Colorimetric and Resolution requirements of cameras

Alan Roberts

ADDENDUM 21 rev 2: Menu settings for

Panasonic DVCPro100 AJ-HDX900

This document is a report of the results of tests that are the precursor of those described in the EBU technical document Tech3335. It is not an endorsement of the product.

Assessment was made on a engineering sample of the AJ-HDX900 (no serial number), a multi-standard HDTV cam-corder. It is very similar in form and function to the SDX900, sharing many features and having a very similar menu set, and seems to be a replacement for the HDX400. Production models may differ slightly from the pre-production model initially assessed for this addendum.

The camera is switchable between 1080-line and 720-line HDTV standards, and between the base-normal frame rates of 29.97 and 25Hz. It can also be switched, in 1080 mode, between interlace (50i, 59.94i) and progressive (25psf, 29.97psf, and 23.98psf in both 2:3 and 2:3:3:2 pull-down) modes. In 720 mode it can also be switched to half-frame rate, and thus can generate a "film look" in the camera at system speed. It has specific "film-look" gamma curves that incorporate many of the contrast handling features of earlier cameras, making it a great deal easier to set up. The camera has 3 2/3" ccds (1280x720, progressively scanned) and records using small-format conventional DVCPro tape at 100Mb/s (in "long-play" mode).

There are two versions of the camera, suffixed P and E; as far as I can tell they are identical in every way, except that the E version is expected to be used mostly at 50Hz while the P version will be used mostly at 60Hz. This is apparent only from the factory default settings of some menu items.

It is significantly smaller and lighter than the familiar Beta camcorder and is useful mostly for portable, single-camera work. It has many internal menus for setting the performance, such that it can then be used without external controls. It is not well suited to multi-camera operation. Monitoring and connectivity have been improved over previous Panasonic models; it will genlock to either analogue HD Y or analogue composite (PAL or NTSC as appropriate); there are two video outputs, one switchable between HDSDI, SDI (appropriate down-conversion), and composite (PAL or NTSC), the other between HDSDI and HD analogue Y for monitoring; it has a IEEE1394 (Firewire) output that will feed and control an external recorder.

There is a 7-second video cache memory. Using this, it is possible to record to tape up to 7 seconds of events that occurred before pressing "Record". The same circuitry is also used to provide a "slow-shutter" in which adjacent frames are summed to produce smeared pictures and reduced noise (or extra gain).

Video compression is still DVCProHD, 6.7:1 for all the NTSC-related standards, 6.3:1 for all the PAL-related standards. The camera section has 14-bit adcs that deliver better noise performance than in earlier models.

In this setup, the gamma correction and knee are adjusted to capture about 2.5 stops of overload, and 1 stop of underexposure, to mimic film performance.

Some typographical errors have been corrected in the first revision.

This second revision includes settings intended to match the camera to the BBC's 'docs' settings for the DSR450.

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Many menu items have little or no effect on the image. Those that do so are highlighted. The full menus are given for completeness. Where two values are given {f} denotes film use, {v} video. The film mode uses the "Filmlike1" gamma curve, which very closely resembles the best that can be done with a conventional gamma curve and knee, but with a nice smooth join; there seems no point in ignoring this curve since Panasonic have clearly put much effort into its design, and it works well. The photographic speed of the camera is unchanged (about 640 ASA) using this curve ("Filmlike2" is a similar curve but copes with about a stop less of overload and reduces the photographic "speed" by about a stop, also the manual knee controls have no effect in this mode so it is not possible to customise it; "Filmlike3" further reduces the exposure range and lowers the photographic "speed" of the camera by about one stop more; both these modes should produce better noise performance and thus may well be the best option for film-like work). The video mode uses conventional gamma and knee settings to achieve similar results but with more contrast compression in highlights. Both modes can cope with about 2.5 stops of overexposure (about 500% measured); the video mode (with optimal knee settings) has a slightly more pronounced change of slope in the knee but the difference is marginal. Total exposure range has been measured as about 11 stops.

The shutter can be set to HALF (i.e. 180º), which avoids the problem of having to work out what it should be from the field/frame rate.

Line Mix mode (available as a User Switch setting) appears to be the equivalent of EVS in other cameras. Switched on in 25p mode reduces the vertical resolution to the same as 50i, thus minimising most interlace twitter artefacts although the effect is not great.

Digital Super Gain is implemented by reducing the frame rate. This gives "free" gain without noise, provided the smeared pictures and lowered frame rate is acceptable.

When shooting at 59.94 rates, drop-frame time code is always used. In this case, the film-like modes are at 29.97fps or 23.98fps. When using 23.98 (called 24 in the camera), you have the option of standard 2:3 pull-down or the recently adopted Advanced mode, 2:3:3:2 in which it is easier to extract original frames from the 59.94 output stream.

Viewfinder and monitoring outputs can both have markers, individually set.

The camera "Gain" switch stores many camera settings, allowing the user to set completely different conditions selectable by that switch. However, most users will want only different gain, the menu contents given here are appropriate for the range of gains quoted, it is for the user to decide which gain settings are appropriate and to set the other conditions accordingly. Beware that the recommended settings were derived during a short laboratory test of the camera, better settings may well be found once the camera goes into general use.

Factory settings are underlined.

This second revision includes settings intended to match the camera to the

In the table, BBC values are marked: {f} for film look; {v} for video look; {u} for shooting without subsequent grading (with headroom adjusted to 1.5 stops, and colour performance offset), intended to match the BBC's 'docs' settings for the DSR450.

SYSTEM SETTING			
System mode			Main video standard setting
Item	**Range**	**description**	**BBC**
System Mode	1080-50i, 1080-59.94i, 720-50P,720-59.94P	Any change requires a power-off/on cycle to take effect. Different defaults for E/P models	1080-50i
Camera Mode	(1080-50i) 50i, 25p, (1080-59.94p) 60i, 30P, 24P, 24PA, (720-50P) 50P, 25P, (720-59.94P) 60P, 30P, 24P	Interlace/proscan. All 59.94-based rates should be these numbers/1.001, the camera will NOT shoot at 24fps. Different defaults for E/P models	25p{fu}, 1080 50i{vu} or 720p 50 {vu}

Rec function Specialist recording functions

Item	**Range**	**description**	**BBC**
Interval Rec Mode	On, One shot, Off	Single frame recording possible	
Interval Rec Hold	On,Off	On holds settings through power cycle	
Rec Time	(59.94) 00s01f~59s29f (50) 00s01f~59s24f	Frames to record each time	
Pause Time	(59.94) 01f~ 04m59s29f~23h59m59s24f (50) 01f~ 04m29s24f~23h59m59s24f	Interval between recordings	
Take Total Time	None~5day	Session duration	
Total Rec Time	01f~99m59s29f~ OVER100m, None	=REC+PAUSE+TOTAL TAKE	
Auto Rec	Off,On		
Start Delay	0sec~10sec	Delay to start full recording in interval mode	
Pre Rec Mode	Off,On	Pre-roll time	
Pre Rec Time	0s~7s	Length of video cache	
Retake Mode	On,Off	Refer to manual	

Output sel Signals on the Video Output connectors

Item	**Range**	**description**	**BBC**
Output Item	TC, Status,Menu only	Stuff on the Video Out	
Moni Out	HDSDI,HD-Y	Video monitoring output, on camera right	
Moni Out Chara	On,Off	Adds characters on monitoring output (HDSDI only)	
Moni Out Mode	Cam,VTR	VTR=EE, Cam always sets camera feed	
VF Mode	Cam,VTR	Same but in the viewfinder	
Video Out Centr Mark	Off,1,2,3,4	Cross-hairs on Video Output, various sizes	
Video Out Safety Mark	Off,1,2	1=box, 2=corners	
Safety Area	80%~90%~100%	Box size, retains aspect ratio	
Frm Sig	4:3,13:9,14:9,Vista	Frame outline marker, Vista=16:8.65	
Video Out User Box	On,Off	User-set marker box, on Video Output	
User Box Width	1~13~100	%	
User Box Height	1~13~100	%	
User Box H Pos	-50~0~50	%	
User Box V Pos	-50~0~50	%	

Monitor Out Setting Signals on the Monitoring Output connector

Item	**Range**	**description**	**BBC**
Moni Out Centr Mark	Off,1,2,3,4	Cross-hairs on Monitoring Output	
Moni Out Safety Mark	Off,1,2	1=box, 2=corners	
Safety Area	80%~90%~100%	Box size, retains aspect ratio	
Moni Out Frm Mark	On,Off	Frame outline	
Frm Sig	4:3,13:9,14:9,Vista	Frame outline marker, Vista=16:8.65	
Moni Out User Box	On,Off	User-set marker box, on Monitoring Output	
User Box Width	1~13~100	%	
User Box Height	1~13~100	%	

User Box H Pos	-50~0~50	%	
User Box V Pos	-50~0~50	%	

RC Out Setting Signals on the Remote connector

Item	Range	description	BBC
RC Out Centr Mark	Off,1,2,3,4	Cross-hairs on Remote Output, various sizes	
RC Out Safety Mark	Off,1,2	1=box, 2=corners	
Safety Area	80%~90%~100%	Box size, retains aspect ratio	
RC Out Frm Mark	On,Off	Frame outline	
Frm Sig	4:3,13:9,14:9,Vista	Frame outline marker, Vista=16:8.65	

Downcon Setting Down-conversion settings, only for monitoring, not for editing

Item	Range	description	BBC
Downcon Mode	Sqeez,Lt-Box,S-Crop	Aspect ratio	
Detail	On,Off	Extra sharpening	
H.Dtl Level	0~8~31	Horizontal detail	
V.Dtl Level	0~4~31	Vertical detail	
Dtl Coring	0,1,15	High value avoids emphasising noise	
H.Dtl Freq	1~3~5	Hump centre (2.5,3,3.5,4,4.5MHz)	
2D lpf	On,Off	Diagonal filter, reduces cross colour	
Setup	0,7.5%	DC setup, 7.5% for NTSC (not Japan)	

Genlock

Item	Range	description	BBC
Genlock	Int,Ext	Genlock source	
GL.Phase	HDSDI,Composit	Which is locked, other has ~90 line delay	
H.Phase Coarse	-100~0~100	Coarse H timing	
H.Phase Fine	-100~0~100	Fine H timing	

Option mode General options

Item	Range	description	BBC
Rec Tally	Red, Green, Char	Record indicator, Char puts REC in the v/f	
P.Off GPS Data	Hold,Clear	Holds GPS data while power off	
1394 Speed	S200,S400	Firewire speed, 200Mb/s or 400Mb/s	
1394 In Ch	0~63,Auto	Assign channel number	
1394 Out Ch	0~63,Auto	Assign channel number	
1394 Control	Off,Both	External recorder, Both servos external to camera controls	
1394 Cmd Sel	Rec_P, Stop	External recorder, Stop or hold on RecPause	
SDI Metadata	On,Off	Embed UMID data into HDSDI	
SDI EDH	On,Off	Embed error signals into HDSDI	

PAINT MENUS

RB Gain Control Colour balancing

Item	Range	description	BBC
R Gain AWB Pre	-200~0~200	Red gain in switch Preset balance	
B Gain AWB Pre	-200~0~200	Blue gain in switch Preset balance	
R Gain AWB A	-200~0~200	Red gain in switch A balance	
B Gain AWB A	-200~0~200	Red gain in switch A balance	
R Gain AWB B	-200~0~200	Red gain in switch B balance	
B Gain AWB B	-200~0~200	Red gain in switch B balance	
AWB A Gain Offset	On,Off	On adds A values above after rebalance in A	
AWB B Gain Offset	On,Off	On adds B values above after rebalance in B	

RGB Black Control More colour balancing

Item	Range	description	BBC
Master Ped	-200~15~200	Master black level, 15's a bit high, 6 is better	6 {fv} 15 {u}
R Pedestal	-100~0~100	Red ped, reports value from remote control	
G Pedestal	-100~0~100	Green	

B Pedestal	-100~0~100	Blue	
Pedestal Offset	On,Off	On enables these values	
R Flare	-100~0~100	Red flare correction	
G Flare	-100~0~100	Green	
B Flare	-100~0~100	Blue	

Matrix (User preset) A,B Colour matrix, user settings

Item	Range	description	BBC
Matrix Table	A,B	Two user tweakable matrices	
Matrix R-G	-63~0~63	Settings for matrix A or B	
Matrix R-B	-63~0~63		
Matrix G-R	-63~0~63		
Matrix G-B	-63~0~63		
Matrix B-R	-63~0~63		
Matrix B-G	-63~0~63		
L Matrix Table	Off,A,B	Select matrix in Low	
M Matrix Table	Off,A,B	Mid	
H Matrix Table	Off,A,B	High gain setting	

Color Correction rather dangerous territory

Item	Range	description	BBC
R (Sat/Phase)	-63~63	Adjusts colour in 45 degree segments, tweaks saturation and hue. This is rather dangerous, but can be very useful for special effects, generally, you should avoid this unless you have good test kit, including comprehensive colour test charts. Beware, equivalent settings from the Varicam do NOT work here.	0/0 {fv} +22/0 {u}
R-Mg (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}
Mg (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}
Mg-B (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}
B (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}
B-Cy (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}
Cy (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}
Cy-G (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}
G (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}
G-Yl (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}
Yl (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}
Yl-R (Sat/Phase)	-63~63		0/0 {fv} +22/0 {u}

Low Setting Low Level Gain switch position

Item	Range	description	BBC[1]
Master Gain	-3,0~30dB	dB settings, 3dB steps	-3 ~ +3
H Dtl Level	0~10~63		6 {f} 20{v} 12 {u}
V Dtl Level	0~20~31		4 {f} 14{v} 9 {u}
Dtl Coring	0,1~15		2
H Dtl Freq	0~18~31		31
Level Dep	0,1~5	Low luma zone, no correction	1
Gamma	0.35~0.45~0.75	0.01 steps	0.45
Black Gamma	-3~Off~+3	No other controls	1
Matrix Table	A,B,Off	User preset matrices	Off
Color Corr.	On,Off	12 segment adjust, see above	Off

Mid Setting Mid Level Gain switch position

Item	Range	description	BBC[2]
Master Gain	-3~6~30dB	dB settings, 3dB steps	+3 ~ +9
H Dtl Lev	0~8~63		6 {f} 20{v} 12{u}
V Dtl Lev	0~18~63		4 {f} 14{v} 9 {u}
Dtl Coring	0~2~15		2
H Dtl Freq	0~18~31		31
Level Dep	0,1~5	Low luma zone, no correction	2
Gamma	0.35~0.45~0.75	0.01 steps	0.45
Black Gamma	-3~Off~+3		0
Matrix Table	A,B,Off	User preset matrices	Off

[1] These settings are suitable for gain values of between –3 and +3dB.
[2] These settings are suitable for gain values of between +3 ans +9dB.

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Color Correct	On,Off	12 segment adjust, see above	Off

High Setting High Level Gain switch position

Item	Range	description	BBC[3]
Master Gain	-3~12~30dB	dB settings, 3dB steps	+12 and above
H Dtl Lev	0~6~63		0 {f} 6{v} 12{u}
V Dtl Lev	0~16~63		0 {f} 4{v} 9 {u}
Dtl Coring	0~3~15		8
H Dtl Freq	0~18~31		31
Level Dep	0~3~5	Low-luma zone, no correction	4
Gamma	0.35~0.55~0.75	0.01 steps	0.5
Black Str	-3~Off~+3		Off
Matrix Table	A,B,Off	User preset matrices	Off
Color Correct	On,Off	12 segment adjust, see above	Off

Additional Dtl Detail, extra controls

Item	Range	description	BBC
Knee Ape Lvl	Off,1,2~5	Correction in knee compressed zone	3
Dtl Gain +	-31~0~31	correction, +ve going edges	0
Dtl Gain -	-31~0~31	correction, -ve going edges	8
Dtl Clip	0~63	Clip level of detail correction	47
Dtl Source	(G+B)/2,(R+G)/2, (2G+R+B)/4, (3G+R)/4, R, G	Doesn't make much difference except when noise level is high	(R+G)/2
V Dtl Freq	360TV,450TV,540TV, 630TV,720TV	TV lines, hump of response, only in 720P	720
H Dtl Line Mix	0H,1H,2H	Vertical size of H detection window	0
Master Dtl	-31~0~31	Master control	0

Skin Tone Dtl

Item	Range	description	BBC
Skin Tone Dtl	Off,A,B,AB	Select skin tone table, reduces wrinkles	Off
Skin Tone Zebra VF	On,Off	Zebra on skin tone detector	
Skin Tone Zebra Vout	On,Off	Adds skin zebra on Video Output (not in SD)	
Skin Tone Zebra Moni	On,Off	Adds skin zebra on Monitoring Output	
Skin Tone Table	A,B	Separate tables of target tones	
Skin Tone Get		Looks for skin tone	
Skin Dtl Coring	0~5~7		
Y Max	0~190~255	Max luma level for skin	
Y Min	0~10~255	Min luma level for skin	
I Center	0~35~255	Saturation mean level for skin	
I Width	0~55~255	Saturation range for skin	
Q Width	0~10~90	Hue mean level for skin	
Q Phase	-180~0~179	Hue range for skin	

Cam Main Menu 1, Knee Level Don't use Auto knee, manual is better

Item	Range	description	BBC
Master Ped	-200~15~200	Duplicate entry for pedestal	6
Manual Knee	On,Off	Valid only if AUTO is off	On
Knee Point	70%~93~107%	Manual break point	85 {fv} 88 {u}
Knee Slope	0~85~99	Gain in knee zone, about 2.5 stops overload	99 {fv} 35 {u}
White Clip	On,Off		On
White Clip Lvl	90%~109%		109% {fv} 102% {u}
A. Knee Point	80%~93~107%	Auto knee point	85%
A Knee Level	100~107~109		105
A.Knee Response	1~4~8	Auto knee response speed (low=fast)	4

Gamma Differentials and colour tweaking

Item	Range	description	BBC

[3] These settings are suitable for gain values of +12dB and above.

Master Gamma	0.35~0.45~0.75		0.45
R Gamma	-15~0~15	Set R away from Master	0
B Gamma	-15~0~15	Set B away from Master	0
Gamma Mode Sel	HD,SD,Filmlike1, Filmlike2,Filmlike3	HD=709, SD=BBC0.4, approximately	Filmlike1 {f} HD {vu}

Camera Settings

Item	Range	description	BBC
Detail	On,Off		Off {f} On {vu}
High Color	On,Off	Hue/Saturation maintenance at high luma	On
Gamma	On,Off		On
Test Saw	On,Off		
Flare	On,Off		
H-F Compe	On,Off	Wide-band detail enhancement	On

VF Display User controls (RC=remote control)

Item	Range	description	BBC
Disp Condition	Normal/Hold	Show switch status: Normal=On, Hold when ModeCheck pressed	Normal
Disp Mode	1,2,3	1=off, 2=some, 3=all	3
VF Out	Y,NAM,R,G,B	What you see, NAM=non-additive mix	Y
VF Dtl	0~5	5 roughly doubles the HD detail in the v/f	
Zebra 1 detect	0%~70~109%	Set for skin tone (BL-TR)	65%{f} 70%{vu}
Zebra 2 detect	0~85~109%	Set for white (TL-BR)	100%
Zebra 2	On,Spot,Off	SPOT works only if Zebra 2>1	Spot
Low Light Lvl	Off,10%~35%	Warns at low light level	35%
RC menu Disp	On,Off	Shows menus in v/f when RC is connected	Off
Marker/Char Lvl	50%~100%	Marker/Character brightness	100%

VF Marker Viewfinder stuff

Item	Range	description	BBC
Table	A,B	Switch between AB setups set below	
Centre Mark	Off,1~4	Cross size/type	
Safety Mark	Off,1,2	1=box, 2=corners	
Safety Area	80%~90~100%	Size of safety area	
Frame Mark	On,Off	Frame marker	OFF
Frame Sig	4:3,13:9,14:9,Vista	Vista is 16:8.65	14:9
Frame Lvl	0~15	Picture level outside frame mark, 15=same	15

VF User Box More viewfinder stuff

Item	Range	description	BBC
User Box	On,Off	Custom frame	
User Box Width	1~13~100	Width, %	
User Box Height	1~13~100		
User Box H Pos	-50~0~50		
User Box V Pos	-50~0~50		

VF Indicator And yet more

Item	Range	description	BBC
Extender	On,Off	Lens extender	
Shutter	On,Off	Shutter speed display	On
Filter	On,Off	Filter position	On
White	On,Off	Show AWB or Preset A/B	
Gain	On,Off		
Iris	Offs,S+Iris,S	Iris/Super Iris (aperture/auto) display	
Camera ID	Bar,Off	Show camera ID over bars onto tape	
ID Position	UpperR,UpperL, LowerR,LowerL	Placement	
Date/Time	On,Off	Show time/date with camera ID	Off
Zoom Lvl	On,Off	Focal length	
Color Temp	On,Off		

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System Mode	On,Off	Camera system speed	
DRS	On,Off	Dynamic range stretcher	

VF Indicator 2 Still more

Item	Range	description	BBC
Tape	On,Off	Tape remaining	
Battery	On,Off	Voltage	
Audio Lvl	On,Off	Level meters	
TC	TCG,TCR, TCG/TCR,Off	Time code	
VTR Warning	Always,Normal,Off	Normal= show for 3 seconds	Normal
Compression	On,Off	VTR indicator	
Save LED	Save&Tape,Save	Standby/Save warning	Save

Mode Check Ind What happens when you press Mode Check

Item	Range	description	BBC
Status	On,Off	Get the status screen	On
!LED	On,Off	Shows why !LED might be lit	On
Function	On,Off	Function screen	On
Audio	On,Off	Audio screen	On
P.On Ind	On,Off	Get status screen up at power-on	On

! LED VF warnings

Item	Range	description	BBC
Gain (0dB)	On,Off		
Gain (-3dB)	On,Off		
DS Gain	On,Off		
Line Mix	On,Off		
Shutter	On,Off		
White Preset	On,Off		
Extender	On,Off		
Black Gamma	On,Off		
Matrix	On,Off		
Color Correct	On,Off		
Filter	On,Off		

OPERATION

Camera ID 3 lines of text

Item	Range	description	BBC
ID1		Max 10 characters	
ID2			
ID3			

Shutter Speed Select which speeds go onto the switch list

Item	Range	description	BBC
Syncrho Scan	On,Off	Speed set by buttons near filter wheel, longest exposure depends on frame rate	
Position 1	On,Off	ON adds items to list of settings that can be cycled through using the little switch below the lens.	
Position 2	On,Off		
Position 3	On,Off		
Position 4	On,Off		
Position 5	On,Off		
Position 6	On,Off		

Shutter Select

Item	Range	Factory 59.94	Factory 50	description	BBC
Position 1	(59.94) 1/100,1/120,1/250, 1/500,1/1000,1/2000,HALF (50) 1/60,1/120,1/250,1/500, 1/1000,1/2000,HALF	1/100	1/60	HALF keeps exposure at 180º irrespective of field or frame rate	1/60
Position 2		1/120	1/120		1/120
Position 3		1/250	1/250		1/250
Position 4		1/500	1/500		1/500
Position 5		1/1000	1/1000		1/1000
Position 6		1/2000	1/2000		HALF

User SW Assign user switches

Item	Range	Factory	description	BBC
User Main Sw	Inh,S.Gain,DS.Gain,LineMix,S.Iris,I.Over,S. Blk,B.Gamma,AudioCh1,AudioCh2, RecSw,Yget,RetSW,Pre.Rec,DRS	S.Gain		
User 1 Sw		Pre.Rec		
User 2 Sw		DS.Gain		

SW Mode More general stuff

Item	Range	description	BBC
Ret Sw	R.Review,Cam Ret	Review last few seconds/check Genlock input	R.Review
S.Blk Lvl	-10,-20,-30	Super black level, not a good idea	
Auto Knee Sw	On,Off	Disables Auto Knee switch	Off
Shd,Abb Sw Ctl	On,Off	Does black shading with black balance if pressed >8secondfs	On
Color Bars	SMPTE,Full,Split,Arib	SMPTE default for P model, Full for E model, daft idea. Arib=multi-format bars	SMPTE
S.Gain Off	L/M/H,S.Gain	Which switch cancels Super Gain	
DS.Gain Off	L/M/H,DS.Gain	Which switch cancels Digital Super Gain	

White Balance Mode Presets

Item	Range	description	BBC
Filter Inh	On,Off	Off allows separate balance data to be stored for each filter wheel position	On
Shockless AWB	Off,Fast,Normal, Slow1,Slow2,Slow3	Response speed to white change, 1~20 seconds	
AWB Area	25%,50%,90%	Central screen target area	
Color Temp Pre	2300K~3200K~8000K	AWB set in Preset	3200K
AWB A Temp	2300K~3200K~8000K	AWB set in A, reports result of rebalance	3200K
AWB B Temp	2300K~3200K~8000K	AWB set in B, reports result of rebalance	3200K

User Sw Gain Gain trickery

Item	Range	description	BBC
S.Gain 30dB		* Allows Super Gain (analogue) gain setting to be included or excluded from the gain lists	
S.Gain 36dB			
DS.Gain 6dB		* Allows Digital Super Gain (Slow Shutter), effectively free gain by summing adjacent frames.	
DS.Gain 10dB			
DS.Gain 12dB			
DS.Gain 15dB			
DS.Gain 20dB			

Lens/Iris

Item	Range	description	BBC
A.Iris Level	0~45~100	Auto iris target level, luma	
A.Iris Peak/Ave	0~30~100	Ratio, 0=average, 100=peak	
A.Iris Mode	Norm1,Norm2,Centr	1=full frame, 2=not top, centre=spot	
S.Iris Level	0~80~100	Super Iris target (backlight compensation)	
Iris Gain	Cam,Lens	Where the iris gain control is	
Iris Gain Value	1~10~20	Value used when set to Cam	

FILE MENUS

Card Read/Write

Item	Range	description	BBC
R.Select	1~8	File number to read	
Read		load from file	
W.Select	1~8	File number to write	
Write		write to file	
Card Config		List titles on card	
Title Read		load user data	
Title1-8		Title, max 8 characters	

Cam Card R/W Select Decide what gets saved on the card

Item	Range	description	BBC
System Mode R/W	On,Off	System and Camera Modes	
ID Read/Write	On,Off	On=save cam ID to card	
User Menu Select R/W	On,Off	Load/save Menu items that are/aren't marked	
System Menu R/W	On,Off		
Paint Menu level R/W	On,Off		
Paint Menu Sw R/W	On,Off		
VF Menu R/W	On,Off		
Operation Menu R/W	On,Off		
Mainte Menu R/W	On,Off		
VTR Menu R/W	On,Off		

Lens File

Item	Range	description	BBC
File No.	1~8	Lens file number	
Read		Read it	
Write		Write it	
Reset All		Reset lens file data	
Title1-8		Max 12 characters	

Lens File Card R/W **Lens files**

Item	Range	description	BBC
Card File Select	1~8	8 lens files	
Read			
Write			
Title Read			
Title1-8		Create a title	

Scene **Scene files**

Item	Range	description	BBC
Read User Data.		Reads data from User memory area	
Scene Sel	1~4	4 scene files	
Read			
Write			
Reset			
Title1-4		Create a title	

Initialise **Reset**

Item	Range	description	BBC
Read Factory Data.		Resets User/Scene data	
Write User Data		Save User data in the camera	

MAINTENANCE

System Check

Item	Range	description	BBC
Color Check	On,Off	Displays RGB levels	

Diagnostic card/software versions, values for engineering sample camera tested on 8.8.2006

Item	Range	description	BBC
Camsoft (in)		Internal flash software version	1.01-00.0.00
Camsoft (out)		External flash software version	1.12-00.0.00
Cam Table		Table version	2.06-00.0.00
Font Rom		Font version	1.01-00.0.00
FPGA (Char)		Characters	1.05-00.0.00
FPGA (FM)		Frame memories	1.05-00.0.00
FPGE (D/C)		Down-converters	1.02-00.0.01
FPGA (TG)		CCD drive version	1.02-00.0.00

Len Adj

Item	Range	description	BBC
F2.8 adj	On,Off		

F16 adj	On,Off		

Black Shading

Item	Range	description	BBC
Correct	On,Off		On
Detection (Dig)		This makes it happen	

White Shading

Item	Range	description	BBC
Correct	On,Off		On
Saw/Para	-255~0~255	Values for R/G/B, H/V, Para/Saw	

Lens File Ad

Item	Range	description	BBC
RB Gain Ctrl Reset	On,Off	Use/Reset RB gain offsets	
Lens R Gain Offset	-200~0~200	Compensate for lens R sensitivity	
Lens B Gain Offset	-200~0~200	Compensate for lens B sensitivity	
Lens R Flare	0~100		
Lens G Flare	0~100		
Lens B Flare	0~100		

VTR MENU

VTR Function Basic stuff

Item	Range	description	BBC
Humid Ope	On,Off	On=ignore humidity warning	Off
Rec Start	All,Normal	How recording start is to be accepted	Normal
Pause Timer	10min,20min,30min,60min	Time to power down	
RC Check Sw	R.Review,Retake	What "Rec" on remote vtr does	
Compression Mode	Normal, Dark	Dark is "Black Compress" on tape	Normal

Battery/Tape Basic stuff

Item	Range	description	BBC
Battery Select	Propac14,Trimpac14,Hytron50, Hytron120,Dionic90, Dionic120,NP-L7,Endura7,Endura10,EnduraD, PagL95,BP-GL65/95,Nicd14,TypeA,TypeB	Set your battery/power source type and all the warnings and meters will read correctly	
Ext DC In Select	AC_Adpt,Propac14,Trimpac14,Hytron50,Hytron120, Dionic90, Dionic120,NP-L7,Endura7,Endura10, EnduraD, PagL95,BP-GL65/95,Nicd14,TypeA,TypeB		
Batt Near End Alarm	On,Off	Beep warning	
Batt Near End Cancel	On,Off	If warning is on, Mode Check cancels beep	
Batt End Alarm	On,Off	End of battery	
Batt Remain Full	100,70%	Sets lcd indicator level for full charge	
Tape Near End Alarm	On,Off	Beep warning	
Tape Near End Time	3min,2min	Bleep time before end	
Tape End Alarm	On,Off	Warning bleep	
Tape Remain	5min,3min	Pixel size on tape display	

Battery Setting 1 Decide which batteries exist in the list

Item	Range	description	BBC
Propac14	Auto,Manual (11~13.8~15)	Select each battery with * Auto/Manual controls whether you can set the warning level voltage manually. Be sensible with this and you'll never have silly battery warnings	
Trimpac14	Auto,Manual (11~13.6~15)		
Hytron50	Auto,Manual (11~13.2~15)		
Hytron100	Auto,Manual (11~13.0~15)		
Diconic90	Auto,Manual (11~13.6~15)		
Diconic160	Auto,Manual (11~13.1~15)		
NP-L7	Auto,Manual (11~12.9~15)		
Endura7	Auto,Manual (11~13.2~15)		
Endura10	Auto,Manual (11~13.2~15)		

EnduraD	Auto,Manual (11~13.2~15)		
PagL95	Auto,Manual (11~13.5~15)		
BP-GL65/95	Auto,Manual (11~13.6~15)		

Battery Setting 2 Continued

Item	Range	description	BBC
Nicd14	Auto,Manual (11~13.2 end~13.8 near end~15)		
TypeA	Auto,Manual (11~12.9 end~13.6 near end~14.6 full~17)		
TypeB	Auto,Manual (11~12.4 end~13.0 near end~15.2 full~17)		

Mic/Audio 1

Item	Range	description	BBC
Front VR Ch1	Front,WL,Rear,All,Off	Where the audio control is, Ch1	
Front VR Ch2	Front,WL,Rear,All,Off	Audio control, Ch2	
Mic Lowcut Ch1	Front,Rear,WL,Off	Bass-cut filters, to 200Hz	
Mic Lowcut Ch2	Front,Rear,WL,Off		
Mic Lowcut Ch3	Front,Rear,WL,Off		
Mic Lowcut Ch4	Front,Rear,WL,Off		
Limiter 1	On/Off		
Limiter 2	On/Off		
Audio Level Ch3	On,Off		
Audio Level Ch3	On,Off		
Cue Rec Select	Ch1,Ch2,Ch3.Ch4,Ch1+2,Ch3+4	What goes onto the Cue Track	
Test Tone	Normal,Always,Off,ChSel	Which channel(s) get test tone	

Mic/Audio 2

Item	Range	description	BBC
Front Mic Power	On,Off	Phantom power	
Rear Mic Power	On,Off	Phantom power	
Audio Out	On,Off		
Monitor Select	Stereo,Mix	What's monitored	
Front Mic level	-40,-50dB		
Rear Mic Ch1 Level	-50,.-60dB		
Rear Mic Ch2 Level	-50,.-60dB		
Rear Line In Level	-3,0,+4dB		
Audio Out level	-2,0,+4dB		
Headroom	18,20dB	Ref level, Factory=(50) 18dB, (59.94) 20dB	18dB
Wireless Warn	On,Off	Warns when radio mic level is poor	

TC/UB Time code and User Bits

Item	Range	description	BBC
TC Mode	DF,NDF	Always NDF at 50	NDF
UB Mode	User,Time,Date,Ext, TCG,FrmRate,Regen	User bits data	
VITC UB MODE	User/Ext,Time,Date,TCG, FrmRate,Regen		
TCG Set Hold	On,Off	Store TC when powered down	
First Rec TC	Regen,Preset	How TC is started	
P.Off LCD Display	On,Off	TC display when power OFF	
TC Out	TCG,TCG/TCR		
TC Disp Sel	30F,24F	Base for 59.94 frame count, always 25 at 50	
TC Video Synchro	0,1,2,3	Correction for TC, refer to the manual	
Rec Recview Regen	On,Off	On uses tape TC on replay	

UMID Set/Info

Item	Range	description	BBC
Country		Input your data, displays "No-Info" until you do so	
Organization			
User			
Device Node		ID number of the product	

VTR Diag Reports from the vtr

Item	Range	description	BBC
Operation		Total time power has been on	
Drum Running		Drum time	
Threading		Number of tape loads	
Drum Running r		Drum time since last reset	
Threading r		Tape loads since last reset	
VTR Syscon		Software versions	4.13-00.0.00
Servo			2.04-00-0.00
Front			3.00-00-0.00
Video FPGA			1.05-00-0.00
Pwr Pld			1.00-00-0.00

OPTION MENU

Option More miscellaneous stuff

Item	Range	description	BBC
Eng Security	On,Off	On disables all menus, and it's a jolly trip back to the shop to open them again	Off
Total Chroma Gain	-40~0~40	Gains for Pb,Pr outputs	0
Chroma Output	On,Off	Makes the camera monochrome	On
Frame Rate UB	FrameRate,Menu	720P or 24 only; record FrameRate or data as in VITC UB Mode in TC/UB Menu	
1394 Config	Dflt,1~255	Best left alone	Dflt
1394 Gap Count	0~40~63	Set interval between packets	40