



CB Electronics

BS-1/BS-2 BIPHASE SYNCHRONISER/ VIRTUAL MACHINE

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BS-1/BS-2 BIPHASE SYNCHRONISER / VIRTUAL MACHINE

- * ONE BI-PHASE OUTPUT 1, 2, 4, 5, 10, 20, 25, 50 or 100 Pulses per Frame
- * TIME CODE INPUT AND OUTPUT Any standard
- * BUILT-IN ELECTRONIC GEARBOX 24:25:30
- * EXTERNAL REFERENCE INPUT Mains, Video, TTL frame rate
- * TAPELESS mode Instant locates for use with Hard Disc Systems
- * SERIAL REMOTE CONTROL INPUT SONY 9 pin protocol
- * SYNCHRONIZE TO TIME CODE Any frame rate

The CB Biphase Synchroniser is a scaled down version of the successful MC-1 Virtual Master. It can lock biphase to timecode, or to act as a sony protocol biphase generator for use with the SR series remote controls or a hard disk work station.

BI-PHASE OUTPUT

The Bi-phase output will provide any of the following biphase rates:-

1, 2, 4, 5, 10, 20, 25, 50, 100 pulses per frame

The frame rate is user-selectable to either 24, 25, or 30 frames per second.

The maximum speed and acceleration are user-selectable to suit the machine.

TIMECODE INPUT

The timecode input is used to chase the biphase to an external source of timecode.

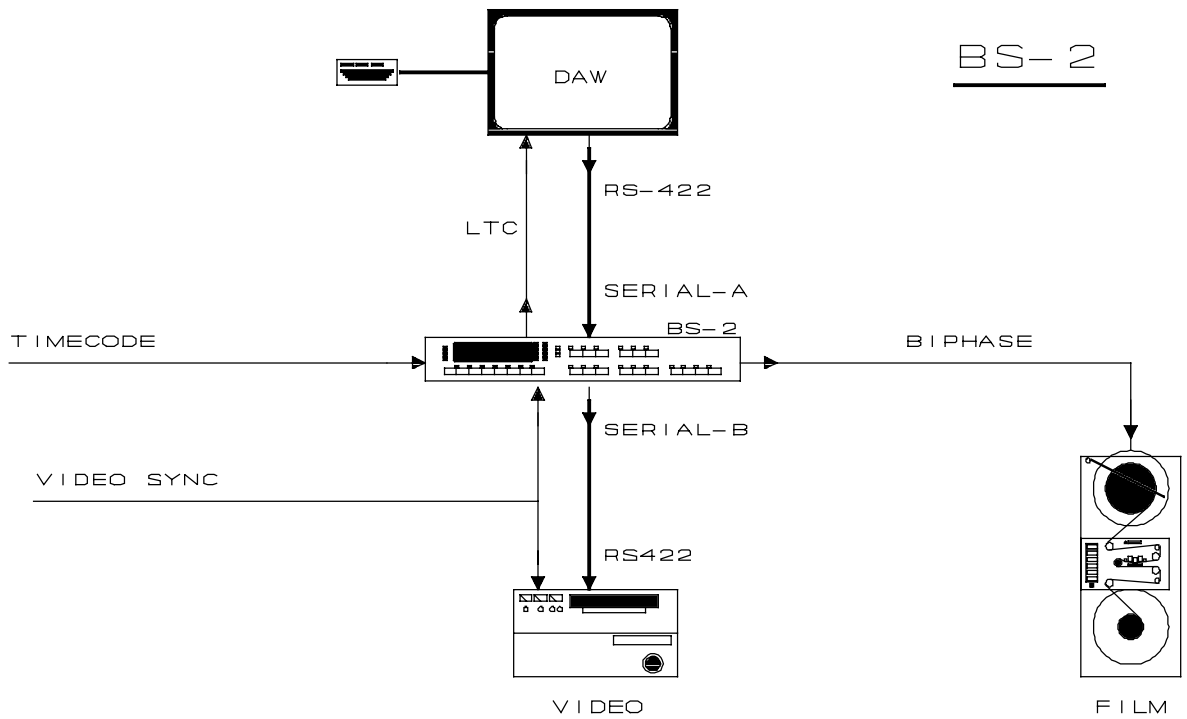
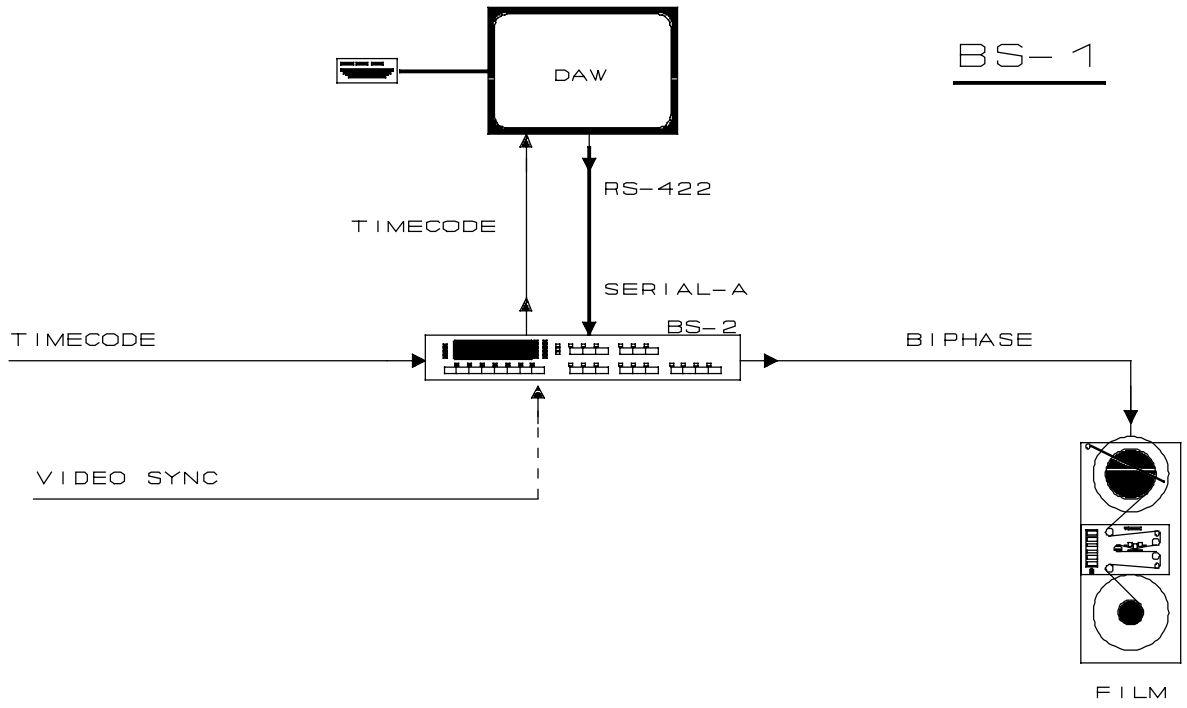
TIME CODE OUTPUT

The time code output reflects the current position of the Biphase generator. The output standard is user-selectable to 24, 25, 30 or 30 drop frame.

RS422 SERIAL PORT-A

This port may be used to control the BS-1 using Sony 9-pin protocol. Normally connected to hard disk editors eg:- SSL, AMS, TimeLine.

Differences between the BS-1 and MC-1		
Description	BS-1/BS-2	MC-1
Biphase Outputs	1	4
24 fps and 25 fps Biphase outputs	No	Yes: 1, 2 or 4 ppf 25 fps always output
Timecode Outputs	1	1 now 2 in the future
Parallel Remote Control Input	Option	Yes
Video Machine Synchroniser	BS-2 Only	Yes
Front Panel Transport controls	Yes	Yes
Record Ready Outputs	Option	16 Track



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0.0 QUICK START

0.01 Connecting the Biphase

See section **10.131** for the connector pin out and some common machine connections.

The biphase outputs are open collector and can sink up to 500mA. For 5 volt operation a 470 ohm pull-up resistor is provided on a separate pin. for 12 volt or higher operation an external pullup resistor must be provided. The diagram **Biphase** shows both of these options.

0.02 Configuration

Section 4 describes the configuration in detail, the **Menu** drawing indicates the locations of the various configuration menu's.

0.03 Setting the Biphase Rate

By changing the **PPF** parameter in Config1-Config4 of the unit configuration (Section 4.12) the pulse rate of the outputs may be changed.

0.04 Setting the Acceleration and Maximum Speed

These parameters are found in Config1-Config4 of the unit configuration.

The acceleration and maximum speed should be set for the slowest machine in the system. Where different selections of film machines are used the different configurations may be set for different accelerations and maximum speeds.

The maximum speed is set in multiples of normal film speed, for example **SPEEd 05** represents $5 * 25\text{fps}$ or 125fps.

The acceleration is specified as two parameters, **PACcn** from stop to play and **Accn** from play upwards. The higher the number the faster the acceleration.

0.05 Setting the Timecode Output Value and Start Mark

- 1) Move the film to the start mark
- 2) Depress the **SET** key so that the **SET** LED is illuminated, use the **DISPLAY** key so that the **GEN TC** Led is illuminated.
- 3) Use the **<-** and **->** keys to move the cursor (Decimal Point) and the **INC** and **DEC** keys to adjust the value of any digit. (Note. Simultaneous depression of the **INC** and **DEC** keys will reset the display.)
- 4) Depress the **SET** key so that the **SET** LED is extinguished.
- 5) Ensure that the film is on the start mark and depress the **G.RST** key, this will set the Generator output to the preset value and reset the film counter to zero.

0.06 Academy Leader

Where academy leaders are used the **LEAdEr** footage may be preset in the configuration. When this is used depressing the **G.RST** key will set the film counter to the negative Leader footage and the generator to a suitable value

0.07 Learning the Film Dynamics for Locate

When the Acceleration and maximum speed are changed the dynamics of the film are changed and the locate data must be updated. To do this depress the **Poz** and **FRM.D.** keys to the right of the set key, The unit will save its current position as Cue-1, Fast Forward until the dynamics have been learnt and then locate Cue-1. This process will take approximately 30 seconds.

0.08 Capturing the master timecode when operating as a chase to timecode.

To capture the master timecode,

- 1) Load the film, at the start mark
- 2) Depress the **G,RST** key, this will reset the film counter.
- 3) Move both the master and the film to a known sync point.
- 4) Select Reader on the display
- 5) Depress both **SET** and **POZ** to grab the master timecode value.

1.0 DISPLAY

In normal operation the eight digit display will show any of the following:-

G.TIME	Generator timecode
G.USER	Generator user bits
READER	Timecode Reader Data
F.FEET	Film position in FEET and FRAMES

1.01 Generator timecode

To display Generator timecode depress **SELECT** until the **GEN** LED is illuminated.

1.02 Generator USER bits

To display Generator user bits depress **SELECT** until the **G.USER** LED is illuminated.

1.03 Timecode Reader

To display the Timecode Reader position in time and frames depress **SELECT** until the **FILM T** LED is illuminated.

1.04 Film position in FEET and FRAMES

To display film position in FEET and FRAMES depress **SELECT** until the **FILM F** LED is illuminated.

1.05 FREEZE

This key may be used to Freeze the display at any time. When the display is frozen the **FREEZE** LED is illuminated.

1.06 FRM.D

This key is used to enable or disable the display of frames. The LED is illuminated when the frame display is disabled.

This key also enable's and disable's the frame display in the inserted video if this option is fitted.

1.07 STD

These LED's will illuminate to indicate the selected film frame rate when either **FILM T** or **FILM F** LED's are illuminated.

These LED's will illuminate to indicate the selected standard of the timecode generator when either **GEN** or **G.USER** LED's are illuminated.

Note: See the CONFIGURATION section for the method of selecting the film frame rate and generator standard.

The generator standards recognised are as follows:-

24	24 frame per second FILM timecode
25	25 frame per second EBU timecode
29	29.97 frame per second SMPTE drop frame timecode
30	30 frame per second SMPTE timecode

The film frame rates recognised are 24, 25, and 30.

1.08 COL

This LED will illuminate to indicate that the timecode generator is colour locked to an external video signal when either 'GEN' or 'G.USER' are illuminated.

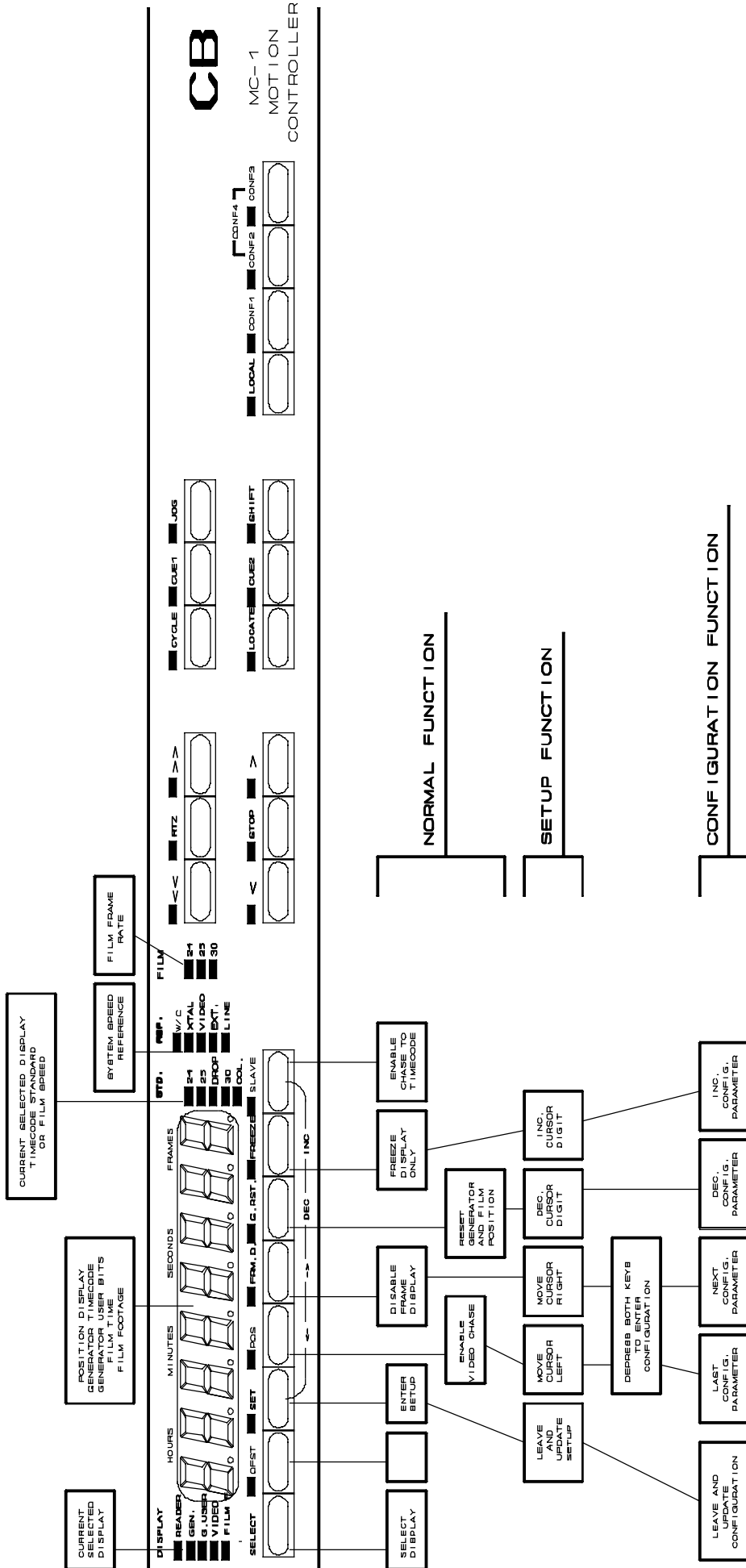
Note: See the CONFIGURATION section for the method of selecting the generator colour lock status.

Not currently available.

MC-1

CB

MC-1
MOTION
CONTROLLER



1.09 REF

These LED's illuminate to indicate the selected SYSTEM REFERENCE. The speed of the bi-phase generator is locked to the selected reference. The following external references may be selected:-

XTAL	Internal crystal reference
VIDEO	External composite video input
EXT	External frame or 2*frame rate input
MAINS	Internally derived mains line

When a reference other than XTAL is selected the LED will flash if the reference is not present. When the system is locked to the external reference the LED will cease flashing.

It is assumed by the system that the frame rate of the external reference is the same or twice the frame rate of the code generator. The time code generator is phase locked to the incoming reference. When XTAL is selected the time code generator is phase locked to the Video output if fitted.

Note:

See the CONFIGURATION section for method of selecting generator reference.

2.00 GENERATOR

2.01 G.RST

When the **G.RST** key is released the film position counter is reset to zero and the timecode generator is preset to the preset start time.

The film should be positioned on the start mark and then G.RST depressed and released.

Note: See section 1.3 GENERATOR SETUP for method of setting the reset start time.

3.00 GENERATOR SETUP

The GENERATOR SETUP mode is entered by depressing the **SET** key, when the setup mode is active the **SET** LED is illuminated.

When the **SET** LED is illuminated the function of the **SELECT** key is modified so that the following may be selected:-

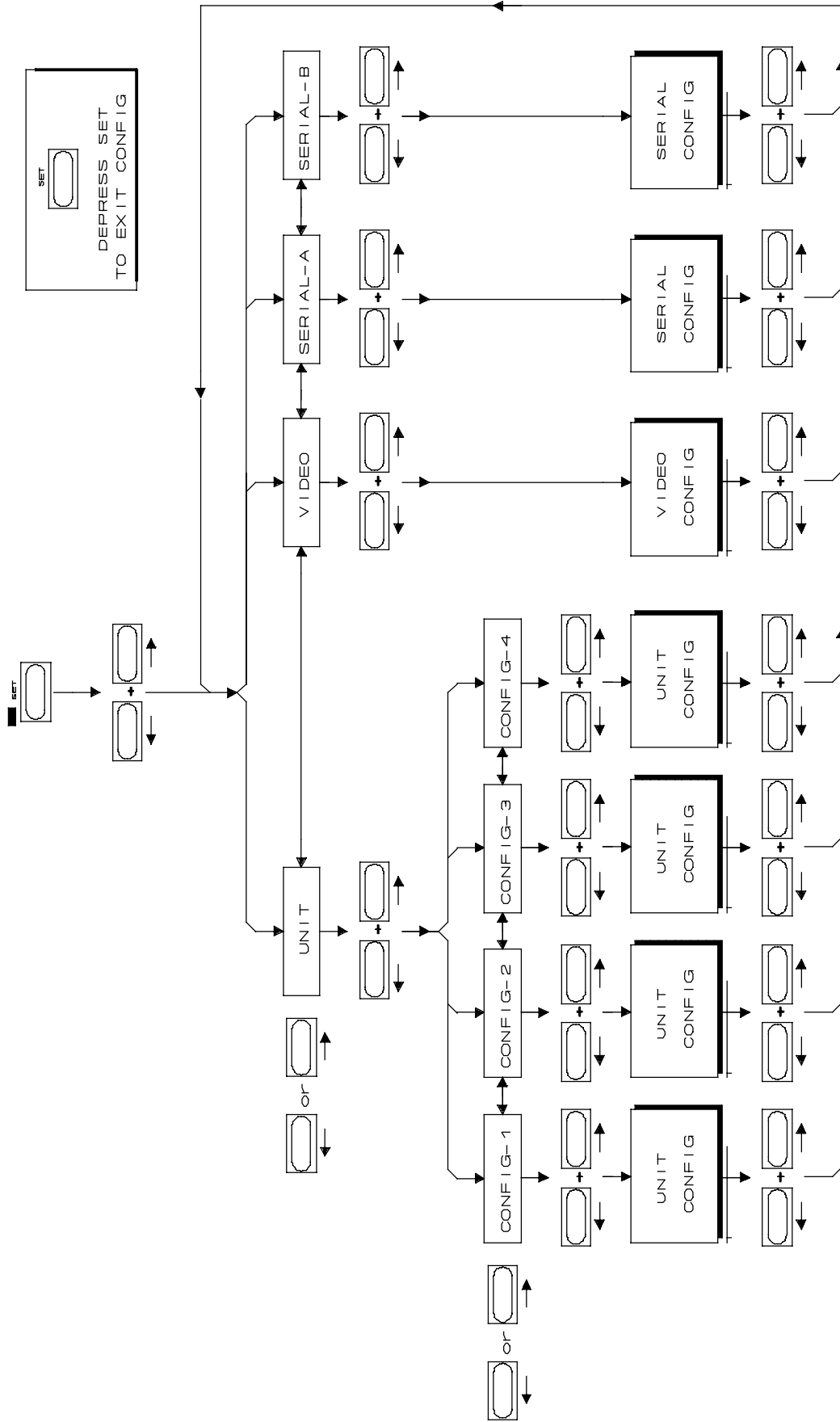
G.TIME	Generator preset timecode
G.USER	Generator preset user bits
READER	Captured Master Timecode

When in setup the preset start time and user bits of the generator may be set. The decimal point is used as a cursor to indicate the digit which will be modified by the numeric or **INC** and **DEC** keys. The cursor keys < and > move the cursor clockwise and anti-clockwise.

CLEAR:

If both **INC** and **DEC** keys are depressed simultaneously then the current displayed data will be cleared to all zero's.

To leave the setup mode depress the **SET** key.



CONF I G U R A T I O N M E N U M A P

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4. UNIT / VIDEO / SERIAL CONFIGURATION

CONFIGURATION SELECTION

The configuration of the unit is selected by first depressing the **SET** key so that the **SET** LED is illuminated then depress both <- and -> simultaneously to enable configuration selection. The first display allows you to select which configuration you wish to adjust **UNIT / SERIAL A / SERIAL B**. Make your selection and then depress <- and -> simultaneously to select.

4.00 UNIT CONFIGURATION

The first display in the unit configuration indicates which of the SIX setup's the unit is set to. The four choices **CONFIG 1 .. CONFIG 6** may be selected simply by using the **INC**, **DEC**, <- or -> keys, once you have chosen and modified the configuration use the **SET** key to exit. **Config 1 .. 6** may be selected from the front panel as follows:-

CONFIG 1
CONFIG 2
CONBIG 3
CONFIG 4 CONFIG 2+CONFIG 3
CONFIG 5 CONFIG 1+ CONFIG 2
CONFIG 6 CONFUG 1 + CONFIG 3

CONFIGURATION MODIFICATION

To modify a parameter within a selected configuration then simultaneously depress both <- and -> keys a second time to enter the configuration menu (note. a third simultaneous depression of these keys will return to the initial menu. Once in the CONFIGURATION MENU the display indicates either the parameter to be modified or the various selections of a particular parameter as follows:-

Filn Std
GEn Std
SYSt rEF
REF 50 / REF 60 / REF 48
Accn 10
PAccn 10
SPEED 10
SPF CoDE / PF CoDE / SP CoDE / P CoDE
JOG 04
Fln FEET / Fln tinE
1 PPF / 2 PPF / 4 PPF / 5 PPF / 10 PPF / 20 PPF / 25 PPF / 50 PPF / 100 PPF
biCor 00
PrE r 05
dELAY 0
I-RPLY 15
REcAdv04
35nn / 16nn
NORNAL / tAPELESS / SONY 9P / Fud ONLY
F No Inc / FASt Inc
PLAYNORN / PLAYStOP
StPdEL00
LEAd 00
St-PicTr / St-LEAdr
NUtE 05
BURST 06
GEnU-PSt /GU-Filnt / GU-FEET
MAStER / SLV rdr2
CONt rEC / PULSErEC / CONt rdY / PULSErdY

The <- and -> keys are used to select the parameter displayed. The **INC** and **DEC** keys are used to change the selection of the displayed parameter.

When the **SET** key is depressed both the Configuration and setup modes are exited. The parameters are then set as selected whilst in setup or Configuration.

4.01 FILM SPEED: FILM STD

The film frame rate may be set to 24, 25 or 30 frames per second. Some film machines (ALBRECHT) require the same pulse rate what ever the frame rate. In this case the film speed selector on the ALBRECHT should be set to 25. The virtual master will then control the frame rate.

4.02 GENERATOR STANDARD: GEN STD

The generator standard may be set to any of the following:-

24	24 frame per second FILM timecode
25	25 frame per second EBU timecode
29	SMPTE drop frame timecode
30	SMPTE timecode

When generating SMPTE time code either DROP or non drop, selected reference will determine the frame rate. For example, if selected to video and a NTSC colour reference is used then the film speed will be 23.97 FPS and the code rate will be 29.97 FPS.

When the Generator standard is changed to 25, 29, or 30 the System reference rate (4.04) is automatically updated to 50 or 60.

4.03 SYSTEM REFERENCE: SYSt rEF

The system reference may be set to any of the following:-

XTAL	Internal crystal reference
VIDEO	External video reference
EXT	External frame or 2 x frame rate NOTE. This input is used on units which have the chase to biphas option as the film frame rate input!
MAINS	Internal reference derived from the power input

This is used as a speed reference for the system and as a phase reference for the generator.

Note:

The System reference will depend on the mode of operation. Therefore the system reference may be set separately for each operational mode, MASTER, Chase to TACH, or Chase to CODE. The system reference is set for the operational mode selected before leaving configuration.

4.04 REFERENCE RATE: REF 50 / REF 60 / REF 48

The frame rate of the SYSTEM REFERENCE, note that the reference input circuit will accept either frame rate or twice frame rate. When working with drop frame the reference rate should be set to **REF 60**.

note. This parameter is automatically changed when the Generator Standard is changed.

4.042 Chase TO TIMECODE

When slaving to code (SLAVE-CODE) with **VIDEO** selected as the reference the master code frame rate is used as system frame rate. Note; this is set on entry and may be changed by entering and leaving configuration.

4.05 FAST ACCELERATION: Accn 10

The rate of acceleration of the biphas output above play speed is determined by this factor. A selection of 1 is very slow, a selection of 20 is very fast. The acceleration should be selected to optimise the system.

4.06 ACCELERATION to PLAY: PAccn 10

The rate of acceleration of the biphas output below play speed is determined by this factor. A selection of 1 is very slow, a selection of 20 is very fast. The acceleration should be selected to optimise the system.

4.07 MAXIMUM FILM SPEED: SPEEd 10

The maximum biphas rate ma be selected as a factor of play speed. The range available is from 1* to 30* film speed. The maximum film speed should be selected to optimise the system.

Acceleration and Speed Table				
Machine	Gauge	Accn	PAccn	SPEEd
Kinoton FP38EC	35mm	08	12	6 (8 Max)

4.08 STATIONARY / HIGH SPEED TIMECODE: SPF CODE / PF CODE / SP CODE / P CODE

When the bi-phase output is at STOP the output timecode can no longer follow the biphase. When the unit is selected to WIND the time code generator can no longer track the bi-phase. The options in stop and wind are as follows:-

SPF CODE

The timecode output frame rate is set to nominal speed and at low speeds will output continuous stationary code, updating on change. At high speeds the timecode output frame rate is set at nominal speed and 0.5 second bursts of incrementing/decrementing timecode emitted.

PF CODE

The timecode output frame rate is set to nominal speed and will output 1/2 second of stationary code only on position change. At other times the timecode output will be muted.

SP CODE

At high speeds the timecode output is muted, at low speeds the stationary timecode will be output.

P CODE

At both Low and High speeds the timecode output is muted.

4.9 FILM POSITION DISPLAY: Fln FEET / Fln TinE

Display Film position as feet+frames or HH:MM:SS:FF

4.10 JOG RESPONSE: JOG 04

The number of frames moved per turn of the JOG wheel is determined by this variable.

4.11 BIPHASE RATE SELECTION: 2 PPF

On the BS-1 there is one Biphase output, the frequency of the Bi-Phase output may be selected by this factor. The following rates are currently available:-

PULSES PER FRAME PULSE RATE @ 24 FPS

1	24
2	48
4	96
5	120
10	240
20	480
25	600
50	1200
100	2400

4.12 Biphase Correction BiCor

There is sometimes a difference between timecode setting at STOP and during PLAY. In order to resolve this problem the Biphase correction parameter has been introduced. The value may be dependant on the film machine. The following table is of results found in the field. Once all machines have been calibrated if there is a constant error then this will be corrected and this parameter will disappear.

Machine	biCor	Machine	biCor	Machine	biCor
Dolby DS-10	+1	CB FC-1	0		+1
Magnatech		Sondor		MB-51	

4.13 CYCLE PREROLL: PrE r 05

This variable sets the pre-roll time used when cycle is activated. The pre-roll time is user selectable between 0 and 19 seconds. To calculate the actual pre-roll time subtract 1 from the display.

4.14 PLAY AFTER LOCATE DELAY: dELAY 01

When the unit is used with sound followers or synchronizers it may be necessary to insert a delay between completing a locate and commencing an automatic play (locate-play or repeat cycle). This variable sets the delay from 1 second to 10 seconds.

4.15 INSTANT REPLAY LENGTH: I-RPLY15

This programs the number of SECONDS subtracted from the current position to calculate the locate point when a INSTANT REPLAY command is received.

4.17 RECORD ADVANCE: REcAdv04

This programs the number of FRAMES used as an advance in a auto record drop in.

4.17 FILM SIZE: 35mm / 16mm

The number of frames per foot for the film position in feet and frames is determined by this flag.

35nn 16 frames per foot

16nn 40 frames per foot

4.18 SYSTEM TYPE: NOrNAL / tAPELESS / SONY 9P /Fud ONLY

NOrNAL

Normal Bi-Phase + timecode mode

tAPELESS

This mode was introduced for use with non-linear systems. In this mode it is assumed that there is no film used and that the only output from the unit is TIMECODE. In this mode Locates are instantaneous.

SONY 9P

Test mode, most of the front panel and remote machine commands are send direct to SERIAL-B.

Fud ONLY

For special systems that will only move in a forward direction.

4.19 STATIONARY / INCREMENTAL CODE: F No Inc / FASt Inc

F No Inc

When the timecode generator outputs code in bursts (Wind) stationary code is generated.

FASt Inc

When the timecode generator outputs code in bursts (Wind) incrementing or decrementing code is generated dependant on the direction.

4.20 PLAY FROM WIND: PLAYNORN / PLAYSTOP

When PlayStop is enabled the biphase will always stop when going from wind to play.

4.21 DIRECTION CHANGE DELAY: STPDEL00

When using flatbed tables or machines with a flywheel engaged at all times it is necessary to insert a stop delay when changing direction.

4.22 FILM LEADER LENGTH: LEAd 00

Film position when the **G.RST** key is depressed, for a 15 foot leader set as **LEAd 15** and the display will show - **15.00** when **G.RST** is depressed.

4.23 TIMECODE @ START MARK: St-Pictr / St-LEAdr

When the LEADER function is enabled (4.26) there are two positions for the start timecode, Start of picture, of start of leader:-

St-Pictr Preset timecode = Start of Picture
St-LEAdr Preset timecode = Start of Leader

4.24 TIMECODE MUTE: NutE 00

When entering play the biphaser will be locked to the timecode provided that the error is less than 3 frames. When the error is greater than 3 frames the timecode output value is changed to be the same as the film position. This is most likely to occur when going directly into play from forward wind. Some hard disk units and synchronizers do not follow this jump in timecode numbers.

This parameter sets the length of time (in frames) that the timecode output is muted whenever a timecode jump is required.

4.25 HIGH SPEED CODE: BURSt 06

When the unit is running at high speed the generator runs at play speed, in order to keep position the generator output is updated regularly. This parameter indicated the number of consecutive frames between updates

4.19 GENERATOR USER SOURCE: GU-FEEt

GEnU-PSst / GU-Filmt / GU-FEEt // GU-rdr-t / GU-rdr-U

The generator timecode USER bits may be sourced from any of the following:-

GEnU-PSst Preset user data
GU-Filmt Current Film time
GU-FEEt Current film footage

4.20 MASTER / SLAVE POSITION SOURCE: MASTER / SLV rdr2 / SLV SErb / SLV SErA

The MC-1 may be used as the master to a system, slaved to an external timecode source or slaved to a machine connected to serial port 'B' or serial port 'A', This parameter determines the master when the Slave LED is illuminated. If Master is selected then there is no change.

4.21 RECORD TRACK ARMING:

CONt rEC / PULSErEC / CONt rdY / PULSErdY / CONt rr / PULSE rr

This determines the operation of the 16 Record On and 16 record Off outputs as follows:-

Selection	Record Output	Ready On	Record On	Record Off	Ready Off
Cont rEC	On	Off	On	Off	Off
	Off	On	Off	On	On
PULSErEC	On	Off	Pulse On	Off	Off
	Off	Off	Off	Pulse On	Off
CONt rdY	On	On	On	On	Off
	Off	Off	Off	Off	On
PULSE rdY	On	Pulse On	Off	Off	Off
	Off	Off	Off	Off	Pulse On
CONt rr	On	Off	On	Off	Off
	Off	ON	On	On	On
PULSE rr	On	Off	Pulse On	Off	Off
	Off	Off	Pulse On	Pulse On	Off

4.** USER CONFIGURATION TABLE

When installing new software or after a **HARD RESET** it is important that the configuration of the unit remains the same. This sheet is provided for that purpose, please write down the current configuration so as to be able to reset the unit correctly. Remember that the next engineer to use the unit may not be a fully understand why it has been set up in this way!

GENERATOR SETUP

The GENERATOR SETUP mode is entered by depressing the **SET** key, when the setup mode is active the **SET** LED is illuminated.

When the **SET** LED is illuminated the function of the **SELECT** key is modified so that only the generator timecode, user bits, or reader timecode may be selected.

The user may then specify the generator reset timecode value, the generator user bits and the reader timecode which is equivalent to the generator timecode when jamming with an offset. The value is modified as follows, the decimal point is used as a cursor to indicate the digit which will be modified by the numeric or **INC** and **DEC** keys. The cursor keys **<** and **>** move the cursor clockwise and anti-clockwise.

CLEAR: If both **INC** and **DEC** keys are depressed simultaneously the current displayed data will be cleared to all zero's.

To leave the setup mode depress the **SET** key.

Setting	Nominal	SELECT
_____	10:00:00	GEN T.Generator Reset Time
_____	00:00:00	GEN U.Generator Reset USER

CONFIGURATION

To enter the configuration mode first enable **SET** then when the **SET** LED is illuminated depress both **<** and **>** simultaneously. The initial CONFIG display allows selection of four different preset configurations. The configurations may be selected using the **INC** and **DEC** keys.

CONFIG 1	_____
CONFIG 2	_____
CONFIG 3	_____
CONFIG 4	_____

Each of the four CONFIG's may be set by the user for different operations. To set up a CONFIG, first select the CONFIG required then depress the **<** and **>** keys simultaneously a second time. The individual configuration parameters are then displayed. The CONFIGURATION the display indicates either the parameter to be modified or the various selections of a particular parameter as follows:-

The **<** and **>** keys are used to select the parameter displayed. The **INC** and **DEC** keys are used to change the selection of the displayed parameter.

When the **SET** key is depressed both the CONFIGURATION and SETUP modes are exited. The parameters are then set as selected whilst in setup or CONFIGURATION.

CONFIG

Setting

HARD RESET Options

_____	25	Filn Std:- 24, 25, 30
_____	25	GEn Std:- 24, 25, 29, 30
_____	Video	SYSt rEF:- XTAL, Video, Line, External
_____	REF 50	REF:- 50, 60, 48
_____	Accn 03	Accn:- 00 - 20
_____	PAccn 03	PAccn:- 00 - 20
_____	SPEEd 05	SPEEd:- 01 - 30 (* play Speed)
_____	SPF COdE	SPF COdE / pf COdE / SP COdE / P COdE
_____	Fln FEET	Fln FEET / Fln tinE
_____	JOG 04	JOG 01 - 06
_____	2 PPF	1 / 2 / 4 / 5 / 10 / 20 / 25 / 50 / 100 PPF
_____	biCor 00	BiCor:- -02 - +02
_____	PrE r 05	PrE r:- 00 - 19
_____	dELAY 00	dELAY:- 00 - 09
_____	I-RPLY 15	I-RPLY:- 05 - 40
_____	REcAdv04	REcAdv:- 0 - 09
_____	35nn	35nn / 16nn
_____	NORNAL	NORNAL / TAPELESS / SONY 9P / Fud ONLY
_____	F No Inc	FASt Inc / F No Inc
_____	PLAYNORN	PLAYNORN / PLAYSTOP
_____	STPDEL00	STPDEL:- 00 - 10(1/2 Seconds)
_____	LEAd 00	LEAd:- 00 - 25(Feet)
_____	St-Pictr	St-Pictr / ST-LEAdr
_____	NUtE 00	NUtE:- 00 - 74 (Frames)
_____	BURSt 06	bURSt:- 01 - 30(frames)
_____	GU-FEEt	GEnU-PSt / GU-Filmt / GU-FEEt / GU-rdr-t / GU-rdr-U
_____	NAStER	NAStER / SLV rdr2
_____	CONt rEC	CONt rEC / PULSErEC / CONt rdY / PULSErdy

5.00 FRONT PANEL & REMOTE COMMANDS

5.01 G.RST

When the **G.RST** key is released the film position counters are reset to zero and the timecode generator is preset to the preset start time.

The film should be positioned on the start mark and then **G.RST** depressed and released.

Note: See section 3.00 GENERATOR SETUP for the method of setting the preset start time.

5.02 Chase

When **SLAVE CODE** is enabled the unit will ignore any front panel or remote commands. The Biphase and timecode outputs will follow the timecode input.

5.03 POZ

To Capture the master timecode position depress **SHIFT** and **SLAVE-CODE** simultaneously.

6.00 RESET

6.01 POWER UP RESET

When switched on the unit will reset, On reset the memory is not completely cleared since the current film position, timecode offset, and configuration are battery backed. If a memory backup failure is detected the unit will reset the whole memory. During the power up sequence the LED Display will show the following:-

LEd Good	This indicates that the CPU, ROM, LED display, and driver are working correctly.
Ran Good	This indicates that the RAM has been checked and is good.
RAn BAd	This indicates that the RAM has been found to be bad.
bC12	This is the revision code of the software
HArd rSt	This indicated that an error was found in the configuration ram and that the memory backed ram has been reset.

6.02 CPU CARD RESET

When servicing the unit it may be required to reset the unit without switching off the power. To do this short the two pins on the front of the PROCESSOR BD labels SW1. This will reset the unit in the same way as a power up reset.

6.03 SOFT RESET

A power up reset may be initiated from the front panel by a simultaneous depression of the **SELECT** and **SET** keys.

6.04 HARD RESET

If it is required to reset the battery backed memory manually a hard reset may be initiated from the front panel by simultaneous depression of the **SELECT** and **FREEZE** keys. This may be necessary when new software is fitted. CAUTION this will wipe the Configuration memory! If the front panel software is not working correctly the unit will only reset if the **SELECT** and **FREEZE** keys are depressed during the power up sequence.

6.05 MANUAL HARD RESET

The front panel hard reset is only possible if the front panel software is running correctly. If all else fails switch off the power, open the unit, and unplug the PROCESSOR BD. This will disconnect the memory from the backup battery. Replace the PROCESSOR BD, and power up the unit.

7.00 SERIAL COMMUNICATIONS

7.1 SERIAL CONFIGURATION

CONFIGURATION SELECTION

The configuration of the unit is selected by first depressing the **SET** key so that the **SET** LED is illuminated then depress both <- and -> simultaneously to enable configuration selection. The first display allows you to select which configuration you wish to adjust **UNIT / SERIAL A** . Make your selection and then depress <- and -> simultaneously to select.

To enter the SERIAL configuration mode first enable **SET** then when the **SET** LED is illuminated depress both < and > simultaneously. Use the < or > keys to select **SERIAL A** or **SERIAL b**. In SERIAL CONFIGURATION the display indicates either the parameter to be modified or the various selections of a particular parameter in the same way as in CONFIGURATION.

BUH-1100 / NNC-1 / bUU-950 / dA-88 / PCN-7030 / FOStEC

The < and > keys are used to select the parameter displayed. The **INC** and **DEC** keys are used to change the selection of the displayed parameter.

When the **SET** key is depressed the SERIAL CONFIGURATION MENU, CONFIGURATION MENU and SETUP MODE are exited. The parameters are then set as selected whilst in setup or CONFIGURATION.

The serial configuration is used to optimize a video chase to the Master.

7.2 MACHINE ID

bUH-1100

All CB products will recognise this as a MC-1

NNC-1

The latest SSL software and motionworks software will recognise this.

BUU-950

Editors

dA-88

8 track record on earlier AMS software

PCN-7030

FOStEC

7.3 RS422 Interface cable:-

SERIAL-A (From Controller)	
9 pin 'D'	Function
1	Internal
2	Tx Data A-
3	Rx Data B+
4	Gnd.
5	+5v
6	Gnd.
7	Tx Data B+
8	Rx data A-
9	Gnd

RS422 operation Serial-A:- **PB4** link pins 1 & 2 (towards front of unit).

BS-2 SERIAL-B (To Machine)	
9 pin 'D'	Function
1	Internal
2	Rx Data A-
3	Tx Data B+
4	Gnd.
5	+5v
6	Gnd.
7	Rx Data B+
8	Tx data A-
9	Gnd

8.00 OPERATION in Chase

When operating as a chase only two factors are involved:-

1. The film START MARK
2. The master biphase position or timecode value at the start mark.

By using the CAPTURE command (SHIFT & SLAVE-CODE, SHIFT & SLAVE_TACH or AUTO CAPTURE) synchronisation may be achieved at any point in the film, however the value stored by the unit is always THE TIMECODE AT THE START MARK!

The timecode output of the Master Motion Controller is not used to chase the unit in any way. This follows the film position in the normal way.

8.01 Chase TO TIMECODE

To operate the Virtual master as a chase two parameters must be specified, the film start mark and the master timecode value at that point. Once these two parameters are specified the unit will chase whenever Chase CODE is active.

In order that the unit chases correctly to timecode it is necessary that the speed reference for the BS-1/MC-1 and the source of master timecode is the same. In most cases this will be VIDEO SYNCS.

Because it is not possible to guarantee that the LTC timecode represents the exact position of the master machine it is recommended that when slaving to timecode AUTO CAPTURE is turned OFF (Section 4.22). With AUTO CAPTURE OFF it is possible to switch the Chase on and off on the BS-1/MC-1 without losing lock when chased unless the G.RST key or SHIFT & CHASE are depressed.

8.011 CHASE WHEN START MARK TIMECODE VALUE IS KNOWN

To synchronise the film to timecode when the master timecode value at the start mark is known use the following procedure:-

1. Select unit as MASTER
2. Position the film on the start mark.
3. Depress G.RST to zero the film counter and set the generator time.
4. Depress the SET key and use the SELECT key until FILM T. is illuminated.
5. Enter the timecode value equivalent to the start mark.
6. Play the master machine to ensure that the Virtual master knows the Master position by reading LTC code..
7. Depress **SLAVE** or **CHASE** to enable.

The Film machine will then move to be in the correct position relative to the LTC code.

8.012 Chase WHEN START MARK TIMECODE VALUE IS NOT KNOWN

To synchronise the film to timecode when the master timecode value at the start point is not known it is necessary to find a suitable sync point, capture the master position and then adjust the captured master position until sync is achieved as follows:-

1. Select the unit as MASTER (Disable **SLAVE** or **CHASE**)
2. Position the film on the start mark.
3. Depress the G.RST key to zero the film counter and set the "Film Timecode" value.
4. Control the film with the BS-1/MC-1 and stop at a suitable sync point.
5. Move the Video machine or source of master timecode and stop at the same sync point.
6. Depress **SHIFT & SLAVE** or **CHASE** to capture the master timecode value.
7. Depress **SLAVE** or **CHASE** to enable.
8. Play the Master, and using the **SHIFT & <-** keys or **SHIFT & ->** keys on the BS-1/MC-1 adjust the film position relative to the Master position until sync is achieved.
9. Depress the SET key and use the SELECT key until FILM T. is illuminated. NOTE the value displayed, this is the master timecode value at the sync point.

8.04 CHECKING FOR FILM LOCK

If at any time you need to check for LOCK the following items need to be checked:-

1. The master timecode value at the start mark. Enable SET, the SELECT Film T. and check the value displayed.
2. The film start mark, select the unit as MASTER and use RTZ to return to the start mark.

If for any reason the start mark has moved, return the film to the Start Mark and depress G.RST on the BS-1/MC-1. This tells the unit that the film is on the start mark.

10.00 REAR PANEL CONNECTIONS

10.01 POWER INPUT

The unit is supplied for either 220-250v A.C. or 110v-125v A.C. operation. The mains IEC input socket contains an integral power line filter and mains switch. The mains lead supplied should be connected as follows:-

Brown	Live
Blue	Neutral
Green/Yellow	Earth

10.02 INPUT XLR

The 3 pin XLR INPUT socket is a balanced input to the Main Timecode reader. The input is connected as follows:-

Pin 1	Chassis
Pin 2	Positive input
Pin 3	Negative input

When connected to an un-balanced source of time code they should be connected as follows:-

INPUT	SOURCE
Pin 1	Chassis
Pin 2	Signal
Pin 3	Signal Ground

10.03 OUTPUT XLR

The 3 pin XLR OUTPUT plug is a balanced output from the Timecode Generator. The output is connected as follows:-

Pin 1	Analog Ground
Pin 2	Positive output
Pin 3	Negative output

When connected to an unbalanced load the connections should be made as follows:-

OUTPUT	LOAD
Pin 1	Ground
Pin 2	Signal
Pin 3	Leave open

10.04 EXT. REF. BNC

The EXT REF BNC is connected to the reference input of the timecode generator. This input when selected should be fed with either frame rate or twice frame rate signal. The preferred input is a 5 volt square wave, but a 5v sine wave is also acceptable.

10.05 VIDEO REF. BNC's

The two VIDEO REF BNC's are connected in parallel and routed to the reference input of the time code generator. This input when selected should be fed with a nominal 1 volt composite or black and burst video signal. The input has an impedance of approximately 100K.

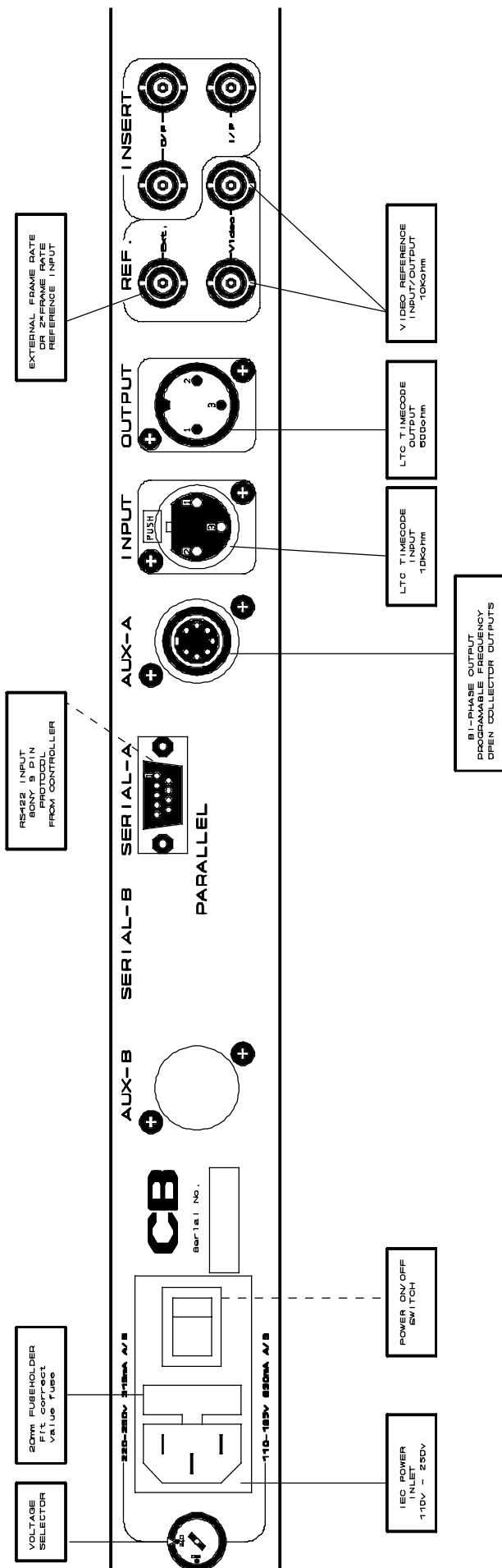
The video input will normally be fed from station sync's in parallel with the video recorder's. In an audio studio there is normally a Sony F1 or equivalent which may be used as a source of station sync's.

10.06 INSERT I/P BNC

Not Used

10.07 INSERT O/P BNC's

Not Used



CB ELECTRONICS LTD	
LONDON, LONDON ROAD, BARKING, ESSEX	
HILL ROAD, CHARVILL, BERKS RG10 0UD	
Size	Document Number
B	BS-1 CON
REV	1

10.08 RS422 SERIAL-A 9 pin 'D'

The RS422 port is used for serial remote control of the Virtual Master. Currently the Sony 9 pin protocol is supported. the pin connections are as follows

SERIAL-A (From Controller)	
9 pin 'D'	Function
1	Internal
2	Tx Data A-
3	Rx Data B+
4	Gnd.
5	+5v
6	Gnd.
7	Tx Data B+
8	Rx data A-
9	Gnd

RS422 operation Serial-A:- **PB4** link pins 1 & 2 (towards front of unit).

Serial A may also be used as a machine control port in the same way as serial 'B'. In order to control a machine a special lead is required and the Serial 'A' configuration set up so that it is not an input.

10.09 RS232 SERIAL-B 9 pin 'D' (OPTION)

The SERIAL 'D' plug if fitted is connected to a RS232 port on the CPU board. The pin connections are as follows:-

SERIAL-B (To Machine)	
9 pin 'D'	Function
1	Internal
2	Rx Data A-
3	Tx Data B+
4	Gnd.
5	+5v
6	Gnd.
7	Rx Data B+
8	Tx data A-
9	Gnd

10.10 AUX-B: BIPHASE OUTPUT DIN CONNECTOR

The OUTPUT DIN sockets are connected to the biphas generator board. The connections are as follows:-

OUTPUT	FUNCTION
1	470R Pullup to +5v
2	Ground
3	470R Pullup to +5v
4	Biphase R open collector output
5	Biphase S open collector output
6	470R Pullup to +5v
7	Fly-wheel

VIEW FROM REAR

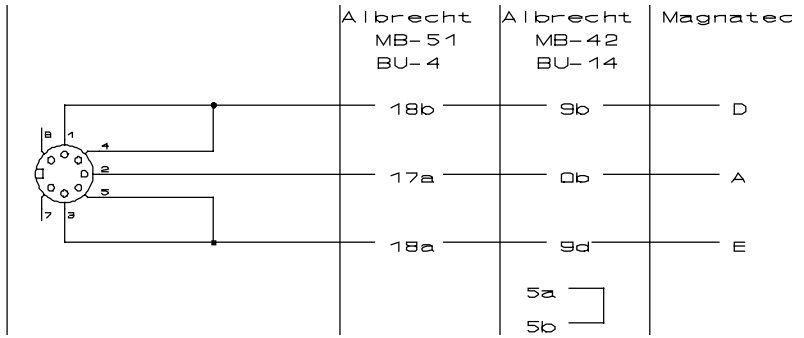
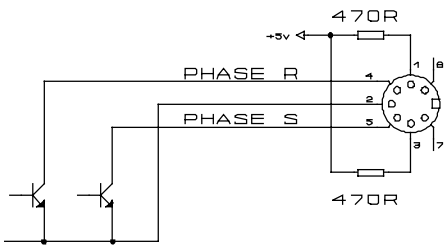
```

Flywheel      7  o      o 6 +5v
+5v           3  o      o 1 +5v
Biphase S -   5  o      o 4 Biphase R -
              o
              2 Ground
    
```

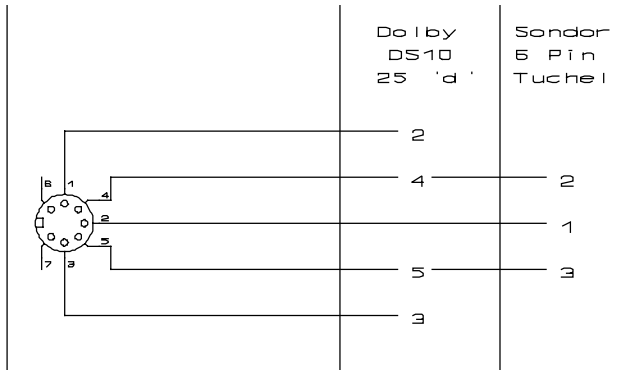
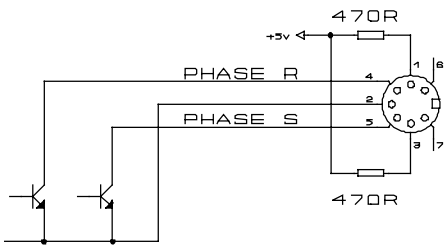
The Bi-Phase outputs are open collector darlington transistors, each output has a Vceo of 50v and will sink up to 500mA. The maximum power dissipation of each output is limited to 1W, and the total dissipation of all outputs should not exceed 2W

Function	CB MC-1	Sondor		MWA MB51	Magnatech
	7 pin DIN	6 pin Tuchel	6 pin XLR	BU-4	Amphenol
470R Pullup	1	NC	NC	18b	D
Biphase R	4	2	2		
Ground	2	1	1	17a	A
BiPhase S	5	3	4	18a	E
470R Pullup	3	NC	NC		
Flywheel	7 (Output A)			15b Low = On	
470 R Pullup	6				

CB BS-1/MC-1



CB BS-1/MC-1



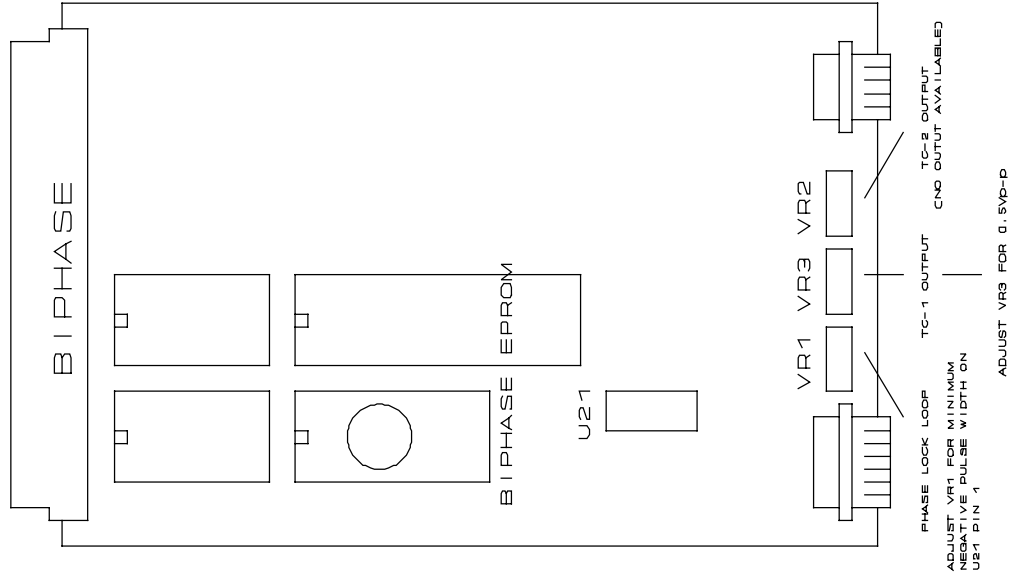
Function	CB MC-1	MWA MB42	MTM-106 Rangerton	Kinoton FP38	Dolby DS10
	7 pin DIN	BU14	e	6 pin Tuchel	25 'D' Male
470R Pullup	1				2
Biphase R	4	9b	D	2	4
Ground	2	0b	C	1	NC
BiPhase S	5				5
470R Pullup	3	9d	F	3	3
		Link 5a to 5b			Note 1

Notes:-

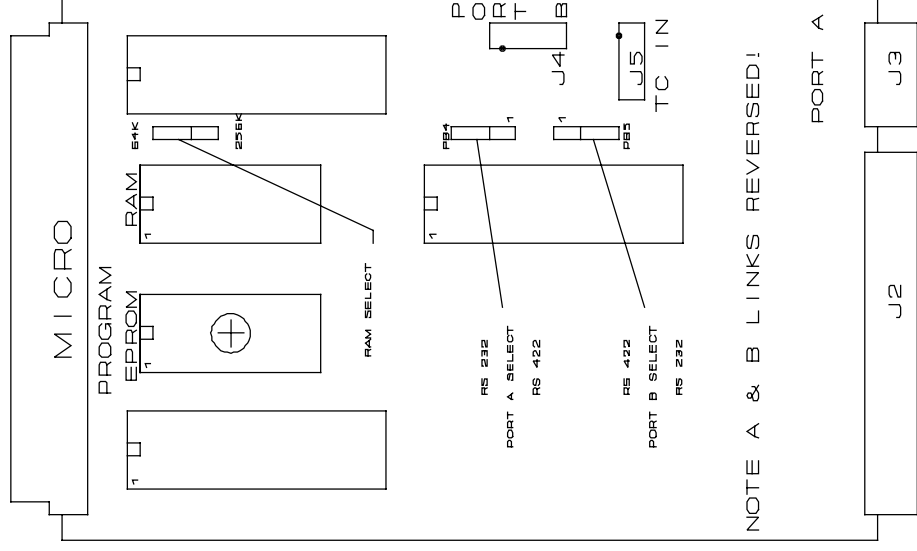
Dolby DS-10

To prevent dropouts change Cat. No. 645 board R44 & R45 from 1K5 to 100R.

BIPHASE
EPROM



PROGRAM
EPROM



D TYPE PROCESSOR VER 2



CB ELECTRONICS
Loddona Tole, Landa End House
Begetre Hill Road, Chervill,
Berke, RG10 0UD, England

