi Kokusai Electric Inc.

# 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

## SDI output Camera base station



The new Camera base station model RU-Z35 with SDI output provides small studio operation.



# Basic Specifications

## ● Camera Head

- 900TVL H-resolution in 4:3
- >70% Depth of Modulation in 4:3 aspect ratio @ 5MHz.
- >65dB Signal to Noise ratio(DNR on).
- F11 @ 2000 lx standard sensitivity & 0.5 lx minimum sensitivity (F1.4 lens & +36dB gain).
- -125dB Vertical Smear.





# User Features & Benefits

## ● NEW Triax System model TU/CX-Z3A

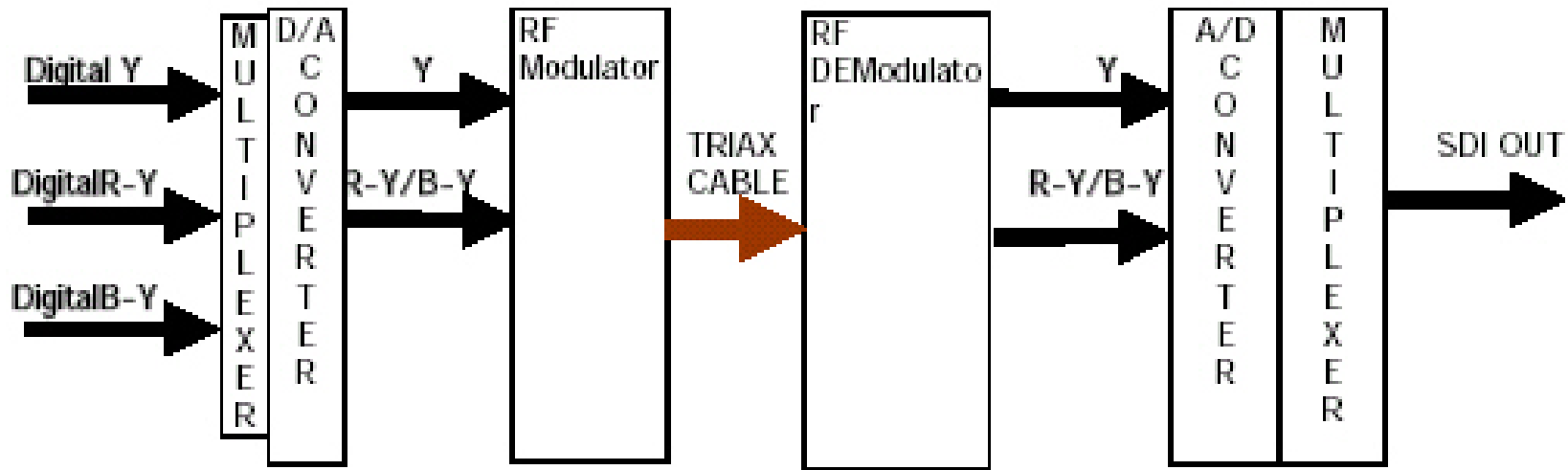


- Component Analog FM-modulated.
- Wideband: Y=10MHz & R-Y, B-Y (5MHz)
- 1900 Meter max. usable cable length.



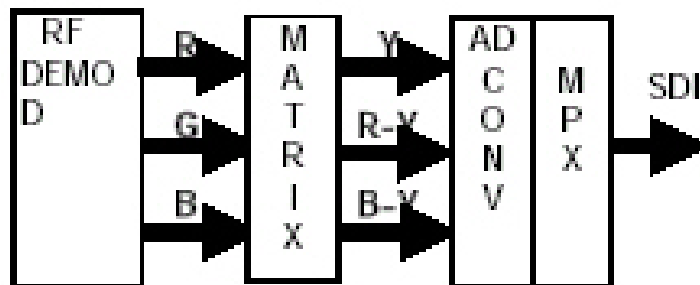
- High Picture quality from CCD & DSP transmits into CCU without Video Loss
- Component Transmission is most idealistic way for SDI output

# Hitachi Wideband Component Transmission System

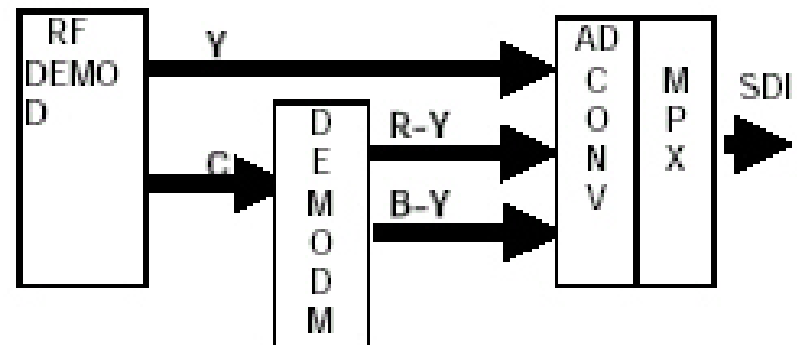


CX-Z3A Camera Adaptor

TX-Z3A CCU



RGB Transmission



Y/C Transmission

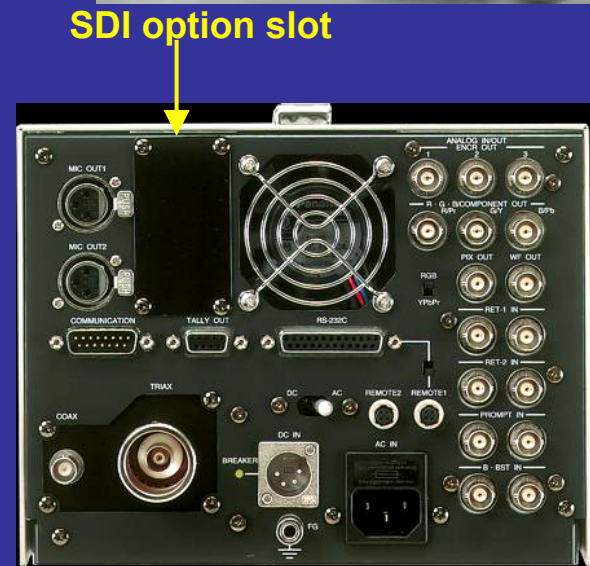
# System Components



Prompter  
Power AC out



RC-Z3



SDI option slot

Camera Head Triax  
Adaptor CX-Z3A

CCU TX-Z3A  
Front View w/ RC-Z3  
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 Z-3500 camera system has been designed for Highest-picture creation from CCD to Video Transmission IT CCD, 14bitADC, DSP & Wideband Triax system.
- The Hitachi Z-3500 offers the best combination of features and price.
- Hitachi's TV cameras always targets future operating renovation by employment of unique Microwave & Device Technologies.

Thank you!



**HITACHI**

All Rights Reserved, Copyright©2004, Hitachi Kokusai Electric Inc.

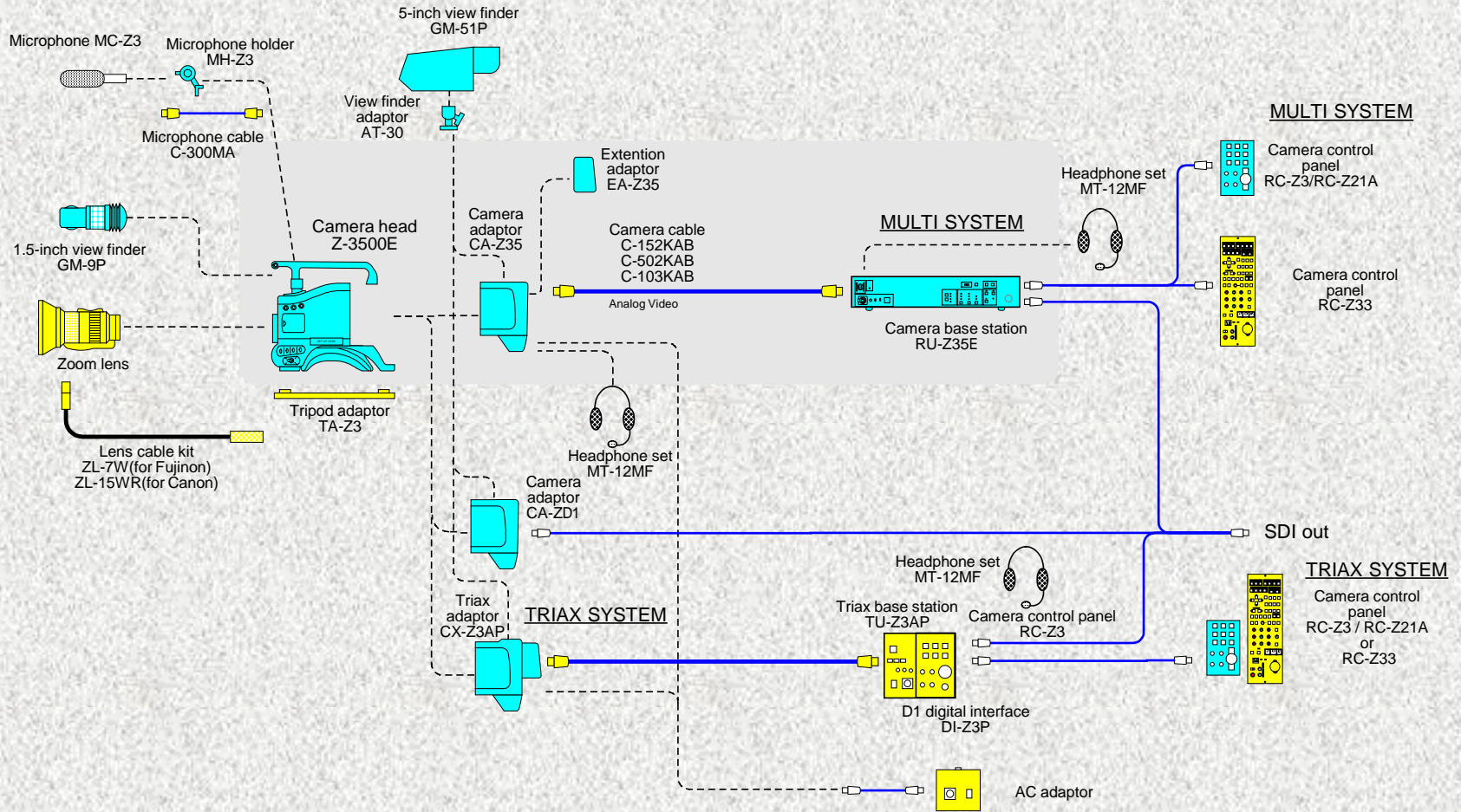




**Z-3500**

**Additional Feature**

# Z-3500 System configuration



## High Cost performance SDTV Camera System

## FEATURES

- ★ High picture quality by 14bit A/D and newest Digital Processing
- ★ High accuracy Digital Gen-Lock system
- ★ Various kinds Auto function for Studio application
  - Gray Scale Auto Setup (Black, White, Gamma, Flare)
  - Auto Shading(Lens Extender X1,X2)
  - Auto Flesh Tone DTL
- ★ Succession of the DSP function of SK-888
- ★ 3 mode IRIS GATE (Standard, Spot, Flat)



# Base station RU-Z35 (Front)

## Feature

RU-Z35 system for substantial studio application

- ★ Built-in Camera controller with **Jog-shuttle**
- ★ Alternative control by **Taken SW** with external remote controller
- ★ Base station setup by **Menu** control  
(Cable length, GL, G-on-sync, Buzzer on/off, G-tally mode)
- ★ Monitor output selectable **VBS, GL, AUX** and **Prompt** video

## Front View



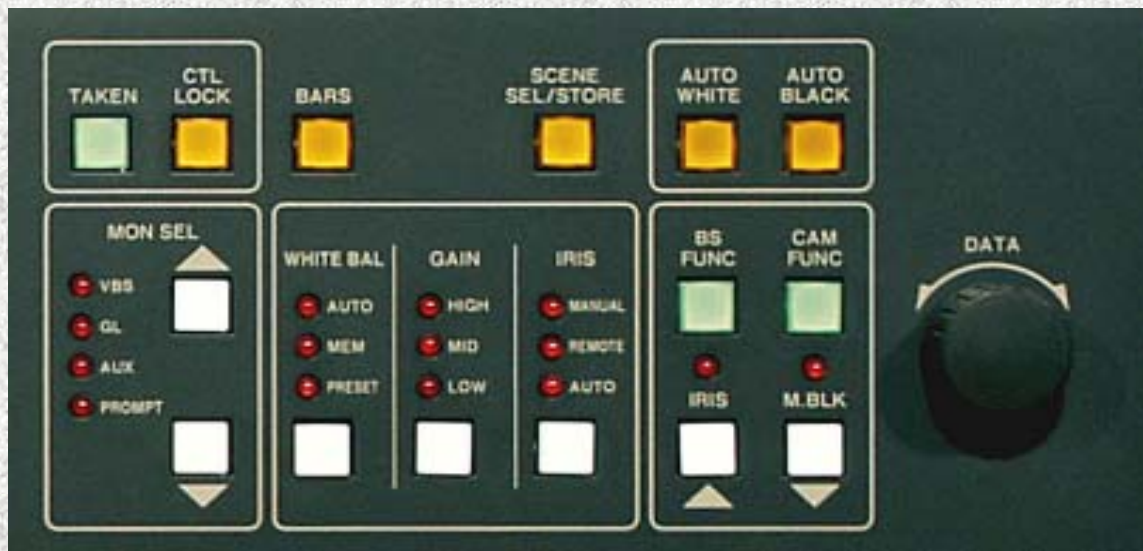
## Feature

- ★ **SDI** output
- ★ **Prompter** function (Video and Power)
- ★ **2-ch Intercom** (PD/ENG selectable from Camera Head w/ EA) with RTS and Creacam interface
- ★ **Camera Status display** on Monitor out (Gain, Scene No, Shutter, Lens F-No/Extender, Filter Position)

## Rear View



## Panel Layout



## BS set-up menu

```

■ BS FUNC 4
BUZZER : ENABL
E
SYNC ON G : OFF
CCU ID : 001
H PHASE : 0
SC COASE : 0°
SC FINE : 0
CABLE CMP : 50
LF : 0
HP : 0
    
```



## Feature

- ★ Extention adaptor for RU-Z35 system
- ★ AUX and CALL button
- ★ PD/ENG select sw
- ★ Prompt video out (BNC)
- ★ VF AUX connector (6pin)

