System Camera Operation
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Preparation for Demonstration

- Prepare for your demonstration
  1. Connect a optical fiber cable and ROP cable
     • See Connection.
  2. Check a camera power switch.
     • Switch to CCU.
  3. Initialize a ROP and CCU setting to factory setting.
     • ROP: CALL + SW4 (ROP)
     • CCU: Remove a panel and Menu ON. Maintenance – System – Initialize
  4. Change Format (Default: 1080/60i)
     • See format change. You have to change camera head, VF and CCU.
  5. Check ROP setting.
     • Light ON: ROP ON, Head ON, VF PW, IRIS ACTIVE, M-PED ACTIVE
     • Light OFF: HEAD
  6. Set a Range (Iris control range) to maximum.
  7. Check a lens.
     • Set Iris to A (Auto). Set Zoom to S (servo).
Trouble Shooting: Operation

- Iris doesn’t work by joystick!
  - Check lens. Lens has manual and auto iris mode. Set to A (Auto Iris), otherwise it doesn’t work.
  - Check the Close button. If it lights on, it doesn’t work.
  - Check the AUTO button of ROP.
    - If it on, it doesn’t work.
  - Check IRIS ACTIVE button.
    - If it is off, it doesn’t work.

- Master pedestal doesn’t work by joystick.
  - Check the M-PED ACTIVE button.
    - If it is off, it doesn’t work.

- ND and CC filter switching don’t work.
  - Check the head button. It must light off.
Trouble shooting: B/W screen (PM out)

• The monitor is B/W.
  1. PM output is B/W.
     – You have to select ENC to get color signal. If you choose R, G or B, it becomes B/W.
  2. CCU output is B/W.
     • OPERATION– Setting3 – MONO SW
       You should select OFF. Otherwise output becomes B/W.
  3. The monitor mode is B/W.
     1. Check the monitor mode.
Trouble shooting: Format change

1. NG appears when you change format.
   1. You should meet the format each peripherals, camera, VF, CCU.

In case of 1080i/59.94:

1. Camera: Hold MENU button
   – Maintenance – Format – Format
   59.94i,50i
   Select 59.94i.
2. VF: Change format by physical switch.
   – Switch to 1080i/60
3. CCU: Remove the front cover and Turn on menu.
   – OPERATION – Setting1 – CCU mode
   Select 1080/59.94i(60i)
Trouble shooting: Auto Set Up NG

1. NG appears when you press Auto Set UP.
   1. Check Range (Iris control range) if its position is maximum. If the position is wrong, iris doesn’t close. So ABB doesn’t work.

34. Iris sensitivity control [SENSE]
   This is used to adjust the iris control range of the joystick.

35. Iris control range control [RANGE]
   This is used to adjust the iris control position (shift the control range) of the joystick.
Factory Setting: ROP

• Reference file operations
  – The operations which can be performed include calling the default basic camera data settings and registering and calling the basic user settings selected.

• How to call the settings in the reference files
  – Scene file is not selected.
    1. Factory file
       1. Press scene file SW4 while holding down CALL. When the LED of scene file SW4 goes off, it signals the completion of the call operation.
    2. User files 1, 2 and 3
       1. Press scene file SW1, SW2 or SW3 while holding down CALL. When the LED of scene file SW1, SW2 or SW3 goes off, it signals the completion of the call operation.

  – Refer to next page to register user files
How to register Factory Setting/ User File

- How to register settings in the reference files
  - 1 Factory file
    - Adjust the camera to the status in which the settings are to be registered, and select the settings. When the scene file STORE SW is pressed, the LED lights up red. When the SHIFT and scene file SW4 are now pressed together while holding down CALL, the STORE SW lamp goes off, signaling the completion of the registration. The factory file is the file which contains the settings stored at the factory. Do not undertake the steps described above because the registration operation is undertaken by the servicing department.
  - 2 User files 1, 2 and 3
    - Adjust the camera to the status in which the settings are to be registered, and select the settings. When the scene file STORE SW is pressed, the LED lights up red. When scene file SW1, SW2 or SW3 is now pressed while holding down CALL, the STORE SW lamp goes off, signaling the completion of the registration.
Factory Setting: CCU

System
This is used to initialize the menu settings.

- Initialize
The menu settings can be returned here to the factory settings using this item.

Selection options: NO?, YES?
After selecting “Initialize”, turn the jog dial to select “YES?”, and then press the jog dial to initialize the settings.

Notes: The settings of the “Date/Time”, “Network” and “Version” menus are not initialized.
Optical System Reliability (ROP)

- You can easily check optical system status.
  1. Optical transmission alarm.
     1. Signal Level Check
     2. Cable alarm
        1. Connection check between the camera and the CCU.

1. Optical transmission alarm indicator [OPT]
   This is the optical transmission indicator.
   Green: The indicator lights when the optical signals received in the transmission between the camera and CCU are strong enough. The optical reception strength level is 5.
   Orange: The optical reception strength level is 3 to 4.
   Red: The optical reception strength level is 1 to 2.
   Check the optical connector connections and mating. If the problem persists, turn off the CCU power, disconnect the cable between the camera and CCU, and clean the optical contact area. Use cotton swabs moistened with alcohol to wipe the optical fiber part gently.

2. Fan alarm indicator [FAN]
   This indicates that the CCU’s fan has stopped or that the camera’s fan is OFF.
   Lighted: The CCU’s fan has stopped or the camera’s fan is OFF.
   Off: Both the CCU’s fan and the camera’s fan are operating normally.

3 Cable alarm indicator [CABLE]
   This is the camera cable warning indicator.
   Lighted: The indicator warns that there is no connection between the camera and CCU or that the power supply has been shorted. If it remains lighted, turn off the CCU’s main power, and check out the cables and connectors. If there is no change in the lighting status, contact your dealer.
   Off: This indicates that the camera cable is connected correctly.

Refer to “OpticalFiberReliability.ppt”
3. Camera cable open alarm indicator [ALARM OPEN]
   This lights when the unit and camera are not connected by the optical fiber multi cable.

4. Camera cable short-circuit alarm indicator [ALARM SHORT]
   This lights when the cable connecting the unit and camera has been short-circuited.

5. Fan alarm indicator [ALARM FAN]
   This lights when the unit’s cooling fan stops running.
Camera Head
Operation 1

- **Operation**
  - **VF Setting1**
    - Viewfinder settings1
      - Side Modu SW (for setting the peripheral brightness modulation to ON or OFF)
      - Side Modu LVL (for setting the peripheral brightness modulation level)
      - Zone Mark (for setting the zone marker)
      - Safety Mark1 (for setting the safety marker1)
      - Safety Area1 (for setting the safety area1)
      - Safety Mark2 (for setting the safety marker2)
      - Safety Area2 (for setting the safety area2)
      - Center Mark (for setting the center marker)
      - Center Mark SEL (for setting the shape of the center marker)
      - Line Width (for setting the thickness of the markers)
      - Marker Level (for setting the brightness of the markers)
  - **VF Setting2**
    - Viewfinder settings2
      - VF DTL (for adjusting VF DTL)
      - RET Signal
      - HD Peak FREQ (for adjusting the peak frequency of HD RET signal)
      - HD Offset Gain (for adjusting the DTL offset gain of HD RET signal)
      - HD Crisp (for adjusting the DTL crisp level of HD RET signal)
      - D1 Peak FREQ (for adjusting the peak frequency of D1 RET signal)
      - D1 Offset Gain (for adjusting the DTL offset gain of D1 RET signal)
      - D1 Crisp (for adjusting the DTL crisp level of D1 RET signal)
      - VBS Peak FREQ (for adjusting the peak frequency of VBS RET signal)
      - VBS Offset Gain (for adjusting the DTL offset gain of VBS RET signal)
      - VBS Crisp (for adjusting the DTL crisp level of VBS RET signal)
  - **Cursor**
    - Cursor settings
      - Cursor (for setting the cursor marker to ON or OFF)
      - Cursor Memory (for selecting the cursor marker memory from ADJ, 1, 2 or 1+2)
      - H Position (for adjusting the H position of the cursor)
      - V Position (for adjusting the V position of the cursor)
      - Width (for adjusting the width of the cursor)
      - Height (for adjusting the height of the cursor)
      - BOX/CROSS (for setting the shape of the cursor)
      - Store (for setting the cursor memory)
      - EXECUTE (for executing Store)
Operation 2

VF Display1
Viewfinder display settings1
- F Number (for setting the f-number display to ON or OFF)
- Zoom (for setting the zoom value display to ON or OFF)
- Focus (for setting the focus value display to ON or OFF)
- Extender (for setting the lens extender display to ON or OFF)
- MONI OUT (for setting the monitor output selection display to ON or OFF)
- Filter (for setting the ND/CC filter display to ON or OFF)
- M Gain (for setting the gain display to ON or OFF)
- Shutter (for setting the electronic shutter display to ON or OFF)
- 5600K (for setting the 5600K effect to ON or OFF)
- Audio Level (for setting the audio level display to ON or OFF)

VF Display2
Viewfinder display settings2
- OPT Level (for setting the optical level display to ON or OFF)
- RET Select (for setting the RET selection display to ON or OFF)
- Status (for setting the display appearing when functions are selected to ON or OFF)
- Status (AUTO) (for setting the display appearing when AWB/ABB/ASU are started or finished to ON or OFF)
- Field Rate (for setting the field rate display to ON or OFF)
- Voltage (for setting the supply voltage display to ON or OFF)
- WFM (for setting the WFM display to ON or OFF)
- White CH (for setting the white balance memory display to ON or OFF)

Setting1
Camera settings1
- FAN Power (for setting the camera fan to ON or OFF)
- FAN Mode (for setting the camera fan mode)
- CALL+R_TALLY (for setting to light R TALLY when CALL is detected)
- CALL+T_TALLY (for setting to light T TALLY when CALL is detected)
- PiP Mode (not operate)
- HD-SDI OUT (for selecting the mode of HD-SDI connector)
- HD-SDI Power (for setting the power of HD-SDI (2 to ON or OFF)
- AUX I/O (for selecting the mode of AUX connector)
- TRUNK1 (for setting the serial interface standard of trunk line)
- TRUNK2 (for setting the serial interface standard of trunk line)
- 5600K (for setting the electronic color temperature filter)

Setting2
Camera settings2
- HND GRIP RET (for selecting the grip RET SW function)
- HND GRIP PTT (for selecting the grip PTT SW function)
- HND Lens VTR (for selecting the handy lens VTR SW function)
- HND Lens RET (for selecting the handy lens RET SW function)
- STD Lens RET1 (for selecting the standard lens RET1 SW function)
- STD Lens RET2 (for selecting the standard lens RET2 SW function)
- EXT RET 1 (for selecting the external return control SW1 function)
- EXT RET 2 (for selecting the external return control SW2 function)
- EXT RET 3 (for selecting the external return control SW3 function)
# Operation 3

## Setting 3
- **Camera settings 3**
  - RET1 ID (for setting the RET1 designation)
  - RET2 ID (for setting the RET2 designation)
  - RET3 ID (for setting the RET3 designation)
  - RET4 ID (for setting the RET4 designation)
  - Gain SW LOW (for setting the gain selector switch to LOW gain)
  - Gain SW MID (for setting the gain selector switch to MID gain)
  - Gain SW High (for setting the gain selector switch to HIGH gain)
  - ID Character (for setting the camera designation)

## Setting 4
- **Camera settings 4**
  - User SW1 (for selecting the function of User SW1)
  - User SW2 (for selecting the function of User SW2)
  - User SW3 (for selecting the function of User SW3)
  - User B/U (for selecting the function of User SW on the Buildup Unit)
  - Back Light (for setting the back light to ON or OFF)
  - RET Mode (for setting the RET SW operation mode)
  - Lens I/F (for setting the interface of the lens)
  - B/U Lens (for setting the lens type in B/U system)

## ILED
- **Camera status display settings**
  - Gamma Off (for displaying the status when the gamma is OFF)
  - Shutter (for displaying the status when the electronic shutter is ON)
  - Extender (for displaying the status when the lens extender is ON)
  - MONI OUT (for displaying the status when the monitor output signal is other than Y)
  - FAN Off (for displaying the status when the fan is OFF)
  - Master Gain (for displaying the status when the gain is other than 0 dB)
  - Black Gamma (for displaying the status when the black gamma is ON)

## 7"VF
- **CRT VF settings**
  - VF FAN Speed (for controlling the fan speed of the CRT viewfinder)
  - Peak Slice (for setting the “peak slice” function)
  - Peak FREQ (for selecting the peak frequency)
Operation 4

INCOM Set.1

Incom settings1

- INC1 MIC Type (for selecting the type of intercom1 microphone)
- INC1 MIC Gain (for setting the gain of intercom1 microphone)
- INC1 MIC Power (for setting the power supply of intercom1 to ON or OFF)
- INC1 Side Tone (for setting the side tone of intercom1 to ON or OFF)
- INC1 PGM MIX (for setting the PGM mix of intercom1 to ON or OFF)
- INC1 ENG/PROD (for selecting the communication destination of intercom1)
- INC1 to CCU (for setting the insertion of CCU into the communication destination for intercom1 to ON or OFF)

INCOM Set.2

Incom settings2

- INC2 MIC Type (for selecting the type of intercom2 microphone)
- INC2 MIC Gain (for setting the gain of intercom2 microphone)
- INC2 MIC Power (for setting the power supply of intercom2 to ON or OFF)
- INC2 Side Tone (for setting the side tone of intercom2 to ON or OFF)
- INC2 PGM MIX (for setting the PGM mix of intercom2 to ON or OFF)
- INC2 ENG/PROD (for selecting the communication destination of intercom2)
- CRANE MIC Gain (for setting the insertion of CCU into the communication destination for intercom2 to ON or OFF)
- CRANE Side Tone (for setting the side tone of CRANE for the intercom to ON or OFF)
- CRANE ENG/PROD (for selecting the communication destination of the CRANE intercom)
- CRANE to CCU (for setting the insertion of CRANE into the communication destination for intercom2 to ON or OFF)

MIC Gain

MIC Gain settings

- MIC1 Gain (for setting the gain of MIC1)
- MIC1 AMP (for setting the amplitude of MIC1)
- MIC2 Gain (for setting the gain of MIC2)
- MIC2 AMP (for setting the amplitude of MIC2)
Paint 3

- **Detail1**
  - **Detail adjustments1**
    - V DTL (for adjusting the V DTL level)
    - H DTL (for adjusting the H DTL level)
    - Crisp (for adjusting the detail crisp level)
    - Peak FREQ (for adjusting the detail peak frequency)
    - Level Dep. (for adjusting the level dependent)
    - Dark DTL (for adjusting the dark detail level)
    - Corner DTL (for adjusting the corner detail level)
    - DTL Source (for selecting the detail source)
    - DTL Clip+ (for adjusting the clip on the detail + side)
    - DTL Clip- (for adjusting the clip on the detail – side)

- **Detail2**
  - **Detail adjustments2**
    - DTL Knee+ (for adjusting the knee compensation on the detail + side)
    - DTL Knee- (for adjusting the knee compensation on the detail – side)
    - Knee DTL (for adjusting the knee detail gain)

- **Skin Tone1**
  - **Skin tone detail adjustments1**
    - Skin Tone DTL (for setting the skin tone detail to ON or OFF)
    - Skin Tone Get (for capturing/canceling the skin tone)
    - MEM Select (for selecting the memory in which the skin tone detail is stored)
    - Cursor (for displaying the cursor which captures the skin tone)
    - H Cursor (for adjusting the horizontal position of the cursor)
    - V Cursor (for adjusting the vertical position of the cursor)
    - ZEBRA (for setting the zebra pattern displayed in the applicable skin tone range to ON or OFF)
    - Effect MEM (for selecting the memory in which the skin tone detail is to be reflected)
    - Skin Tone DTL (for setting the skin tone detail to ON or OFF)

- **Skin Tone2**
  - **Skin tone detail adjustments2**
    - MEM A
      - Skin Tone Crisp (for adjusting the crispness of the skin tone detail)
      - Phase (for adjusting the skin tone detail phase)
    - Width (for adjusting the skin tone detail range)
    - Saturation (for adjusting the skin tone detail saturation)
    - MEM B
      - Skin Tone Crisp (for adjusting the crispness of the skin tone detail)
      - Phase (for adjusting the skin tone detail phase)
    - Width (for adjusting the skin tone detail range)
    - Saturation (for adjusting the skin tone detail saturation)
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1. Extender display:
This appears when the lens extender is being used.

2. Shutter speed/mode display:
This indicates the shutter speed or shutter mode setting.

3. RET SEL display:
This indicates the return mode selected by the grip RET switch.

4. Voltage display:
This indicates the voltage of the DC IN currently in use.

5. Filter display:
This indicates the type of filter selected.

6. White balance memory display:
This indicates the automatic adjustment memory selected for the white balance.
A: The WHITE BAL switch is set to “A”.
B: The WHITE BAL switch is set to “B”.
P: The WHITE BAL switch is set to “PRST”.

7. Gain display:
This indicates the video amplifier’s gain setting (in dB) which has been selected by the gain selector switch.

8. Audio CH1 and CH2 displays:
The audio levels are displayed here (separately for audio CH1 and audio CH2).

9. Iris f-number display:
The approximate value of the iris setting (f-number) is displayed here.

<Note>
This display appears when a lens which has an f-number output is being used.

10. Camera warning or message display:
A message indicating the occurrence of an alarm, the camera settings, the progress made in the adjustments, and the adjustment results appear here for about 3 seconds.

11. Focus position display:
The focus position is indicated here in the form of a number.

<Note>
This display appears only when a lens which has a focus position output is being used.

12. Zoom position display:
The zoom position is indicated here in the form of a number.

<Note>
This display appears only when a lens which has a zoom position output is being used.

13. MONI SEL display:
This indicates the video mode of the monitor output.

14. Optical level display:
This indicates the light sensing level of the optical fiber cable.

15. 5600K display:
This indicates the setting of the electronic color compensation.

16. Field frequency display:
This indicates the field frequency at which the camera is operating. Either 50i or 60i is displayed.
Adjusting the lens flange back

1 Mount the lens on the camera. Do not forget to connect the lens cable at this time.

2 Set the lens iris to manual, and open the iris.

3 Set the lighting in such a way that the appropriate video output level is obtained at a distance of about 9.9 ft. (3 m) from the flange back adjustment chart. If the video level is too high, use a filter or shutter.

4 Loosen the screw that secures the F.f (flange focus) ring.

5 Set the zoom ring to the telephoto position either by manual or electrical means.

6 Shoot the flange back adjustment chart, and turn the distance ring to adjust the focus.

7 Set the zoom ring to the wide-angle position, and turn the F.f ring to adjust the focus. Take care not to move the distance ring.

8 Repeat steps 5 to 7 until the chart is focused properly at both the telephoto and wide-angle positions.

9 Tighten up the screw that secures the F.f ring.

Note
Depending on the lens concerned, this ring may be marked as the “F.b” (flange back) ring.
51. **Menu switch [MENU]**
When this switch is pressed, the camera’s user menu is output; when it is pressed again, the menu screen display is cleared.

52. **JOG dial button**
Turning the JOG dial while the menu screen is displayed moves the cursor to the setting items. The menu settings are established by operating this dial button. For details on the menu operations, refer to the section on the menu operations.

53. **Electronic shutter selector switch [SHUTTER]**
This is set to ON when the electronic shutter is to be used. When it is set to the SEL position, the shutter speed is switched in the preset range and the mode is also switched. It is not effective when the CCU is connected to the camera.

54. **AWB/ABB start switch [AUTO W/B BAL]**
This is used for conducting automatic white balance adjustments (AWB) or automatic black balance adjustments (ABB). It is not effective when the CCU is connected to the camera.

55. **Lens connector [LENS]**
The lens cable is connected to this connector.

**Note 1.**
All side panel switches don’t work when CCU is connected.

**Note 2.**
No53 [SHUTTER] and No.54[AUTO w/B BAL] don’t work when CCU is connected.
ROP Operation
ROP Panel

ROP, Camera and VF Power ON/OFF

CAMERA No.

Output Selector

MODE

ND/CC Filter

Scene File

White/Black Balance and Auto Setup

RGB GAIN and Black Control

Monitor

Control
- MATRIX
- SKIN TONE

Joystick

Master Gain

To Top
1. **ROP ON switch**
   This switch enables the controls on the ROP’s operation panel to be operated. Its lamp lights as soon as the CCU power is turned on.

2. **Camera power switch [HEAD ON]**
   This switch makes it possible to turn the camera’s power on and off by remote control at the ROP. However, it will not function unless the CCU’s camera power switch and the power switch of the camera itself are at the “ON” position. Each time the switch is pressed, the power setting is switched between ON (power on: LED lights) and OFF (power off: LED off).
   - **Green:** Power ON
   - **Red Blinking:** Camera power off by ROP (You can turn on by ROP.)
   - **Red:** Camera power is off locally. (You need to turn on camera’s power switch.)

3. **VF power OFF switch [VF PW]**
   This is the camera VF power switch which is operated by remote control from the ROP. When it is at the ON setting, its LED is on. Each time the switch is pressed, the power setting is switched between ON (power on) and OFF (power off).

4. **Camera number display [CAMERA No.]**
   This is where the camera number information is displayed. “–” appears when no camera number is displayed.

You can change **Camera No.** at FUNC(SHIFT+DTL)
39. Optical filter selector switch [FILTER LOCAL]
This is pressed to adjust the optical filter manually. When it is pressed again, the optical filter can be controlled by the ROP.

40. Filter local LED [LOCAL]
This LED lights when the optical filter can be adjusted manually.

41. Monitor output selector switch [MONI SEL]
This is used to select the images (Y, NAM, R, G, B) which are to be output from the monitor output connector.

42. ND filter selector knob
This is used to adjust the optical filter manually when LOCAL has been selected as the filter setting.
1: CAP, 2: Through, 3: 1/4, 4: 1/16, 5: 1/64

43. CC filter selector knob
This is used to adjust the optical filter manually when LOCAL has been selected as the filter setting.
A: 3200K, B: 4300K, C: 6300K, D: Cross, E: DF0
Shutter

1. Electronic shutter speed setting switch [SPD]
   This is used to set the electronic shutter mode and shutter speed. The shutter speed and mode are displayed on the LCD display.

2. Shutter switch [ON]
   This is the ON/OFF switch for the electronic shutter mode, and its lamp lights when it is set to ON.

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**MODE: Switching settings for SHUTT/V.RES**
This is used to switch from SHUTT to V.RES or vice versa.
AK-HC930, AK-HC980: Available
AK-HC931, AK-HC3500: Not available
(fixed at “SHUTT”)
Selection range: SHUTT, V.RES

**SYNC: Synchro switch**
This is used to select the continuously variable shutter when the electronic shutter mode is set to ON.
Selection range: OFF, ON

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14. Adjustment rotary encoders
   The data of the adjustment items displayed on the LCD display can be changed using the adjustment rotary encoders which are positioned immediately below the display panel.

15. Up/down shift switches
   These are used to scroll the menu of the function selected by the control item selector switches up or down. They function when their lamps are lighted.

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*Bear in mind that the settings in the shaded areas of the table denote that the numerical values are displayed but the corresponding operations are not performed.*
6 Camera video output selector switch [CLOSE/BAR/TEST]
This is used to select the mode of the camera video signals which are to be output from the CCU’s rear panel. The switches are self-illuminating, and the lighting of the lamp of a switch indicates that the switch has been selected.

CLOSE switch lamp lighted:
Camera video output (when the lens is closed)

BAR switch lamp lighted:
Color bar signal output

TEST switch lamp lighted:
Test signal output

Note: Camera viewfinder doesn’t show color bar signal even if you press Bar button. (This is for VE to adjust a monitor or to record color bar at the top of a tape.)
If you want to show color bar on the camera viewfinder for VF’s brightness or contrast adjustment.
White/Black Balance and Auto Setup

You need gray scale chart to fulfill AUTO SET UP.

3 Auto setup switch [AUTO SET UP]
This switch is used to execute auto setup.
The setup status is output to the picture monitor.
“SETUP” selection options are provided on the FUNC menu, and the OUT FULL or OUT EASY mode is set.

OUT FULL: Standard setup based on an outdoor shooting chart
<Sequence of operation execution>
AWB ABB BSHD ABB AWB
GAMMA FLARE BSHD ABB AWB
GAMMA FLARE AWB

OUT EASY: Easy setup based on an outdoor shooting chart
<Sequence of operation execution>
AWB ABB AWB GAMMA FLARE
ABB AWB GAMMA FLARE B

Note: We recommend ASU gray scale chart with black pattern both side of center white area to improve FLARE adjustment.

1 Auto white balance switch [AUTO WHITE]
This is used to automatically adjust the white balance.

2 Auto black balance switch [AUTO BLACK]
This is used to automatically adjust the black balance.
Operation of Auto Setup

1. Press the auto setup switch.
2. The auto setup switch flashes at 2-second intervals, the auto setup start preparation mode is established, and a square marker appears in the center of the camera’s viewfinder. Roughly align this square with the white at the gray scale center. (To cancel the setup, hold down the switch for at least one second.)
3. When the auto setup switch is pressed again, its LED lights, and auto setup begins. (If the switch is pressed at any point during the auto setup operation, auto setup will be aborted.)
4. If the auto setup is completed successfully, the LED of the auto setup switch will be extinguished.
   1. If the LED flashes at 1-second intervals, it means that the operation has been terminated without completing the auto setup.
   2. During the auto setup operation, the operation status is displayed using characters on the PM.
Auto Setup Setting (ASU)

- Auto Setup Setting at FUNC menu is required.
  - SETUP (ASU): Auto setup mode setting.
    - For further details, refer to previous page.
    - Selection range: OUT FULL, OUT EASY
  - FSEL (ASU): File select
    - This is used to select the file to be referenced when auto setup has been started.
    - Selection range: FCTRY, USR1, USR, USR3
  - MPED (ASU): Auto setup MPED convergence value
    - This is used to set the position where the master pedestal is to be converged when auto setup has been started.
    - Adjustment range: 0.0 % to 7.5 %
    - M.PED: In Japan: 5%. Some users are different. 3%(TBS), 2.5%(NHK)
      - In America: 0% (SD:7.5% setup is added by SD product)
  - FILTER (ASU): Auto setup filter setting
    - This is used to set the operation of the NC/CC filter when auto setup has been started.
    - REF: Operation starts with the filter which has been set in the reference file.
    - CRRNT: Auto setup starts at the filter position prior to startup.
    - Selection range: REF, CRRNT
  - Note: Recommend REF because R/B gain variable range affect the result.
What’s the difference between ASU and Reference file.

- **Auto Setup (ASU):**
  - AWB, ABB, GAMMA, FLARE and BSHD are automatically adjusted by gray scale chart.

- **Reference file:**
  - Read the registered values are read from a reference file and are set to a camera.
    - An example of GAMMA
      - Reading from Reference file
        - R.GAMMA  MASTER.GAMMA  B.GAMMA
        - +2  0.45  -1
      - After executing ASU
        - R.GAMMA  MASTER.GAMMA  B.GAMMA
        - +6  0.45  -3 (R/B GAMMA is automatically adjusted.)
    - If you execute ASU under the actual condition and register it to the reference file, next time you can use reference file in place of ASU.
    - **Note:** Sony doesn’t have auto setup. They have only camera internal process set up. HC3500 auto setup is much closer to the actual condition than Sony’s.
1 Scene file selector switches [1 to 4, 5 to 8]
These file selector switches enable up to 8 sets of data to be stored ahead of time and then to be called when the data is needed.

2 Scene file storage switch [STORE]
This is pressed to store data in a scene file.

How to store the current file as the scene file
1. When the STORE switch is pressed, its lamp lights up.
2. When the switch with the number of the scene file in which the data is to be saved is pressed and its lamp is lighted, the storage of the current file starts and, upon completion, the lamp of the STORE switch goes off.

3 Scene file 1-4/5-8 selector switch
This is used to switch between scene files 1 to 4 and scene files 5 to 8.
How to operate scene file

In case of reading scene No.6 from current setting (scene No.1).

Holding shift and press 6

No.6 is selected. If you want to select 5,7,8, you can press 5,7,8 without pressing SHIFT key. In case of off mode, shift key is being kept.

In case of copying scene 1 to scene 6

Press STORE key.

Holding SHIFT key and press 6.

Scene No.1 is copied to Scene No.6. You can store 5,7,8 without pressing SHIFT key as well as reading.

In case of moving from scene 6 to scene 1

Holding shift key and press 1,2,3,4.
Otherwise you select 5,6,7,8 as a result.

If all LED is off, shift key is toggled.
Master Gain

This is the selector switch for the video input sensitivity.

The gain is selected using ◄ and ►.

-6 dB: Set input sensitivity to –6 dB
–3 dB: Set input sensitivity to –3 dB
0 dB: Set input sensitivity to 0 dB (standard setting)
+3 dB: Set input sensitivity to 3 dB
+6 dB: Set input sensitivity to 6 dB
+9 dB: Set input sensitivity to 9 dB
+12 dB: Set input sensitivity to 12 dB
RGB GAIN and Black Control

20. R, G and B gain controls [GAIN]
These are used to adjust the red (R), green (G) and blue (B) of the white balance.
Auto white balance can be initiated, and when the R, G and B gain controls are turned, the gain control levels shown on the LCD display are changed.

21. R, G and B black controls [BLACK]
Select FLARE or PED at FUNC(SHIFT + DTL)
Whether these controls are to be used to adjust the flare or pedestal can be set on the menu. These are used to adjust the red (R), green (G) and blue (B) of the black adjustments.
Auto black balance can be initiated, and when the R, G and B gain controls are turned, the flare or pedestal control levels shown on the LCD display are changed.

22. DTL control [DTL]  Select SD or HD.
This is used for incremental or decremental adjustments (painting) of the detail control settings (V-DTL and H-DTL adjustment values adjusted on the LCD display of the ROP).

Video Signal = 0.7V_{P-P}
Black Level
Sync. Signal = 0.3 V_{P-P}
Monitor

Monitor selector switches [R, G, B, SEQ, ENC]
These are used to select what is to be displayed on the waveform monitor (WFM) and picture monitor (PM). The output mode can be changed by selecting the MLINK settings on the SYSTEM screen.
If MLINK is set to ON, the monitor display is also switched temporarily in linkage with the R, G and B shading switches when BLACK SHADING and WHITE SHADING are to be adjusted on the MSU.

<table>
<thead>
<tr>
<th>Monitor selector switch</th>
<th>HDTV</th>
<th>SDTV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SDI4/PM</td>
<td>P-M</td>
</tr>
<tr>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>G</td>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>SEQ</td>
<td>RGB</td>
<td>Y</td>
</tr>
<tr>
<td>ENC</td>
<td>RGB</td>
<td>Y</td>
</tr>
</tbody>
</table>

The R, G and B switches can be selected simultaneously. The RGB outputs on the WFM display are shown as a parade display.

Note: ZEBRA signal of SKIN TONE DTL is shown
Only in the case that SDI4-PM setting is SEQ or ENC.
Mode

MODE ON/OFF switches [MODE]
These switches are for setting the camera operation modes.

1. *5600K switch [5600K]*
   This is used to change the amplification rate of the GBR signals by an electrical circuit to achieve the white balance that corresponds to the color temperature of 5600K.

   This is electric CC Filter. Convert 3200K to 5600K (134mired).

   **B:** Approx. -6dB
   **R:** Approx. 3dB

   **Note:** CC filter must be 3200K.

   CC filter: 4300K + ON  --  10,150K
   CC filter: 6300K + ON  --  40,400K

2. *Knee OFF switch [KNEE OFF] (P.10)*
   This is used to cancel the knee function that attenuates those parts of the video signals where a particular level (knee point) has been exceeded so that they will not become saturated as easily.

   **Lighted:** Knee function is canceled. (Knee OFF)
   **Off:** Knee function is valid.

3. *White clip OFF switch [W.CLIP OFF] (P.10)*
   This is used to cancel the white clip function by which the video signal output is clipped (saturated).

   **Lighted:** White clip function is canceled. (White clip OFF)
   **Off:** White clip function is valid. (White clip ON)

4. *Detail OFF switch [DTL OFF] (P.14)*
   This is used to cancel the function (detail enhancer) for enhancing the detail (hard/soft) of the image output. Depending on the setting established by DTL on the FUNC menu, the effect on the HDTV or SDTV detail is switched.

   **Lighted:** Detail enhancing function is canceled. (Detail enhancer OFF)
   **Off:** Detail enhancing function is valid. (Detail enhancer ON)
Joystick

23. Iris joystick control range selector switch [FULL]
This is used to set the control range of the iris joystick to FULL (when the switch lamp is lighted: from open to close). When the switch lamp is off, the control range of the SENSE control (34) is used for control.

24. Auto iris switch [AUTO]
This is used to activate the auto iris function. 
Lighted: The auto iris mode is established.
Off: The lens iris is controlled by the iris/master pedestal control joystick.

25. Tally indicators
The red tally indicator is at the top and the green tally indicator is at the bottom. They light when the respective tally signals are input to the INCOM/tally connector on the CCU.

28. Iris active switch [IRIS ACTIVE]
This holds the authority to exercise iris control. The AUTO IRIS, IRIS COARSE, MEMO and RECALL settings take effect only when the lamp of this switch is lighted.

29. Master pedestal active switch [M-PED ACTIVE]
This is used to activate the master pedestal control functions of the joystick. Its lamp lights when the functions are activated.

34. Iris sensitivity control [SENSE]
This is used to adjust the iris control range of the joystick.

35. Iris control range control [RANGE]
This is used to adjust the iris control position (shift the control range) of the joystick.

36. Master pedestal level indicator [M-PED]
This indicates the master pedestal level. Adjustment range: –64 to 63

37. Iris f-number indicator [IRIS]
This indicates the lens f-number.
Control item selector switches [CONTROL]
When these switches are selected (their lamps are lighted), the corresponding adjustment items and adjustment values appear on the LCD display.

1. Pedestal (PED), Shading (SHIFT + PED)
2. FLARE, MATRIX (SHIFT + FLARE)
3. GAMMA, Black Gamma (SHIFT + GAMMA)
4. R,G,B GAIN (GAIN)
5. KNEE/White Clip (KNEE/W.CLIP), System (SHIFT + KNEE/W.CLIP)
6. Detail (DTL), Function (SHIFT + DTL)
Control 1 (Pedestal and Shading)

1 Pedestal control switch [PED]
This is selected to adjust the R, G and B pedestal levels in relation to the master pedestal position. When it is selected, its lamp lights.

• LCD display of pedestal adjustments

<table>
<thead>
<tr>
<th>PED</th>
<th>G PED</th>
<th>B PED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Shading selector switch [SHIFT + PED → SHD]
This switch is used to correct the black shading (coloring of black images) and white shading. Its lamp lights when the switch’s function has been selected. The adjustment items for shading are indicated on the LCD display. The shading correction can be adjusted using the three rotary encoders for adjustment purposes immediately below.

Notes:
* Adjust the black shading when the ND filter is at the cap position or the lens is in the closed status.
* To adjust the white shading, shoot a white object so that it fills the screen, and use a level close to 100%.
Control 2 (FLARE and MATRIX)

2. Flare control switch [FLARE]
This is selected when the flare correction amount is to be adjusted. Its setting takes effect when the flare OFF switch on the FUNC menu is at ON. Its lamp lights when the switch’s function has been selected.

• LCD display of flare correction adjustments

<table>
<thead>
<tr>
<th>RFLR</th>
<th>GFLR</th>
<th>BFLR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

RFLR: R flare
GFLR: G flare
BFLR: B flare

Flare correction operation is turned off at 0.
Adjustment range: −100 to +100

Matrix control switch [SHIFT + FLARE → MTX]
This is used to change the correction amount for the saturation and color phase.
Control 3 (Gamma and Black Gamma)

3. Gamma curve control switch [GAMMA]
   This is selected when the gamma is to be corrected. Its setting takes effect when the gamma OFF switch on the FUNC menu is at ON. Its lamp lights when the switch’s function has been selected.

Black gamma control switch
[SHIFT + GAMMA → BLK GMA]
This is selected when the black gamma is to be corrected. Its setting takes effect when the black gamma ON switch on the BLACK GAMMA menu is at ON. Its lamp lights when the switch’s function has been selected.

- When the Cinema GAMMA switch is OFF in a conventional camera or the AK-HC3500 camera
  
  | BLK GAM | OFF |
  | BLKR   | BLKM | BLKB
  | 0      | 0    | 0    |

- When the Cinema GAMMA switch is ON in the AK-HC3500 camera
  
  | BLK GAM | OFF |
  | BLKR   | BLKM | BLKB
  | -      | -    | -    |
Control 4 (Gain)

4. **Gain control switch [GAIN]**
   This is selected to adjust the white balance. When it is selected, its lamp lights.
   • **LCD display of gain adjustments**

<table>
<thead>
<tr>
<th>R</th>
<th>G</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**GGAN: G gain**
This is used to adjust the mount by which the G gain is to be increased or decreased from its reference setting.
Adjustment range: –800 to +800

**RGAN: R gain**
**BGAN: B gain**
Amount by which the R or B gain is to be increased or decreased as referenced to their levels of the G pedestal when the white balance was attained; when the auto white balance is adjusted, 0 is set as the adjustment value.
Adjustment range: –800 to +800
Control 5  (KNEE/White Clip and SYSTEM)

5 Knee/white clip control switch [KNEE/W.CLIP]
This is selected when the knee slope, knee point or white clip level is to be adjusted.
Its setting takes effect when the KNEE OFF switch/W.CLIP OFF switch among the MODE ON/OFF switches are at ON.
Its lamp lights when the switch’s function has been selected.

System switches
[SHIFT + KNEE/W.CLIP → SYSTEM]
These switches are used for such purposes as selecting the down-converter mode and the up-converter mode and switching between HDTV video output YPbPr and GBR and between SDTV video output YPbPr and GBR.
Control 6  (Detail and Function)

6 Detail control switch [DTL]
Depending on the setting selected by DTL on the FUNC menu, the menu for HD detail (including skin tones) or SD detail (including skin tones) is displayed.

HD detail
This switch is selected when the extent of the detail enhancement (hard/soft) of the HDTV image output is to be changed. When the detail OFF switch is lighted, the effects will not be reflected in the images and the numerical values will remain unchanged as well. Since the SDTV video output is created from the HDTV video output, the adjustments made by the HD detail controls are also reflected in the SDTV video output.

FUNC control switch [SHIFT + DTL → FUNC]
These are used to establish the settings of the camera and peripheral devices.
• Press MTX (SHIFT + FLARE)

MATRIX ON/OFF:
Rotate the dial (14-1).

Step1: Select an item by up-down button.

Step2: Change value by those dials.

MTX12 (12-axis MATRIX) means color correction of HPX3100

Step1: Select color axis by the dial(14-1).

Step2: Change menu by the up-down button(No.15).

Step3: Change value by the dials (14-1,14-2).
Skin Tone Detail

1. Press DTL (Skin Tone Detail is in DTL menu)
2. Select SKDTL by up-down button.
3. Change OFF to ON by dial (No.14-1)
4. Select an item by up-down button

Note: You have to set SDI4-PM to SEQ or ENC. Otherwise you cannot see ZEBRA signal.
How to adjust skin tone detail

1. Press DTL button (Skin Tone Detail is in DTL menu.)
2. Set SKDTL to ON.
   1. Move to SKDTL by up-down button and set to ON.
3. Set CURSOR to ON.
   1. Move to CURSOR by up-down button and set to ON by dial(No.14-1).
4. Move to the place you want to compensate skin tone.
   1. Move to POSH,POSV by up-down button and move to the position where you want to get skin tone by dial(No.14-1,14-2).
5. Execute SKIN-GET
   1. Move to SKIN-GET by up-down button and rotate the dial (No.14-1).
6. Set ZEBRA to ON to adjust compensation range.
   1. Move to ZEBRA by up-down button and rotate the dial (No.14-1) to set it to ON.
7. Adjust WIDTH to get correct compensation range.
   1. Move to WIDTH by up-down button and rotate the dial (No.14-1) to adjust compensation range.
8. Set ZEBRA to OFF to check compensation amount.
   1. Move to ZEBRA by up-down button and rotate the dial (No.14-1) to set it to OFF.
9. Adjust CRISP to get correct compensation amount.
   1. Move to CRISP by up-down button and rotate the dial (No.14-1) to adjust compensation amount.
The difference between HPX3100 and HC3500

<table>
<thead>
<tr>
<th></th>
<th>HPX3100</th>
<th>HC3500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection Position</td>
<td>Fixed (Center Area)</td>
<td>Variable (Any position)</td>
</tr>
<tr>
<td>Compensation Amount</td>
<td>Fixed</td>
<td>Variable (CRISP)</td>
</tr>
<tr>
<td>Parameter</td>
<td>Y MAX, Y MIN, I CENTER, I WIDTH, Q WIDTH, Q PHASE</td>
<td>WIDTH, PHAS, SATU</td>
</tr>
</tbody>
</table>

HPX3100
Y MAX, Y MIN
I CENTER, I WIDTH
Q WIDTH, Q PHASE

CRISP: Amount of detail reduction
PHAS: Phase for skin tone
WIDTH: Width of skin tone
SATU: Saturation of skin tone areas
CCU
Front Panel

Remove the front panel to set a menu.
Rear Panel

- **Intercom/tally connector [COMMUNICATION]**
  - This is used to connect the intercom signals and tally signals to the external system.
CCU Menu

*** TOP MENU ***

Operation
- Format Change (Setting1)
  - Frequency: CCU Mode 50i/60
  - HD/SD: SDI OUT – HD/SD
- B/W Screen(Setting3)
  - MONO SW – ON/OFF
- Incom Setting
  - Incom, Incom/Mic

Maintenance
- Initialization: System -- Initialize

** Operation **

Setting1
- Setting2
- Setting3
- HD Phase
- SD Phase
- BAR ID
- Incom
- Incom/MIC

** Maintenance **

Start Up
- Mode
- Analog Gain
- ND/CC Name
- Date/Time
- Network
- Version
- PM View Setting
- PM Operation STAT
- System

* Setting1 *
- CCU Mode
  - 1080/59.941(601)
  - SDI RET1&2: HD
  - SDI RET3&4: HD
  - SDI OUT1&2: HD
  - SDI OUT3: HD
  - SDI OUT4: HD
  - NORM/PM: PM
  - Composite2
  - NORM/PM: PM
  - Sync Out: HD

* Setting2 *
- FS Delay: NORMAL
- Trunk1: RS422
- Trunk2: RS422

* Setting3 *
- MONO SW: OFF
- HD BAR Select: STD
- LPF: OFF
- User1: 75%WHITE
- User2: 0%BLACK
- SD BAR Select: SMPTE
- C/B Setup Add: COMPST
- Setup 7.5%: OFF
- Patho: OFF

* System *
- Initialize: NO?

To Top
Reference Signal

• There are 2 kinds of reference signal.
  – Black Burst Signal (In case of SD)
  – Tri-level Sync (In case of HD)
Genlock

- Gen-lock means synchronization of multiple video products.
  - In case of SD: Black burst signal is used for reference signal.
  - In case of HD: Tri-level sync is mainly used for reference signal. But actually black burst signal is used for HD products, too. Because
    1. They don’t want to change the current sync generator.
    2. HD/SD simulcasting system requires SD products which require black burst signal.
  - **Advanced sync:**
    - The down-converted SD signal s delayed from HD signal. Advanced sync is used to make HD signal advanced to SD signal. So if HD signal is advanced from reference signal, down-converted SD signal timing becomes the same as SD signal’s.
  - HD(SD) Phase: You have to adjust the HD(SD) phase by CCU to get precise timing of each product.
Connection for Genlock

75Ω Termination is recommended.

Reference Signal
Black Burst or Tri-level Sync.

VDA (Distribution Amp.)
We don't recommend cascade connection.

Sync Generator

Refer to next page
Back

To Top
Advanced SYNC

About HD and SD signal timing

- **Advanced SYNC**
  - the HD signals are advanced by 90H with 60 Hz or by 75H with 50 Hz for the HTDV signals over the SDTV genlock sync signals.
  - The down-converted signal is delayed from HD signal. So if HD signal is advanced, it becomes the same as SD reference signal.
  - **Note:** This is good for SD main studio. But 0H (No advanced timing) system becomes more popular now. Because the studio is changing from SD studio to HD studio.

- **Setting**
  - SD → HD V Phase: 0H, ADVANCE, 0H_SD_DLAY
  - Vertical phase setting between SD/HD
    - Select this to set the vertical phase of the HDTV output to that of the SDTV output.
    - **ADVANCE:** Advanced by 90H with 60 Hz or by 75H with 50 Hz
    - **0H_SD_DLAY:** The SDTV signals are delayed and set in-phase with the HDTV signals.
    - **0H:** The return signal for a camera system is 1 fame delayed.
Incom

- Intercom is used for communication between a cameraman and a director, a video engineer and so on.
- 3 kinds of system, 2W, RTS, 4W are used.
  - You have to change the setting by dip switch on the board.
  - INCOM ENG I/O
    - Selected using SW301, SW303 on the board.
  - INCOM PROD I/O
    - Selected using SW300, SW302 on the board.
- 2W and RTS systems require crosstalk adjustment.
### Intercom/tally connector [COMMUNICATION]

**RDBD-25SE1/M2.6 (55) (Hirose Electric Co., Ltd.)**

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal</th>
<th>Flow of signals</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INCOM ENG OUT (H)</td>
<td>CCU → SYSTEM</td>
<td>0 dBm, 600 Ω &lt;br&gt;2W/RTS/4W &lt;br&gt;• Selected using SW301, SW303 on the board.</td>
</tr>
<tr>
<td>2</td>
<td>INCOM ENG OUT (C)</td>
<td>CCU → SYSTEM</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>INCOM ENG (GND)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>INCOM ENG IN (H)</td>
<td>SYSTEM → CCU</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>INCOM ENG IN (C)</td>
<td>SYSTEM → CCU</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>PGM1 IN (H)</td>
<td>SYSTEM → CCU</td>
<td>0 dBm/–20 dBm, 600 Ω &lt;br&gt;• Selected using a menu.</td>
</tr>
<tr>
<td>7</td>
<td>PGM1 IN (C)</td>
<td>SYSTEM → CCU</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>PGM1 IN (GND)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>NC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>NC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>R TALLY IN (H)</td>
<td>SYSTEM → CCU</td>
<td>ON: Shorted/TTL(H)/24 V → Refer to &quot;Example of tally input connections&quot;.</td>
</tr>
<tr>
<td>12</td>
<td>R TALLY IN (C)</td>
<td>SYSTEM → CCU</td>
<td>OFF: Open/TTL(L)/24 V</td>
</tr>
<tr>
<td>13</td>
<td>NC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>INCOM PROD OUT (H)</td>
<td>CCU → SYSTEM</td>
<td>0 dBm, 600 Ω &lt;br&gt;2W/RTS/4W &lt;br&gt;• Selected using SW300, SW302 on the board.</td>
</tr>
<tr>
<td>15</td>
<td>INCOM PROD OUT (C)</td>
<td>CCU → SYSTEM</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>INCOM PROD (GND)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>INCOM PROD IN (H)</td>
<td>SYSTEM → CCU</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>INCOM PROD IN (C)</td>
<td>SYSTEM → CCU</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>PGM2 IN (H)</td>
<td>SYSTEM → CCU</td>
<td>0 dBm/–20 dBm, 600 Ω &lt;br&gt;• Selected using a menu.</td>
</tr>
<tr>
<td>20</td>
<td>PGM2 IN (C)</td>
<td>SYSTEM → CCU</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>PGM2 IN (GND)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>NC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>NC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>G TALLY IN (H)</td>
<td>SYSTEM → CCU</td>
<td>ON: Shorted/TTL(H)/24 V → Refer to &quot;Example of tally input connections&quot;.</td>
</tr>
<tr>
<td>25</td>
<td>G TALLY IN (C)</td>
<td>SYSTEM → CCU</td>
<td>OFF: Open/TTL(L)/24 V</td>
</tr>
</tbody>
</table>

### TRUNK

**RDBD-9SE1/M2.6(55) (Hirose Electric Co., Ltd.)**

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal</th>
<th>Flow of signals</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TRUNK1_TX (C)</td>
<td>CAM → CCU</td>
<td>RS-422/RS-232C &lt;br&gt;• Selected using a menu.</td>
</tr>
<tr>
<td>2</td>
<td>TRUNK1_TX (H)</td>
<td>CAM → CCU</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>TRUNK1_RX (H)</td>
<td>CCU → CAM</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>TRUNK1_RX (C)</td>
<td>CCU → CAM</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>TRUNK2_TX (C)</td>
<td>CAM → CCU</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>TRUNK2_TX (H)</td>
<td>CAM → CCU</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>TRUNK2_RX (H)</td>
<td>CCU → CAM</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>TRUNK2_RX (C)</td>
<td>CCU → CAM</td>
<td></td>
</tr>
</tbody>
</table>
4W/RTS/2W

- **4W**: Balanced 4 wire shield line.
  - TALK and Receive are separated.
- **2W, RTS**: unbalanced 2 wire shield line.
  - TALK and Receive are the same. So crosstalk adjustment is required.
    - Clear-com system: ClearCom Company
    - RTS System: Telex Company (RTS company had developed. And then Telex company bought RTS.)
Technical Term

1. What is flange back?
2. What is color temperature?
3. What is white balance?
4. The difference between Optical CC filter and Electrical CC Filter (Camera Block Diagram)
5. What is pedestal?
6. What is shading?
7. What is flare?
8. What is MATRIX?
9. What is gamma?
10. What is knee?
11. What is detail?
12. What is white clip?
What is Flange Back?

- **Back Focus**: the distance between the rear element of a lens and the camera focal plane.

- **Flange Back** (flange focal length): Distance between the lens mount and the camera focal plane.
If you change focal length of zoom lens, image plain will change. Flange back adjustment means to adjust lens position to focus on the same position of image plain.

If flange back error is 0.1mm at 5m distance, the error will become 50mm : 0.8m error (16%) at 50mm lens and 3.2m error (64%) at 25mm lens.
Color Temperature

Color temperatures over 5,000K are called *cool colors* (blueish white), while lower color temperatures (2,700–3,000 K) are called *warm colors* (yellowish white through red).[1] This relation, however, is a psychological one in contrast to the physical relation implied by [Wien's displacement law](https://en.wikipedia.org/wiki/Wien%27s_displacement_law), according to which the spectral peak is shifted towards shorter wavelengths (resulting in a more blueish white) for higher temperatures.

[Image: Colour Temperatures in the Kelvin Scale](https://www.mediacollege.com)
What is White Balance?

- Make input signals (R,G,B) same. (R=G=B)
  - 3200K Setting: R/1.91, B/0.62  Reduce red (52%), Gain up B (61%)
  - 5600K Setting: R/0.84, B/0.98  Gain up red. (19%), reduce B (almost same)

**Correct Setting**

Tungsten 3200k  
3200K Setting  
R'=R/1.91  
G'=G  
B'=B/0.62

Daylight 5600k  
5600K Setting  
R'=R/0.84  
G'=G  
B'=B/0.98

**Wrong Setting**

The higher temperature you set, the more reddish a picture becomes. (Vice Versa)

Florescent light bulb 5000k  
3200K Setting  
R'=R/1.91  
G'=G  
B'=B/0.62

Sunset 3700k  
5600K Setting  
R'=R/0.84  
G'=G  
B'=B/0.98
Lens

Optical Filter

Prism, CCD

<Camcorder Block Diagram>

Pre Amp (CDS)

Pre Process
- AWB (White Balance)
- ABB
- W/B Shading
- Gain control

DSP
- Gamma
- Detail
- Matrix

Output

System Control

SYNC

CCD Drive

Pulse

Lens Control

To Top
The difference between Electrical CC Filter and Optical CC Filter

1. Dynamic Range and S/N Ratio  (In case of Optical CC filter)

A camera signal process is based on 3200K. (reference)

To adjust white balance, B gain is around 4dB and R gain is around -6dB if G is 0dB (reference)

When color temperature is 5600K, R component decrease and B component increase.

Optical filter converts 5600K to 3200K.

5600K’s amplifier gain becomes the same as 3200K’s because color temperature converts optically.
The difference between Electrical CC Filter and Optical CC Filter

2. Dynamic Range and S/N (Electrical CC filter)

**In case of 3200K**
- B = 4dB
- G = 0dB
- R = -6dB

**In case of 5600K**
- B = 0.2dB
- G = 0dB
- R = 1.5dB

**Gain difference**
- B = -3.8dB
- G = 0dB
- R = 7.5dB

See above figure. B signal decreases (-3.8dB) and R signal increases (7.5dB) when color temperature is 5600K.

As a result, amplifier gain changes. That means dynamic range becomes small and S/N becomes worse.
What is PED (Pedestal)?

PEDESTAL means VASE On Signal.

Video Signal = 0.7V_{P-P}

Sync. Signal = 0.3 V_{P-P}

BL Level

Deference of M PED depend on area and how to set up HPX3000G M PED

NTSC BLACK Spec.: 7.5% ± 2.5%

① USA: 7.5% (Setup) + 1% (Ped) → Total 8.5% Black at ENC OUT
② Japan: 0% (Setup) + 5% (Ped) → 5% Black (W/O SET UP)
③ Europe (Continental): 3% (Ped) → 3% Black
④ UK: 1% → 1% Black
④ HD: 3% Ped (to unify PAL and NTSC)
What is shading?

White shading: Edge area is not white when you shoot white signal.

Black shading: Edge area is not black when you shoot black signal.

To compensate it, we use sawtooth wave (HSAW, VSAW) and parabolic wave (HPARA, VPARA). Because there are 2 kinds of distortion, sawtooth type distortion and parabolic type distortion.
What is flare?

- **Lens flare** is the light scattered in lens systems through generally unwanted image formation mechanisms, such as internal reflection and scattering from material inhomogeneities in the lens.
  - Refer to Wikipedia
What is MATRIX?

To improve color reproduction.

Color reproduction can be expanded with MATRIX.

CIE Chromaticity Diagram
What is gamma?

Gamma = OFF

* Broadcaster
* CRT: OUTPUT = (INPUT)^2.2
* Television Set OUT

Gamma = ON

* V = L^{1/2.2}
* x 1/2.2 = 0.45
Gamma Correction equation

**INPUT: L  OUTPUT: V**

1. **SD Gamma Correction carve equation**
   \[ V = L^{0.45} \quad (1 \geq L \geq 0.037703) \]
   \[ V = 5L \quad (0.037703 \geq L \geq 0) \]

Initial Gain \textbf{X5} (BBC Spec.)

Initial Gain \textbf{X4.5} (Studio camera)

Initial Gain \textbf{X4.0~3.5} (ENG camera)

2. **HD Gamma Correction carve equation**
   \[ V = 1.115L^{0.45} - 0.1115 \quad (1 \geq L \geq 0.0228) \]
   \[ V = 4L \quad (0.0228 \geq L \geq 0) \]

**Example:**
- \( L = 0.31 \) (Cross Point)
  \[ V = (0.31)^{0.45} \]
  \[ = 0.59 \]

**Example:**
- \( L = 0.31 \) (Cross Point)
  \[ V = 1.115(0.31)^{0.45} - 0.1115 \]
  \[ = 54.7 \]
What is KNEE?

It compresses high level signal to within 109% level.
Compression starts from knee point.
What is detail (DTL)?

• To emphasis the rising edge and negative going edge of wave.
What is white clip?

- Video signal must be within 109% at HD.
- White clip function limits video signal within 109%.