CB ELECTRONICS

Loddonside, Lands End House, Beggars Hill Road, Charvil, Berks RG10 0UD, UK
Tel: +44 (0)118 9320345, Fax: +44 (0)118 9320346, Email:suport@colinbroad.com

MC-1 MASTER MOTION CONTROLLER

* FOUR SEPARATE BI-PHASE OUTPUTS . . . . . Most bi-phase rates
* TIME CODE OUTPUT 1 . . . . . Any standard
* TIMECODE OUTPUT 2 (Aux-A) . . . . . Locked Play Only for Automation Systems
* BUILT-IN ELECTRONIC GEARBOX 24:25:30
* EXTERNAL REFERENCE INPUT . . . . . Mains, Video, TTL frame rate
* PARALLEL REMOTE CONTROL . . . . . Full function including JOG
* TAPELESS option . . . . . Instant locates for use with Hard Disc Systems
* SERIAL REMOTE CONTROL INPUT . . . . . SONY 9-pin protocol
* SERIAL REMOTE CONTROL OUTPUT . . . . . Slaving a VTR using Sony protocol

OPTIONS

* MCO-2 SYNCHRONIZE TO TIME CODE . . . . . Any frame rate
* GD-1 GIANT DISPLAY (5" Characters) . . . . . Displays Timecode or Footage

The CB Virtual Master is unique in that it generates both bi-phase and time code simultaneously. This unit is designed for use where audio, video and film formats are mixed.

Most of the problems which occur are designed out from the start. Fast synchronization is possible since in PLAY the bi-phase is synchronized to the time code, good play speed code is output immediately a PLAY command is recieved.

The MC-1 generates both bipase in timecode derived from a single high frequency reference (4.8MHz). The master clock may be locked to Video, Mains, or an external frame reference signal.

When operating with an external reference an internal crystal reference is locked to the external reference, thus if the external reference is removed the unit continues to function at the correct speed.

BI-PHASE OUTPUTS

Four separate locked Bi-phase outputs are provided allowing any combination of the following number of pulses per frame:-

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 rates are user-selectable to suit the slowest machine connected to the system.

TIME CODE OUTPUT’s

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. The second output is muted until locked play is achieved and is suitable for automation systems and some hard disk followers.

PARALLEL PORT

This is used to provide a remote control interface for the MC-1. The following are some of the commands supported:-

REWIND, REVERSE PLAY, STOP, PLAY, FORWARD WIND, SHUTTLE, JOG, LOCATE, CYCLE, RETURN TO ZERO, STEP+, STEP-, 6x, 4x, 2x

RS422 SERIAL PORT-A

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

RS422 SERIAL PORT-B

This port may be used to slave a video tape recorder using the Sony 9-pin protocol.

REFERENCE INPUTS

The following signals may be used as reference inputs for the speed of the Bi-phase generator:-

VIDEO, MAINS, EXT Frame rate or 2*frame rate TTL

PULSE/TIMECODE2 OUTPUT

On the early units a balanced output is provided to allow locked transfer from a Nagra or Stellavox to film. The frequency is user-selectable as 48Hz 50Hz, or 60Hz. The output is approximately a 1v sine wave. A 5v square wave output is also provided as a reference. On later units this is replaced by the second timecode output.

TIME CODE INPUT

The timecide input is used to synchronize the Bi-phase output to an external source of time code. The Bi-phase outputs will follow the time code as well as possible within the limits set by the maximum speed and acceleration. The unit will operate with any input time code standard.

To work correctly the master machine should be locked to the same reference as the Bi-phase generator (eg. Video syncs)

MCO-3 EXTRA 25fps ONLY BI-PHASE OUTPUT

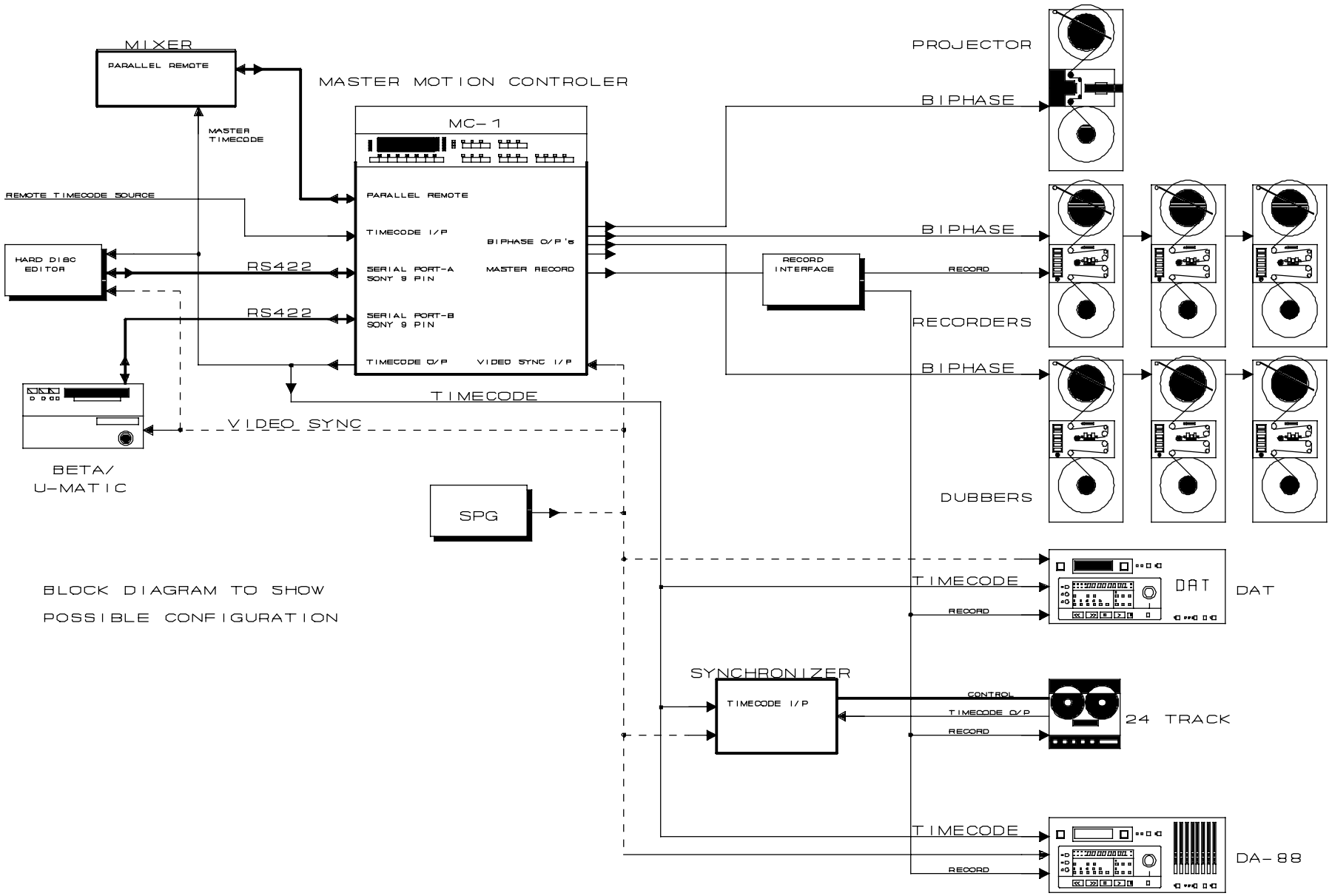
This output may be used to drive any machine that accepts 2ppf (50Hz) or 4ppf(100Hz) biphase. The frame rate is always at 25 fps dependant of the frame rate of the other biphase outputs.

MCO-4 24 Track Record Enable/Disable

Three 8 track Record On/Off outputs for track arming controlled by the Serial Remote Control Input (Serial-A).

GD-1 GIANT DISPLAY

The GD-1 giant display uses 5" high LED displays and provides both timecode and footage displays. Remote control of brightness, TimeCode/Footage, and Frame display is provided.


MIXER
PARALLEL REMOTE
MASTER MOTION CONTROLER
MASTER TIMECODE
MC-1
REMOTE TIMECODE SOURCE
PARALLEL REMOTE
TIMECODE I/P
BIPHASE O/P's
HARD DISC EDITOR
RS422
SERIAL PORT-A SONY 9 PIN
MASTER RECORD
RS422
SERIAL PORT-B SONY 9 PIN
TIMECODE O/P
VIDEO SYNC I/P
TIMECODE
VIDEO SYNC
BETA/ U-MATIC
SPG
PROJECTOR
BIPHASE
BIPHASE
RECORD INTERFACE
RECORD
RECORDERS
BIPHASE
DUBBERS
BLOCK DIAGRAM TO SHOW
POSSIBLE CONFIGURATION
TIMECODE
RECORD
DAT
DAT
SYNCHRONIZER
TIMECODE I/P
CONTROL
TIMECODE O/P
RECORD
24 TRACK
TIMECODE
RECORD
DA-88

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MC-1 MASTER MOTION CONTROLLER / VIRTUAL MASTER

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11.00 VARISPEED

0.0 QUICK START

0.01 Connecting the Biphase

See section **10.131** for the connector pinout 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

The standard biphase outputs are as follows:-

Output A 2 pulses per frame (48/50Hz)
Output B 2 pulses per frame (48/50Hz)
Output C 10 pulses per frame (240/250Hz)
Output D 100 pulses per frame (2400/2500Hz)

By changing the **tAblE** parameter in Config1-Config4 of the unit configuration (Section 4.12) the pulse rate of the outputs may be changed. CB Electronics can supply a Biphase generation EPROM with any available biphase rate programed into the EPROM in any combination.

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 * 25fps 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 Locate Optimisation

Whenever the Acceleration or maximum speed are changed the locate should be optimised as follows:-

1) Stop the system and wait until the biphase stops.
2) Depress the **Fast Forward** key and wait until the system reaches full speed.

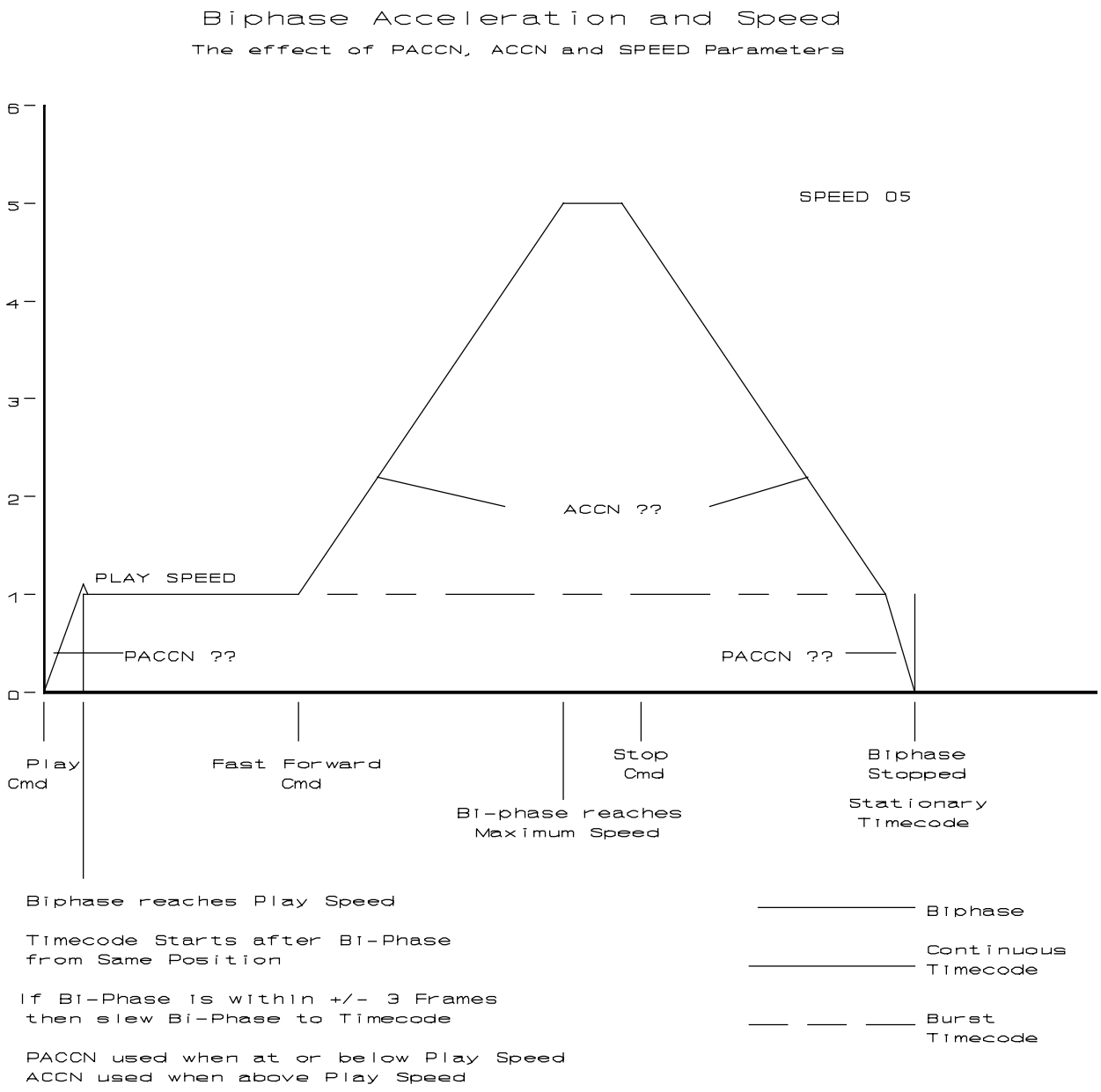
This allows the unit to learn the selected acceleration and maximum speed.

0.06 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.

0.07 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



0.08 Slaving a Video Machine

Any 9-Pin Sony P2 protocol video machine may be locked to the MC-1 via Serial port B. For this to operate correctly the MC-1 should be locked to Video Syncs and the timecode output value and standard set to the same as the video.

The video machine position may be captured directly from the video machine by simultaneously depressing the **SET** and **POS** keys (The **POS** key was labled **F1** on earlier units).

0.20 Checklist

For correct operation of the MC-1/BS-1 please ensure the following:-

1) When using from a remote system (eg Digital Audio Workstation), check the MC-1 by switching to local and using the front panel controls.

2) **REFERENCE** in most applications the reference will be Video, this LED should be on and **NOT** flashing. If the LED is flashing then the video reference is connected to the wrong input, the wrong type, or the

wrong level (1v Black and Burst is required).

3) **Timecode Standard** The correct timecode standard must be selected PAL=25, NTSC=30

4) **Film Frame Rate** The correct film frame rate should be selected, normally 24 fps.

5) **Local** for remote operation the local LED must be off.

6) **Slave** unless chasing to timecode, the SLAVE LED should be off.

7) **Biphase Rate** select the correct biphase rate for your film machines outputs A, B, C, D. and manual section **4.12 Biphase Rate Table Selection**.

8) **Acceleration** and **Play Acceleration** set for film machine, manual **4.06 Film Acceleration**.

9) **Maximum Film Speed** manual section 4.07.

If the unit is not operating correctly then perform a **HARD RESET** manual section **6.04** then use this check list to set all the parameters.

1.0 DISPLAY

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

READER	Reader timecode
GEN.	Generator timecode
G.USER	Generator user bits
VIDEO	Video position
FILM	Film position in FEET and FRAMES or Time

1.01 Generator timecode

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

1.02 Film position in TIME and FRAMES

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

1.03 Generator USER bits

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

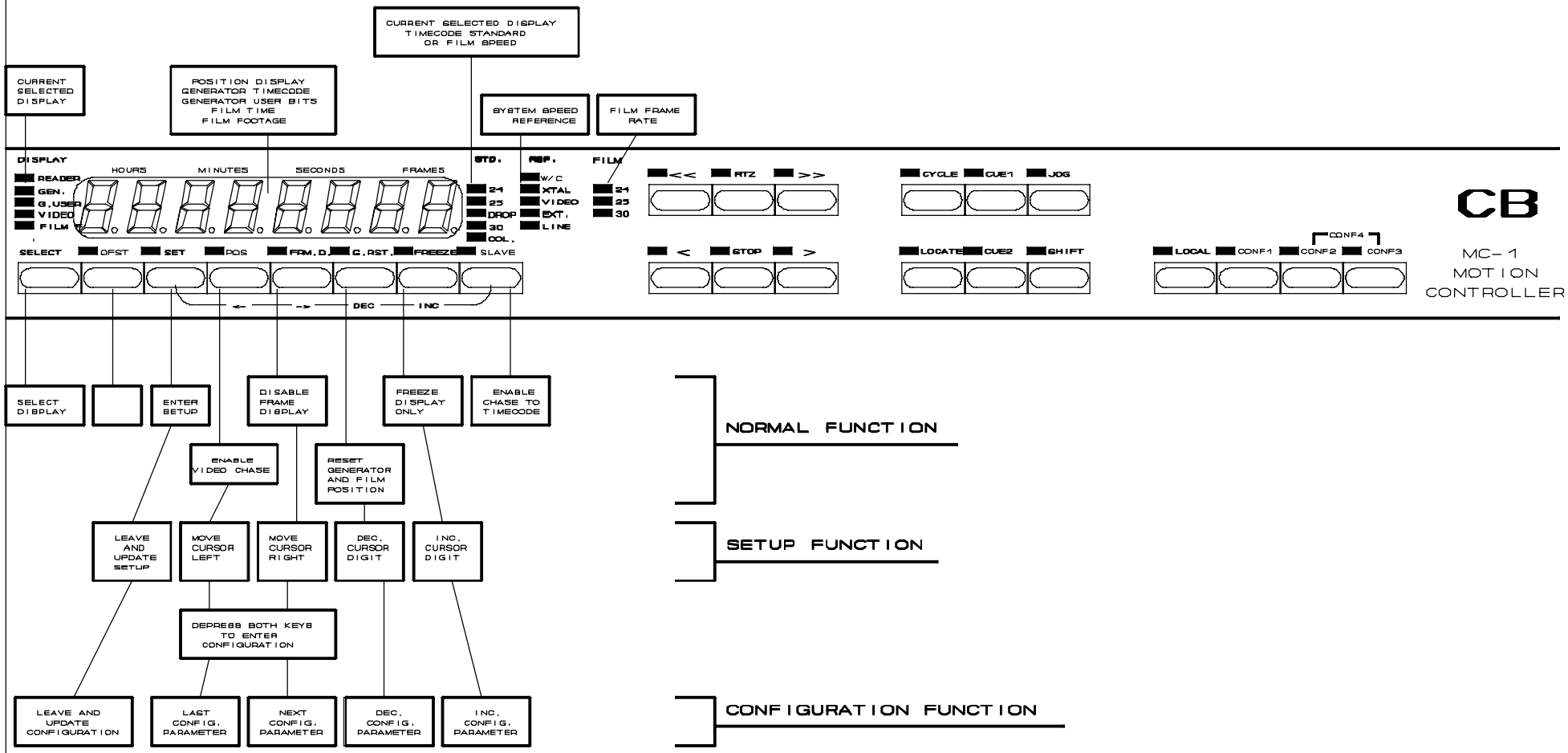
1.08 COL

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


CURRENT SELECTED DISPLAY TIMECODE STANDARD OR FILM SPEED
CURRENT SELECTED DISPLAY
POSITION DISPLAY GENERATOR TIMECODE GENERATOR USER BITS FILM TIME FILM FOOTAGE
SYSTEM SPEED REFERENCE
FILM FRAME RATE
DISPLAY
READER
GEN.
G.USER
VIDEO
FILM
HOURS
MINUTES
SECONDS
FRAMES
STD.
24
25
DROP
30
COL.
REF.
W/C
XTAL
VIDEO
EXT.
LINE
FILM
24
25
30
<<
RTZ
>>
CYCLE
CUE1
JOG
CB
SELECT
OFST
SET
POS
FRM.D
C.RST
FREEZE
SLAVE
<
STOP
>
LOCATE
CUE2
SHIFT
CONF4
LOCAL
CONF1
CONF2
CONF3
MC– 1
MOTION
CONTROLLER
<-
->
DEC
INC
SELECT DISPLAY
ENTER SETUP
DISABLE FRAME DISPLAY
FREEZE DISPLAY ONLY
ENABLE CHASE TO TIMECODE
ENABLE VIDEO CHASE
RESET GENERATOR AND FILM POSITION
LEAVE AND UPDATE SETUP
MOVE CURSOR LEFT
MOVE CURSOR RIGHT
DEC. CURSOR DIGIT
INC. CURSOR DIGIT
DEPRESS BOTH KEYS TO ENTER CONFIGURATION
LEAVE AND UPDATE CONFIGURATION
LAST CONFIG. PARAMETER
NEXT CONFIG. PARAMETER
DEC. CONFIG. PARAMETER
INC. CONFIG. PARAMETER
NORMAL FUNCTION
SETUP FUNCTION
CONFIGURATION FUNCTION

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.

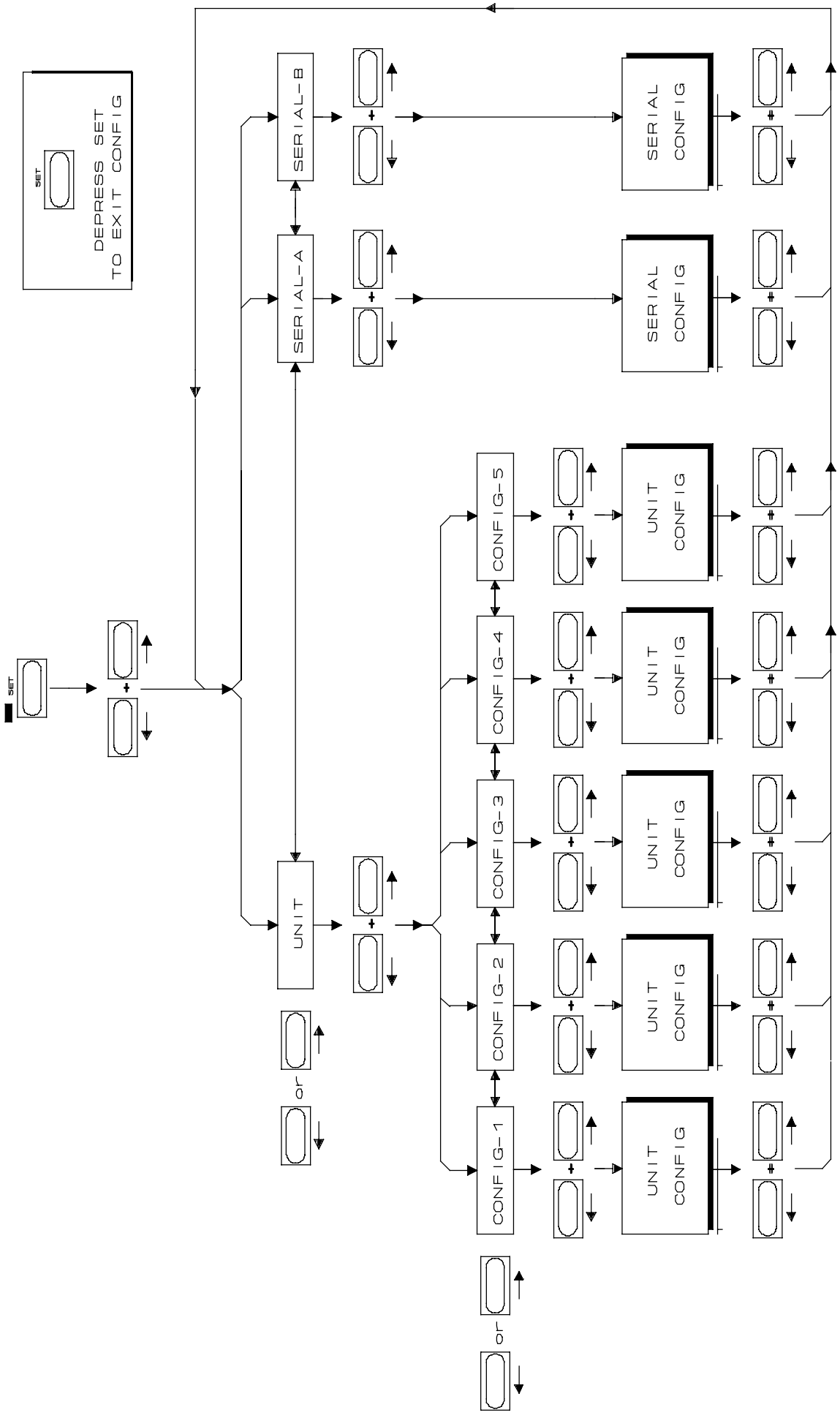
When the **SET** LED is illuminated the function of the **SELECT** key is modified so that the following may be selected:-

G.TIME	Generator preset timecode
G.USER	Generator preset user bits
F.TIME	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.


SET
DEPRESS SET
TO EXIT CONFIG
SET
SERIAL-B
SERIAL-A
UNIT
or
or
CONFIG-5
CONFIG-4
CONFIG-3
CONFIG-2
CONFIG-1
SERIAL
CONFIG
SERIAL
CONFIG
UNIT
CONFIG
UNIT
CONFIG
UNIT
CONFIG
UNIT
CONFIG
UNIT
CONFIG

4. UNIT / EEPROM / 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 / EEPRONN / VIdEO / SErIAL**. Make your selection and then depress **<-** and **->** simultaneously to select.

4.000 EEPROM

The adition of an EEPROM to the system allows the user to select between three different settings as follows:

1) Current: Held in battery backed RAM destroyed when Read User or Read Factory are selected or a Hard Reset command.
2) User: Selected by Read User or a hard reset command
3) Factory: Selected by Read Factory

The EEPROM section of the setup that determins the action to be taken on leaving Setup as follows

NoUPdAtE No action
SAVE USR Write current user setings from Batery backed RAM to EEPROM
LOAd USR Write saved settings from EEPROM to Batery backed RAM
LOAd FAC Write Factory Default settings to Batery backed RAM

Units shipped after December 2002 have the EEPROM fitted by default, older units can be updated by a a plug in PCB and new software.

Installing EEPROM Software for the first time

When new software is installed where it is necessary to initialise user setup in the EEPROM as follows:-

i) Enter Setup
ii) Select the EEPROM Menu
iii) Select **LOAd FAC**.
iv) Exit setup.
v) Enter setup
vi) Select the EEPROM Menu
vii) Select **SAVE USR**
iii) Exit Setup and wait until **Urite EE** stopps flashing

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
CONFIG 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:-

FiIn Std
GEn Std
SYSt rEF
REF 50 / REF 60 / REF 48
PULSE 50 / PULSE 48 / PULSE 60 / tESt 480
Accn 10
PAccn 10
SPEED 10
SPF COdE / PF COdE / SP COdE / P COdE
VOFSt 00
FIn FEEt / FIn tinE
JOG 04
tAbLE u1/tAbLE u2 /1 PPF / 2 PPF / 4 PPF / 5 PPF / 10 PPF / 20 PPF / 25 PPF / 50 PPF / 100 PPF
biCor 00
PrE r 05
UAri OFF /UAri 0.1/UAri-0.1/UAri 4.0/UAri-4.0/UAri 3.9/UAri 4.1/UAri-3.9/UAri-4.1
I-rPLY15
REcAdv04
35nn / 16nn
NOrNAL / tAPELESS / SONY 9P / Fud ONLY
FASt Inc / F No Inc
PLAYNORN / PLAYStOP
StPdEL00
LEAd 00
St-Pictr / St-LEAdr
NUtE 00
BURST 06
GEnU-PSt / GU-FiInt / GU-FEET / GU-SErAt / GU-SErbt / GU-rdr1t / GU-rdr1U /GU-rdr2t / GU-rdr2U
NAStER / SLU rdr2 / SLU SErb / SLU SErA
JOG Uid / JOG FiIn
CONt rEC / PULSErEC / CONt rdY / PULSErdY / CONt rr / PULSE rr
REn1 / REn1 tAL / REn2 / REn2 tAL / REn3 / REn3 tAL

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 slave to biphase 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, SLAVE to TACH, or SLAVE 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.

SLAVE 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 PULSE OUTPUT FREQUENCY: PULSE 50

On Some older boards a pulse output was provided as a reference for external units. The pulse frequency may be selected as either 48Hz, 50Hz, or 60Hz.

For test purposes an extra setting of **tESt 480** selects an output frequency of 48KHz. This will not appear at the sine wave output 'AUX A' but will be present at the square wave PULSE BNC.

4.06 FILM ACCELERATION: PAccn 10 & Accn 10

The rate of acceleration of the biphase output 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. **PAccn** is the acceleration to play speed, **Accn** is the acceleration from play speed to high speed.

4.07 MAXIMUM FILM SPEED: SPEEd 10

The maximum biphase 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. The high speed timecode will be as per **FS ON.**

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.

4.09 VIDEO OFFSET: VOFSt 00

A +/- 10 frame offset may be introduced on the video, this is useful for adjusting for small timecode errors and for monitoring from tape when recording. Currently the offset is maintained in STOP, On the next software revision the offset will only be present in PLAY!

4,10 FILM POSITION DISPLAY: Fln FEET / Fln TinE

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

4.11 JOG RESPONSE: JOG 04

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

4.12 BIPHASE RATE TABLE SELECTION:

tAbLE U1 / tAbLE U2 / 1 PPF / 2 PPF / 4 PPF/
/ 5 PPF / 10 PPF / 20 PPF / 25 PPF / 50 PPF / 100 PPF

On the MC-1 there are Four biphase outputs, On the BS-1 there is one Biphase output. In both the frequency of the Bi-Phase output may be selected by this factor. On the BS-1 **USErtbL1** & **USErtbL2** are not available. On standard MC-1 USEr 1 and USEr 2 are set as follows. Other combinations are available to special order.

TABLE	PULSES PER FRAME				PULSE RATE @ 24 FPS			
	A	B	C	D	A	B	C	D
USErtbL1	2	2	10	100	48	48	240	2400
USErtbL2	2	2	4	5	48	48	96	120

4.13 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 disapear.

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

4.14 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.

4.15 VARISPEED:

UAri OFF /UAri 0.1/UAri-0.1/UAri 4.0/UAri-4.0/UAri 3.9/UAri 4.1/UAri-3.9/UAri-4.1

This paramter enables the varispeed, the timecode and biphase are locked together and there speed ismodified by the specified amount. When vari-speed is enabled it is not posible to phase lock the timecode to the reference as it is running at a different speed.

The varispeed values are calulated by speed ratio which are not exactly as displayed.

UAri 0.1	Drop+	100.1%	UAri-0.1	Drop-	99.900999%
UAri 4.0	25/24	104.167%	UAri-4.0	24/25	96.0%
UAri 3.9	25/24 & Drop-	104.065	UAri-3.9	24/25 & Drop+	96.095%
UAri 4.1	25/24 & Drop+	104.27	UAri-4.1	24/26 & Drop-	95.005%

4.16 INSTANT REPLAY LENGTH: I-RPLY15

This programs the number of SECONDS subtracted from the current position co 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.

4.18 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

4.19 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.

4.20 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 deprndant on the direction.

4.21 PLAY FROM WIND: PLAYNORN / PLAYSTOP

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

4.22 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.

4.23 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.

4.24 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

4.25 TIMECODE MUTE: NutE 00

When entering play the biphase 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.

4.26 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

4.27 GENERATOR USER SOURCE: GU-FEEt

GEnU-PSt / GU-Filmt / GU-FEEt / GU-SErA t / GU-SErB t / GU-rdr2t / GU-rdr2U

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

GEnU-PSt Preset user data
GU-Filmt Current Film time
GU-FEEt Current film footage
GU-SerAt Serial port A timecode
GU-SerBt Serial port B timecode
GU-rdr2t Reader 2 timecode
GU-rdr2U Reader 2 USER

4.28 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 determins the master when the Slave LED is illuminated. If Master is selected then there is no change.

4.29 SERIAL JOG: JOG Vid / JOG Filn

When using serial control via Port 'A' and a video machine is connected to serial port 'B' this parameter determins whether the Film or the video is master when a Jog command is used. In this way the user may jog the video directly to find a frame.

4.30 RECORD TRACK ARMING:
CONt rEC / PULSErEC / CONt rdY / PULSErdY / CONt rr / PULSE rr

This detemins 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

4.31 REMOTE CONTROL SELECTION:
REn1 / REn1 tAL / REn2 / REn2 tAL / REn3 / REn3 tAL

This selects between the original remote control connections and a new variation as specified in sections 10.16 and 10.17.

The unit will disable the remote tallies when in local mode. To enable the tallies at all times select **REn1 tAL**, **REn2 tAL**, or **REn3-tAL**.

NOTE:- Earlier versions with the 25fps output only option is fitted the tallies should be enabled since they drive this card!

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**	
_____	10:00:00:00	GEN T.	Generator Reset Time
_____	00:00:00:00	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 six different preset configurations. The configurations may be selected using the **INC** and **DEC** keys.

CONFIG 1 _____
CONFIG 2 _____
CONFIG 3 _____
CONFIG 4 _____
CONFIG 5 _____
CONFIG 6 _____

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.

5.00 FRONT PANEL & REMOTE COMMANDS

5.01 BASIC COMMANDS

The basic commands provided on the Virtual Master are as follows:-

PLAY, REVERSE PLAY, STOP, FORWARD WIND, REVERSE WIND

The maximum speed and acceleration should be set by the user to suit his system.The method of setting the basic parameters is described in section 4.0 (CONFIGURATION).

5.02 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. When a Leader length is set in the CONFIG then the film position counter is set to LEADER feet before zero and the time code generator is set as follows:-

preset start time - (leader frames * generator standard / film standard)

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.

5.03 RETURN TO ZERO: RTZ

When the **RTZ** key is depressed the unit will locate the point at which the **G.RST** key was depressed.

This key may be used instead of the **RWD** key on the remote control. If **G.RST** is depressed at the start of the film the operator can not then inadvertently wind off the film.

5.04 LOCATE

When the **LOCATE** key is depressed the unit will locate the film position as defined by CUE 1.

To locate CUE 2 depress **CUE-2** whilst locating, or depress **LOCATE** and **CUE-2** simultaneously, or depress **SHIFT** and **LOCATE** simultaneously.

CUE 1 and CUE 2 are defined by depressing the appropriate key when stopped at or playing through the point.

5.05 LOCATE PLAY

Automatic play after locate is achieved by depressing the **PLAY** key whilst the unit is locating, or simultaneous depression of **LOCATE** and **PLAY** keys.

5.06 CYCLE

If Cycle is enabled, each time the unit plays through CUE 2 then an LOCATE CUE 1 command is issued.

To disable CYCLE depress the **CYCLE** key.

5.07 REPEAT CYCLE

By depressing **PLAY** and **CYCLE** simultaneously REPEAT CYCLE is enabled. In this mode the unit will issue a LOCATE CUE 1 THEN PLAY command when playing through CUE 2.

To disable REPEAT CYCLE depress the **CYCLE** key.

5.08 JOG

Enable the JOG pot by depressing the **JOG** key. The front panel JOG key is provided for test purposes only. The sensitivity of the jog pot may be adjusted in the configuration menu.

When **JOG** is enabled the **PLAY** and **REVERSE PLAY** keys may be used to move the film by one frame per depression.

5.09 SEARCH
A simultaneous depression of the **SHIFT** and **JOG** keys will enable **SEARCH**. When search is enabled the **JOG** pot may be used to adjust the wind speed of the film.

5.10 LOCAL
When **LOCAL** is enabled all front panel transport controls operate and all remote controls are disabled.

When **LOCAL** is disabled all front panel transport controls except for STOP are disabled and all remote controls are enabled.

5.11 MASTER
When **MASTER** is enabled the unit is the master and will ignore any timecode or biphase input.

5.12 SLAVE TO CODE
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.

5.13 CAPTURE MASTER TIMECODE
To Capture the master timecode position depress **SHIFT** and **SLAVE-CODE** simultaneously.

5.14 SLAVE TO TACH
When **SLAVE TACH** is enabled the unit will ignore any front panel or remote commands. The Biphase and timecode outputs will follow the TACH or BI-PHASE input.

5.15 PRESET INPUT FILM COUNTER
To preset the input film counter to be the same as the current biphase position depress **SHIFT** and **SLAVE-TACH** simultaneously.

5.16 REMOTE SLAVE/MASTER
To enable/Disable the slave from the remote control simultaneously depress **SHIFT** & **STOP**. A separate tally is provided so that this function may be wired from single switch using diodes.

5.17 INSTANT REPLAY
Instant Replay locates (current position - IREPLAY) see section 4.28. To perform a INSTANT REPLAY depress PLAY+RWD simultaneously.

5.18 CUE 1
This key defines the address of CUE 1 when depressed in PLAY, JOG or STOP.

5.19 CUE 2
This key defines the address of CUE 2 when depressed in PLAY, JOG or STOP.

5.19 MASTER CAPTURE TIME ADJUSTMENT (OFFSET ADJUSTMENT)
To increment or decrement the captured master time (offset) depress SHIFT+FFWD or SHIFT+FRWD. Note this will only work when **SLAVE** is enabled.

When slaving to timecode, the captured master time is displayed when SET is enabled and FILM T. is selected. When the captured master time is displayed it may be adjusted in the same way as the generator time and user bits.

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

To slave a VTR the following must be carried out.

1) The SYNCHRONISER should be setup as required with the VTR timecode output **if used** connected to **AUX-B** and the serial control to **SERIAL-B**.

2) The unit timecode output at the sync point should be the same as the timecode at the video start mark. One way this may be achieved easily is described in section **1.1 MARK SYNC** below.

3) The VTR should be selected to **SERIAL REMOTE CONTROL**

4) The synchroniser should be enabled as described below.

If all the above are carried out and the VTR timecode is within 2 hours of the current timecode the VTR will then locate to the current **GENERATOR TIMECODE** position (**GEN**).

If a VO9800 or VO9850 is used and you expect to use timecode on track 1 or 2 as well as the dedicated timecode track then it is recommended that the modification as detailed in our application note are carried out. The machine modification as designed by our Italian agents (Audio International) allows the use of time code from any of the tracks by a simple switch behind the front panel.

7.10 MARK SYNC

The quickest way of setting the generator timecode the same as the slave time code is to mark sync. this may be achieved as follows:-

1) Disable the synchroniser or put the video machine to local.
2) Position both the master and slave on a known sync point.
3) Depress the **CAPTURE POSITION** key combinations, **SET** + **F1** (Old Units) or **SET** + **POS** (New Units)

7.11 CAPTURING a OFFSET

There are times when you wish to slave a video machine with a different timecode to the MC-1 timecode to do this you need to capture a offset as follows:-

1) Disable the synchroniser or put the video machine to local.
2) Position both the master and slave on a known sync point.
3) Depress the **CAPTURE OFFSET** key combinations, **SET** + **Head** (Old Units) or **SET** + **OFST** (New Units)

7.12 ENTER an OFFSET

To Enter an Offset select Film T when SET is illuminated and enter the required offset.

7.13 INCREMENT / DECREMENT OFFSET

To fine tune the synchronisation the offset may be adjusted whilst synchronised.

INCREMENT OFFSET:- **SET** + **INC**
DECREMENT OFFSET:- **SET** + **DEC**

7.14 ENABLE

To Enable the synchroniser depress the **POS (F1)** key so that the **POS (F1)** LED is illuminated.

7.15 MASTER TIMECODE

The master timecode is the timecode output from the virtual master, the video slave will be locked to this timecode.

7.2 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.

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.

0 INPUt / 1 bUU800 / 2 UO9850 / 3 A500 / 4 SSL SS / 5 dA-88 / 6 r-dAt
SEr POS / TAch-LtC / SEr-LTC
rEC OFF / AUDIO 1 / AUDIO 2 / AUDIO 12
SYNC ALL / SYNC ENb / SY O-LAP
LOFSt 00
PLAYd 08
PAr-O OO
LOCAtE02
Loc OnLY/ Loc-Uind
trYS 06
Conn Nid / ConStArt
Error 00
ChS PLAY / ChS UAri / ChS Cnnd/ ChS CndP
RdY OFF / RdY A-U / RdY AU8d
POS LtC / POS tin 1 / POS UltC / POS L-U / POS LUt
R-P JoG / R-P UAri / R-P Shut
F-P UAri / F-P Shut / F-P JoG / F-P PPLY
SGen Nor / SGen dFC
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 slave to the Master.

7.21 MACHINE TYPE:
0 INPUT / 1 BUU800 / 2 U9850 / 3 A500 / 4 SSL SS / 5 dA-88 / 6 r-dAt

Currently the input selection and three different machines have been interfaced, when the machine type is changed the parameters are updated with the factory preset information. When the machine type is not changed the user may adjust the individual variables for his machine.

0 INPUT This should be used on SERIAL-A when remote control from a hard disk controller is used.

3 SSL SS The SSL Screen Sound has a slow start time and is set-up with a two second park offset and a 25 frame Play delay. The settings required will vary with the amount of audio on the work top.

4 dA-88

7.22 SLAVE POSITION SOURCE: SEr POS / TAch-LtC / SEr-LTC

The position of the Serial slave may be determined in three ways:-

SEr POS This is the simplest selection, the position is determined via the RS422 serial link by using the timecode reader in the machine.

TAch-LtC This selection uses the serial tach from the machine and receives timecode via the rdr2 on the unit. The rdr2 input on the unit is **AUX-B**. Useful for machines without a timecode reader card or where a the timecode is no an audio track.

SEr-LTC This selection uses a combination of serial code and time code reader 2 (AUX-B)

7.23 RECORD ENABLE: rEC OFF / AUDIO 1 / AUDIO 2 / AUDIO 12

In order to record on the serial slave it is necessary to send a record command as follows:-

rEC OFF Record disabled
AUDIO 1 Record on Channel 1 only.
AUDIO 2 Record on Channel 2 only.
AUDIO 12 Record on Channels 1 & 2.

7.24 SYNCHRONISER ENABLE : SYNC ALL / SYNC ENb / SY O-LAP

The synchroniser is either always enabled and following the GENERATOR TIMECODE or he appropriate enable command must be used.

SYNC ALL The synchroniser is always enabled, in this case the machine Local/Remote switch should be used to enable the synchroniser.

SYNC ENb The appropriate enable key as described above should be used.

SY O-LAP The appropriate enable key should be used and the system will then wait for coincident timecode before enabling the sync function. See the discussion below.

7.25 LOCAL OFSET: LOFSt 00

This is a frame ofset added or subtracted to the master time only in play before locking the video slave.

7.26 START DELAY: PLAYd 08

If the video is parked less than two seconds ahead of the master it will wait for the master to arrive at its position. Video machines take a little time to accelerate to play speed. It is therefore necessary to send a play command to the video slave before the master arrives at the same point, **PLAYd** defines when to send the play command to the slave. Increase PLAYd if the video always has to speed up to lock, decrease PLAYd if the video always has to slow down to lock.

7.27 PARK OFFSET

Normally the video slave is parked at the same position as the master. When the slave has only a very small vari-speed range this will lead to very long lock-up times. The solution is to down-stream park the slave and trim the START DELAY for optimum performance.

7.28 LOCATE

This parameter is used to specify the effectiveness of the machines locate. If is mainly used when chasing as moving master. Set this number higher if the slave appears never to catch up with the master.

7.29 USE LOCATE Only or WIND and Locate

On some machines the locate is very slow on these machines it is better to Wind close to the master and then issue a locate command. On Tapeless machines it is better to always use the Locate command.

7.30 NUMBER OF TRY's

After locking the video machine it is released to video syncs, when this happens the video machine will sometimes move by one frame, the synchroniser will then take over and pull the video machine to zero error, and let go again. This parameter sets the maximum number of times the video may be pulled into lock.

7.31 COMMUNICATION POSITION

Commands are sent to the video machine once per frame. Depending on the relative phase of the Video and timecode changes the performance of the lock-up. This can also be tape dependant!

7.32 ALLOWABLE SYNC ERROR

Maximum allowable sync error in frames after the trying for zero error "Try" times, normally set to four to allow for a 8 field colour frame sequence.

7.33 CHASE ALGORITHM

ChS PLAY Use vari-play to pull machine into lock followed by a PLAY command

ChS VAri Use vari-play to pull machine into lock, remain in vari-play.

ChS Cnnd Send a chase command to the machine.

ChS CndP Send a chase - play command to the machine, the machine will revert to play once locked.

7.34 SERIAL TRACK ARM COMMAND

This parameter determines the length of the edit preset (track arm) command sent to the slave machine. It is used if it is required to pass a record command from the serial input to the serial output.

RdY OFF No Ready Commands
Rdy A-U U-matic and Betacam
RdY AU8d 8 track Audio, Digital Betacam

7.35 POSITION REQUEST TYPE

What positional information is requested from the machine
POS LtC LTC only
POS tin1 Timer 1 only
POS VItC VITC only
POS L-U VITC or LTC
POS LUt VITC, LTC or Tach

7.36 REVERSE VARIPLAY COMMAND

R-P JoG Reverse lock using Jog command
R-P UAri Reverse Lock using Variable play command
R-P Shut Reverse lock using Shuttle command

7.37 FORWARD VARIPLAY COMMAND

F-P UAri Forward Lock using Variable Play command
F-P Shut Forward Lock using Shuttle Command
F-P JoG Forward Lock using Jog Command
F-P PPLY Forward Lock using Programable Play command

7.38 SET GENERATOR COMMAND

SGEN Nor Normal Sony Set Generator Command (HH MM SS FF).
SGEn dFC Reversed Sony Set Generator Command (FF SS MM HH) As found on some AMS DFC and Other consoles.

7.38 MACHINE ID (Only used when 0 Input is selected in Section 7.21)

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 Test
FOStEC Test

7.4 RS422 Interface cable:-

RS422 operation Serial-A:- **PB4** link pins 1 & 2 (towards front of unit).
Serial-B:- **PB5** link pins 1 & 2 (towards front of unit).

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

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

7.5 RS422 Converter cable

RS422 connections are normally defined as Controllers or devices, some may be switched between controlled (Device emulation) or controller (Hard Disk Editors). Some will automatically switch there connections to suit the new mode (Akai) some will remain the same (CB, SSL). On the MC-1 Serial-A is configured as a device, Serial-B is configured as a controller. In order to use serial-A as an output to a device, or to control a hard disc editor with Serial-B it will be necessary to use a converter cable.

SERIAL-A Converter cable	
9 pin 'D' Male	9 pin 'D' Female
1	No Connection
2	8
3	7
4	4 (Screen)
5	No Connection
6	No Connection
7	3
8	2
9	No Connection

8.00 OPERATION AS A SLAVE available as OPTION

When operating as a slave 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 is 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 slave the unit in any way. This follows the film position in the normal way.

8.03 SLAVE TO TIMECODE

To operate the Virtual master as a slave 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 slave whenever SLAVE CODE is active.

In order that the unit slaves correctly to timecode it is necessary that the speed reference for the FILMCODE GENERATOR 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 switch the FILMCODE GENERATOR between SLAVE-CODE and MASTER without losing lock when slaved unless the G.RST key or SHIFT & CODE are depressed.

8.031 SLAVE 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 CODE to slave the unit.

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

8.032 SLAVE 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
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 FILMCODE GENERATOR 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-CODE to capture the master timecode value.
7. Depress SLAVE-CODE to slave the unit.
8. Play the Master, and using the SHIFT & << keys or SHIFT & >> keys on the FILMCODE GENERATOR 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 FILMCODE GENERATOR. This tells the unit that the film is on the start mark.

9.00 SLAVING A VTR USING SONY PROTOCOL

Note: This should be read with section 7.10 which discusses the serial setup.

To slave a VTR to the MMC the following must be carried out.

1) The MMC should be setup as required with the VTR timecode output if used connected to AUX-B and the serial control to SERIAL-B.

2) The MMC timecode at the start mark should be the same as the timecode at the video start mark. One way this may be achieved easily is to position the video on the start mark, position the film on the start mark and then simultaneously depress the **GRST** and **F1** key.

3) The VTR should be selected to SERIAL REMOTE CONTROL

4) Depending on the serial setup **F1** may have to be enabled.

If all the above are carried out and the VTR timecode is within 2 hours of the current timecode the VTR will then locate to the current master TIMECODE position.

If a VO9800 or VO9850 is used and you expect to use timecode on track 1 or 2 as well as the dedicated timecode track then it is recommended that the modification as detailed in our application note are carried out. The machine modification as designed by our Italian agents (Audio International) allows the use of time code from any of the tracks by a simple switch behind the front panel.

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 (MMC OPTION)

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 AUX-A XLR

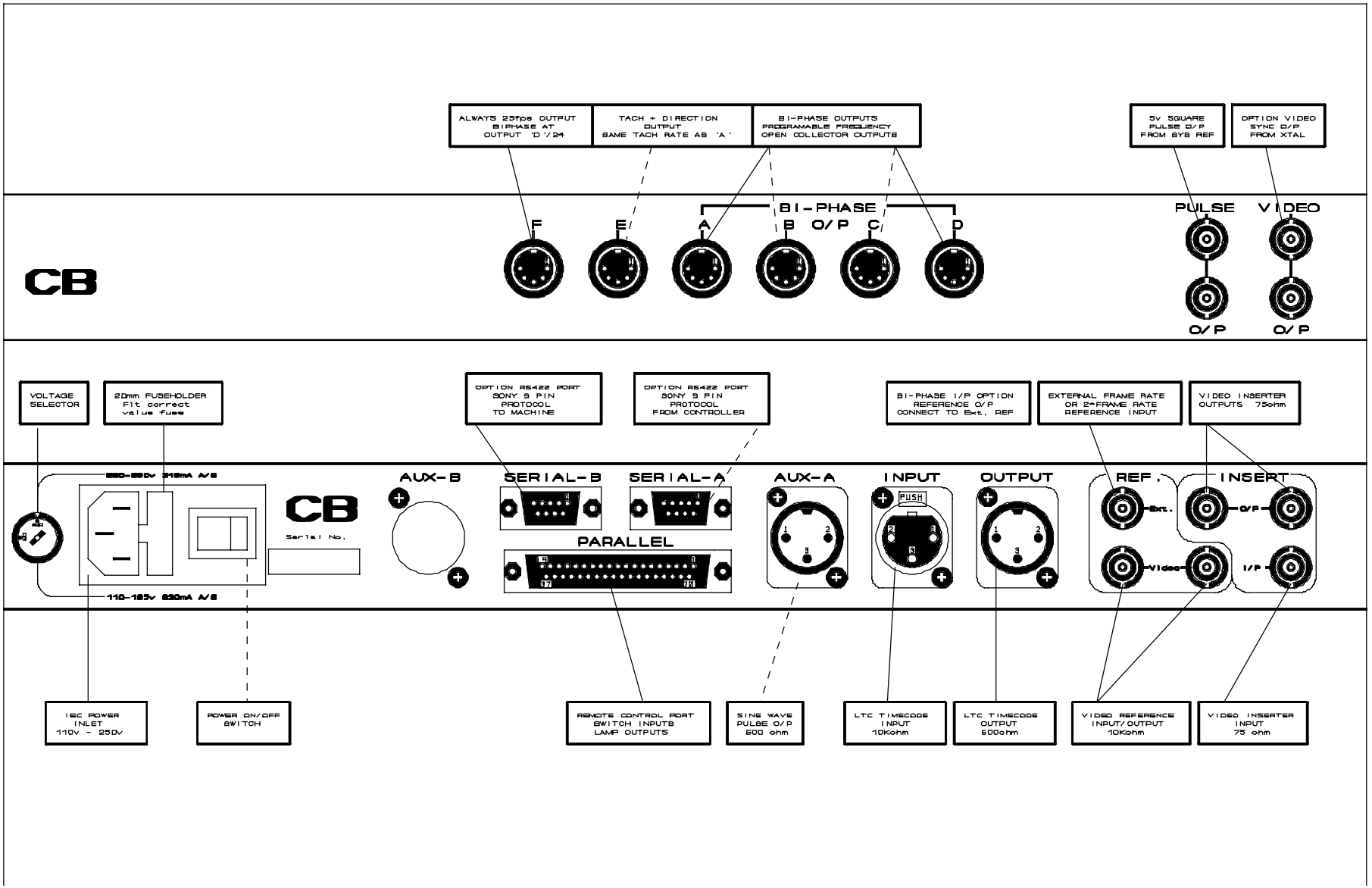
On earlier MC-1's the 3 pin XLR AUX plug is a balanced output from the pulse generator,the output is a 1 volt sine wave. The frequency is user selectable to 48Hz, 50Hz, or 60Hz. This output is used to reference Nagra or similar play in machines. On later MC-1's this connector is linked to timecode output 2, this output is only enabled when the unit is in locked play, socftware after Jult 2000 is requiredfor this feature, boards 9305-2 or 9305-3 need modification to enable this feature.

The output is connected as follows:-

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

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

AUX	**LOAD**
Pin 1	Ground
Pin 2	Signal
Pin 3	Leave Open


ALWAYS 25fps OUTPUT BIPHASE AT OUTPUT 'D'/24
TACH + DIRECTION OUTPUT SAME TACH RATE AS 'A'
BI-PHASE OUTPUTS PROGRAMABLE FREQUENCY OPEN COLLECTOR OUTPUTS
5v SQUARE PULSE O/P FROM SYS REF
OPTION VIDEO SYNC O/P FROM XTAL
CB
BI-PHASE O/P
F
E
A
B
C
D
PULSE
VIDEO
O/P
O/P
VOLTAGE SELECTOR
20mm FUSEHOLDER Fit correct value fuse
OPTION RS422 PORT SONY 9 PIN PROTOCOL TO MACHINE
OPTION RS422 PORT SONY 9 PIN PROTOCOL FROM CONTROLLER
BI-PHASE I/P OPTION REFERENCE O/P CONNECT TO Ext. REF
EXTERNAL FRAME RATE OR 2*FRAME RATE REFERENCE INPUT
VIDEO INSERTER OUTPUTS 75ohm
220-250v 315mA A/S
110-125v 630mA A/S
CB
Serial No.
AUX-B
SERIAL-B
SERIAL-A
PARALLEL
AUX-A
INPUT
PUSH
OUTPUT
REF.
INSERT
Ext.
Video
O/P
I/P
IEC POWER INLET 110v - 250v
POWER ON/OFF SWITCH
REMOTE CONTROL PORT SWITCH INPUTS LAMP OUTPUTS
SINE WAVE PULSE O/P 600 ohm
LTC TIMECODE INPUT 10Kohm
LTC TIMECODE OUTPUT 600ohm
VIDEO REFERENCE INPUT/OUTPUT 10Kohm
VIDEO INSERTER INPUT 75 ohm

10.05 PULSE SQUARE WAVE OUTPUT (MMC OPTION)

The Pulse square wave is the same frequency as the Pulse output. The output is a 5v TTL square wave, the output buffer is a RS442 driver.

10.06 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.

10.07 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.

10.08 INSERT I/P BNC (OPTION)

The INSERT I/P BNC is connected to the video inserter input. The inserter input has an input impedance of 75 ohms, see section A.11 for further information on input termination.

This input will normally be connected to the output of a telecine or VTR.

10.09 INSERT O/P BNC's (OPTION)

The INSERT O/P BNC's are connected to the video inserter output. Each output has a source impedance of 75 ohms, and is resistivly isolated.

The output's will normally be connected to a video monitor and the input of the video work-copy recorder.

10.10 VIDEO OUTPUT (MMC OPTION)

The two video output BNC's are connected to the internal Black and White Sync Pulse Generator. The output impedance is 75 ohms, each output is resistivly isolated.

The SPG is referenced to the same Crystal as the Biphase generator and Timecode generator. The Timecode generator is locked to the SPG when XTAL is selected as the system reference.

NOTE: On early 1U units, the Video Inserter outputs are used as the video output.

10.11 SERIAL I/O

10.111 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.

Serial 'A' machine control lead		
9 pin 'D' Male	Cable	9 pin 'D' Female
2		8
3		7
4	Screen	4
3		3
2		2

10.113 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

RS422 operation Serial-B:- **PB5** link pins 1 & 2 (towards front of unit).

10.131 BIPHASE OUTPUT DIN CONNECTORS (Master Motion Controller Only)

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

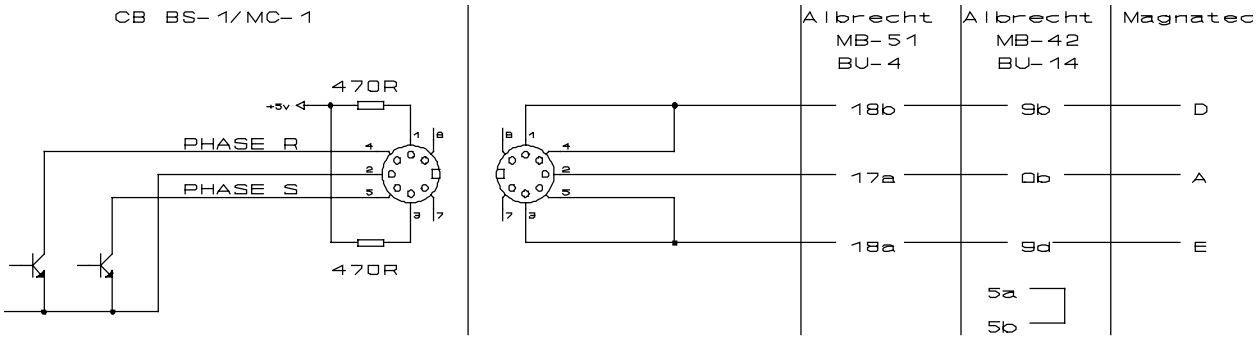
OUTPUT FUNCTION

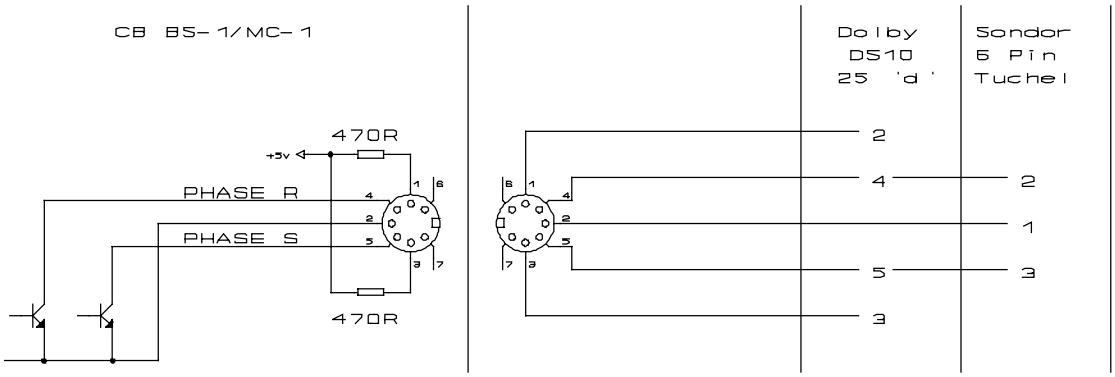
1 470R Pullup to +5v
2 Ground
3 470R Pullup to +5v
4 Biphase R open collector output
5 Biphase S open collector output
6 470R Pullup to +5v
7 Fly-wheel

VIEW FROM REAR

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

Individual machine connection details:-





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= Flywheel Off Note, 1	
470R Pullup	6				

Note 1. By setting a fast accelleration to play speed (PACCN 12) the flywheel connection may not be required. MWA have different versions of software with different fly-wheeel timeouts.

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

Note 2:- **Dolby DS-10** To prevent dropouts it may be necessary to change Cat. No. 645 board R44 & R45 from 1K5 to 100R.

10.132 TACH + DIRECTION OUTPUT

OUTPUT E socket is connected to the biphase generator board. The connections are as follows:-

OUTPUT FUNCTION

1 470R Pullup to +5v
2 Ground
3 470R Pullup to +5v
4 Tach open collector output
5 Direction open collector output
6
7

KEM T5 pin a10 = Tach +12v Pull-up
T5 pin a12 = Direction +12v Pull-up

10.133 THREE PHASE OUTPUT

The B output socket may be used for three phase output. The connections are as follows:-

OUTPUT FUNCTION

1 470R Pullup to +5v
2 Ground
3 470R Pullup to +5v
4 Phase 1 open collector output
5 Phase 2 open collector output
6 470R Pullup to +5v
7 Phase 3 open collector output

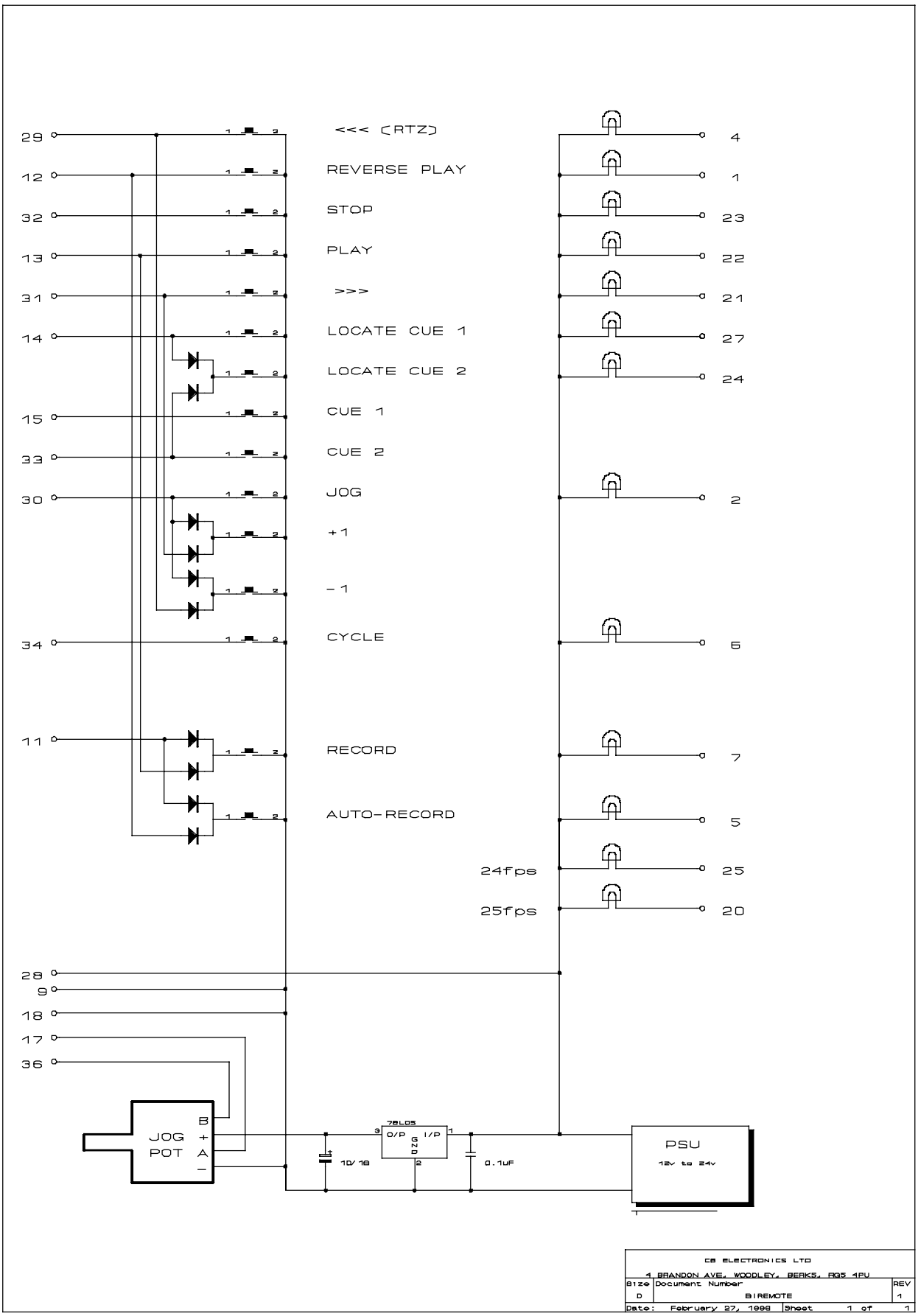
10.14 Typical Accelleration and Speed values					
Parameter	MB51 17.5mm				
PAccn	18				
Accn	15				
Speed	12				

10.15 PARALLEL 'D' CONNECTOR (MMC-Standard, VM Option)

This connector is used command and tally signals. The connector on the unit is a 37 way 'D' socket (female) with screw lock. A typical remote control system is as follows:-

10.16 37 PIN female 'D' PARALLEL PINOUT

Pin	Function	Remote 1	Remote 2	Remote 3	Remote 4
28	Tally Commom				
1	TALLY O/P	Reverse Play			
2	TALLY O/P	Jog	Step +	Auto Record	
3	TALLY O/P	Steady Play			
4	TALLY O/P	Rewind			
5	TALLY O/P	Auto-Record			
6	TALLY O/P	Cycle	Step -	Cycle	
7	TALLY O/P	Record			
8	TALLY O/P	Slave	6 * Speed	6 * Speed	
20	TALLY O/P	25 fps			
21	TALLY O/P	Forward Wind			
22	TALLY O/P	Play			
23	TALLY O/P	Stop			
24	TALLY O/P	Cue 2	4 * Speed	Cue 2	
25	TALLY O/P	24 fps			
26	TALLY O/P	Locate			
27	TALLY O/P	Cue 1	2 * Speed	Cue 1	
9	Command Common				
10	Switch I/P	Chase	6 * speed	6 * Speed	
11	Switch I/P	Shift			
12	Switch I/P	Reverse Play			
13	Switch I/P	Play			
14	Switch I/P	Locate			
15	Switch I/P	Cue 1	2 * Speed	Cue 1	
29	Switch I/P	Rewind			
30	Switch I/P	Jog	Step +	Auto-Record	
31	Switch I/P	Forward Wind			
32	Switch I/P	Stop			
33	Switch I/P	Cue 2	4 * Speed	Cue 2	
34	Switch I/P	Cycle	Step -	Cycle	
18	Internal 0v				
17	Jog Pot 'A'				
36	Jog Pot 'B'				


<<< (RTZ)
REVERSE PLAY
STOP
PLAY
>>>
LOCATE CUE 1
LOCATE CUE 2
CUE 1
CUE 2
JOG
+1
-1
CYCLE
RECORD
AUTO-RECORD
24fps
25fps
29
12
32
13
31
14
15
33
30
34
11
28
9
18
17
36
4
1
23
22
21
27
24
2
6
7
5
25
20
JOG POT
B
+
A
−
78L05
O/P
I/P
GND
10/16
0.1uF
PSU
12v to 24v
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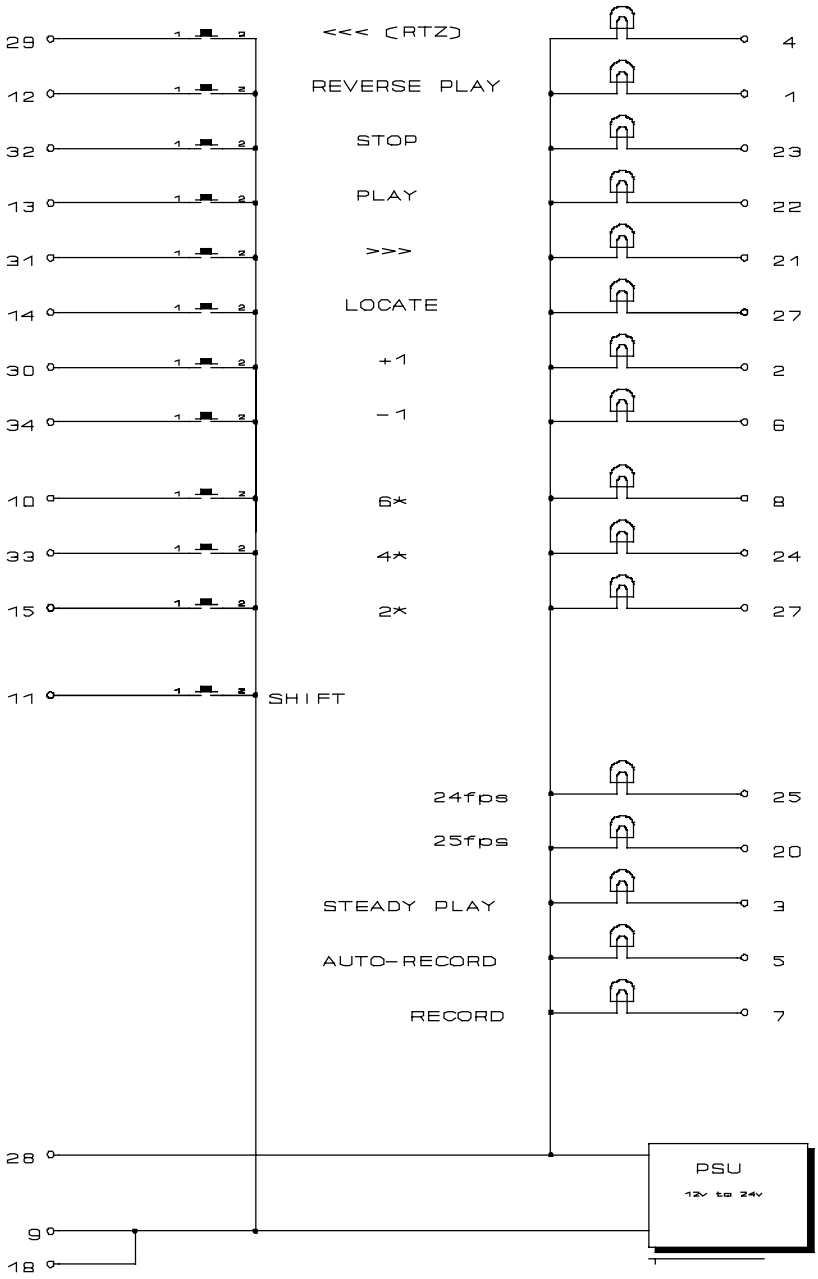

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4 BRANDON AVE, WOODLEY, BERKS, RG5 4PU		
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10.18 COMBINED COMMANDS

SHIFT+PLAY	RECORD
SHIFT+RVS-PLAY	AUTO-RECORD ENABLE
STOP+PLAY	CRAWL FORWARD
STOP+RVS-PLAY	CRAWL REVERSE
JOG+FWD	STEP ONE FRAME FORWARD
JOG+RWD	STEP ONE FRAME BACKWARD
PLAY+RWD	INSTANT REPLAY
LOCATE+CUE_2	LOCATE CUE_2, if cycle is active then LOCATE (CUE_2-Preroll)
PLAY+LOCATE	LOCATE (CUE_1-Preroll) wait for DELAY seconds then enter play.
PLAY+LOCATE+CUE_2	LOCATE (CUE_2-Preroll) wait for DELAY seconds then enter play.
PLAY+CYCLE	REPEAT CYCLE, Enter play DELAY seconds after locating to CUE_1-PREROLL.
PLAY+REWIND	INSTANT REPLAY, locate current position less 15 (programable) seconds then enter play
FWD +RWD	SHUTTLE
SHIFT+STOP	CHANGE SLAVE STATUS (MASTER -> SLAVE, SLAVE -> MASTER)
SHIFT+FWD	DECREMENT OFFSET
SHIFT+REWIND	INCREMENT OFFSET

10.19 THE PLAY KEY

The action of the play key is modified dependant on the whether a locate to Q1 or Q2 is active. If the unit is locating CUE_1 or CUE_2 then the locate point is modified by subtracting PREROLL and once the locate is completed the unit will enter play "DELAY" seconds later.

10.20 THE CYCLE TALLY

When the cycle tally is illuminated locates to CUE_1 and CUE_2 are modified by subtracting Pre-roll seconds from the locate point.

10.21 PULSE FREQUENCY TALLY

This tally is now used as a film speed indicator! for 48/50/60 read 24/25/30fps.

10.22 MASTER, SLAVE-CODE, SLAVE-TACH

When the slave to code or slave to tach software option is not fitted these keys are used to switch configurations. The MASTER switch may be re-labled CONFIG-1, The SLAVE-CODE switch CONFIG-2, and the SLAVE-TACH switch CONFIG-3. CONFIG-4 may be accessed by depressing CONFIG-2 & CONFIG-3 simultaneously.

10.3 Maganatech Remote control connection List

Function (Magnatech 8-LB)	Magnatech	MC-1 Remote 2
Step - Tally	1	6
25 Frame Tally	20	20
Ready On Lamp	2	
Stop Lamp	21	23
Reverse Play Switch	3	12
24 Frame Lamp	22	25
Fast Reverse Switch	4	29
N/C	23	
2x Speed Switch	5	15
N/C	24	
Ground (Shield)	6	
Fast Reverse Lamp	25	4
Fast Forward Switch	7	31
Fast Forward Lamp	26	21
0v (+5 volt common)	8	
Reverse Play Lamp	27	1
Picture in reverse Lamp	9	
Play Switch	28	13
Stop Switch	10	32
+24 Volts	29	28
+24 volts	11	
0v (+24 volt Common)	30	9
0v (+24 volt Common)	12	18
Play Lamp	31	22
Step - Switch	13	34
+ 5 volts	32	
Picture in reverse switch	14	
6 x Speed Switch	33	11
4 x Speed Switch	15	33
6 x Speed Lamp	34	8
N/C	16	
Step + Lamp	35	2
4 x Speed Lamp	17	24
2 x Speed Lamp	36	27

Step + Switch	18	30

10.4 TRACK RECORD CONNECTIONS

Option Board MCO-3 includes 16 record on and 16 record off outputs (Suitable for two six tracks and one 4 track) These may only be addressed with a suitable serial remote (CB Electronics SR or MR series).

The track record ON and OFF outputs may be either Pulse or Continuous dependant on the selected configuration.

A master continuous record output, with pulse master record on and off outputs are also provided

A 37 way 'D' Female is fitted to the unit.

Pin	Cable Colour	Function	Pin	Cable Colour	Function
1		Channel 1 Record On	20		Channel 1 Record Off
2		Channel 2 Record On	21		Channel 2 Record Off
3		Channel 3 Record On	22		Channel 3 Record Off
4		Channel 4 Record On	23		Channel 4 Record Off
5		Channel 5 Record On	24		Channel 5 Record Off
6		Channel 6 Record On	25		Channel 6 Record Off
7		Channel 7 Record On	26		Channel 7 Record Off
8		Channel 8 Record On	27		Channel 8 Record Off
9		Channel 9 Record On	28		Channel 9 Record Off
10		Channel 10 Record On	29		Channel 10 Record Off
11		Channel 11 Record On	30		Channel 11 Record Off
12		Channel 12 Record On	31		Channel 12 Record Off
13		Channel 13 Record On	32		Channel 13 Record Off
14		Channel 14 Record On	33		Channel 14 Record Off
15		Channel 15 Record On	34		Channel 15 Record Off
16		Channel 16 Record On	35		Channel 16 Record Off
17		Master Record On Continuous	36		Master Record Off Pulse
18		Master Record On Pulse	37		+5v via link
19		Ground			

10.41 MB51 4 track connections (BA-50 Card fitted to MB51)

Up to 4 4 track machines may be connected, one only is shown. The MC-1 should be set to CONt rr or PULSE rr.

MC-1 Pin	Cable Colour	MB51 ST5 Pin	Function	MC-1 Pin	Cable Colour	MB51 St5 Pin	Function
1		10a	Track 1 Record On	20		6a	Track 1 Record Off
2		9a	Track 2 Record On	21		5a	Track 2 Record Off
3		8a	Track 3 Record On	22		4a	Track 3 Record Off
4		7a	Track 4 Record On	23		3a	Track 4 Record Off
5			Track 5 Record On	24			Track 5 Record Off
6			Track 6 Record On	25			Track 6 Record Off
7			Track 7 Record On	26			Track 7 Record Off
8			Track 8 Record On	27			Track 8 Record Off
9			Track 9 Record On	28			Track 9 Record Off
10			Track 10 Record On	29			Track 10 Record Off
11			Track 11 Record On	30			Track 11 Record Off
12			Track 12 Record On	31			Track 12 Record Off
13			Track 13 Record On	32			Track 13 Record Off
14			Track 14 Record On	33			Track 14 Record Off
15			Track 15 Record On	34			Track 15 Record Off
16			Track 16 Record On	35			Track 16 Record Off
17			Master Record On Continuous	36			Master Record Off Pulse
18			Master Record On Pulse	37			+5v via link
19		2a	Ground				

11.0 VARISPEED

In the Varispeed mode the MC-1 Biphase output rate may be set very precisly, in this mode the timecode output will not be continuous, if continuous locked timecode is requiredthen a FC-1 filmcoder should be used.

To enter the varispeed mode, enter the Unit Configuration and set SPEEd 0. The last four digits of the Generator user bit setting are then used to set the speed. Depress the set key, and select GEN.U. look up the speed required on the table below, using the **<-, ->, INC** and **DEC** keys set the last four characters of the display. Exit using the SET key.

This sets the maximum speed of the system to the table below. The config keys may be used to switch to and from this mode. The maximum speed setting is limited to 50 fps for safty. The Fast Forward and Fast Rewind keys may be used to output the selected frame rate.

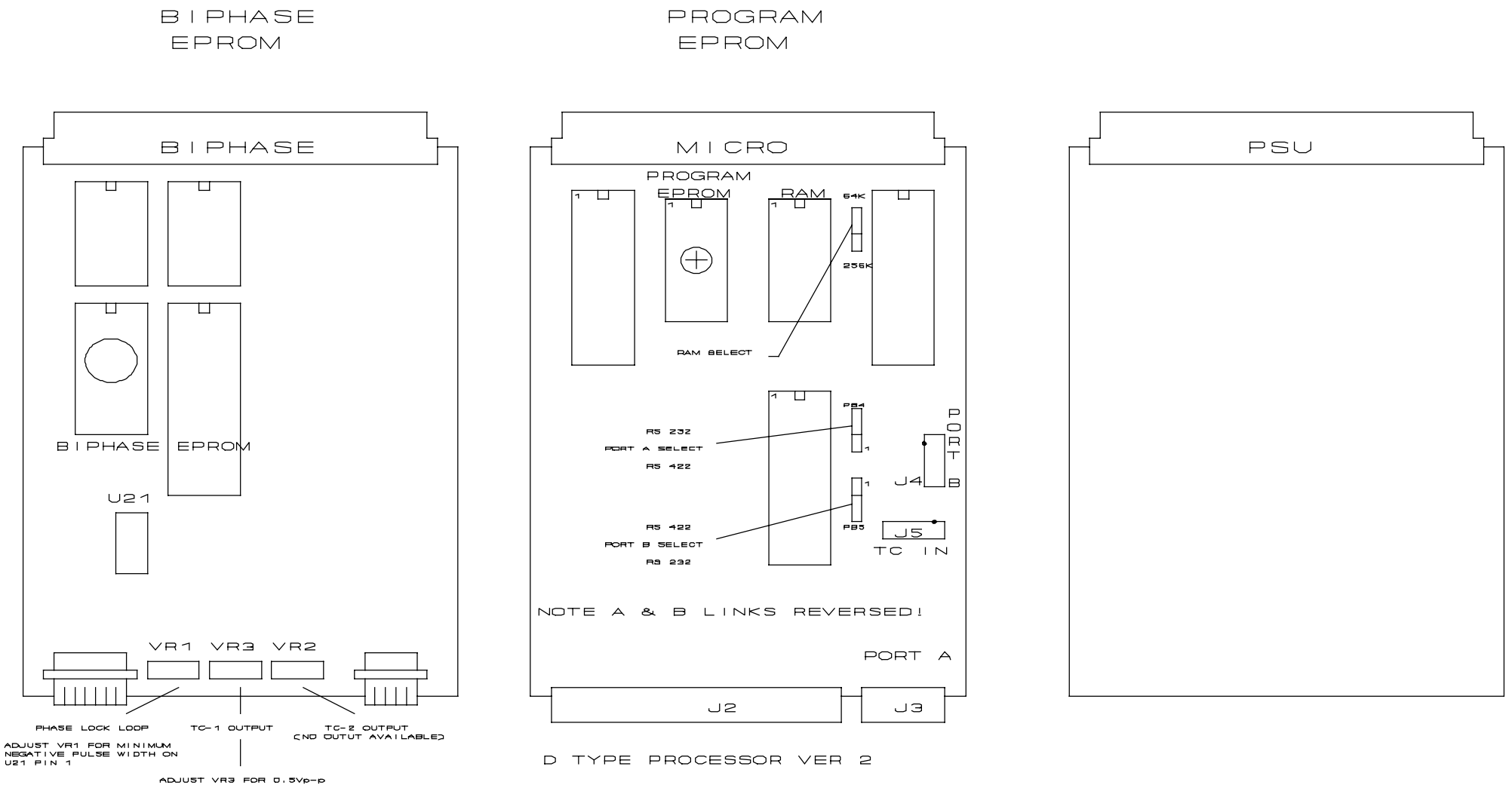
FPS	SET	FPS	SET	FPS	SET	FPS	SET
15.0	0320	20.0	0258	25.0	01E0	30.0	0190
15.1	031B	20.1	0255	25.1	01DE	30.1	018F
15.2	0315	20.2	0252	25.2	01DC	30.2	018D
15.3	0310	20.3	024F	25.3	01DA	30.3	018C
15.4	030B	20.4	024C	25.4	01D8	30.4	018B
15.5	0306	20.5	0249	25.5	01D7	30.5	0189
15.6	0301	20.6	0247	25.6	01D5	30.6	0188
15.7	02FC	20.7	0244	25.7	01D3	30.7	0187
15.8	02F7	20.8	0241	25.8	01D1	30.8	0186
15.9	02F3	20.9	023E	25.9	01CF	30.9	0184
16.0	02EE	21.0	023B	26.0	01CE	31.0	0183
16.1	02E9	21.1	0239	26.1	01CC	31.1	0182
16.2	02E5	21.2	0236	26.2	01CA	31.2	0181
16.3	02E0	21.3	0233	26.3	01C8	31.3	017F
16.4	02DC	21.4	0231	26.4	01C7	31.4	017E
16.5	02D7	21.5	022E	26.5	01C5	31.5	017D
16.6	02D3	21.6	022C	26.6	01C3	31.6	017C
16.7	02CF	21.7	0229	26.7	01C1	31.7	017B
16.8	02CA	21.8	0226	26.8	01C0	31.8	0179
16.9	02C6	21.9	0224	26.9	01BE	31.9	0178
17.0	02C2	22.0	0221	27.0	01BC	32.0	0177
17.1	02BE	22.1	021F	27.1	01BB	32.1	0176
17.2	02BA	22.2	021D	27.2	01B9	32.2	0175
17.3	02B6	22.3	021A	27.3	01B8	32.3	0174
17.4	02B2	22.4	0218	27.4	01B6	32.4	0172
17.5	02AE	22.5	0215	27.5	01B4	32.5	0171
17.6	02AA	22.6	0213	27.6	01B3	32.6	0170
17.7	02A6	22.7	0211	27.7	01B1	32.7	016F
17.8	02A2	22.8	020E	27.8	01B0	32.8	016E
17.9	029E	22.9	020C	27.9	01AE	32.9	016D
18.0	029B	23.0	020A	28.0	01AD	33.0	016C
18.1	0297	23.1	0207	28.1	01AB	33.1	016B
18.2	0293	23.2	0205	28.2	01AA	33.2	0169
18.3	0290	23.3	0203	28.3	01A8	33.3	0168
18.4	028C	23.4	0201	28.4	01A7	33.4	0167
18.5	0289	23.5	01FF	28.5	01A5	33.5	0166
18.6	0285	23.6	01FC	28.6	01A4	33.6	0165
18.7	0282	23.7	01FA	28.7	01A2	33.7	0164
18.8	027E	23.8	01F8	28.8	01A1	33.8	0163
18.9	027B	23.9	01F6	28.9	019F	33.9	0162
19.0	0278	24.0	01F4	29.0	019E	34.0	0161
19.1	0274	24.1	01F2	29.1	019C	34.1	0160
19.2	0271	24.2	01F0	29.2	019B	34.2	015F
19.3	026E	24.3	01EE	29.3	019A	34.3	015E
19.4	026B	24.4	01EC	29.4	0198	34.4	015D
19.5	0267	24.5	01EA	29.5	0197	34.5	015C
19.6	0264	24.6	01E8	29.6	0195	34.6	015B
19.7	0261	24.7	01E6	29.7	0194	34.7	015A
19.8	025E	24.8	01E4	29.8	0193	34.8	0159
19.9	025B	24.9	01E2	29.9	0191	34.9	0158

Configuration Table

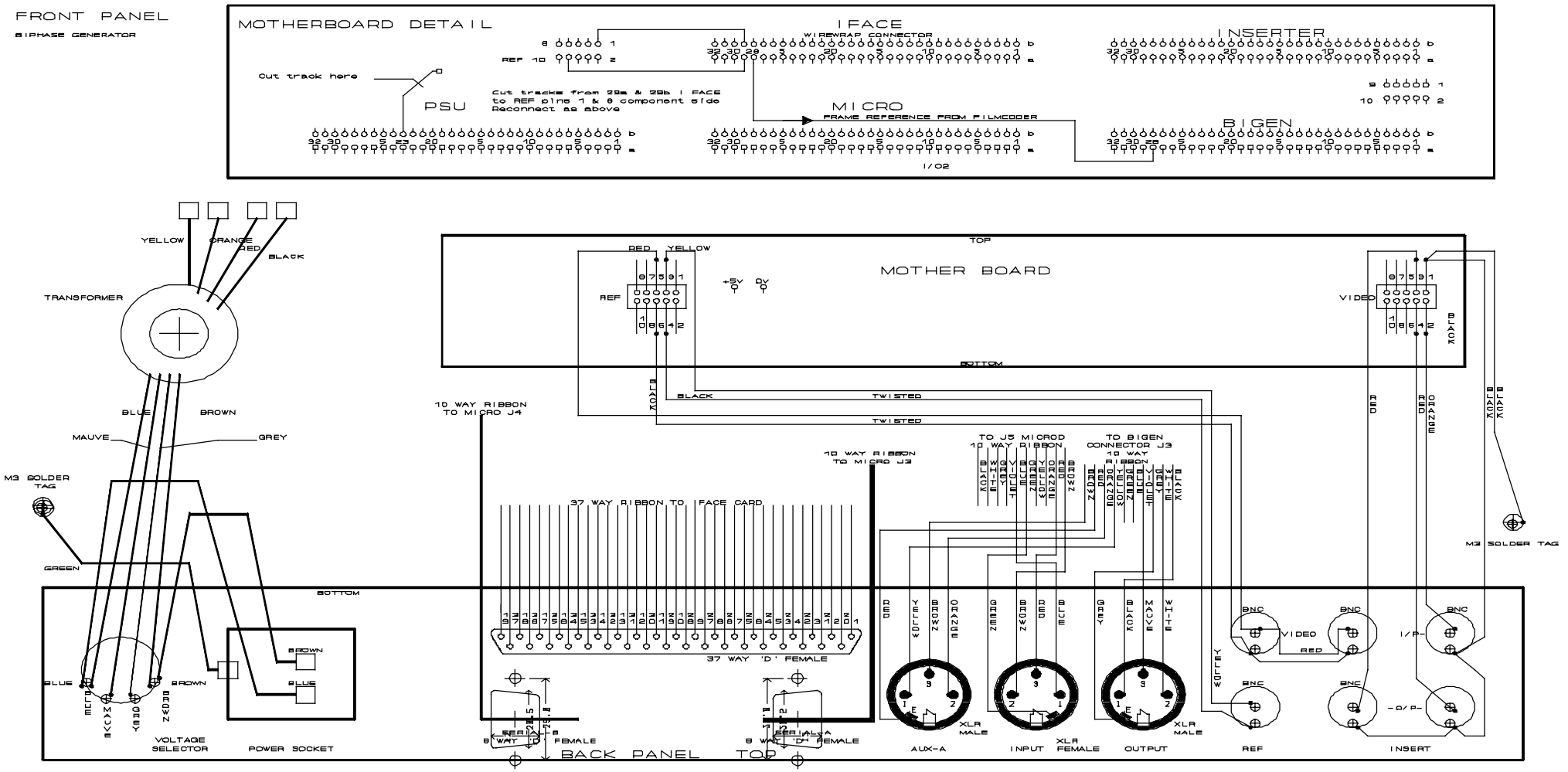
Offset	Function	Config 1 $7F00		Config 2 $7F20		Config 3 $7F40		Config 4 $7F60		Config 5 $7F70		Config 6 $7F60	
		Default	User	Default	User	Default	User	Default	User	Default	User	Default	User
00	Biphase Frame Rate: Filn Std	24		25									
01	Timecode Generator Standard: Gen Std	25		25									
02	System Reference: SYSt rEF	Video											
03	System Reference frequency	REF 50											
04	Pulse Output Frequency	PULSE 50											
05	Accelleration from Play to Wind Speed	ACCN 5											
06	Accelleration from Stop to Play Speed	PACCN 5											
07	Maximum speed	SPEED 05											
08	Timecode Output Enable Slow/Play/Fast	SPF CodE											
09	Tempory Video Offset	VOFSt 00											
0A	Film Position Display	Fln FEEt											
0B	Jog Pot Sensitivity	JOG 04											
0C	Biphase table/Rate	tAbLE u1											
0D	Pre Roll	PrE r 05											
0E	Post Roll	PoStr 01											
0F	Loop Delay	Delay 01											

Configuration Table

Off set	Function	Config 1 $7F00		Config 2 $7F20		Config 3 $7F40		Config 4 $7F60		Config 5 $7F70		Config 6 $7F60	
		Norm	User	Norm	User	Norm	User	Norm	User	Norm	User	Norm	User
10	Instant Replay	I-rPLY 15											
11	Record Advance	REcAdv 04											
12	16/35mm Film Footage	35nn											
13	Operational Mode:- Normal/Tapeless/Sony 9 pin/Fwd Only	NOrNAL											
14	Fast TC:- Incremental /Stationary Code	F No Inc											
115	Play from Wind via Stop?	PLAY NOrN											
16	Direction Change Delay	StPdEL 00											
17	Leader Length	LEAd 00											
18	Start Picture/Leader	St-Pictr											
19	Timecode Mute On Change	Nute 05											
1A	Burst Length	BURST 11											
1B	Generator User Data	GU-FEET											
1C	Chase Master Master / Timecode / Serial B / Serial A	SLV SErb											
1D	Jog configuration	JOG Vid											
1E	Parallel Record Commands	CONt-rEC											
1F	Parallel Remote Type	rEn2 tAL											



CB ELECTRONICS
Loddonside, Lands End House
Beggars Hill Road, Charvil,
Berks, RG10 0UD, England



USES LARGE FRONT PANEL PCB

SEE MC1 FRONT PANEL FOR DETAILS

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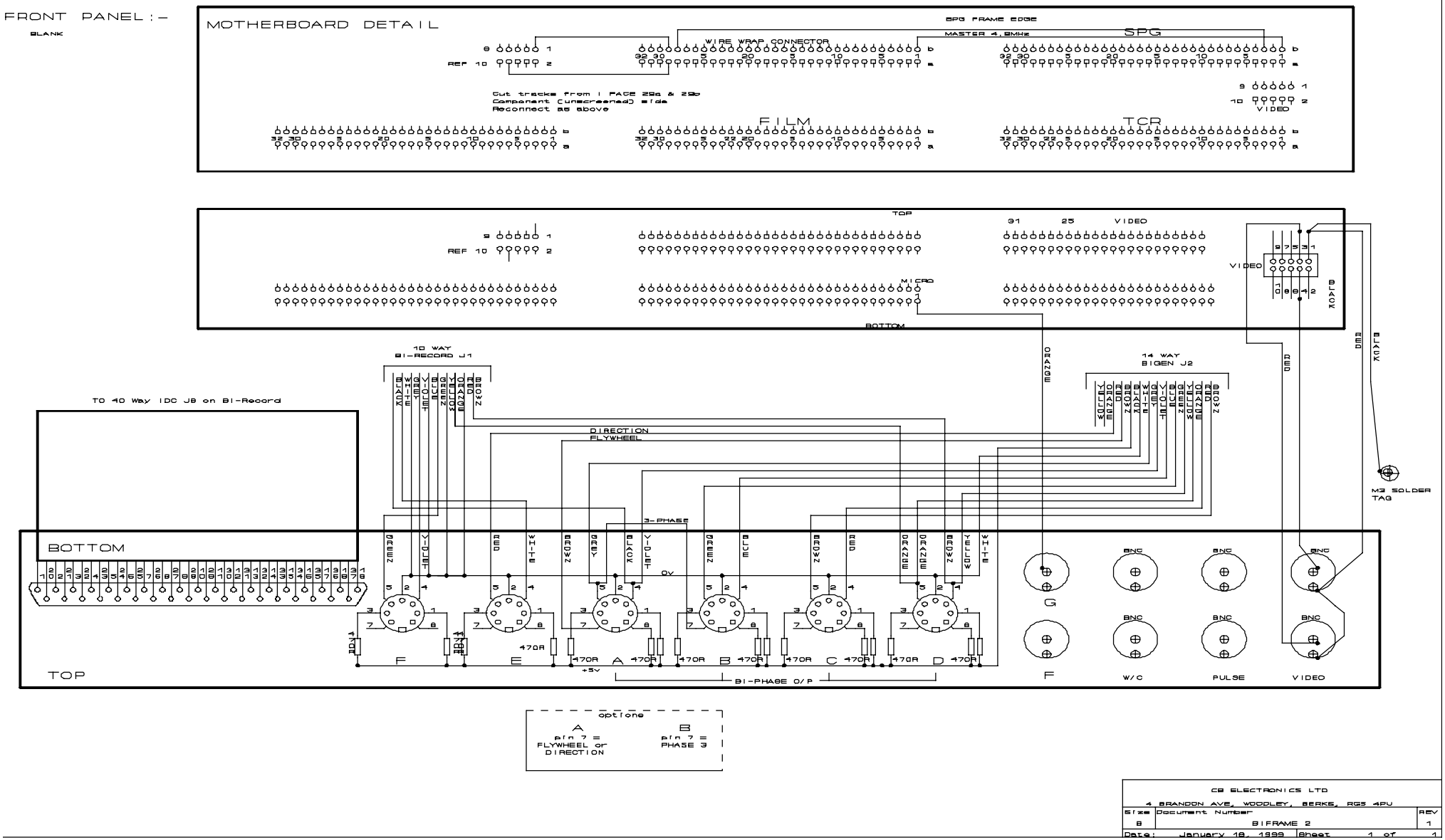
FRONT PANEL :-

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