The AJ-PX230 Book

Understanding Scene files

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1. Understanding Scene files

1. Selecting scene file

1-1. Scene Files and their features

In AJ-PX230, setting values for adjusting the image quality are preset in advance as Scene Files of six types.
With Main Menu [SCENE FILE] > [FILE SELECT], Suitable Scene Files for recording conditions or operator's intended images can be called.   Also, by assigning [SCENE FILE SEL] to one of the USER buttons, Scene files can rapidly recalled with it.

F1:	Suitable for normal recording. Gamma is "HD NORMAL" and the other parameters are factory default settings.
F2: FLUO.	Suitable for recording where the characteristics of fluorescent lamps are taken into consideration (e.g. shooting indoors). Most of the parameters are equal to Normal but the MATRIX is for fluorescent lighting. This is not particularly necessary under the fluorescent lighting close to the natural light. But it is suitable for the recording conditions under which the color reproduction is poor due to blue-intense fluorescent lamps.
F3: SPARK	Suitable for recording in SD resolution with richer color level and sharper contrast. The picture will be showy with vivid colors and give a bright impression.
F4: B-STR	Suitable for recording where the gradation is expanded on dark parts of the image (e.g. shooting a sunset scene). This is effective if being used when dark parts are difficult to see or both bright and dark scenes need to be seen in detail in shooting at sunset, in the theater or at a wedding.
F5: CINE V	Suitable for movie-like recording where importance is placed on contrast. This has the Gamma curve to make a movie-like picture using a video camera (V).
F6: CINE D	Suitable for movie-like recording where importance is placed on the Dynamic Range. This Gamma gives priority to the Dynamic (D) Range and maintains the gradation that ranges evenly from low to high level. If the post-production editing or the kinescope is planned, this can be selected because recording in this mode will make such post-processing easier and smoother. Also, it will create a unique atmosphere which is sometimes used as an effect.

* Even if the Scene File is changed, [SYSTEM MODE] will not be changed.

1-2. Table of Factory Default Settings

Menu items	F1:	F2:FLUO.	F3:SPARK	F4:B-STR	F5:CINE V	F6:CINE D
VFR	OFF	OFF	OFF	OFF	OFF	OFF
SYNC SCAN TYPE	sec	sec	sec	sec	sec	sec
MASTER DTL	0	0	4	0	-8	-8
DTL CORING	1	1	3	1	1	1
SKIN TONE DTL A	OFF	OFF	OFF	OFF	OFF	OFF
SKIN TONE DTL B	OFF	OFF	OFF	OFF	OFF	OFF
SKIN TONE DTL C	OFF	OFF	OFF	OFF	OFF	OFF
CHROMA LEVEL	0%	0%	0%	0%	-10%	-10%
CHROMA PHASE	0	0	0	0	0	0
COLOR TEMP Ach	3200K	3200K	3200K	3200K	3200K	3200K
COLOR TEMP Bch	3200K	3200K	3200K	3200K	3200K	3200K
MATRIX	NORM 1	FLUO.	NORM2	NORM1	CINE LIKE	CINE LIKE
MASTER PED	16	16	16	16	16	16
GAMMA MODE SEL	HD	HD	HD	HD	FILM LIKE3	FILM REC
MASTER GAMMA	0.45	0.45	0.45	0.45	0.45	0.45
F-REC DYNAMIC LVL	-	-	-	-	-	600%
F-REC BLACK STR LVL	-	-	-	-	-	0%
V-REC KNEE SLOPE	-	-	-	-	-	-
V-REC KNEE POINT	-	-	-	-	-	-
BLACK GAMMA	OFF	OFF	-4	6	OFF	OFF
B.GAMMA RANGE	1	1	2	2	1	1
KNEE MODE	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO
A.KNEE RESPONSE	4	4	4	4	4	4
KNEE MASTER POINT	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%
KNEE MASTER SLOPE	85	85	85	85	85	85
KNEE MASTER SLOPE Rch	0	0	0	0	0	0
KNEE MASTER SLOPE Bch	0	0	0	0	0	0
HI-COLOR SW	ON	ON	ON	ON	ON	ON
HI-COLOR LVL	32	32	32	32	32	32
WHITE CLIP	ON	ON	ON	ON	ON	ON
WHITE CLIP LVL	109%	109%	109%	109%	109%	109%
Rch CLIP LVL	0	0	0	0	0	0
Bch CLIP LVL	0	0	0	0	0	0
DRS	OFF	OFF	OFF	OFF	OFF	OFF
DRS EFFECT DEPTH	1	1	1	1	1	1

* Setting values of each Scene File can also be overwritten as you like and saved.

With Main Menu > [SCENE FILE] > [FILE SELECT], select one of Scene Files [F1] – [F6] and change any of [SCENE FILE] Menu items.   The current values of selected Scene File will be overwritten.
Further, with [SCENE FILE] > [LOAD/SAVE/INITIALIZE], execute [SAVE].

The overwritten values of selected Scene File will be saved in the memory of the camera.
Moreover, Scene Files [F1:] – [F6:] can be saved all together in an SD memory card.
(With [CARD FUNCTIONS] > [SCENE FILE], execute [SAVE].)

How to restore scene files to default settings

With [SCENE FILE] > [LOAD/SAVE/INITIALIZE], select [INITIALIZE].

2. Expressing the texture of objects

2-1. Detail enhancement

When expressing the outline or surface texture of an object, faint reflection of light may be intensified or, to the contrary, the picture may look blurred.   This is a phenomenon caused by the strength / weakness of Detail signal to intensify the video signal for the object's outline.   Adjustment of Detail signal can make the object's luster or texture look more natural.

MASTER DTL: +31

MASTER DTL: -31

For AJ-PX230 camera, the adjustment of Detail is usually made by setting MASTER DETAIL (intensity of the effect) and DETAIL CORING.　DETAIL CORING is a function to set the level of signal (including noise) which suppresses the Detail effect.

For further information, please refer to "2-4. More advanced settings for Detail".
On the other hand, as an advanced setting, DETAIL (both horizontal and vertical directions) and V DETAIL (vertical direction) are mainly used.　Within a certain range of levels of outline signal, the adjustment can be made balancing the horizontal and vertical effects against each other.

If the setting value is set to a positive value, which is greater than the center value "0" (zero), that is, if the Detail level is increased, the edges of video signal will be intensified horizontally and vertically and the picture will look sharper with an enhanced outline of an object.　To the contrary, if it is set to a negative value, that is, if the Detail level is decreased, the outline enhancement will be suppressed and the picture will look softer.

After the Detail is adjusted, if there is a noticeable difference in sense of resolution between the horizontal and vertical directions, use V DETAIL to make adjustments to the vertical Detail only.

‡ VDTL
　(Vertical Direction)
In this picture, the adjustment in the positive direction can make the eyes look clearer.

↔ HDTL
　(Horizontal Direction)
In this picture, the adjustment in the positive direction can make the outline of the neck look sharper.

2-2. Basic settings for Detail

General Settings: Main Menu → [SCENE FILE]   (Factory default settings underlined)

[MASTER DTL] **-31 --- 0 --- 31**

Adjusts the level of overall Detail effect.

[DTL CORING] **0 --- 1 --- 60**

Sets the level of signal (including noise) that suppresses the Detail effect.

More Detailed Settings: Main Menu → [SCENE FILE] → [DETAIL SETTING]

[DETAIL] **ON / OFF**

Selects whether to add the Detail or not.

[V.DTL LEVEL] **-7 --- 0 --- 7**

Sets the intensity of Detail level in the vertical direction.

[H.DTL FREQ.] **-7 --- 0 --- 7**

Sets the thickness of Detail in the horizontal direction.

[V.DTL FREQ.] **0 --- 1 --- 2**

Sets the thickness of Detail in the vertical direction.

[LEVEL DEPEND.] **-7 --- 0 --- 7**

When the Detail of luminance signal is intensified, the Details of darker areas are compressed.
If this setting value is larger, the Details of brighter areas will also be compressed.

[KNEE APELVL] **0 --- 2 --- 5**

Sets the Detail level of high-luminance areas (very bright areas).

[DTL GAIN（+）] **-31 --- 0 --- 31**

Sets the Detail level in the positive (brightening) direction separately.
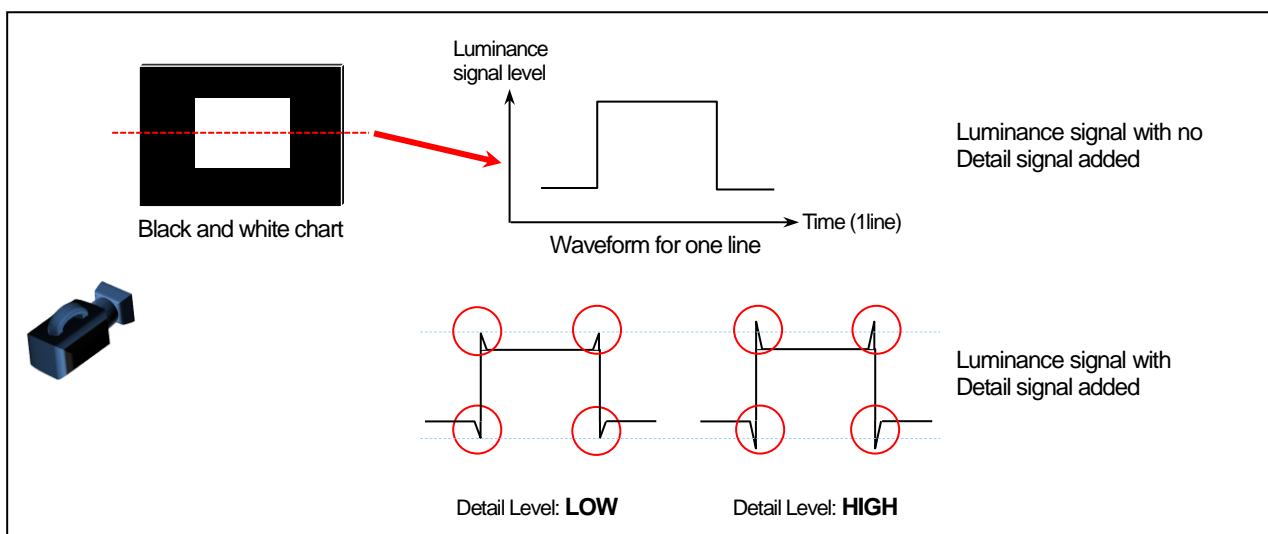
[DTL GAIN（−）] **-31 --- 0 --- 31**

Sets the Detail level in the negative (darkening) direction separately.

2-3. Technical description : Detail

This is an outline signal which is added to a video signal.
If the Detail level is increased, the edges of video signal will be intensified and outlines in the picture will look sharper.
If the Detail level is decreased, the edges of video signal will be weakened and the picture will look softer with its outline enhancement suppressed.

Black and white chart

Luminance
signal level

Waveform for one line

Time (1line)

Luminance signal with no
Detail signal added

Luminance signal with
Detail signal added

Detail Level: **LOW**   Detail Level: **HIGH**

Difference of video image and waveform with different MASTER DETAIL settings

MASTER DETAIL   +31 (Image is sharper)

Brightness

Detail level is fully
increased

MASTER DETAIL

MASTER DETAIL   -31 (Image is softer)

11
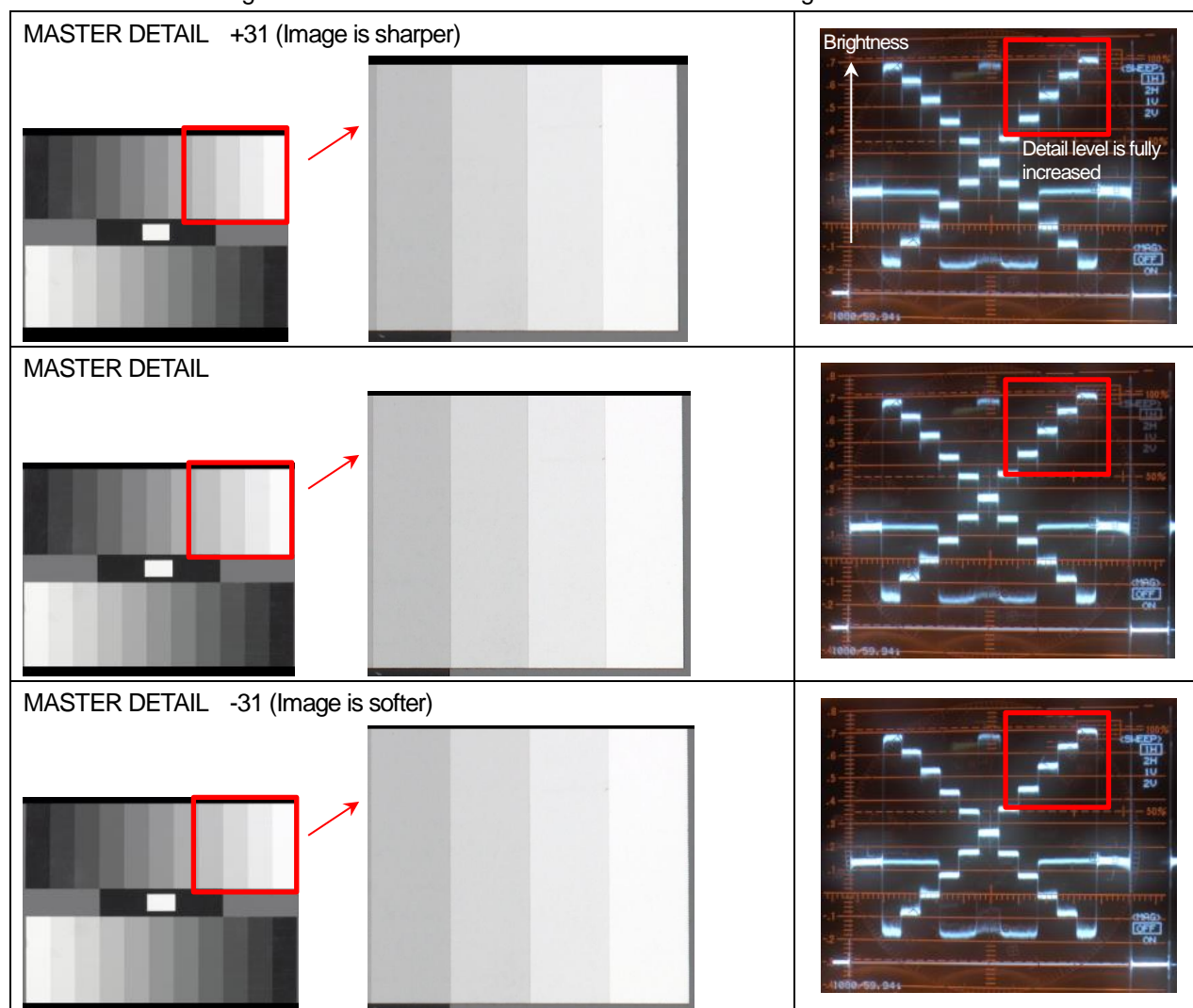
2-4. More advanced settings for Detail : Detail Coring, Skin Tone Detail

Detail Coring

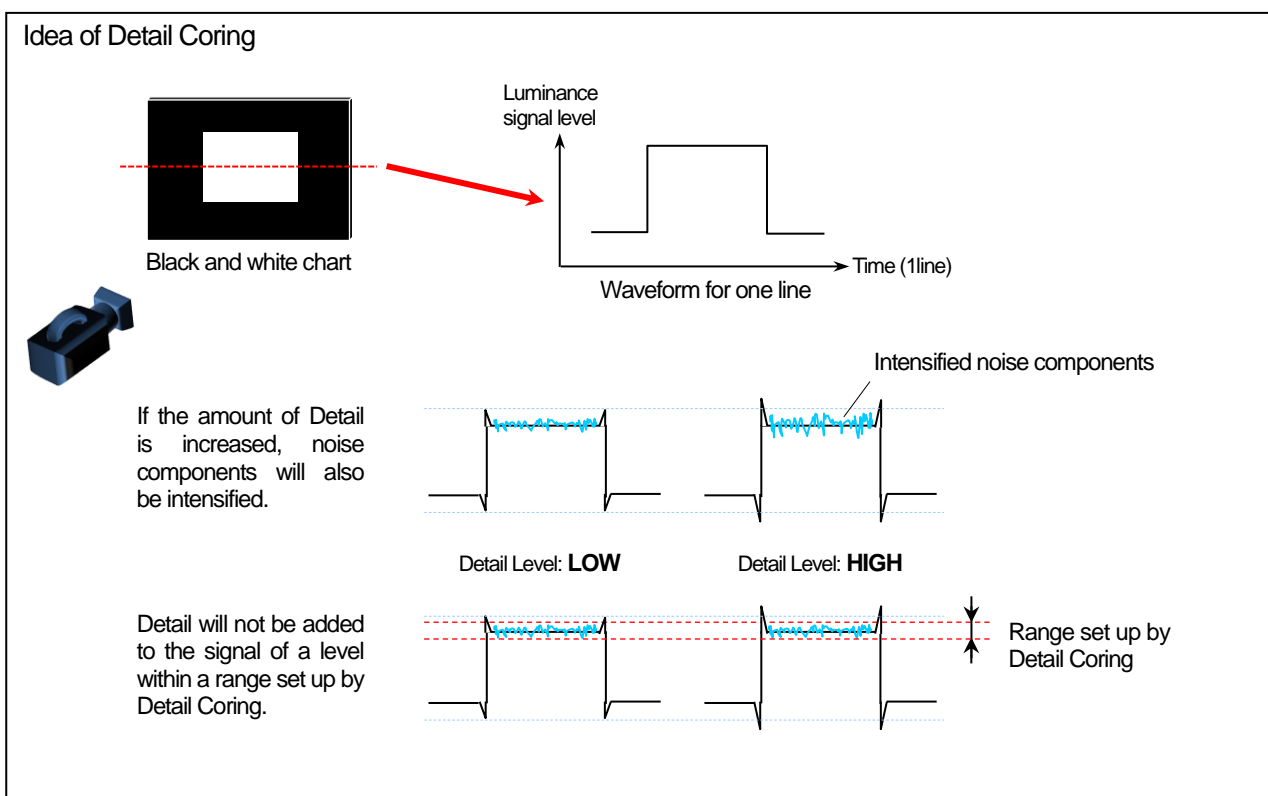Outline compensation can be performed by adjusting the Detail, and enhanced outlines enable clear representation of images.　But at the same time it may make a whole picture look coarse.　This is because added Detail signal will also work on low-level signals including noise.
Detail Coring function can adjust the range of adding the Detail signal and reduce the noise caused by adjusting the Detail.

Noise is a low-level signal.　So, when the Detail Coring is set to a higher level than noise signals, the Detail signal will work only on high-brightness signals to be intensified, not on the noise.　By this adjustment, the outline of an object will be enhanced and its texture will look the same while the increase of coarseness on the whole picture is suppressed.

In some cases, this adjustment of Detail range by Detail Coring is effective to reduce the noise that has become noticeable due to GAMMA setting.　Moreover, with the Skin Detail turned ON, graininess of human skin color can be lowered and, also in representing the images of people, it is possible to make the texture look natural depending on the situation.

Idea of Detail Coring

Black and white chart

Luminance signal level

Waveform for one line

Time (1line)

Intensified noise components

If the amount of Detail is increased, noise components will also be intensified.

Detail Level: **LOW**　　Detail Level: **HIGH**

Detail will not be added to the signal of a level within a range set up by Detail Coring.

Range set up by Detail Coring

Skin Tone Detail

When there is grainy noise on human skin color areas, Skin Detail function can decrease the Detail of those areas to lower their graininess.

However, depending on the situation, setting the Skin Detail or Detail Coring may even affect natural light and shade, which characterize the human skin or the texture of an object, and, as a result, the natural representation may become impossible.   So it needs to be checked every time this adjustment is made.

General Settings: Main Menu → [SCENE FILE]   (Factory default settings underlined)

[SKIN TONE DTL A], [SKIN TONE DTL]B, [SKIN TONE DTL C]:   ON / OFF for each

Select the type of skin color on which the Skin Tone Detail works.   These three settings can be set either separately or in combination.

[SKIN TONE ZEBRA]:   ON / OFF

Displays the zebra pattern on a selected skin color area.   This zebra pattern indicates an area selected by [SKIN TONE DTL SETTING].

More Advanced Settings: Main Menu → [SCENE FILE] → [SKIN TONE DTL SETTING]

[DETECT TABLE〕   A / B / C

Selects the skin color table of the object to apply the Skin Tone table to.

[SKIN TONE GET〕

Acquires the color information of [A], [B] or [C] selected in [DETECT TABLE] from the area around the center marker.
By executing this menu, the data from [I CENTER] to [Q PHASE] are acquired automatically.

[SKIN DTL EFFECT〕   0 - - - 16 - - - 31

Sets the effect level of Skin Tone Detail.

* Data acquired by [SKIN TONE GET]

When the color composition of video signal (R/G/B) is converted to color difference signal (R-Y/B-Y), it can be represented as the figure below.   On this diagram, using the axes across Red-Cyan and Green-Magenta phases (I axis and Q axis, respectively), set the following areas to apply Skin Tone.

[I CENTER]　0　- - -　35　- - -　255

Sets the center position on the I axis (the area to apply Skin Tone).

[I WIDTH]　　0　- - -　55　- - -　255

Sets the area width to apply Skin Tone along the I axis with [I CENTER] as the center.

[Q WIDTH]　0　- - -　10　- - -　90

Sets the area width to apply Skin Tone along the Q axis with [I CENTER] as the center.

[Q PHASE]　-180　- - -　0　- - -　179

Sets the area phase to apply Skin Tone with the Q axis as a reference.

If some areas on the background, etc. are close to skin-colored, they will also look smoother after this function is used. When the brightness is not enough, the effect may not be easily recognized.   Also, if people are filmed in a reduced size, their faces may be blurred.

Effect and adjustmet range of SKIN TONE DTL settings on vector scope
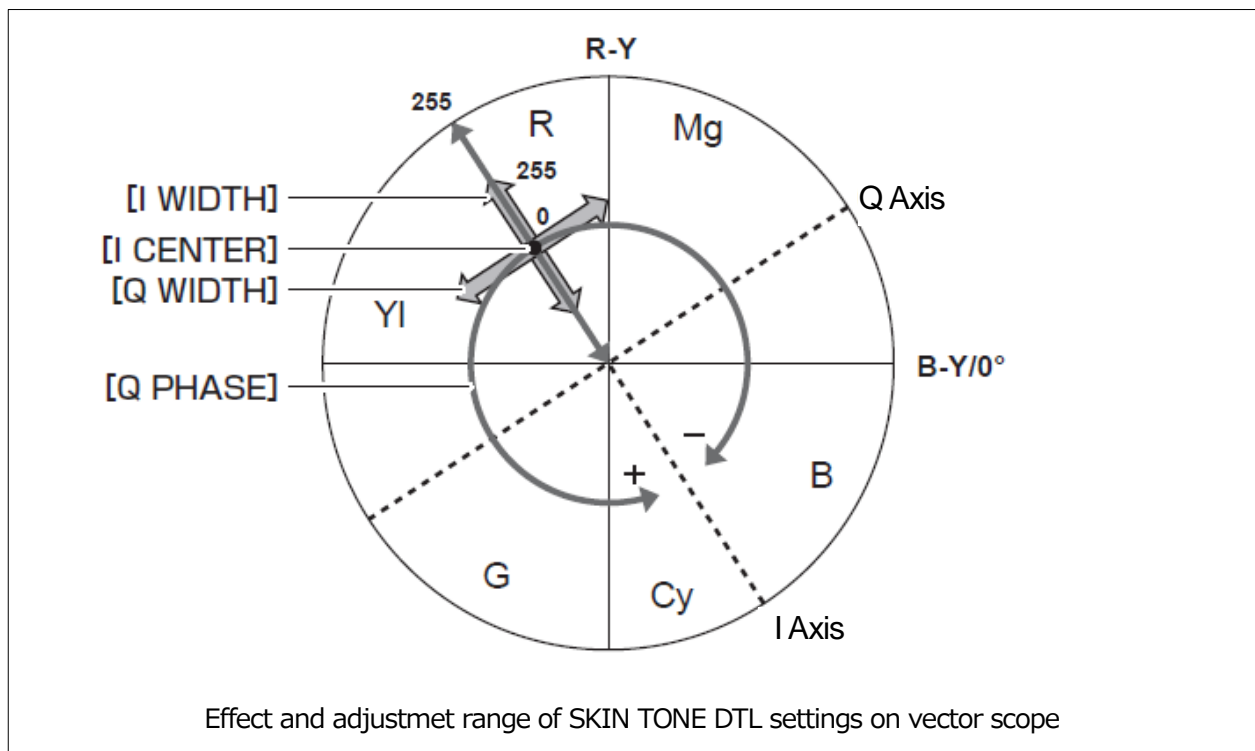
3. Expressing the gradation of a picture (Knee, Gamma)

3-1. Knee adjustment

Due to the sunny weather or the lighting, "blown-out highlights" sometimes occur, where bright areas look completely white.

This is a phenomenon caused by the luminance signals that are out of the camera's Dynamic Range (processing range). In order to put such high-brightness input signals within the Dynamic Range, Knee function can be used to compress the gradation. However, the color gradation is also compressed at the same time by this function. So, depending on the scene, the color may become lighter. In that case, setting [KNEE MASTER SLOPE Rch] and [KNEE MASTER SLOPE Bch] will enable the adjustment of color.

KNEE MASTER POINT: 70%

KNEE MASTER POINT: 93%

KNEE MASTER POINT: 107%

3-2. Technical description : Knee

Knee is a function to compress the luminance signal of a certain level or higher so that it can be output at a level of about less than 109% (white clip) in order to put the brightness of an object within the Dynamic Range.
Knee Point is a setting about which level to start the compression from.   It is said that the brightness of human skin is about 85%, so professional video cameras are designed so that their settings can be set for the brightness of the same level as human skin or higher.   That is, without affecting much the gradation expression of human skin, the gradation of brighter areas like clouds in the sky can be expressed well by using Knee.
Knee Slope indicates how much to be compressed, which means a slope of the brightness curve from Knee Point to the maximum of Dynamic Range.   Generally, when a scene includes high-brightness areas, the Knee Point is set to a lower value to prevent blown-out highlights.   On the other hand, when a scene does not include such areas, the Knee Point is set to a higher value to prevent the gradation of middle-brightness areas from being compressed.
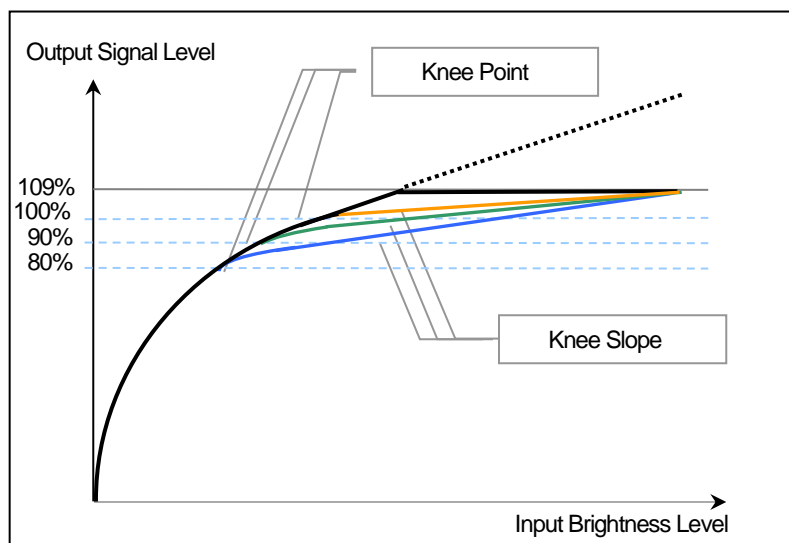
Knee Point: A point to start the compression
Knee Slope: A slope of the brightness from Knee Point to the maximum of Dynamic Range

This is an example for explanation only and may be different from actual measurements.

Adjustment Items for Knee: Main Menu > [SCENE FILE] > [KNEE SETTING]   (Factory default settings underlined)

[A.KNEE RESPONSE]   1 - - - <u>4</u> - - - 8

Sets the response speed.   A smaller setting value allows a faster response speed.   (* Enabled when KNEE MODE is AUTO)

[KNEE MASTER POINT]   70.0% - - -   <u>93.0%</u> - - -   107.0%

Sets the position of Knee Point in units of 0.5%.   (* Enabled when KNEE MODE is MANUAL)

[KNEE MASTER SLOPE]   0 - - - <u>85</u> - - - 99

Sets the slope of Knee.   (* Enabled when KNEE MODE is MANUAL)

[KNEE MASTER SLOPE Rch]   -31 - - -   <u>0</u> - - -   31

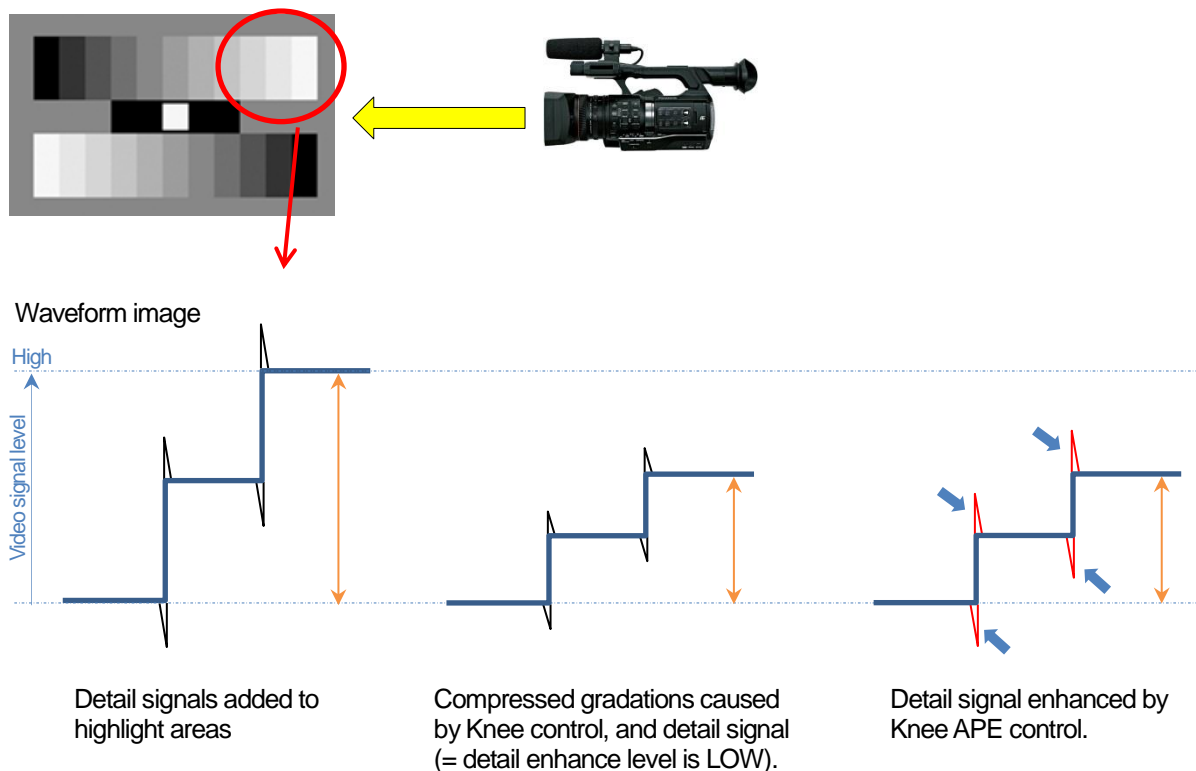Sets the Knee slope of Rch.   (* Enabled when KNEE MODE is MANUAL)

[KNEE MASTER SLOPE Bch]   -31 - - -   <u>0</u> - - -   31

Sets the Knee slope of Bch.   (* Enabled when KNEE MODE is MANUAL)

3-3. KNEE APE control

When compressing highlight portions with KNEE control to avoid overexposed image (blown-out highlights), detail signal will also be compressed and it may cause softening in highlight areas.   This can be compensated by using KNEE APE LEVEL control.

Concept of detail compensation for highlight areas with KNEE APE LEVEL control

Waveform image

High

Video signal level

Detail signals added to highlight areas

Compressed gradations caused by Knee control, and detail signal (= detail enhance level is LOW).

Detail signal enhanced by Knee APE control.

MENU > SCENE FILE >   (Factory default settings underlined)

[KNEE APE LEVEL]   0 - - - 2 - - - 5
Sets enhancement level of detail signal for highlight areas

3-4. White Clip

Adjustment Items for White Clip:
Main Menu → [SCENE FILE] → [WHITE CLIP SETTING]   (Factory default settings underlined)

[WHITE CLIP LVL]   90% - - - 109% Sets the White Clip level.

[Rch CLIP LVL]   -31 - - - 0 - - - 31 Sets the clip level of Rch against White Clip.

[Bch CLIP LVL]   -31 - - - 0 - - - 31 Sets the clip level of Bch against White Clip.

3-5. Gamma adjustment

There are cases where the color and contrast, which look natural to the eye, are not fully reproduced on the picture. An effective way for these cases is to adjust the gradation of output signal.   Select a suitable Gamma curve according to the scene.   AJ-PX230 offers seven types of Gamma curves.
(Main Menu → [SCENE FILE] → [GAMMA MODE SEL])

HD:
This is a video Gamma characteristic for HD (High Definition).
This Gamma complies with the standards defined by ARIB, EBU, SMPTE, etc.   Use this for the purpose of normal HD shooting.

SD:
Gain is increased for dark areas more than HD Gamma.
This Gamma curve can be used for shooting in SD mode, or for HD shooting that needs the same Gamma as used in SD shooting.

FILM LIKE 1:
Compared with HD Gamma, this has the characteristics by which the gradation of the highlights can be reproduced better.   Using this Gamma curve which gently slopes for the low-brightness area makes the picture look calm.   Contrast becomes sharper and the gradation expression of the middle- and high-brightness areas (face, etc.) is extended.

FILM LIKE 2:
Compared with FILM LIKE 1, this has the characteristics by which the gradation of the highlights can be reproduces better.

FILM LIKE 3:
Compared with FILM LIKE 2, this has the characteristics by which the gradation of the highlights can be reproduce better.

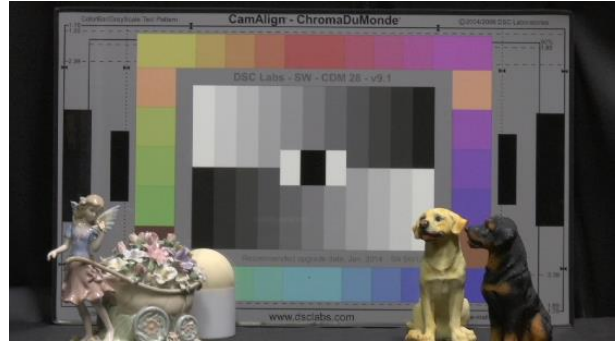**FILM-REC:**
Film-use cine Gamma characteristics.
This Gamma gives priority to the Dynamic Range and maintains the gradation that ranges evenly from low to high level.   It creates a unique atmosphere which is sometimes used as an effect.
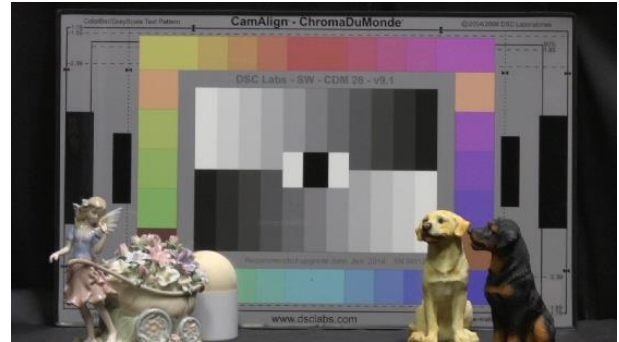
VIDEO-REC:
Video-use cine Gamma characteristics.
This is a Gamma curve to make a movie-like picture using a video camera.   It creates a picture where more importance is placed on contrast than in normal video mode recording.
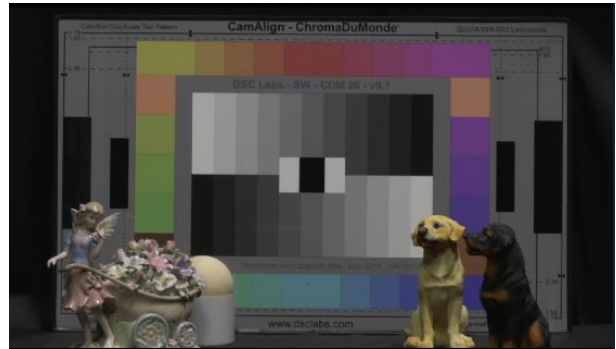
GAMMA: HD
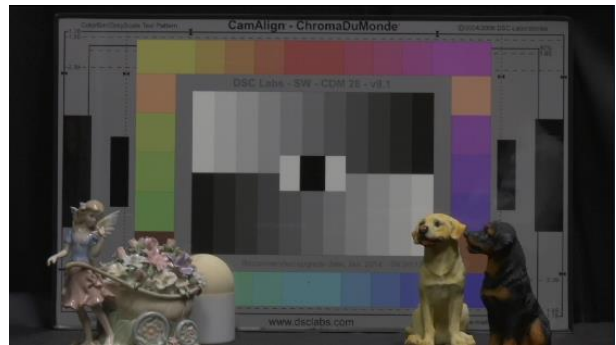

GAMMA: SD

GAMMA: FILM LIKE1

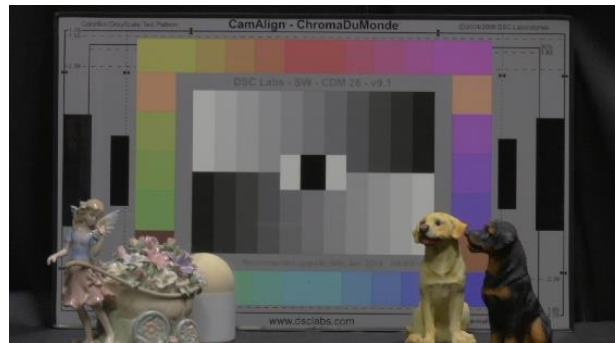**GAMMA: FILM LIKE2**

GAMMA: FILM LIKE3
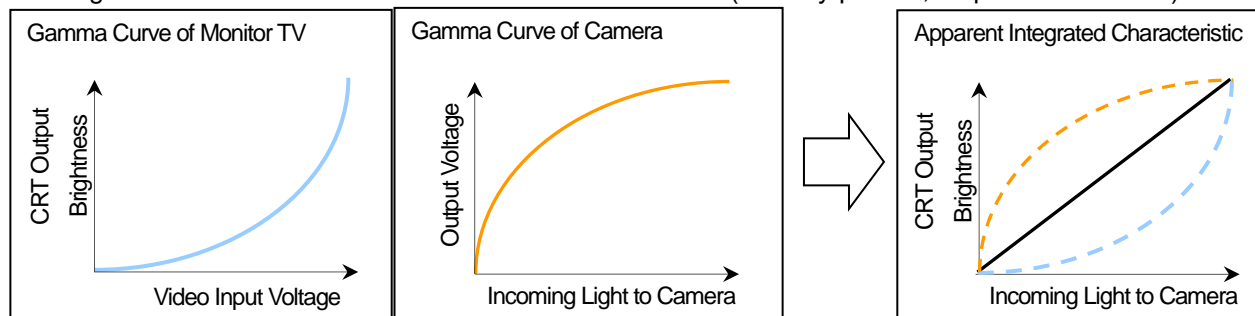

GAMMA: FILM -REC

GAMMA: VIDEO-REC

3-6. Technical description : Gamma

Gamma is a value that indicates the relationship between the levels of input and output signals of the camera or monitor TV.   Generally, it is said that linear Gamma (γ = 1) represents the image reproduction closest to the one seen by the eye.   However, the monitor TV has the Gamma characteristics that make the output level of its signal higher and higher as the input level increases. (γ = approx. 2.2)   So the camera corrects its Gamma and performs the recording so that the Gamma will become close to linear in the end. (normally γ = 0.45, reciprocal value of 2.2)

Gamma Curve of Monitor TV	Gamma Curve of Camera	Apparent Integrated Characteristic
CRT Output Brightness / Video Input Voltage	Output Voltage / Incoming Light to Camera	CRT Output Brightness / Incoming Light to Camera

This is an example for explanation only and may be different from actual measurements.

The picture's total atmosphere can be changed by this Gamma correction.   So this function can be used for a more active picture-making, e.g. film-like coloring.

Adjustment Items for Gamma: Main Menu → [SCENE FILE] → [GAMMA SETTING]
(Factory default settings underlined)

[MASTER GAMMA]   0.30 - - - <u>0.45</u> - - - 0.75

Sets the Master Gamma in units of 0.01.

When [FILM-REC] is selected in [GAMMA MODE SEL],

[F-REC DYNAMIC LVL]   200% , 300% , 400% , 500% , <u>600%</u>

Sets the Dynamic Range.

[F-REC BLACKSTR LVL]   <u>0%</u> - - - 30%

Sets the Black Stretch.

When [VIDEO-REC] is selected in [GAMMA MODE SEL],

[V-REC KNEE SLOPE]   150% , 200% - - - <u>500%</u>

Sets the Knee Slope.

[V-REC KNEE POINT]   <u>30%</u> - - - 107%

Sets the Knee Point.

[BLACK GAMMA]   (Depressing)   -8 - - - <u>OFF</u>   - - - 8   (Expanding)

Sets the depression and expansion of Gamma curve for dark areas.

[B.GAMMA RANGE]   <u>1</u> / 2 / 3

Sets the maximum level of compression / expansion.   1 (approx. 20%), 2 (approx. 30%), 3 (approx. 40%)

3-7. DRS: Useful for shooting the scene with large contrast between bright and dark areas

By starting up DRS (Dynamic Range Stretcher) function, the Gamma curve and Knee Slope are estimated according to the signal level of each pixel and adjusted in real time. This allows both dark and bright areas to maintain the high level of gradation expression and can minimize not only crushed blacks and blown-out highlights but also hue compression.

DRS: OFF	DRS: ON DRS EFFECT DEPTH : 3
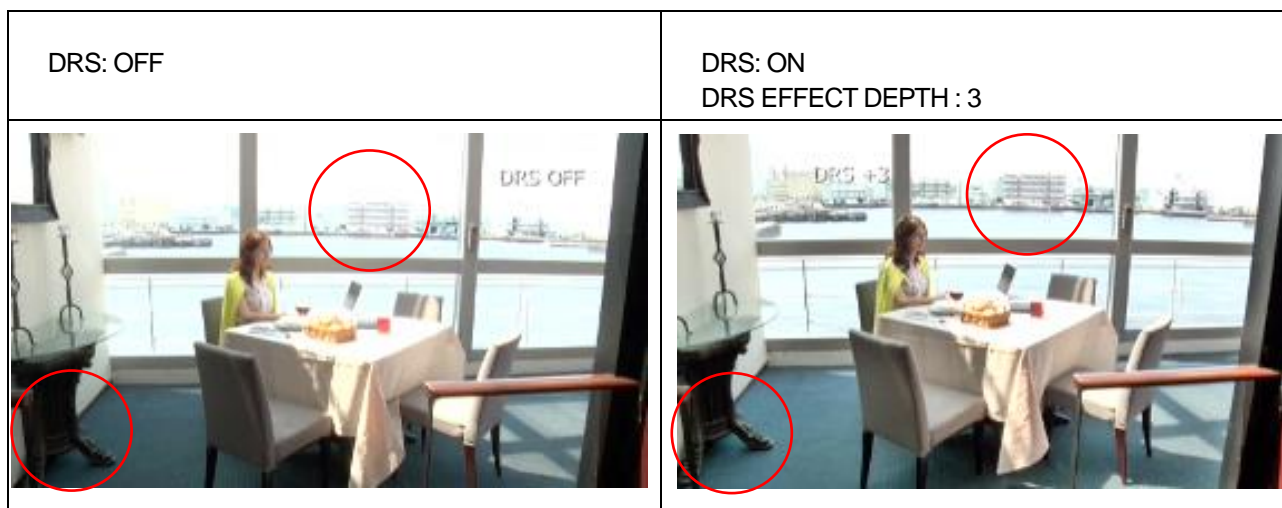
Setting and Adjustment items for DRS: Main Menu → [SCENE FILE]
(Factory default settings underlined)

[DRS]   **OFF** / ON

Enables / disables the Dynamic Range Stretcher function.

[DRS EFFECT DEPTH]   1 / 2 / **3**

Sets the compression level of high-brightness areas by Dynamic Range Stretcher function.

Compressing the video signal level of high-brightness area, which is so bright that it would be represented as blown-out highlights in normal recording, enables the Dynamic Range to be expanded. A larger setting value has more effect of DRS (compression level of high-brightness area) to make the Dynamic Range wider in appearance. However, if this level is higher, the noise on dark areas may also be intensified. In addition, depending on the scene, its picture may look unnatural. So it needs to be checked every time this adjustment is made. Also, when there is an extremely dark or bright area, or when the brightness is not enough, the effect may not be easily recognized.

4. Controlling the color (Chroma Level, Phase, Color Correction)

4-1. Adjustments of Chroma Level (color saturation) and Chroma Phase (hue)

Adjustment items for Chroma Level and Phase: Main Menu → [SCENE FILE]
(Factory default settings underlined)

[CHROMA LEVEL]　OFF -- -99% - - - 0% - - - 40%

Sets the Chroma Level of Pr and Pb signals.　On the vector scope, the distance from the center (no color) will increase / decrease as a whole picture.

[CHROMA PHASE]　-31 - - - 0 - - - 31

Finely adjusts the Chroma Phase of Pr and Pb signals.　On the vector scope, the plotted lines for a whole picture rotate clockwise or counterclockwise.

Example of Chroma Level adjustment　　Color saturation is varied.
CHROMA LEVEL: +60

CHROMA LEVEL: -60

Example of chroma phase adjustment   Color phase (tint) is varied.

CHROMA PHASE: +31

CHROMA PHASE: 0
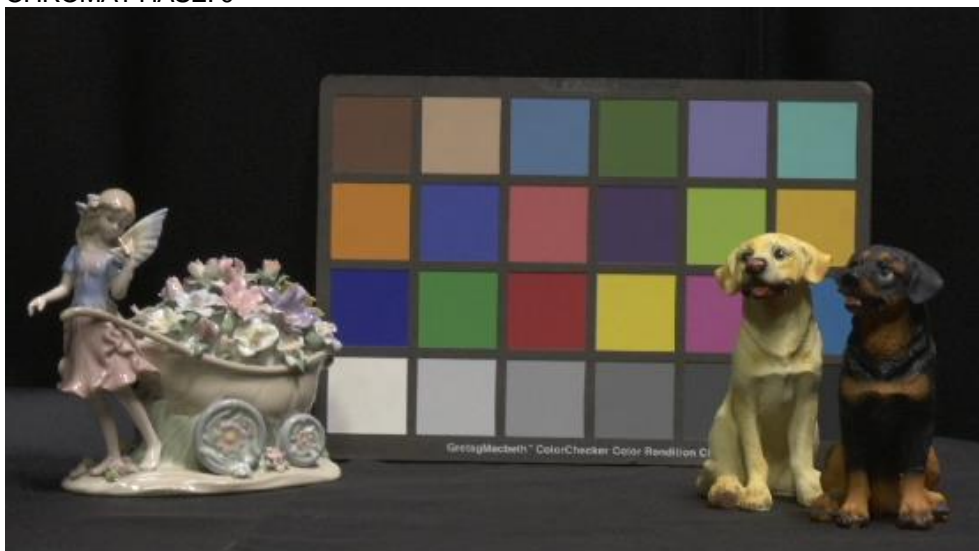
CHROMA PHASE: -31

4-2. Technical description: About color saturation and hue

The relation of Red, Green and Blue to each other is typically represented in the form of a circle.   Adjustment of Chroma Level (color saturation) is to adjust the amplitude of chrominance signal at each point without changing the phase.
Adjustment of Chroma Phase (hue) is to rotate the whole circle to some degree.

Example of colors indicated on vector scope   Illustration of CHROMA LEVEL and CHROMA PHASE
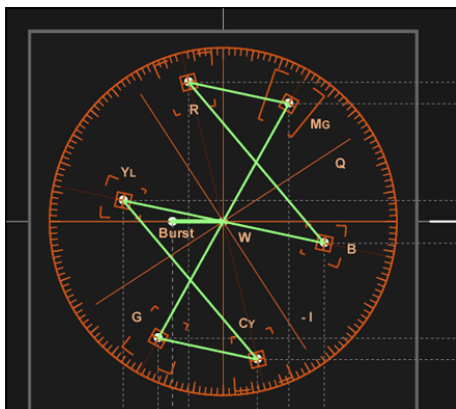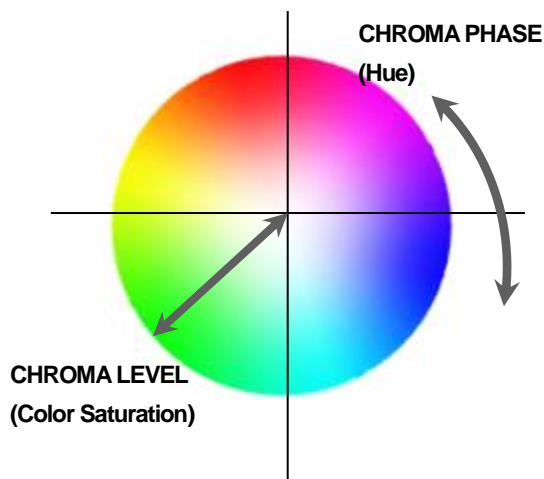
4-3. Color correction

In addition to Chroma Level and Phase adjustments to a whole picture, AJ-PX230 has the Color Correction function to vary the level and phase of each of particular twelve colors without affecting the others as little as possible.

Adjustment items for Color Correction: Main Menu → [SCENE FILE] → [COLOR CORRECTION SETTING]
(Factory default settings underlined)

[R]／[R-R-Mg]／[R-Mg]／[Mg]／[Mg-B]／[B]／[B-Cy]／[Cy]／[Cy-G]／[G]／[G-Yl]／[Yl]／[Yl-Yl-R]／[Yl-R]／[Yl-R-R]

Sets the saturation and phase of a color.   This has an effect individually on fifteen color axes (twelve tones + three skin tones) of a picture.   And it can be set for an individual hue.
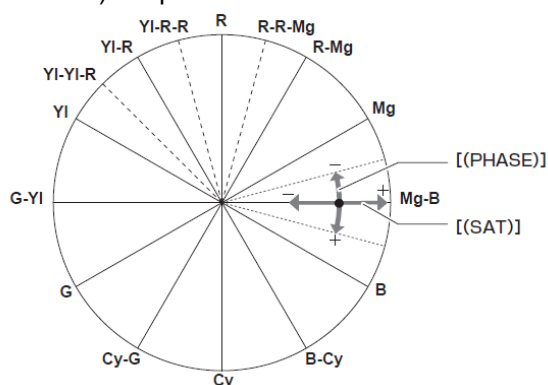
[(PHASE)]   -63 - - - 0 - - - 63

Changes the phase.   Positive values are for rotating in clockwise direction and negative values for in counterclockwise direction.

[(SAT)]   -63 - - - 0 - - - 63

Changes the saturation (level of chroma, the degree to which a color is pure).

4-4. Using a preset color look : Matrix settings

For more active changes of coloring, the color look can be selected from the preset Matrix Table.
Calling of Matrix settings: Main Menu → [SCENE FILE] → [MATRIX]　　(Factory default settings underlined)

**[MATRIX]**　**NORM 1** / NORM 2 / FLUO / CINELIKE

	NORM1 This expresses the colors suitable for shooting in the open air or under the halogen lamp. Generally, this color look is preferred in NTSC areas such as Japan and North America.
	NORM2 This enables the coloring suitable for shooting in the open air or under the halogen lamp. And it has richer color saturation than NORM1. Generally, this color look is preferred in PAL areas such as Europe.
	FLUO This expresses the colors suitable for shooting indoors under the fluorescent lamp. This is suitable for shooting in the condition of poor color-reproduction under the bluish light from fluorescent lamp.
	CINELIKE This expresses the colors suitable for shooting a movie-like picture. When you have selected the Gamma, select and use this Matrix setting.

Adjustment items for Matrix: Main Menu → [SCENE FILE] → [MATRIX SETTING]
(Factory default settings underlined)

[MATRIX R-G]　[MATRIX R-B]　[MATRIX G-R]　[MATRIX G-B]　[MATRIX B-R]　[MATRIX B-G]

-63・・・0・・・63
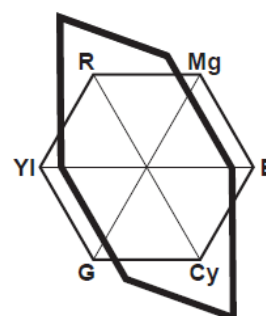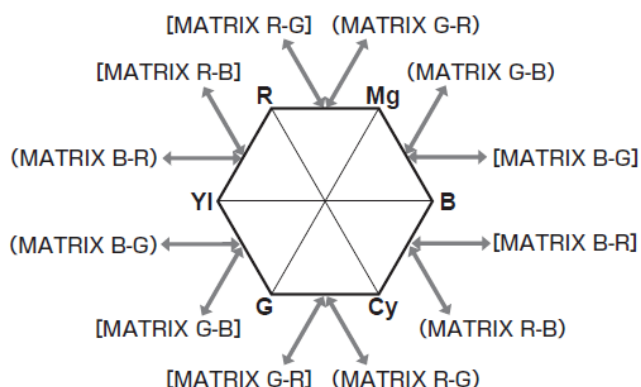
EX)
[MATRIX R-G] adjusted in positive direction
and [MATRIX B-G] in negative direction

4-5. Adjustment of color temperature 1: Color Temp adjustment

On the channel for White Balance (Ach / Bch), fine adjustments can be made after the White Balance adjustment.
Use this, for example, when you want to adjust the White Balance as you prefer.
When the White Balance position (WHITE BAL) switch is at the <B> or <A> position, this adjustment is enabled.

Example of video effects created by intentionally changed White Balance:
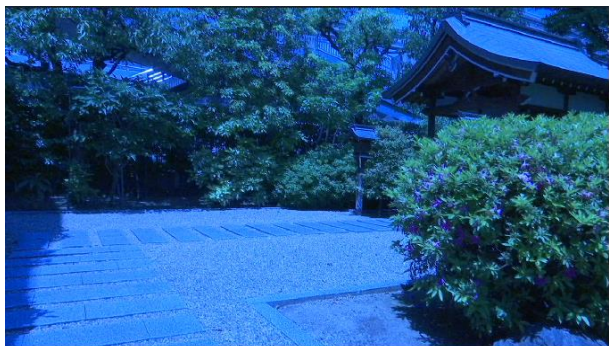
Scene like "early morning" acquired by increase of blue

Scene like "sunset" acquired by increase of red

Adjustment Items for Color Temp: Main Menu → [SCENE FILE] → [COLOR TEMP A/B SETTING]
(Factory default settings underlined)

[COLOR TEMP] 2000K **---** <u>3200K</u> **---** 15000K
Changes the color temperature by changing the output balance between Rch and Bch.
[R Gain] -400 **---** <u>0</u> **---** 400
Changes the color on Rch axis by changing the output of Rch.
[B Gain] -400 **---** <u>0</u> **---** 400
Changes the color on Bch axis by changing the output of Bch.
[G AXIS] -400 **---** <u>0</u> **---** 400
Changes the color on G axis by changing the output of Rch and Bch.

4-6. Adjustment of color temperature 2: R, B Gain control

This is a function to increase / decrease the intensity of red and blue colors.
When the White Balance position (WHITE BAL) switch is at the <B>, <A> or <PRST> position, this adjustment is enabled.   It will not work when Auto Tracking White Balance is activated.

Adjustment Items on R, B Gain Control: Main Menu → [SCENE FILE] → [RB GAIN CONTROL SETTING]
(Factory default setting underlined)

When <WHITE BAL> switch is at the <PRST> position;

[RGAIN   AWB   PRE] -200 **- - -** 0 **- - -** 200
Sets the settings so that the intensity of red color will be increased / decreased.

[B GAIN   AWB   PRE] -200 **- - -** 0 **- - -** 200
Sets the settings so that the intensity of blue color will be increased / decreased.

When <WHITE BAL> switch is at the <A> or <B> position;

[RGAIN   AWB   A（or B）] -200 **- - -** 0 **- - -** 200

Sets the settings so that the intensity of red color will be increased / decreased.

[B GAIN   AWB   A（or B）] -200 **- - -** 0 **- - -** 200

Sets the settings so that the intensity of blue color will be increased / decreased.

[AWB A GAIN OFFSET］

Sets whether to keep the values set for [R GAIN AWB A] and [B GAIN AWB A] or reset them if Auto White Balance is executed while the <WHITE BAL> switch is at the <A> position.

[AWB B GAIN OFFSET］

Sets whether to keep the values set for [R GAIN AWB B] and [B GAIN AWB B] or reset them if Auto White Balance is executed while the <WHITE BAL> switch is at the <B> position.

5. Enhancing the level of expression for dark areas (Master Ped, RBG Black Control)

5-1. Pedestal (Master Pedestal) adjustment

Regarding the video signal, the reference of luminance signal is Black, which is called Master Pedestal.　Adjusting the lower limit of this pedestal level allows not only the level of black floating but also the brightness balance of a whole picture to be set.
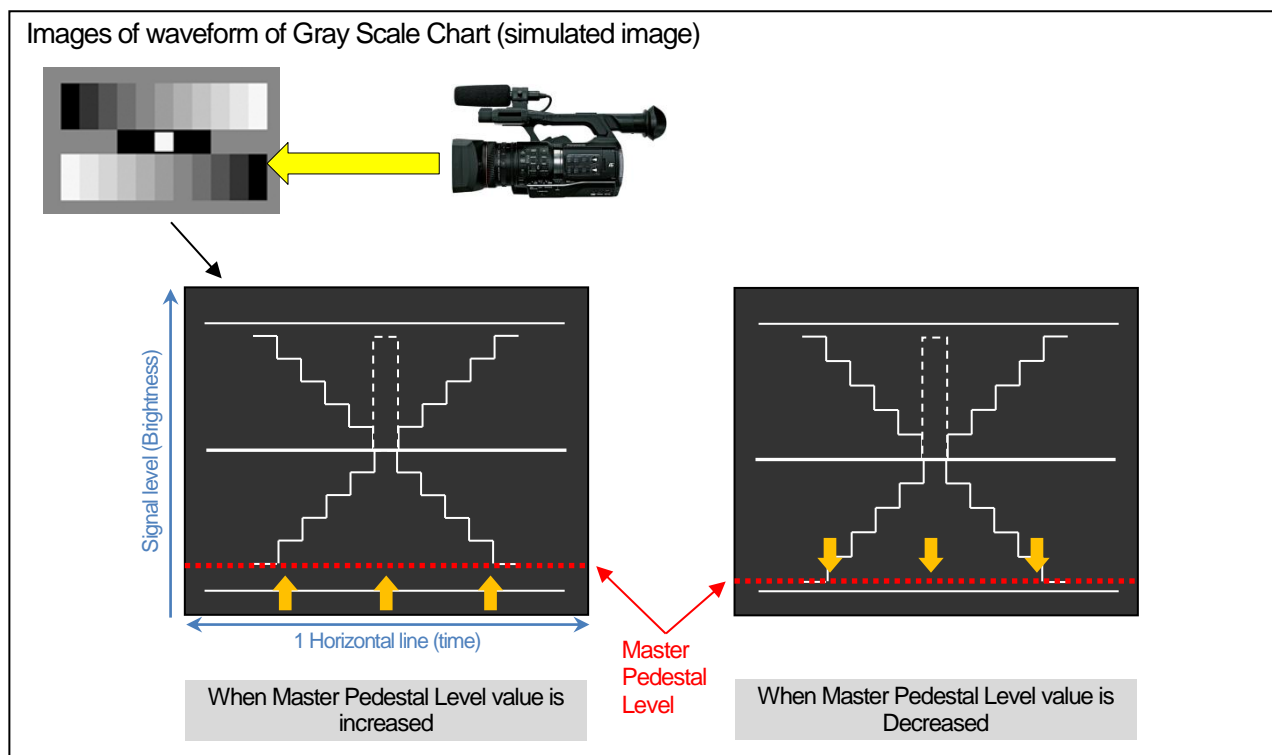
What is called "sharper" or "softer look" is largely related to the adjustments of outline and gradation.

	Outline	Gradation	
	DTL	Gamma	Master Pedestal
Sharper Look	**+** Signal edge is enhanced.	**LOW B PRESS** Slope for darker area is gentle. (Gradation is suppressed.)	**–** Darker area is made sharper.
Softer Look	**–** Signal edge is weakened.	**HIGH CINELIKE** Slope for darker area is steep.	**+** Contrast is reduced.

MASTER PED : -200
By decreasing the Master Pedestal level, the picture becomes sharper with its contrast enhanced.

MASTER PED : +16
This is normal setting (factory default).

MASTER PED :+200
Increasing the Master Pedestal level can produce a misty effect, especially around darker areas.

5-2. Technical description : About Pedestal

Master Pedestal (or Master Black, etc.) is for the adjustment of black level as the reference of a picture.　This adjustment has a significant influence, so it is ideal to check the picture using the waveform monitor or higher definition TV monitor.

Images of waveform of Gray Scale Chart (simulated image)

When Master Pedestal Level value is increased

When Master Pedestal Level value is Decreased

Master Pedestal Level

Adjustment Items for Pedestal: Main Menu　>　[SCENE FILE]
(Factory default settings underlined)

[MASTER PED] -200 **- - -** <u>16</u> **- - -** 200	
Sets the reference black level.　RGB changes according to this setting.　Positive values for making black color darker and negative for making it less dark.	
[Hi-COLOR SW]　ON /　<u>OFF</u>	
Turns [ON] / [OFF] the mode to expand the color Dynamic Range.	
[HI-COLOR LVL]　1 **- - -** <u>32</u>	
Selects the level of the mode to expand the color Dynamic Range.	

Adjustment Items for Pedestal: Main Menu　>　[SCENE FILE]　>　[RGB BLACK CONTROL SETTING]
(Factory default settings underlined)

|	
[R PED] -100 **- - -** <u>0</u> **- - -** 100	
Sets the pedestal level of Rch.	
[G PED] -100 **- - -** <u>0</u> **- - -** 100	
Sets the pedestal level of Gch.	
[B PED] -100 **- - -** <u>0</u> **- - -** 100	
Sets the pedestal level of Bch.	
[PEDESTAL OFFSET]　ON / <u>OFF</u>	
Sets whether to keep each of the values set for [R PED], [G PED] and [B PED] or reset them if Auto Black Balance adjustment is executed.	

2. MENU settings

1. Opening MENU

Menu setting are devided into following levels.

MENU	Purpose	How to open
USER MENU	MENU screen is user customizable and the selected menu items are shown in this level. Open MAIN MENU > "USER MENU SEL" to select items.	Press "MENU" button.
MAIN MENU	All menu items are displayed. Items are layered by purposes and usages. (See P.33 MENU structure for the details.)	Keep press "MENU" button for 3 seconds.
OPTION MENU	For some advanced menu items.	Press "LCD BACKLIGHT" + "MENU" button.

LCD BACKLIGHT button

MENU button
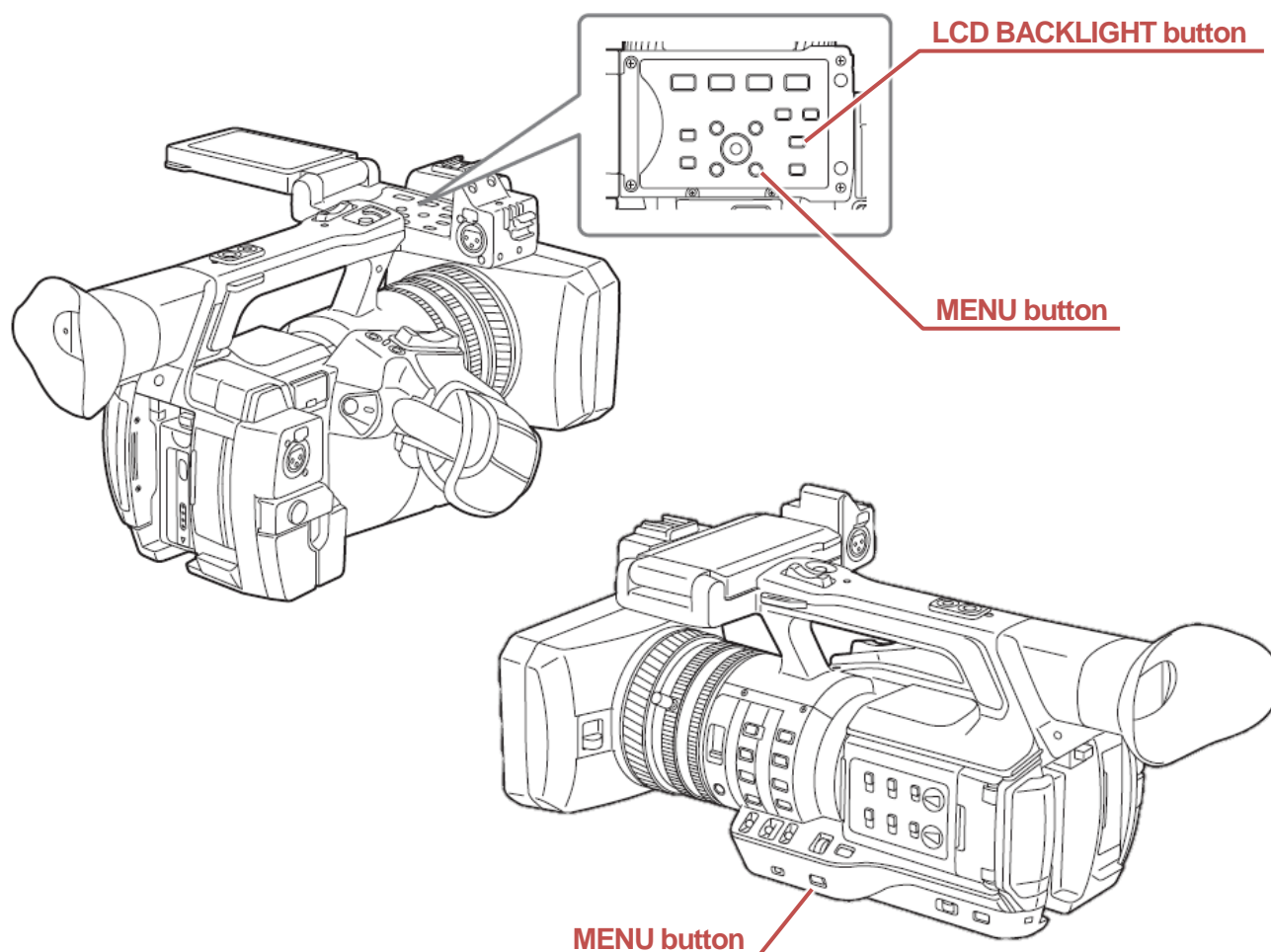
MENU button

* Two menu buttons are located on the body, function of these buttons are exactly the same.

2. MENU structure

MAIN MENU (Keep press "MENU" button for 3seconds to open)

OPTION MENU (press "LCD BACKLIGHT" + "MENU" buttons)

SCENE FILE menu

Menu item		Description	Setting (factory default)
FILE SELECT		Recall scene files	F1 - F6
NAME EDIT		Edit scene file name	---
LOAD / SAVE / INITIALIZE		Load/save custom scene files to/from SD memory cards, and initialize.	---
VFR		Turn ON/OFF variable frame record mode.	ON / OFF
FRAME RATE		Adjust frame rate when VFR is ON. Adjustable range is from 1fps to 60fps.	Adjustable range and steps vary depending on system frequency setting.
SYNC SCAN TYPE		Set display unit for shutter speed in synchro scan mode.	sec / deg
SYNCHRO SCAN		Set shutter speed for synchro scan mode.	---
MASTER DTL		Adjust image contour correction level for entire image.	-31 – 0 – 31
DTL CORING		Adjust threshold level of image contour correction.	0 – 1 – 60
DETAIL SETTING	DETAIL	Turn ON/OFF contour correction.	ON / OFF
	V.DTL LEVEL	Adjust image contour correction level for vertical direction.	-7 – 0 – 7
	H.DTL FREQ.	Set thickness of contour correction signal for horizontal direction.	-7 – 0 – 7
	V.DTL FREQ.	Set thickness of contour correction signal for vertical direction.	0 / 1 / 2
	LEVEL DEPEND	Set compression level of contour correction signal for bright part. (Compression level becomes higher by increasing the value.)	-7 – 0 – 7
	KNEE APE LVL	Set knee compression level for a very bright part.	OFF / 1 / 2 / 3 / 4 / 5
	DTL GAIN (+)	Adjust image contour correction level for + (brighter) direction.	-31 – 0 – 31
	DTL GAIN (-)	Adjust image contour correction level for - (darker) direction.	-31 – 0 – 31
SKIN TONE DTL A		Choose tables from A, B, and C to be used for softness effect for a certain color tone (fresh tone). Tables can be edited in DETECT TABLE item.	ON / OFF
SKIN TONE DTL B			
SKIN TONE DTL C			
SKIN TONE ZEBRA		Turn ON/OFF zebra indicator (for fresh tone effect) on the viewfinder display.	ON / OFF

SCENE FILE menu (continued)

Menu item		Description	Setting (factory default)
SKIN TONE DTL SETTING	DETECT TABLE	Select a fresh tone table (parameter group)	A / B / C
	SKIN TONE GET	Obtain color information (I/Q width, I center, Q phase) from subjects located around the center marker, then store to selected table.	---
	SKIN DTL EFFECT	Set fresh tone (softness effect for a certain color tone) level.	0 – 16 – 31
	I CENTER	Adjust center position of the I AXIS for fresh tone control. (see following figure)	0 – 35 – 255
	I WIDTH	Adjust range of the color adjustment on I AXIS from a point set as I CENTER. (see following figure)	0 – 55 – 255
	Q WIDTH	Adjust range of the color adjustment on Q AXIS from a point set as I CENTER. (see following figure)	0 – 10 – 90
	Q PHASE	Adjust color phase. (see following figure)	-180 – 0 – 179
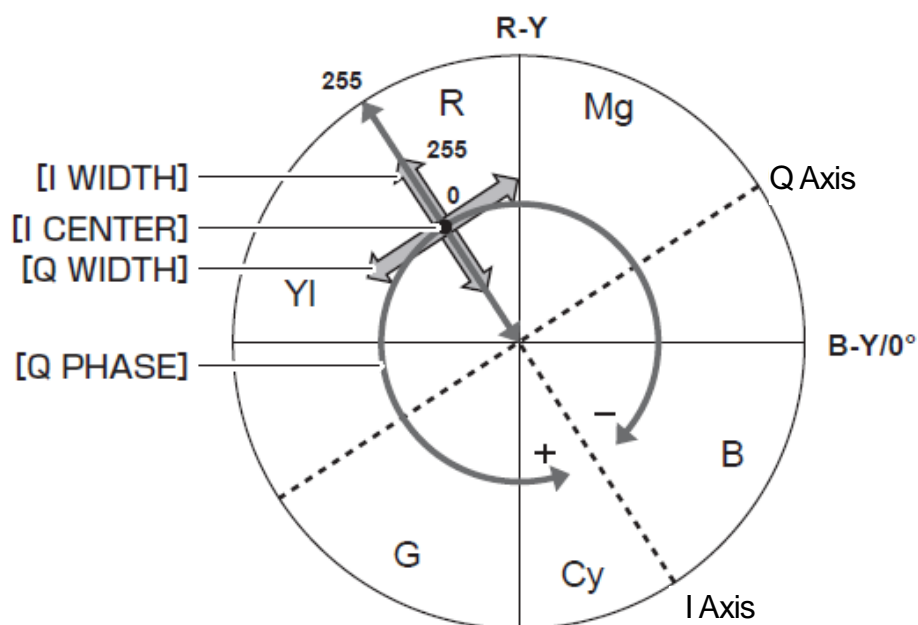
Adjustmet range of SKIN TONE DTL settings

SCENE FILE menu (continued)

Menu item		Description	Setting (factory default)
RB GAIN CONTROL SETTING	R GAIN AWB PRE	Adjust gain of Rch when white balance memory position is set to "PRST".	-200 – 0 – 200
	B GAIN AWB PRE	Adjust gain of Bch when white balance memory position is set to "PRST".	-200 – 0 – 200
	R GAIN AWB A	Adjust gain of Rch when white balance memory position is set to "A".	-200 – 0 – 200
	B GAIN AWB A	Adjust gain of Bch when white balance memory position is set to "A".	-200 – 0 – 200
	R GAIN AWB B	Adjust gain of Rch when white balance memory position is set to "B".	-200 – 0 – 200
	B GAIN AWB B	Adjust gain of Bch when white balance memory position is set to "B".	-200 – 0 – 200
	AWB A GAIN OFFSET	Apply "R GAIN AWB A" and "B GAIN AWB A" adjustment value to AWB result in memory position A.	ON / OFF
	AWB B GAIN OFFSET	Apply "R GAIN AWB B" and "B GAIN AWB B" adjustment value to AWB result in memory position B.	ON / OFF
COLOR TEMP Ach SETTING	COLOR TEMP	Display current adjustment value of AWB position A, it can also be adjusted manually.	2000K – 15000K
	R GAIN	Adjust gain of Rch when white balance memory position is set to A.	-400 – 0 – 400
	B GAIN	Adjust gain of Bch when white balance memory position is set to A.	-400 – 0 – 400
	G AXIS	Adjust gain of Gch when white balance memory position is set to A.	-400 – 0 – 400
COLOR TEMP Bch SETTING	COLOR TEMP	Display current adjustment value of AWB position B, it can also be adjusted manually.	2000K – 15000K
	R GAIN	Adjust gain of Rch when white balance memory position is set to B.	-400 – 0 – 400
	B GAIN	Adjust gain of Bch when white balance memory position is set to B.	-400 – 0 – 400
	G AXIS	Adjust gain of Gch when white balance memory position is set to B.	-400 – 0 – 400
CHROMA LEVEL		Adjust saturation of color.	-99 - 0 - 40%, OFF
CHROMA PHASE		Adjust tone of color.	-31 – 0 – 31
MATRIX		Recall color presets.	NORM1 / NORM2 / FLUO / CINELIKE
MATRIX SETTING		Adjust 6 different individual color phases for MATRIX presets.	-63 – 0 – 63
COLOR CORRECTION SETTING		Adjust color tone and saturation. This has an effect on 12 different individual color phases. See P.25 for the details.	-63 – 0 – 63
MASTER PED		Adjust master black level.	-200 – 0 – 200
RGB BLACK CONTROL SETTING	R PED	Adjust black level on Rch.	-100 – 0 – 100
	G PED	Adjust black level on Gch.	-100 – 0 – 100
	B PED	Adjust black level on Bch.	-100 – 0 – 100
	PEDESTAL OFFSET	Apply "R PED", "G PED" and "B PED" adjustment value to ABB result.	ON / OFF

SCENE FILE menu (continued)

Menu item		Description	Setting (factory default)
GAMMA MODE SEL		Select gamma curve. See P.18 for the details.	HD / SD / FILMLIKE1 / FILMLIKE2 / FILMLIKE3 / FILM-REC / VIDEO-REC
GAMMA SETTING	MASTER GAMMA	Adjust shape of the master gamma curve (in 0.01 steps)	0.30 – 0.45 – 0.75
	F-REC DYNAMIC LVL	Set dynamic range. (Available with FILM-REC gamma curve)	200% / 300% / 400% / 500% / 600%
	F-REC BLACK STR LVL	Adjust gamma characteristic in darker signal areas. (Available with FILM-REC gamma curve)	0% - 30%
	V-REC KNEE SLOPE	Adjust knee slope angle. (Available with VIDEO-REC gamma curve)	150% / 200% - 500%
	V-REC KNEE POINT	Adjust knee point level. (Available with VIDEO-REC gamma curve)	30% - 107%
	BLACK GAMMA	Adjust general gamma characteristic in darker areas.	-8 – OFF – 8
	B GAMMA RANGE	Set the upper limit of compression / expansion level of the BLACK GAMMA control.	1: 20% / 2: 30% / 3: 40%
KNEE SETTING	KNEE MODE	Set operation mode of knee function (compress bright areas to avoid an overexposure image.)	AUTO / MANUAL / OFF
	A KNEE RESPONSE	Set response speed of automatic knee control. Its speed becomes faster when decrease the value.	1 – 4 – 8
	KNEE MASTER POINT	Adjust master knee point level in MANUAL knee mode. (in 0.5% steps)	70.0% - 93.0% - 107.0%
	KNEE MASTER SLOPE	Adjust master knee slope angle in MANUAL knee mode.	0 – 85 – 99
	KNEE MASTER SLOPE Rch	Adjust master knee slope angle of Rch in MANUAL knee mode.	-31 – 0 – 31
	KNEE MASTER SLOPE Bch	Adjust master knee slope angle of Bch in MANUAL knee mode.	-31 – 0 – 31
HI-COLOR SW		Turn ON/OFF color dynamic range expansion mode.	ON / OFF
HI-COLOR LVL		Adjust color dynamic range level.	1 – 32
WHITE CLIP SETTING	WHITE CLIP	Turn ON/OFF white clip function.	ON / OFF
	WHITE CLIP LVL	Adjust clipping level of bright part.	90% - 109%
	Rch CLIP LVL	Adjust clipping level of bright part of Rch.	-31 – 0 – 31
	Bch CLIP LVL	Adjust clipping level of bright part of Bch.	-31 – 0 – 31
DRS		Turn ON/OFF Dynamic Range Stretcher (DRS) function.	ON / OFF
DRS EFFECT DEPTH		Set effect level of DRS. *Note: Better result of DRS can be expected when higher number is chosen. However, noise level will also become higher.*	1 / 2 / 3
A.IRIS LEVEL		Turn ON/OFF automatic aperture level control.	ON / OFF
A.IRIS LEVEL EFFECT		Set the target brightness level in auto iris mode.	-50 – 0 – 50

SYSTEM MODE menu

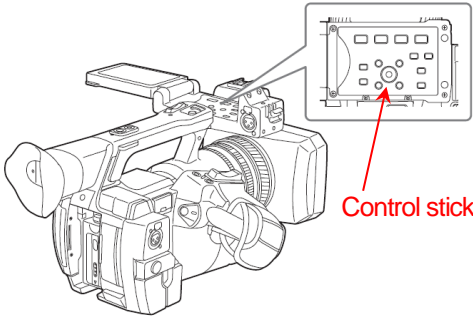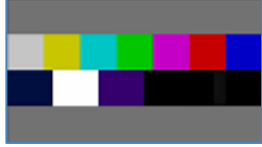| Menu item	Description	Setting (factory default)
LINE&FREQ	Set system format. (number of lines and frame rate)	1080-59.94P / 1080-50P / 1080-59.94i / 1080-50i / 1080-23.98PsF / 720-59.94P / 720-50P / 480-59.94i / 576-50i
REC FORMAT	Set record format. * Available item varies depending on LINE&FREQ setting.	AVC-I200/60P, AVC-I200/60i, AVC-I200/50P, AVC-I200/50i, AVC-I200/30PN, AVC-I200/25PN, AVC-I200/24PN, AVC-I100/60P, AVC-I100/60i, AVC-I100/50P, AVC-I100/50i, AVC-I100/30PN, AVC-I100/24PN, AVC-I100/25PN, AVC-I50/60P, AVC-I50/60i, AVC-I50/50P, AVC-I50/50i, AVC-G50/60P, AVC-G50/60i, AVC-G50/50P, AVC-G50/50i, AVC-G25/60P, AVC-G25/60i, AVC-G25/50P, AVC-G25/50i, AVC-G12/60P, AVC-G12/60i, AVC-G12/50P, AVC-G12/50i, DVCPRO HD/60P, DVCPRO HD/60i, DVCPRO HD/50P, DVCPRO HD/50i, DVCPRO50/60i, DVCPRO50/50i, DVCPRO/60i, DVCPRO/50i, DV/60i, DV/50i
CAMERA MODE	Set record mode when in 480i, 576i modes * Available item varies depending on LINE&FREQ setting.	50i / 25P or 60i / 30P
AUDIO SMPL RES	Set bit depth of audio when REC FORMAT setting is set to AVC-I100 or AVC-I50.	16BIT / 24BIT
ASPECT CONV	Set image aspect ratio when 480i or 576i mode is chosen.	SIDE CROP / LETTER BOX / SQUEEZE
SCAN REVERSE	Set image upside down and right side left.	ON / OFF
SETUP	Set video setup level when 480i mode is chosen.	0% / 7.5%A
SHOOTING MODE	Turn ON/OFF high sensitivity mode.	NORMAL / HIGH SENSE

USER SW menu

Menu item	Description	Setting (factory default)
USER 1-8	Assign features to USER buttons (USER1 to USER8).	See P.58, 3. Understanding USER button operation for the details.

SW MODE menu

Menu item	Description	Setting (factory default)
LOW GAIN	Set Gain value to the gain switch, 'L' position.	-3dB – 0dB – 18dB
MID GAIN	Set Gain value to the gain switch, 'M' position.	-3dB – 6dB – 18dB
HIGH GAIN	Set Gain value to the gain switch, 'H' position.	-3dB – 12dB – 18dB
SUPER GAIN	Set Gain value recalled as SUPER GAIN with USER buttons. The gain value can be toggled through 24dB > 30dB > 36dB > … when ALL is selected.	24dB / 30dB / 36dB / ALL
OIS	Turn ON/OFF optical image stabilizer function.	ON / OFF
ATW	Assign Auto Tracking White balance adjustment feature (ATW) to one of white balance memory positions.	Ach / Bch / PRE / OFF
ATW SPEED	Set response speed of ATW.	FAST / NORMAL / SLOW
ATW TARGET R	Fine-tune for Rch level of ATW.	-10 – 0 – 10
ATW TARGET B	Fine-tune for Bch level of ATW.	-10 – 0 – 10
W.BAL PRESET	Set color temperature of white balance preset position.	3200K / 5600K / VAR
W.BAL VAR	Adjust color temperature of white balance preset position when W.BAL PRESET item is set "VAR".	2000K – 3200K – 15000K
H.ZOOM SPEED	Set servo zoom speed of handle zoom. (Effective when handle zoom control switch is set to "FIX")	1 – 50 – 99
PUSH AF MODE	Set auto focus adjustment speed when PUSHAUTO button is pressed. 	TURBO / NORMAL
MF ASSIST	Focus mode is momentarily set to "AUTO" immediately after manual focusing.	ON / OFF
FOCUS ASSIST MODE	Set focus assist type.	EXPAND / IN RED
MACRO	Turn ON/OFF macro mode.	ON / OFF
MACRO MODE	Set effective range of macro focus mode.	WIDE (wide-end only) / ALL (All zoom range)
A.IRIS SPEED	Set control speed in auto iris mode.	FAST / NORMAL / SLOW
A.IRIS WINDOW	Set video level detection area for auto iris control.	NORM1 (Around center) / NORM2 (Around bottom) / CENTER

SW MODE menu (continued)

Menu item	Description	Setting (factory default)
AREA MODE	Set a function to be recalled with the control stick. Control stick	INHIBIT: No function assigned FOCUS: Assign Autofocus and focus bar IRIS: Assign auto iris Y GET: Assign spot meter FOCUS/IRIS: Assign both FOCUS and IRIS FOCUS/Y GET: Assign both FOCUS and YGET
WFM MODE	Set waveform display type to be displayed on the built-in LCD monitor.	WAVE , VECTOR , WAVE/VECTOR
ZEBRA	Turn ON/OFF ZEBRA pattern display	ON / OFF
ZEBRA MODE	Set display time of ZEBRA	CONTINUE / MOMENT (5 sec.)
BARS TYPE	Select color bars type	SMPTE FULL BARS SPLIT ARIB
FRONT REC	Enable/disable the REC button located at front side of the unit.	INHIBIT / ACTIVE

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AUTO SW menu

In the AUTO SW menu screen, features works in the AUTO mode can be individually turn ON / OFF.

AUTO/MANUAL selector

| Menu item	Description	Setting (factory default)
A.IRIS	Auto iris control	ON / OFF
AGC	Auto gain control	ON / OFF
AGC LIMIT	Set the upper limit of the amplifier while in AUTO mode.	3dB / 6dB / 12dB / 18dB
AGC POINT	Set the F-number as threshold of switching point between auto iris control and auto gain control (AGC). (Works when "AGC" item is set to ON.)	F4.0 / 5.6
A.SHUTTER	Auto shutter control (works when "A.IRIS" items is set to ON.)	ON / OFF
A.SHUTTER LIMIT	Set the upper limit of the shutter speed when "A.SHUTTER" item is set to ON.	1/100 , 1/120 , 1/250
A.SHUTTER POINT	Set the F-number as threshold of switching point between auto iris control and auto shutter control. (Works when "A.SHUTTER" item is set to ON.)	F8.0 / F9.6
ATW	Auto Tracking White balance control	ON / OFF
AF	Auto Focus control	ON / OFF

RECORDING SETUP menu

Menu item		Description	Setting (factory default)
FILE SPLIT		Set record file format	ONE FILE: each clip data is recorded as a single file without splitting (LongG codecs only) SPLIT: each clip data splitted at every 4GB SHORT SPLIT : each clip data is splitted at every 128 seconds
RECORDING		Set record modes	NORMAL: normal mode INTERVAL: time-lapse mode ONE SHOT: record specified duration and stop LOOP: endless record mode using 2 P2 cards
RECORDING SETTING	RECORDING HOLD	Retain setting of RECORDING item after power OFF and ON	ON: retain record mode setting OFF: Back to normal mode after power ON
	ONE SHOT TIME	Set record duration of ONE SHOT record mode	1frm / 2frm / 4frm / 8frm / 16frm / 1s
	INTERVAL TIME	Set record interval time (pause time) of Time-laps recording.	2frm / 4frm / 8frm / 16frm / 1s / 2s / 5s / 10s / 30s / 1min / 5min / 10min
	START DELAY	In INTERVAL and ONE SHOT modes. Delay the record start time for 1 second	ON / OFF
PRE REC		Turn ON/OFF the pre-record mod. This mode allows the camera to start recording the video and audio (approx. 3 sec in the HD mode, 7 sec in the SD mode) before rec button is pressed.	ON / OFF
ONE CLIP REC		Turn ON/OFF a record mode that allows multiple clips as a single successive clip.	ON / OFF
SIMUL REC		Turn ON/OFF the record mode that allows simultaneous redundant recordings with 2 microP2 cards. (See P.43)	ON / OFF
BACKGROUND REC		Turn ON/OFF the record mode that allows simultaneous recordings. (See P.43)	ON / OFF
START TEXT MEMO		Leave text memo when record starts	ON / OFF
TIME STAMP		Allow recording of superimposed date and time on the image.	ON / OFF
DF MODE		Set timecode drop frame mode	DF / NDF
TCG		Set timecode count mode	FREE RUN / REC RUN

BACKGROUND REC and SIMUL REC mode

Following recording modes are available with dual microP2 card slots.

BACKGROUND

Keep recording with one of the two microP2 cards in the card slot1, another card can start and stop recording.

Slot1		TAKE1 → TAKE2 ····· TAKE X
Slot2		RECORD
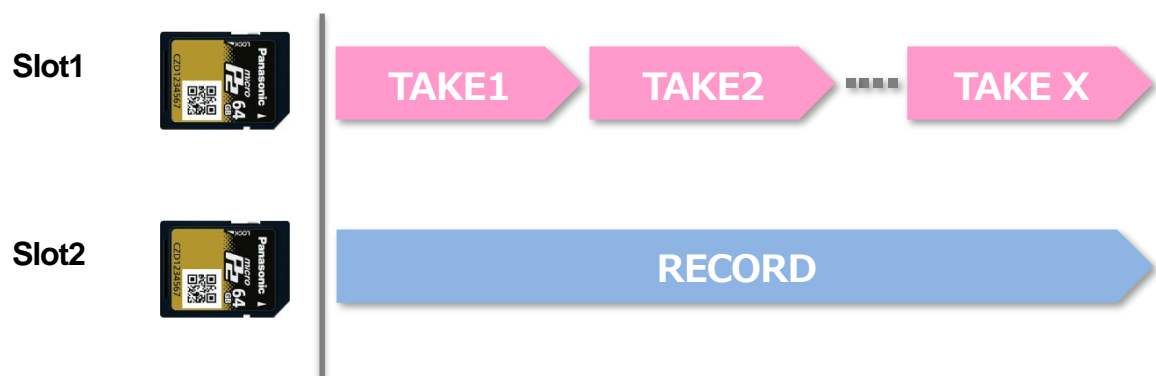
* When press the REC button, recording starts in both slots. After that, recording can start and stop in the slot1.
* To stop recording in the card slot2, assign "BACKGR REC PAUSE" function to any USER assignable buttons and keep press it for 5 seconds.

SIMUL

Record the same content onto the two microP2 cards simultaneously.

Slot1		TAKE1 → TAKE2 ····· TAKE X
Slot2		TAKE1 → TAKE2 ····· TAKE X
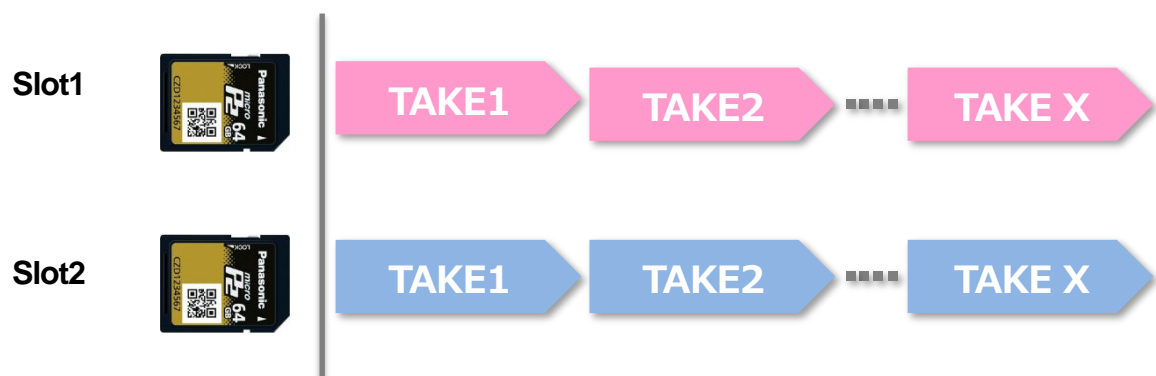
* When remaining record time for the microP2 cards is different, the camera displays shorter one's remaining time.
* Recording stops when one of the two microP2 cards became full.

RECORDING SETUP menu

Menu item		Description	Setting (factory default)
TC PRESET		Set timecode value	---
UBG MODE		Select information record to be recorded as users bit area	USER / TIME / DATE / TCG / FRAME RATE / REGEN
UB PRESET		Set users bit value when USER is selected in UBG MODE item.	---
VITC UBG MODE		Select USERS BIT information to be recorded in VITC area	USER/EXT , TIME , DATE , TCG , FRAME RATE , REGEN
REC META DATA	LOAD	Import custom metadata from SD memory card	---
	RECORD	Record imported meta data to clips	ON / OFF
	USER CLIP NAME	Set type of information to be recorded as META DATA in USER CLIP NAME area	When REC META DATA > RECORD: ON TYPE1: Record read data only TYPE2: Record read data + clip no. counter When REC META DATA > RECORD: OFF TYPE1: Record the same data with GLOBAL CLIP ID TYPE2: Record the same data with CLIP NAME
	CARD SERIAL	Record information of serial number and part number of the microP2 card as metadata.	ON / OFF
	INITIALIZE	Clear imported custom metadata information from the unit.	---
	PROPERTY	View and edit imported custom metadata.	---

CLIP menu

Available in THUMBNAIL mode only.

Menu item	Description	Setting (factory default)
REPOSITION	Set thumbnail display filter	ALL CLIP: Show all clips SAME FORMAT CLIPS: Show only clips that match format with the system setting. SELECTED CLIPS: Show only selected clip(s). MARKED CLIPS: Show only shot marked clips. SLOT CLIPS: Show only clips in specified slot. NG CLIPS: Show only ERROR clip(s)
DELETE	Delete selected clip(s) from the microP2 card(s)	---
FORMAT	Perform card format (microP2, SD card)	---
COPY	Copy selected clip(s)	---
REPAIR	Repair damaged clip (indicated as NG in yellow)	---
RE-CONNECT	Fix discontinuity of spanned clips' relation (indicated as ! in Magenta) by rebuilding the relation.	---
EXCH. THUMBNAIL	Replace the thumbnail image to specified timecode position's image.	---
AUTHENTICATE	Authenticate (enter password) to use the microP2 card(s)	---

CLIP menu (continued)

Available in THUMBNAIL mode only.

Menu item		Description	Setting (factory default)
PEOPERTY	CLIP PROPERTY	Show clip property	
	CARD STATUS	Show remaining time of microP2 cards	
	CPS PASSWORD	Manage encryption password to microP2 card	LOAD: Read password setting from SD memory card SET: Enter password DELETE: Remove and disable current password from the unit
	SD CARD	Show SD memory card's property (capacity, write protection status etc.)	
	REMAIN SETUP	Set microP2 card's capacity display	REMAIN: Show available space USED: Show consumed space
THUMBNAIL SETUP	INDICATOR	Show/hide indicator icons on each clip thumbnail	ALL HIDE: Do not show any icons MARKER: Show/hide shot mark icon M TEXT MEMO: Show/hide text memo icon T WIDE: Show/hide wide (16:9) material icon W PROXY: Show/hide clip with proxy icon P Clip thumbnail example
	DATA DISPLAY	Set information type shown at bottom part of each clip thumbnail	TC: Display the initial timecode value of the clip UB: Display users bit value TIME: Display time of record start DATE: Display date of recorded DATE TIME: Display date and time of recorded CLIP NAME: Display clip name USER CLIP NAME: Display user editable clip name SLOT: Display slot number THUMBNAIL TC: Display timecode value of the thumbnail image
	THUMBNAIL SIZE	Set clip thumbnail size	SMALL / MEDIUM / LARGE
	PB POSITION	Set playback position	RESUME / THUMBNAIL TC / START TC
	PROPERTY DISP.	Show clip property information to left hand side of the thumbnail screen while THUMBNAIL SIZE is set to SMALL.	
	THUMBNAIL INFO.	Show some additional information (number of selected clips, duration etc.)	
	TEXT MEMO IND	Set text memo indicator display	

AUDIO SETUP menu

Menu item		Description	Setting (factory default)
INPUT SETTING	INT MIC	Enable/disable built-in microphone	STEREO / MONO / OFF
	INPUT1 MIC LEVEL	Set mic level for AUDIO IN1	-40dB / -50dB / -60dB
	INPUT2 MIC LEVEL	Set mic level for AUDIO IN2	-40dB / -50dB / -60dB
	INPUT1 LINE LEVEL	Set level (line) for AUDIO IN1	4dB / 0dB
	INPUT2 LINE LEVEL	Set level (line) for AUDIO IN2	4dB / 0dB
RECORDING CH SETTING	FRONT VR SELECT	Set adjustment channel with F.AUDIO LEVEL knob	CH1, CH2, CH3, CH4, CH1/CH2, CH3/CH4 , ALL , OFF
	AUDIO LEVEL CH3	Turn ON/OFF automatic level control for audio CH3	ON / OFF
	AUDIO LEVEL CH4	Turn ON/OFF automatic level control for audio CH4	ON / OFF
	LEVEL CONTROL CH3	Adjust audio level for CH3 when AUDIO LEVEL CH3 menu item is set to OFF	0 – 70 – 100
	LEVEL CONTROL CH4	Adjust audio level for CH4 when AUDIO LEVEL CH4 menu item is set to OFF	0 – 70 – 100
	MIC LOWCUT CH1	Turn ON/OFF low cut filter for audio CH1	ON / OFF
	MIC LOWCUT CH2	Turn ON/OFF low cut filter for audio CH2	ON / OFF
	MIC LOWCUT CH3	Turn ON/OFF low cut filter for audio CH3	ON / OFF
	MIC LOWCUT CH4	Turn ON/OFF low cut filter for audio CH4	ON / OFF

AUDIO SETUP menu (continued)

Menu item		Description	Setting (factory default)
RECORDING CH SETTING	LIMITER CH1	Turn ON/OFF audio limiter for audio CH1	ON / OFF
	LIMITER CH2	Turn ON/OFF audio limiter for audio CH2	ON / OFF
	LIMITER CH3	Turn ON/OFF audio limiter for audio CH3	ON / OFF
	LIMITER CH4	Turn ON/OFF audio limiter for audio CH4	ON / OFF
	HEADROOM	Set audio reference level	12dB / 18dB / 20dB (*1)
OUTPUT SETTING	AUDIO OUT	Set monitor audio channel output from headphones, HDMI and built-in speaker.	CH1/2 , CH1 , CH2 , CH3 , CH4
	TEST TONE	Turn ON/OFF 1kHz tone generator	ON / OFF (Reference level varies depending on setting of HEADROOM menu item.)

*1: The default setting varies depending on the setting of AREA SELECT men item (P.56) in OPTION MENU. See the following table for the details of settings including other menu items that also affected.

Items	AREA SELECT menu		
	NTSC	NTSC(J)	PAL
LINE&FREQ	1080-59.94i	1080-59.94i	1080-50i
REC FORMAT	AVC-I100/60i	AVC-I100/60i	AVC-I100/50i
SETUP	7.5%A	0%	0%
HEADROOM	20dB	20dB	18dB
Date display	m/d/y	y/m/d	d/m/y
TIME ZONE	+0:00	+9:00	+0:00

Initial setting difference of AREA SELECT menu

OUTPUT SEL menu

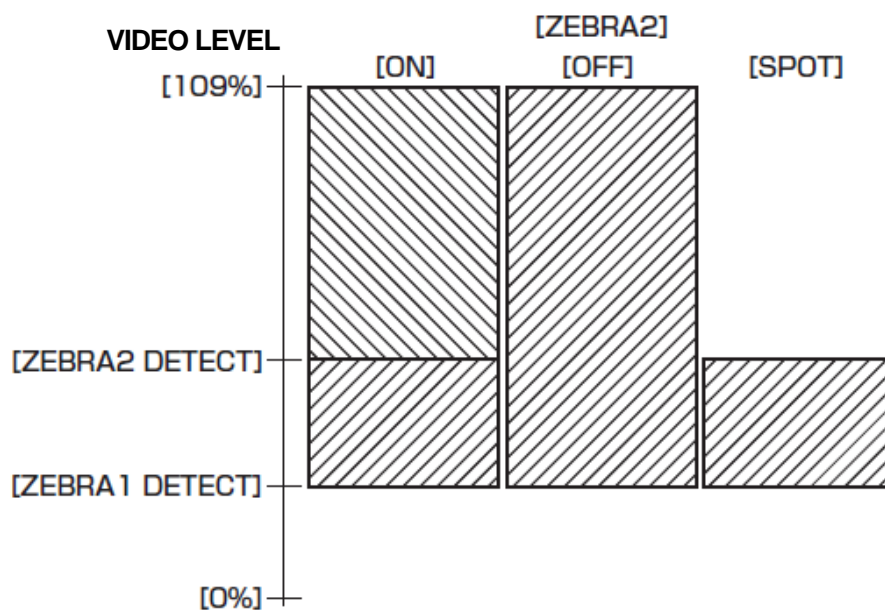| Menu item		Description	Setting (factory default)
SDI OUT		Turn ON/OFF SDI OUTPUT.	ON / <u>OFF</u>
SDI&HDMI SELECT		Select signal format from SDI and HDMI OUT terminals.	<u>SYSTEM MODE</u>: Follow system setting 1080i:Output 1080i when in 1080p mode DOWNCON: Down convert to SDTV format
3G-SDI OUT		Set 1080p signal output format of HD SDI OUT.	<u>LEVEL-A</u> / LEVEL-B (LEVEL-B DL)
SDI OUT CHAR		Superimpose characters on video from SDI OUT.	ON / <u>OFF</u>
SDI EDH		Add Error Detection and Handling (EDH) signal to SDI OUT in 480i or 576i mode.	<u>ON</u> / OFF
HD SDI REMOTE		Output REC/PAUSE trigger signal from SDI OUT.	ON / <u>OFF</u>
DOWNCON MODE		Set the display mode of down converted image from SDI OUT in 1080p, 1080i, 720p mode.	SIDE CROP / <u>LETTER BOX</u> / SQUEEZE
DOWNCON SETTING	DETAIL	Turn ON/OFF image contour correction to down converted image.	<u>ON</u> / OFF
	H.DTL LEVEL	Adjust down converted image contour correction level for horizontal direction.	0 – <u>8</u> – 31
	V.DTL LEVEL	Adjust down converted image contour correction level for vertical direction.	0 – <u>8</u> – 31
	DTL CORING	Adjust threshold level of down converted image contour correction.	0 – <u>1</u> – 15
	H.DTL FREQ	Set thickness of contour correction signal for horizontal direction.	2.5MHz / 3MHz / <u>3.5MHz</u> / 4MHz / 4.5MHz

USB SETUP menu

Menu item	Description	Setting (factory default)
USB MODE	Turn ON/OFF USB connection mode	ON / <u>OFF</u>

DISPLAY SETUP menu

Menu item	Description	Setting (factory default)
MENU DISPLAY	Set display device of menu screen	LCD&EVF / LCD
ZEBRA1 DETECT	Set the primary zebra detection level	0 – 70% – 109%
ZEBRA2 DETECT	Set the secondary zebra detection level	0 – 85% – 109%
ZEBRA2	Turn ON/OFF the secondary zebra pattern. (See following chart for the details)	ON / SPOT / OFF
CENTER MARK	Set shape of center marker	1: ┼ 2: ┴ 3: ┼ 4: ┴ OFF
SAFETY MARK	Set type of safety zone marker	1: Box / 2: Corner only / OFF
SAFETY AREA	Set size of safety zone marker	80% - 90% - 100%
FRAME MARK	Show the frame marker	ON / OFF
FRAME SIG	Set size of frame marker	4:3 / 13:9 / 14:9 / 1.95:1 / 2.35:1
FRAME LVL	Set dimming level of outside of the frame marker.	0 – 15
LEVEL GAUGE	Turn ON/OFF level gauge display	ON / OFF

ZEBRA settings in DISPLAY SETUP menu

DISPLAY SETUP menu (continued)
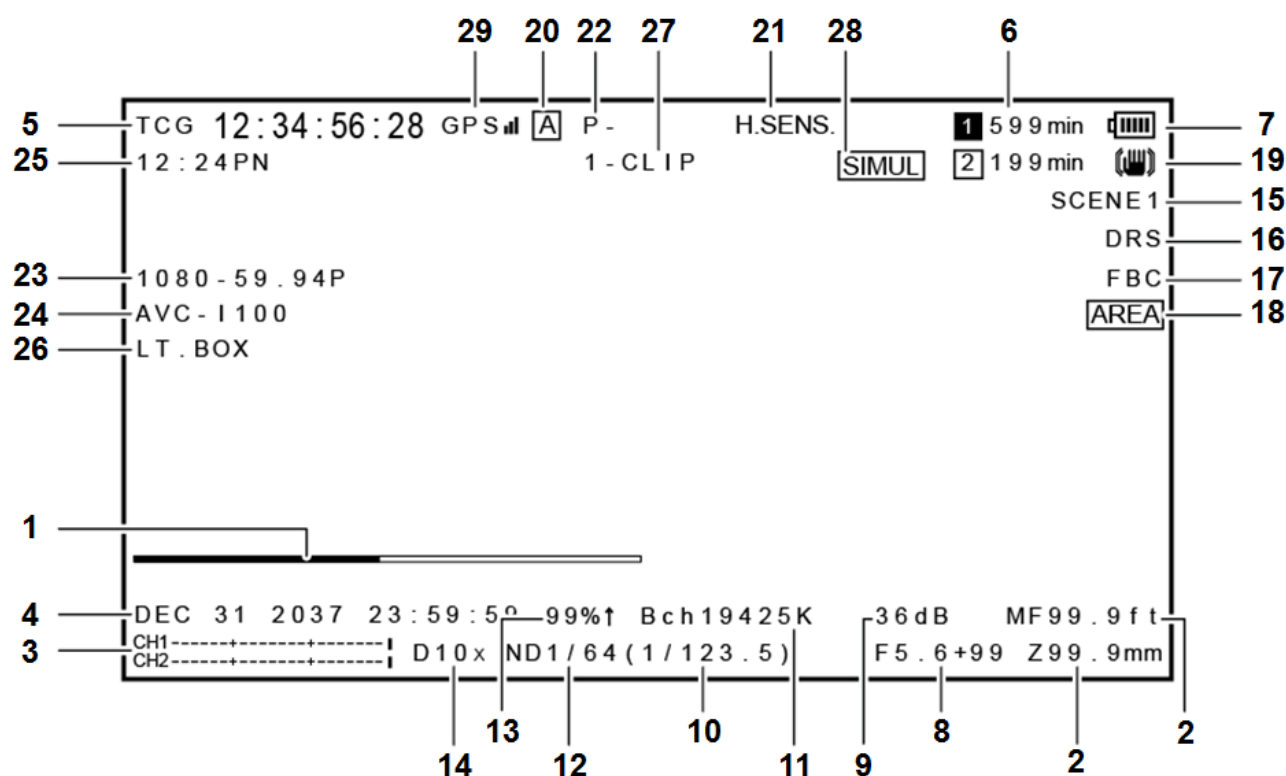
#	Menu item	Description	Setting (factory default)
1	FOCUS BAR	Show/hide a bar that indicates focusing level.	ON / <u>OFF</u>
2	ZOOM/FOCUS	Set unit of zoom and focus value	<u>NUMBER</u> , mm/feet , mm/m , OFF
3	LEVEL METER	Show/hide audio level meter	<u>ON</u> / OFF
4	DATE/TIME	Show/hide a calendar	TIME / DATE / TIME&DATE / <u>OFF</u>
5	REC COUNTER	Set count mode of the record counter	<u>TOTAL</u>: Accumulate counter CLIP: Reset by each recording start
6	P2CARD REMAIN	Show/hide remaining time display of microP2 card	<u>ON</u> / OFF
7	BATTERY	Show/hide battery remaining display	<u>ON</u> / OFF
--	OTHER DISPLAY	Show/hide other information	<u>PARTIAL</u>: Show certain information items ALL: Show all information items USER: Show items manually selected

DISPLAY SETUP menu (continued)

```
      29 20 22 27      21  28        6
  5 ──TCG 12:34:56:28 GPS⬤ⓐ P-      H.SENS.       1 599min ⬜⬜── 7
 25 ──12:24PN                 1-CLIP      SIMUL  2 199min 〽── 19
                                                  SCENE1── 15
                                                     DRS── 16
 23 ──1080-59.94P                                    FBC── 17
 24 ──AVC-I100                                      AREA── 18
 26 ──LT.BOX


  1 ──────────────┐
                  └──────────────────────────────

  4 ──DEC 31 2037 23:59:5⁰-99%↑  Bch19425K   -36dB    MF99.9ft
  3 ──CH1----+------+------|  D10x ND1/64(1/123.5)  F5.6+99  Z99.9mm
      CH2----+------+------|
                  13    12        10    11  9   8      2    2
          14       12              11   9          8
```
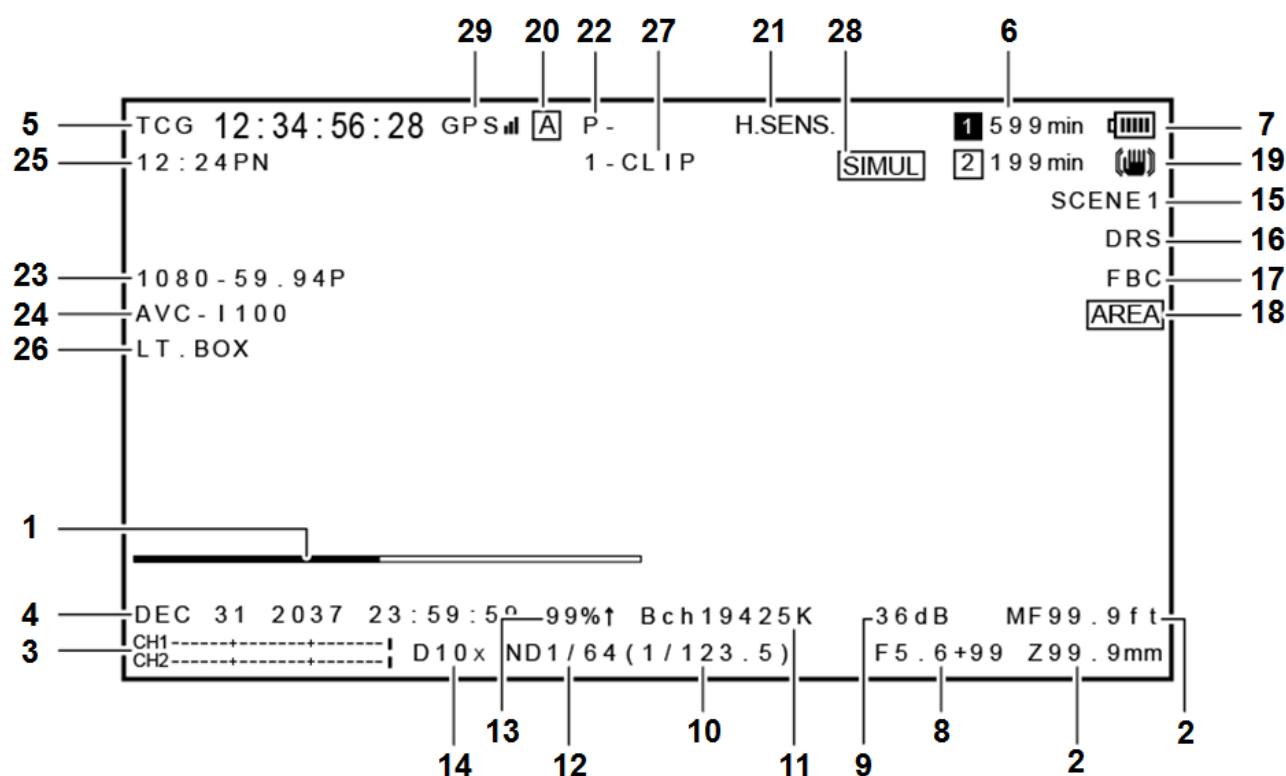
Menu	#	Item	Description	Setting (factory default)
DISPLAY SETTING	8	IRIS	Show/hide F-number and auto iris values	<u>ON</u> / OFF
	9	GAIN	Show/hide gain value	<u>ON</u> / OFF
	10	SHUTTER	Show/hide shutter speed	<u>ON</u> / OFF
	11	WHITE BALANCE	Show/hide WHITE BAL position (A, B, Preset)	<u>ON</u> / OFF
	12	ND	Show/hide ND filter position	<u>ON</u> / OFF
	13	Y GET	Show/hide brightness level measured by Y GET function	<u>ON</u> / OFF
	14	D.ZOOM	Show/hide digital zoom ratio	<u>ON</u> / OFF
	15	SCENE FILE	Show/hide Scene file name	<u>ON</u> / OFF
	16	DRS	"DRS" is displayed there while Dynamic Range Stretcher is functioning.	<u>ON</u> / OFF
	17	FBC	"FBC" is displayed there while Flash Band Compensation is functioning.	<u>ON</u> / OFF
	18	AREA	"AREA" is displayed there while area mode feature is functioning.	<u>ON</u> / OFF

DISPLAY SETUP menu (continued)
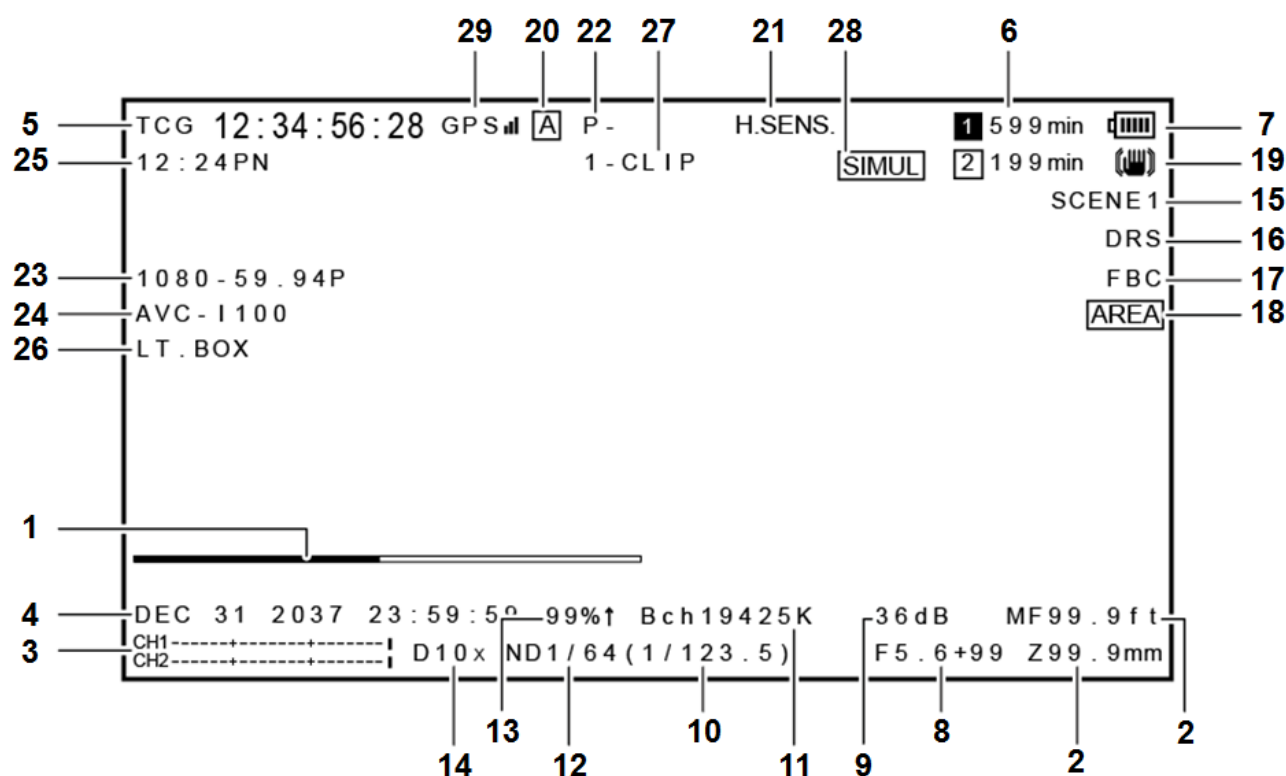
Menu	#	Item	Description	Setting (factory default)
DISPLAY SETTING	19	OIS	〔〕 symbol is displayed while optical image stabilizer is functioning.	<u>ON</u> / OFF
	20	FULL AUTO	Display A when auto mode is functioning.	<u>ON</u> / OFF
	21	SHOOTING MODE	Display "H.SENS" when high sensitivity mode is functioning.	<u>ON</u> / OFF
	22	PB MODE	Display playback mode.	<u>ON</u> / OFF
	23	SYSTEM MODE	Display system mode (Line – Frame rate).	ON / <u>OFF</u>
	24	REC FORMAT	Display record format.	<u>ON</u> / OFF
	25	FRAME RATE	Display current frame rate in Variable Frame Rate mode.	<u>ON</u> / OFF
	26	ASPECT	Display "LT.BOX" symbol when in Letter Box mode.	<u>ON</u> / OFF
	27	ONE CLIP REC	Display "1-CLIP" symbol when in one clip record mode.	<u>ON</u> / OFF
	28	REC MODE	Display "SIMUL" when in simultaneous record mode.	<u>ON</u> / OFF
	29	GPS	Display signal level meter of GPS.	<u>ON</u> / OFF

DISPLAY SETUP menu (continued)

Menu item		Description	Setting (factory default)
EVF DETAIL		Turn ON edge enhancer for video image on the viewfinder and built-in LCD monitor for easy focusing.	<u>ON</u> / OFF
EVF PEAK LEVEL		Set enhancement level in the EVF DETAIL setting.	-7 – <u>0</u> – 7
EVF PEAK FREQ		Set enhancement frequency in the EVF DETAIL setting.	HIGH / <u>LOW</u>
EVF SETTING	EVF BRIGHTNESS	Set brightness level (video on EVF)	-15 – <u>0</u> – 15
	EVF CONTRAST	Set contrast level (video on EVF)	-30 – <u>0</u> – 30
	EVF COLOR LEVEL	Set color saturation level (video on EVF)	-15 – <u>0</u> – 15
	EVF COLOR	Turn OFF color image (video on EVF)	<u>ON</u> / OFF
EVF SENSOR		Set sensitivity of the proximity sensor on the viewfinder.	<u>HIGH</u> / LOW
LCD SETTING	LCD BRIGHTNESS	Set brightness level (video on built-in LCD)	-15 – <u>0</u> – 15
	LCD CONTRAST	Set contrast level (video on built-in LCD)	-30 – <u>0</u> – 30
	LCD COLOR LEVEL	Set color saturation level (video on built-in LCD)	-15 – <u>0</u> – 15
	LCD BACKLIGHT	Turn OFF color image (video on built-in LCD)	1 / <u>0</u> / -1 / -2 / -3
SELF SHOOT		Set display mode of the built-in LCD monitor. Choose "MIRROR" when performing self-portrait recording. (Image can be inverted horizontally.)	NORMAL / <u>MIRROR</u>

CARD FUNCTIONS menu

Menu item	Description	Setting (factory default)
SCENE FILE	Read / write SCENE files between SD memory card.	LOAD / SAVE
USER FILE	Read / write USER files between SD memory card.	LOAD / SAVE
SD CARD PROPERTY	Show remaining record time of the SD memory card.	---
FORMAT SD CARD	SD memory card can be formatted.	---

OTHER FUNCTIONS menu

Menu item	Description	Setting (factory default)
USER FILE	Read/write or initialize USER files between a built-in data memory in the unit.	LOAD / SAVE / INITIALIZE
ACCESS LED	Turn ON/OFF the access indicator of microP2 card slots.	ON / OFF
TALLY LAMP	Turn ON/OFF tally lights.	FRONT / REAR / BOTH / OFF
CLOCK SETTING	Set calendar and time zone.	---
TIME ZONE	Set time difference between the Greenwich Mean Time (GMT). The time difference is added to record and display time.	From -12:00 to +13:00
SEEK POS SEL	Set position to be moved with <</>> buttons while in PLAY-PAUSE mode.	CLIP / CLIP&TEXT MEMO
GPS	Turn ON/OFF the GPS function.	ON / OFF
P.OFF GPS DATA	When switch OFF the power, global positioning data is stored in the unit. This item is to decide to keep the data until the unit receives GPS signal after power ON.	HOLD: Use (record) stored data. CLEAR: Clear the data, and record "0" until GPS signal can be received.
MENU INITIALIZE	Restore the product to factory default condition.	---

MAINTENANCE screen

Menu item	Description
UPDATE	Perform firmware update (Visit firmware download website at http://panasonic.biz/sav/pass_e)
ACTIVATE	Activate optional features.

DIAGNOSTIC screen

Menu item	Description
VERSION	Display firmware versions etc.
OPERATION	Display power ON times in Hours.

AREA SELECT menu   (OPTION MENU: press "Backlight" + "MENU")

Menu Item	Description	Setting (factory default)
AREA SELECT	Change certain menu items such as REC FORMAT, HEAD ROOM etc. by area setting. See the table below for the details.	NTSC / NTSC(J) / PAL

Items	AREA SELECT menu		
	NTSC	NTSC(J)	PAL
LINE&FREQ	1080-59.94i	1080-59.94i	1080-50i
REC FORMAT	AVC-I100/60i	AVC-I100/60i	AVC-I100/50i
SETUP	7.5%A	0%	0%
HEADROOM	20dB	20dB	18dB
Date display	m/d/y	y/m/d	d/m/y
TIME ZONE	+0:00	+9:00	+0:00

AWB PRE CONTROL menu   (OPTION MENU: press "Backlight" + "MENU")

Menu Item	Description	Setting (factory default)
R GAIN	Adjust color temperature at preset 3200K of R-Channel.	-400 – 0 – 400
B GAIN	Adjust color temperature at preset 3200K of B-Channel.	-400 – 0 – 400
G AXIS	Adjust color temperature at preset 3200K of G-Channel.	-400 – 0 – 400

CAM REMOTE ADJ menu   (OPTION MENU: press "Backlight" + "MENU")

Menu Item	Description	Setting (factory default)
FOCUS ADJ.	Adjust characteristic of focus control of wired remote terminal.	-20 – 0 – 20
IRIS ADJ.	Adjust characteristic of iris control of wired remote terminal.	-20 – 0 – 20
ZOOM ADJ.	Adjust characteristic of zoom control of wired remote terminal.	-20 – 0 – 20

LCD SUB BRIGHTNESS menu   (OPTION MENU: press "Backlight" + "MENU")

Menu Item	Description	Setting (factory default)
R OFFSET	Adjust brightness of R-channel of the built-in LCD monitor.	0 – 22 – 31
G OFFSET	Adjust brightness of G-channel of the built-in LCD monitor.	0 – 4 – 31
B OFFSET	Adjust brightness of B-channel of the built-in LCD monitor.	0 – 18 – 31

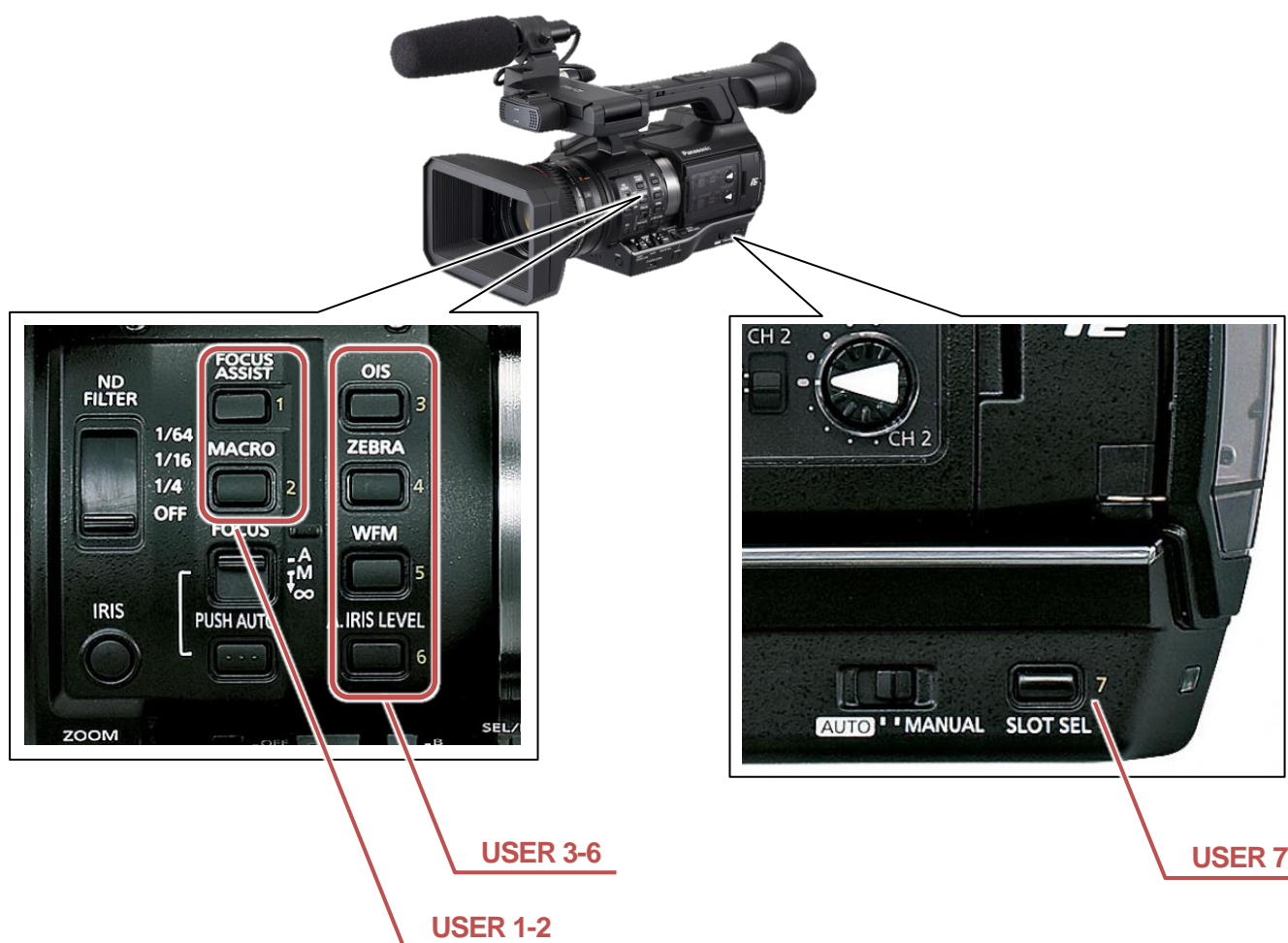**ENG SECURITY menu   (OPTION MENU: press "Backlight" + "MENU")**

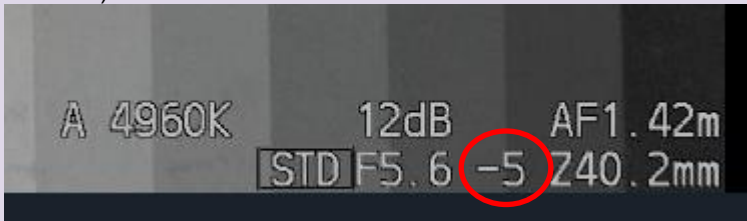| Menu Item	Description	Setting (factory default)
ENG SECURITY	Turn ON/OFF menu open restriction. Only USER MENU can become open once turn ON. Ask your dealer how to unlock it.	<u>ON</u> / OFF

3. Understanding USER button operation

1. USER button layout

Selected 34 functions can be assigned to the eight USER buttons.

USER 3-6

USER 1-2

USER 7

USER 8

2. USER assignable functions

Item	Effect
INHIBIT	Assign no function
SCENE FILE SEL	Select scene files
LEVEL GAUGE	Turn ON/OFF level gauge display
LEVEL GAUGE RESET	Set current vertical and horizontal level to zero on the level gauge. Keep press the USER button to clear.
WFM	Turn ON/OFF waveform monitor display. Display type can be selected from MAIN MENU > SW MODE > WFM MODE
D.ZOOM	Enable digital zoom (x2, x5, x10)
DRS	Turn ON/OFF dynamic range stretcher
FBC	Turn ON/OFF flash-band compensation
S.GAIN	Turn ON/OFF super gain (higher than 24dB) mode. Gain value can be selected from MAIN MENU > SW MODE > SUPER GAIN
1S.EXP.	Turn ON/OFF long time (1 second) exposure function.
ATW	Turn ON/OFF auto tracking white balance adjustment
ATW LOCK	Fix white balance while auto tracking white balance control (ATW) is working. Press the USER button again to release its fixing.
SPOTLIGHT	Set auto iris control to "spot light (when subject is flooded with light)" mode.
BACKLIGHT	Set auto iris control to "back light (when subject is lit from behind)" mode.
BLACKFADE	Perform fading out image to black.
WHITEFADE	Perform fading out image to white.
A.IRIS LEVEL	Set reference (target) level of auto iris control. While this function is ON, the auto iris level can be adjusted with the iris ring. (A.IRIS LEVEL value displays nearby F number indicator.)
IRIS	Select iris control mode (auto/manual).
Y GET	Turn ON/OFF spot-meter function. While this function is ON, a white box appears at the center part of the EVF as a measuring point indicator.
FOCUS ASSIST	Turn ON/OFF focus assist (EXPAND, EDGE PEAKING) function. Type of assist can be selected from MAIN MENU > SW MODE > FOCUS ASSIST MODE
FOCUS MACRO	Turn ON/OFF macro focus mode. Effective range (Wide-end only or All zoom range) can be selected from MAIN MENU > SW MODE > MACRO MODE

2. USER assignable functions (continued)

Item	Effect
OIS	Turn ON/OFF optical image stabilizer (OIS).
FAST ZOOM	Turn ON/OFF a function increases servo zoom speed. To use this function with handle zoom button, set a speed control switch to "VAR". *Note: When this function is turned ON, motor's operation sound becomes louder, and may be audible and recorded.*
ZEBRA	Show/hide ZEBRA indicator and marker.
EVF ON/OFF	Turn ON/OFF viewfinder image
PRE REC	Turn ON/OFF the pre-record mode. This mode allows the camera to start recording video and audio approx. 3 seconds in the HD mode, 7 seconds in the SDTV mode before the REC/PAUSE button is pressed.
TEXT MEMO	Leave TEXT MEMO to clips.
SHOT MARK	Leave SHOT MARK to clips.
DEL LAST CLIP	Delete the last recorded clip from the microP2 card.
SLOT SEL	Select microP2 card slot to be recorded. It only works when two micro P2cards are mounted to both slots.
AUDIO MON SEL	While keep pressing the USER button, change audio output (*) channel from CH1/2 to CH3/4. * From Headphones out, built-in speaker, and HDMI terminal
REC CHECK	Play last 3 seconds of the last recorded clip on the microP2 card. Plays last 10 seconds when keep press the USER button.
BACKGR REC PAUSE	Pause recording on SLOT2 when background record mode (see P.43) performed, stop background recording when keep press the USER button for 5 seconds.
USB MODE	Turn ON/OFF USB connection mode.

MEMO

Revision history

Date	Comments	Document Ver.
Mar 2016	The first edition issued	V1.00E
July 2016	Added explanations and figures for some scene file controls.	V1.01E

Panasonic

Panasonic professional video support portal (Firmware, utility downloads)
https://panasonic.biz/cns/sav/pass_e