

Colorimetric and Resolution requirements of cameras

Alan Roberts

ADDENDUM 3 : Menu settings for

Panasonic DVCPProHD (AJ-HDC27A 720/59.94Hz proscan)

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 prototype model of the AJ-HDC27V, 720-line progressive variable frame-rate camera, and all menu items refer to this camera only. This camera has 3 ccds, each of 1280x720 pixels. It is a fixed-frame rate version of the AJ-HDC27V, and is almost identical to it.

The camera is 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.

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

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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.

CAM MAIN MENUS

Cam Main Menu 1

routing menus

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
ROP			Remote operation panel	
MATRIX				
COLOR CORRECTION 1				
COLOR CORRECTION 2				
LOW SETTING			Settings for gain switch, this holds very much more than just gain settings, use with care	
MID SETTING				
HIGH SETTING				
ADDITIONAL DTL 1				
ADDITIONAL DTL 2				
SKIN TONE DTL				
KNEE/LEVEL				
GAMMA				
CAMERA SETTING				

Cam Main Menu 2

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
VF DISPLAY				
VF MARKER				
VF INDICATOR				
CAMERA ID				
SHUTTER SPEED				
!LED				
CAMERA SW MODE				
SUPER GAIN				

Cam Main Menu 3

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
CAM CARD READ/WRITE				
CAM CARD R/W SELECT				
GENLOCK/IRIS				
LENS ADJ				

Cam Main Menu 4

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
CAM USER MENU SELECT 1				
CAM USER MENU SELECT 2				
CAM USER MENU SELECT 3				
BLACK SHADING				
WHITE SHADING				
FLARE				
COLORIMETRY				
INITIALIZE				
DIAGNOSTIC				
EVALUATION				
OPTION				

CAM MAIN MENUS 1

Cam Main Menu 1 ROP

remote operating panel

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Master Ped	-200~200	18	Master lift	0

Master Dtl	-31~31	0		0
Master Gamma	0.35~0.75	0.45	In 0.1 steps, stored in gain switch	0.40
R Gain	-200~200	0		0
G Gain	-200~200	0		0
B Gain	-200~200	0		0
R Pedestal	-200~200	0		0
G Pedestal	-200~200	0		0
B Pedestal	-200~200	0		0

Cam Main Menu 1, Matrix (User preset) A,B

(Not used, set to 'off' in L/M/H Setting)

Item	Range	Factory	description	BBC
Matrix Table	A,B	A	Two user tweakable matrices	
Matrix R-G	-31~31	0		0,0
Matrix R-B	-31~31	0		0,0
Matrix G-R	-31~31	0		0,0
Matrix G-B	-31~31	0		0,0
Matrix B-R	-31~31	0		0,0
Matrix B-G	-31~31	0		0,0

Cam Main Menu 1, Color Correction 1

rather dangerous territory

Item	Range	Factory	description	BBC
R (Sat)	-63~63	0		0
R (Phase)	-63~63	0		0
Mg (Sat)	-63~63	0		0
Mg (Phase)	-63~63	0		0
B (Sat)	-63~63	0	Adjusts colour in 45 degree segments, tweaks saturation and hue.	0
B (Phase)	-63~63	0		0
Cy (Sat)	-63~63	0	These segments interleave those in Color Correction 2.	0
Cy (Phase)	-63~63	0		0
G (Sat)	-63~63	0		0
G (Phase)	-63~63	0		0
Y1 (Sat)	-63~63	0		0
Y1 (Phase)	-63~63	0		0

Cam Main Menu 1, Color Correction 2

Item	Range	Factory	description	BBC
R-Mg (Sat)	-63~63	0		0
R-Mg (Phase)	-63~63	0		0
Mg-B (Sat)	-63~63	0		0
Mg-B (Phase)	-63~63	0		0
B-Cy (Sat)	-63~63	0	Adjusts colour in 45 degree segments, tweaks saturation and hue.	0
B-Cy (Phase)	-63~63	0		0
Cy-G (Sat)	-63~63	0	These segments interleave those in Color Correction 1.	0
Cy-G (Phase)	-63~63	0		0
G-Y1 (Sat)	-63~63	0		0
G-Y1 (Phase)	-63~63	0		0
Y1-R (Sat)	-63~63	0		0
Y1-R (Phase)	-63~63	0		0

Cam Main Menu 1, Low Setting

Low Level Gain switch position

Item	Range	Factory	description	BBC
Master Gain	-6,-3,0, 6,9,12,18,24,30	0	dB settings	0
H Dtl Lev	0~63	12	=12 for video, 0 for film-look	12
V Dtl Lev	0~63	16	=12 for video, 0 for film-look	12
Dtl Coring	0~15	2		2
H Dtl Freq	0~29	22	V freq set in Add. Detail 2	31
Level Dep	0~5	2	Low luma zone, no correction	2
Gamma	0.35~0.75	0.45	0.01 steps	0.40
Black Str	ON,OFF	OFF	No control over slope or range	ON
Matrix Table	A/B/OFF	OFF	User preset matrices	OFF
Col. Corr.	ON,OFF	OFF	12 segment adjust, see above	OFF

Cam Main Menu 1, Mid Setting

Mid Level Gain switch position

Item	Range	Factory	description	BBC
Master Gain	-6,-3,0, 6,9,12,18,24,30	6	dB settings	6
H Dtl Lev	0~63	12	=12 for video, 0 for film-look	12
V Dtl Lev	0~63	16	=12 for video, 0 for film-look	12

Dtl Coring	0~15	2		2
H Dtl Freq	0~29	22	V freq set in Add. Detail 2	31
Level Dep	0~5	2	Low luma zone, no correction	2
Gamma	0.35~0.75	0.45	0.01 steps	0.40
Black Str	ON,OFF	OFF	No control over slope or range	ON
Matrix Table	A/B/OFF	OFF	User preset matrices	OFF
Col. Corr.	ON,OFF	OFF	12 segment adjust, see above	OFF

Cam Main Menu 1, High Setting

High Level Gain switch position

Item	Range	Factory	description	BBC
Master Gain	-6,-3,0,6,9,12,18,24,30	12	dB settings	12
H Dtl Lev	0~63	12	=12 for video, 0 for film-look	12
V Dtl Lev	0~63	16	=12 for video, 0 for film-look	12
Dtl Coring	0~15	2		2
H Dtl Freq	0~29	22	V freq set in Add. Detail 2	31
Level Dep	0~5	2	Low-luma zone, no correction	2
Gamma	0.35~0.75	0.45	0.01 steps	0.40
Black Str	ON,OFF	OFF	No control over slope or range	ON
Matrix Table	A/B/OFF	OFF	User preset matrices	OFF
Col. Corr.	ON,OFF	OFF	12 segment adjust, see above	OFF

Cam Main Menu 1, Additional Dtl 1

Detail, extra controls

Item	Range	Factory	description	BBC
Knee Aperture	ON,OFF	ON	Detail enhancement in knee region	ON
Slim Dtl	ON,OFF	OFF	Finer detail correction (hf boost)	OFF

Cam Main Menu 1, Additional Dtl 2

Detail, extra controls

Item	Range	Factory	description	BBC
Knee Apa Lvl	0~5	5	Correction in knee compressed zone	5
Dtl Gain +	-31~31	0	H correction, +ve going edges	0
Dtl Gain -	-31~31	0	H correction, -ve going edges	0
Dtl Clip	0~63	47	Clip level of detail correction	47
Dtl Source	(G+B)/2, (R+G)/2, (2G+R+B)/2, (3G+R)/2, R,G	(R+G)/2		(R+G)/2
V Dtl Freq	360,450,540,630,720	630	V detail boost frequency, lines	720

Cam Main Menu 1, Skin Tone Dtl

Item	Range	Factory	description	BBC
Skin Tone Dtl	ON,OFF	OFF		OFF
Skin Tone Zebra	ON,OFF	OFF	VF level has external control	OFF
Skin Dtl Coring	0~7	5		5
Y Max	0~255	190	Max luma level for boost	190
Y Min	0~255	10	Min luma level for boost	10
I Center	0~255	55	I axis mean level for boost	55
I Width	0~255	90	I axis min level for boost	90
Q Width	0~255	10	Q axis max level for boost	10
Q Phase	0~255	0	Q axis min level for boost	0

Cam Main Menu 1, Knee Level

Item	Range	Factory	description	BBC
Master Ped	-200~200	18	Duplicate entry for pedestal	0
Manual Knee	ON,OFF	ON	Valid only if AUTO is off	ON
Knee Point	80%~107%	95%	Manual break point	90%
Knee Slope	0~99	50	Gain in knee zone, about 2.5 stops overload	64
White Clip	ON,OFF	ON		ON
White Clip Lvl	90%~109%	109%		106%
A. Knee Point	80%~107%	95%	Auto knee point	95%
A. Knee Slope	100~110	108%	Auto knee slope	108%

Cam Main Menu 1, Gamma

Differential, colour tweaking

Item	Range	Factory	description	BBC
R Gamma	-15~15	0	Set R away from Master	0
B Gamma	-15~15	0	Set B away from Master	0

Cam Main Menu 1, Camera Setting

Item	Range	Factory	description	BBC
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Detail	ON,OFF	ON	OFF for Film	OFF {f} ON {v}
High Color	ON,OFF	OFF	Saturation boost in knee	OFF
Gamma	ON,OFF	ON	Main gamma on/off	ON
Test Saw	ON,OFF	OFF	Test ramp waveform	OFF
Flare	ON,OFF	ON	Flare correction	ON
H-F Compe	ON,OFF	ON	High range frequency comp	ON
D 4300K	ON,OFF	OFF	Use for florescent lighting	OFF

CAM MAIN MENUS 2

Cam Main Menu 2, VF Display

Item	Range	Factory	description	BBC
Disp Condition	NORMAL/HOLD	NORMAL	Show switch status or not	NORMAL
Disp Mode	1,2,3	3	1=off,2=some,3=all	3
VF Out	Y,NAM,R,G,B	Y	What you see	Y
VF Dtl	0~4	4	Extra detail gain	4
Zebra 1 detect	50%~110%	70%		65%
Zebra 2 detect	50%~110%	85%		100%
Zebra 2	ON,OFF,SPOT	SPOT	SPOT works only if Zebra 2>1	SPOT
Low Light Lvl	OFF,20%~45%	45%	Warns at low light level	45%

Cam Main Menu 2, VF Marker

Item	Range	Factory	description	BBC
Safety Zone	OFF,0~12	3	set for 90% corners	3
Center Mark	ON,OFF	ON		ON
Frame Sig	4:3,13:9,14:9	4x3		14:9
Mark	ON,OFF	OFF	Frame marker	OFF
Lvl	0~15	15	Picture level outside frame mark	15

Cam Main Menu 2, VF Indicator

Item	Range	Factory	description	BBC
Extender	ON,OFF	ON	Lens extender	ON
Shutter	ON,OFF	ON	Shutter speed display	ON
Filter	ON,OFF	ON	Filter position	ON
White	ON,OFF	ON	Show AWB or Preset A/B	ON
Gain	ON,OFF	ON		ON
Iris	IRIS,S+IRIS,OFF	S+IRIS	Iris/Super Iris (?) display	S+IRIS
Camera ID	ON,OFF	ON	Show camera ID with bars	ON
Zoom Lvl	ON,OFF	ON	Focal length	ON
Color Temp	ON,OFF	ON		ON

Cam Main Menu 2, Camera ID

Item	Range	Factory	description	BBC
ID			Max 10 characters	

Cam Main Menu 2, Shutter Speed

Item	Range	Factory	description	BBC
Synchrho Scan	ON/OFF	ON	Speed set by buttons near filter wheel	ON
1/100	ON/OFF	ON		ON
1/120	ON/OFF	ON		ON
1/250	ON/OFF	ON	ON adds items to list of settings that can be	ON
1/500	ON/OFF	ON	cycled through using the little switch below	ON
1/1000	ON/OFF	ON	the lens.	ON
1/2000	ON/OFF	ON		ON

Cam Main Menu 2, ! LED

Item	Range	Factory	description	BBC
Gain (0dB)	ON/OFF	ON		ON
Gain (-3dB)	ON/OFF	OFF		ON
Shutter	ON/OFF	ON		ON
White Preset	ON/OFF	OFF		ON
Extender	ON/OFF	ON		ON
Filter	ON/OFF	OFF		ON
Black Str	ON/OFF	OFF		ON
D4300K	ON/OFF	OFF		ON
Matrix	ON/OFF	OFF		ON
Color Correct	ON/OFF	OFF		ON

VF warnings

Cam Main Menu 2, Camera SW Mode

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Filter Inh	ON,OFF	ON	AWB stored with filter data	ON
Shockless AWB	OFF,NORM, SLOW,FAST	OFF	Smooth AWB on-shot, 0.5~3 sec	OFF
Color Bars	SMPTE,FULL	FULL		FULL
S. Gain Off	S.GAIN,L/M/H	L/M/H	Way to release Super Gain	L/M/H
User1 SW	INH,S.GAIN,S.IRIS,	S.GAIN	Switch allocation	S.GAIN
User2 SW	S.BLK,S.STR,AUDIO CH1,AUDIO CH2	INH	Switch allocation	INH
S. Black Lvl	OFF,-10,-20,-30	OFF	Super black level setting	OFF
ECU Data Save	ON,OFF	OFF		OFF

Cam Main Menu 2, Super Gain

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
S.Gain Value	18,24,30,36	18dB		18dB

CAM MAIN MENUS 3**Cam Main Menu 3, Card Read/Write**

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Select	1~8	1	File number to read	1
Read			load from file	
Select	1~8	1	File number to write	1
Write			write to file	
Card Config			format card for use	
Read User Data			load user data	
Title			max 8 characters	

Cam Main Menu 3, Cam Card R/W Select

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
ID Read/Write	ON,OFF	OFF	ON=save cam ID to card	OFF
Cam Main Menu1 Level R/W	ON,OFF	OFF		
Cam Main Menu1 SW R/W	ON,OFF	OFF		
Cam Main Menu2 R/W	ON,OFF	OFF	Load/save Menu items	
Cam Main Menu3 R/W	ON,OFF	OFF	that are/aren't marked	
Cam Main Menu4 R/W	ON,OFF	OFF		

Cam Main Menu 3, Genlock/Iris

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
H Phase Coarse	0~15	7	Genlock phase	7
H Phase Fine	0~64	32		32
A.Iris Level	0~100	83	Auto iris target level, luma	83
A.Iris Peak/Ave	0~100	16	Ratio, 0=ave'ge, 100=peak	16
A.Iris Mode	NORM1,NORM2,CENT	NORM1	1=full frame, 2=not top	NORM1
S.Iris Level	0~100	100	Super Iris target level	100

Cam Main Menu 3, Lens Adj

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
F2.8 Adj	ON,OFF	OFF		OFF
F16 Adj	ON,OFF	OFF	refer to manual, I don't understand	OFF

CAM MAIN MENUS 4**Cam Main Menu 4, Black Shading**

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Detection			This makes it happen	
Dig. Corr.	ON,OFF	ON		ON

Cam Main Menu 4, White Shading

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Detection (V Saw)			This makes it happen	
Correct	ON,OFF	ON		ON

Cam Main Menu 4, Flare

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
R.Flare	0~100	4	Set depending on lens	4

G.Flare	0~100	0	0
B.Flare	0~100	10	10

Cam Main Menu 4, Colorimetry

actually only the coding matrix

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Matrix	SMPTE274, 240, NTSC	SMPTE274	SMPTE240 for 1035, 274 for 1080	SMPTE 274

Cam Main Menu 4, Initialise

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Read Factory Data			Factory reset menu settings	
Write User Data			Save user setup	
Scene Sel	1~4		Select scene file	
Read			Read scene file	
Write			Save scene file	
Reset			Factory reset scene files	
Title 1				
Title 2				
Title 3				
Title 4				

Cam Main Menu 4, Diagnostic

card/software versions

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Camssoft (in)			Internal flash software version	
Camssoft (out)			External flash software version	
Gamma gain			Gamma table version	
Gamma ram			Black gamma table version	
Knee			Knee table version	
Alc			Auto Luma control version	
Pld			PLD version	

Cam Main Menu 4, Evaluation

routes to measurement system, see below

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
S/N				
Modulation				
Resolution				
Sensitivity				

Cam Main Menu 4, Options

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Eng Security	ON,OFF	OFF	=enable all engineering menus	OFF
Shd. ABB SW CRTL	ON,OFF	ON	=ABB if AWB switch on >8 sec	ON
AWB Area	90%,50%	90%	Sets AWB search area	90%

Cam Main Menu 4, Evaluation S/N

for making S/N measurement

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
S/N	ON		Go	
Detail	ON,OFF	OFF		
H-F Compe	ON,OFF	OFF		
Gamma	ON,OFF	OFF	Temporary settings just for making	
Matrix	ON,OFF	OFF	measurements...	
Flare	ON,OFF	OFF		
M.Ped	-200~200	140		

Cam Main Menu 4, Evaluation Modulation

For making modulation measurements

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Modulation	ON		Go	
Detail	ON,OFF	OFF		
H-F Compe	ON,OFF	OFF		
Gamma	ON,OFF	OFF		
Matrix	ON,OFF	OFF		
Flare	ON,OFF	OFF		
M.Ped	-100~100	18		

Cam Main Menu 4, Evaluation Resolution

For making resolution measurements

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Resolution	ON			

Detail	ON,OFF	OFF	Go
H-F Compe	ON,OFF	OFF	
Gamma	ON,OFF	OFF	
Matrix	ON,OFF	OFF	
Flare	ON,OFF	OFF	
M.Ped	-100:100	18	

Cam Main Menu 4, Evaluation Sensitivity

For making sensitivity measurements

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Sensitivity	ON		Go	
Knee	ON,OFF	OFF		
W.Clip	ON,OFF	OFF		
M.Ped	-100:100	18		

VTR MAIN MENUS**VTR Main Menu, Function**

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
News Rec Mode	OFF,0,2:2	OFF	=recording overruns STOP	OFF
Humid Ope	ON,OFF	OFF	=only Eject when humid	OFF
Rec Start	ALL,NORMAL	NORMAL	=only in Power Save/Pause	NORMAL
Pause Timer	10,29,30,60	30	Pause before auto stop	30
Retake Mode	ON,OFF	OFF	Rewind to over-record	OFF
HDSDI Out	ON,SIDE SW,AUTO,OFF	AUTO	Control for SDI socket	AUTO
Interval Rec	ON,OFF	OFF		OFF
Int Rec Time	00s10f:59s29f	00s10f	Intermittent, recording time	00s10f
Int Pause Time	0:23h59m59s	00h00m02s	Gap between recordings	00h00m02s

VTR Main Menu, Battery/Tape

Choice of battery types

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Battery Select	see next menu	PRO14	See next menu	
Ext DC In Select		AC-ADPT	As for battery, plus external	AC-ADPT
Batt Near End Alarm	ON,OFF	OFF	Warning bleep	OFF
Batt Near End Cancel	ON,OFF	ON	Mode switch cancels bleep	ON
Batt End Alarm	ON,OFF	ON	Warning bleep	ON
Batt Remain Full	100%,70%	70%	Indicator level called "full"	70%
Tape Near End Alarm	ON,OFF	OFF	Warning bleep	OFF
Tape Near End Time	3min,2min	2min	Bleep time before end	2min
Tape End Alarm	ON,OFF	ON	Warning bleep	ON
Tape Remain	3min,5min	3min	Size of time pixel in LCD	3min

VTR Main Menu, Battery Setting

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
AJ-BP490	MANUAL,AUTO	AUTO	Pan AJ-BP490, PACO HP-90A and so on	AUTO
AU-BP402	MANUAL,AUTO	AUTO		AUTO
HP-30A	MANUAL,AUTO	AUTO	PACO	AUTO
PRO14	MANUAL,AUTO	AUTO	Anton Bauer	AUTO
TRIM14	MANUAL,AUTO	AUTO	...	AUTO
TRIM13	MANUAL,AUTO	AUTO	...	AUTO
DIGITAL14	MANUAL,AUTO	AUTO	...	AUTO
DIGITAL13	MANUAL,AUTO	AUTO	...	AUTO
BP-H90	MANUAL,AUTO	AUTO	IDX	AUTO
BP-H100	MANUAL,AUTO	AUTO	...	AUTO
NP-L40	MANUAL,AUTO	AUTO	...	AUTO
NP-L40 D	MANUAL,AUTO	AUTO	...	AUTO
BP-L60/90	MANUAL,AUTO	AUTO	Sony Lithium	AUTO
NP-1B	MANUAL,AUTO	AUTO	Sony	AUTO

VTR Main Menu, VTR VF Indicator

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Tape	ON,OFF	ON	Tape Left display	ON
Battery	ON,OFF	ON	Battery voltage	ON
Level Meter	CH1,CH1+CH2,CH2,OFF	CH1	Audio indicator	CH1
Audio In	ON,OFF	OFF		
TC	ON,OFF	OFF	Time code	OFF
VTR Warning	ALWAYS,NORM,OFF	NORM	=warning for 3 sec	NORM
Save LED	SAVE&TAPE,SAVE	SAVE		SAVE

VTR Main Menu, Mic/Audio

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Front Mic Power	ON,OFF	ON	Phantom power	ON
Mic Lowcut Ch1	FRONT,REAR,	OFF	High-pass filters for channels 1 and 2	OFF
Mic Lowcut Ch2	F&R,OFF	OFF		OFF
Limiter	ON,OFF	OFF		OFF
Test Tone	NORM,ALWAYS, OFF,CHSEL	NORM	=tone with bars	NORM
Rec CH3CH4	CH1/2,CH3/4	CH1/2	Ch 3/4 from adaptor plate	CH1/2
Cue Select	SIDE SW,CH1,CH2,MIX	SIDE SW	Source for cue track	SIDE SW
Cue Rec	ON,OFF	ON	and whether or not	ON

VTR Main Menu, TC/UB

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
UB Mode	USER,DATE,TIME, EXT,TCG	USER	User bits data	USER
TCG Set Hold	ON,OFF	OFF	Store TC when powered down	OFF
First Rec TC	REGEN,PRESET	REGEN	How TC is started	REGEN
P.OFF Display	ON,OFF	ON	TC display when power OFF	ON
TC Out	TCG,TCG/TCR	TCG		TCG
VITC UB Mode	USER,DATE,TIME, EXT,TCG	TIME		TIME

VTR Main Menu, Time/Date

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Year	00~99	0	Set time and date	
Month	1~12	1		
Day	1~31	1		
Hour	0~23	0		
Minute	0~59	0		
Time/Date set			Enter it directly	

VTR Main Menu, VTR Card Read/Write

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Read				
Write				
Read User Data				

VTR Main Menu, VTR Initialize

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Read Factory Data				
Write VTR User Data				

VTR Main Menu, Diagnostic

<i>Item</i>	<i>Range</i>	<i>Factory</i>	<i>description</i>	<i>BBC</i>
Operation			Time in use	
Drum Running			Drum hours	
Threading			Number of tape loads	
VTR Syscon			System version number	
Servo			Servo version number	
Mechacon			Mechanism control version number	
Front			LCD version number	

**VTR Main Menu, VTR USER MENU
SELECT**

Menus to set contents of Function, Battery/Tape, VTR VF Indicator, Mic/Audio, TC/UB Menus