FC-1 Film Coder

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FILM-CODER

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1.0 DISPLAY

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

Generator timecode
Generator user bits

Film position in TIME and FRAMES
Film position in FEET and FRAMES

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

1.06 FRM.D
This key is used to enable or disable the display of frames. The **FRM.D.** 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 4.00 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 section 4.00 CONFIGURATION for the method of selecting the generator colour lock status.

Not currently available.

1.09 REF

These LED's illuminate to indicate the selected frame rate reference for the timecode generator when set to FREE RUN. The following external references may be selected:-

VIDEO	External composite video input
EXT	External frame or 2*frame rate input
MAINS	Internally derived mains line
FILM	Locked to incoming Bi-Phase

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

Note: See section 4.00 CONFIGURATION for method of selecting generator reference.

2.0 GENERATOR

2.1 G.RESET
This key functions differently depending whether the generator is free running or locked to the bi-phase input.

2.11 G.RESET when generator LOCKED to BI-PHASE input
When the 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.RESET depressed and released.

2.12 G.RESET when generator free running
This key is used to stop, reset and start the generator to the preset start time. When the **G.RST** LED is illuminated the generator is stopped and reset to the preset start time. To start the generator depress the **G.RST** key, the generator will start and the **G.RST** LED will be extinguished.

Note: See section 4.00 CONFIGURATION for method of setting the preset start time.

2.2 FREE RUN
When the **F.RUN** LED is illuminated the generator will operate as a normal time code generator. The generator speed is locked to the selected reference (section 1.09). The generator will start and stop as commanded by the **G.RESET** key (section 1.212).

When the **FREE R** is selected CONFIG 4 is selected, when **FREE R** is deselected the previous CONFIG is selected.

3.0 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 or user bits may be selected.

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 the current displayed data will be cleared to all zero's.

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

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

4.00 UNIT CONFIGURATION

The first display in the unit configuration indicates witch of the four selectable setup's the unit is set to. The four choices **CONFIG 1** .. **CONFIG 4** may be selected simply by useing the **INC, DEC, <-** or **->** keys, once you have chosen and modified the configuration use the **SET** key to exit.

CONFIGURATION MODIFICATION

To modify a parameter within a selected configuration simultaneously depress both **<-** and **->** keys a second time to enter the configuration menu (note. a third simultaneous depression of these keys will enter the **SERIAL CONFIGURATION 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:-

GEn Std
GEn rEF
Film Std
GUSR SEt / GU FEET / GU EdGE
LEAd ??
PPF - ???
GSPd PPP / GSPd SPH / GSPd PPH / GSPd SPP
Phase ??
GSPd PPP / GSPd SPH / GSPd PPH / GSPd SPP
bi-PHASE / tACH dir
dir A / dir b / UP ONLY
CONt OFF / CONt ON
SCodE ON / SCod OFF
35 mm / 16 mm
BURSt ??
Norn Out / PLAY Out / SYNC Out
FrZ dISP / FrZ ENd / FrZ LOOP
dELAY ??
PLS VId / PULSE Et / PS NAINS
NoLocOut / ConF Loc / FrZ Frnd / FrEEZ / TotAlLoc

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 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, the film will determine the frame rate, with a film speed of 24 FPS the code rate will be 30 FPS. With a film speed of 23.97 FPS the code rate will be 29.97 FPS.

4.02 GENERATOR REFERENCE: GEN REF
The generator frame rate reference in free run mode may be set to any of the following:-

XTAL	Internal crystal reference.
VIDEO	External video reference.
EXT	External frame or 2 x frame rate.
MAINS	Internal reference derived from the power input.
FILM	Derived from the film frame rate.

NOTE: When the generator is not locked to film the generator frame rate is assumed to be the same or one half of the reference frame rate.

4.03 FILM SPEED: FILM Std
The film frame rate may be set to 24, 25 or 30 frames per second. Some film machines (ALBRECHT) give out the same pulse rate for any frame rate. In this case the film standard is set by the pulse rate. When used with the ALBRECHT the unit film standard should be set at 25 for both 24 and 25 frames per second.

4.04 GENERATOR USER SOURCE: GUSR SEt / GU FEEt / GU EdGE
The generator user bits may be selected to any of the following

GUSR SEt	As set by the user in setup.
GU FEEt	**The current Film Footage**
GU EdGE	**The current film edge code (KeyKode). Only available with the KeyKode reader option.**

4.05 LEADER LENGTH: LEAd ??
When using the FilmCoder with a Leader it is often required that the film is aligned at the start of the leader but the zero point should be at the start of picture. To achieve this set the length of the leader in FEET at this point eg:-

LEAd 00	No leader
LEAd 12	Twelve foot leader
LEAd 15	Fifteen foot leader

Note:-   This setting assumes 16 frames per foot for both 16mm and 35mm operation.

4.06 PULSES PER FRAME: PPF - ??

The number of tach pulses per frame is set by this flag, currently adjustable between 1 and 100.

4.07 PHASE: PPF - ??
When connected to a Tele-cine it was discovered that the slack between the picture frame and the sprocket could cause a random frame error. The phase parameter is used to offset the biphase counter so that any movement in the sprocket wheel does not cause the film count to change.

4.07 LOW/HIGH SPEED CODE:
GSPd PPP / GSPd SPH / GSPd PPH / GSPd SPP
When the input pulse rate is below 2/3 of play speed the output frame rate can no longer track the input. When the input pulse rate is above 4/3 of play speed the output frame rate can no longer track the input.

GSPd PPP :   Slow speed:- The timecode output frame rate is set to nominal speed and position update on change.
High Speed:- The timecode output frame rate is set to nominal speed and position update on change.

GSPd SPH : Slow Speed:- The timecode output frame rate is set at 1/4 of nominal speed and position update on change.
Hi Speed:- The timecode output frame rate is set at 4 x nominal speed and position update on change.

GSPd PPH : Slow speed:- The timecode output frame rate is set to nominal speed and position update on change.
Hi Speed:- The timecode output frame rate is set at 4 x nominal speed and position update on change.

GSPd SPP : Slow Speed:- The timecode output frame rate is set at 1/4 of nominal speed and position update on change.
High Speed:- The timecode output frame rate is set to nominal speed and position update on change.

4.08 PULSE INPUT: bi-PHASE / tACH dir
The FILM CODER can convert both bi-phase pulses and a tach pulse with direction signal to timecode.

4.07 FILM DIRECTION: dir A / dir b / UP OnlY
When The unit is connected the count may be reversed. If the input is bi-phase then the connections may be reversed, however if a tach and direction input is used this is not possible. In either case the count direction may be reversed by selecting **DIR b.**

NOTE: The direction of count is only updated when a change of direction is detected, The film machine should be run forwards and backwards after this parameter has been changed.

4.08 CONTINUOUS CODE: CONt OFF / CONt ON
The output when the film is stopped is determined by this flag:-

CONT OFF :   No timecode output.

CONT ON :   Stationary timecode.

4.09 STATIONARY CODE: SCod ON / S Cod OFF
If the output is inhibited when the film is stopped some timecode readers will not recognise the jump in timecode value when G.RST is depressed. If this problem is encountered then setting this option to **S Cod OFF** may solve this problem. When enabled the generator starts one second before the G.RST point and than plays to the point.Synchronizers that work correctly with stationary code include the Adams Smith, Studer 4000 and Timeline, synchronizers that will not work with stationary code include Tascam, Studer 2000 and Q-Lock.

S Cod ON :   Stationary code allowed, Time code numbers may be repeated.

SCod OFF :   Stationary code not allowed, Time code numbers should increment to current position.
NOTE: See section 4.09, this must be set to CONt OFF.

4.10 FILM SIZE: 35mm / 16mm
The number of frames per foot for the film position in feet and frames is determined by this flag.

35mm   16 frames per foot

16mm   40 frames per foot

4.11 CODE BURST LENGTH: BurSt ??
This flag sets the number of frames sent when not at play speed. When slow speed bi-phase is read then stationary code is output for a minimum of **BURST** frames between value changes. When high speed biphase is read then incrementing code is output at play speed for **BURST** frames before value change.

4.12 TIMECODE OUTPUT: Norn Out / PLAY Out / SYNC Out

This flag determines when the timecode output is enabled as follows:-

Norm Out   The timecode output is enabled at all times.

PLAY Out   The timecode output is only enabled when generating incrementing Code at play speed.

SYNC Out   The timecode output is only enabled when the generator is phase locked.

4.13 OPERATION WITH A FILM LOOP: FrZ dISP / FrZ ENd / FrZ LOOP

When film loops are used it is necessary to define the beginning and end of the loop, and enable an automatic reset of both film and timecode at the end of the loop.

FrZ dISP   Loop software disabled, the **FREEZE** key is used to freeze the display.

FrZ ENd   Loop software enabled, the **FREEZE** key is used to Mark the end of the LOOP. When the **G.RST.** key is depressed the start of the loop is defined and the length of the loop is set at 12 hours.

FrZ LOOP   Loop software enabled, the **FREEZE** key is used to freeze the display. When the **G.RST.** key is depressed the beginning of the loop is re-defined but the length of the loop remains the same.

To run a film loop follow the following sequence:-
1. Check length of leader, set Configuration 4.15 to the required leader length.
2. Set configuration 4.18 to **FrZ ENd**.
3. Position the film at the start of the leader and depress the **G.RST.** key.
4. Move the film forward until the start of the leader is found. On exactly the same frame as step 3. depress the **FREEZE** key.
5. If required set configuration 4.18 to **FrZ LOOP** to enable the FREEZE key and lock loop.
6. Set configuration 4.19 to the required loop start delay.

4.19 LOOP START DELAY: dELAY 50

When using film loops with automation or hard disc systems it may be necessary to insert a break in the timecode at the beginning of the loop. This is to tell the system that the code has stopped. If this break is not inserted the system may assume that there has been an edit in the timecode and not loop back to the beginning. This break may be set from 0 to 99 frames in length.

4.20 PULSE OUTPUT, DEFAULT REFERENCE

Generator reference:- VIDEO, EXTERNAL, or MAINS
   The reference for the optional pulse output is the same as for the generator.

Generator reference:- XTAL, FILM
   The reference for the optional pulse output is set by this variable to any of the following:-

PLS Vid   Pulse referenced to Video
PULSE Et   Pulse referenced to External
PS NAINS   Pulse referenced to the mains

4.22 LOCKOUT: NoLocOut / ConF Loc / FrZ Frnd / FrEE Run / TotAlLoc

This allows lockout of the configuration and some of the keys are progressively locked out defined as follows:-

NoLocOut   No Lock out
ConF Loc   The current configuration is locked out.
FrZ Frnd   The **FREEZE** and **Frm.D.** keys are locked out.
FrEE Run   The **FREE** key is locked out.
TotAlLoc   The **G.RST** and **SET** keys are locked out.

To remove the lockout on the current setting then a **Soft Reset** (See Section 6) should be preformed

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4.3 SERIAL & VIDEO CONFIGURATION

To enter the configuration mode first enable **SET** then when the **SET** LED is illuminated depress both **<** and **>** simultaneously to enter **CONFIGURATION**, Then depress **<** and **>** simultaneously a second time to select between VIDEO and SERIAL CONFIGURATION. Use the **<** and **>** to select between **VIdEO** and **SERIAL** (Where two serial ports are fitted then select between **SERIAL A** and **SERIAL B**. Once selected then depress **<** and **>** simultaneosly to enter **SERIAL CONFIGURATION or VIDEO CONFIGURATION**.

4.4 SERIAL CONFIGURATION

The ASCII SERIAL CONFIGURATION display indicates either the parameter to be modified or the various selections of a particular parameter in the same way as in CONFIGURATION. The first three selections are as follows:-

9600bAud / 300 bAud / 1200bAud / 2400bAud / 19200 bd
NO   PAr / EVEN PAr /Odd PAr
1 StOP / 2 StOP

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, CONFIGURATION and SETUP modes are exited. The parameters are then set as selected whilst in setup, CONFIGURATION or SERIAL CONFIGURATION.

Further information on serial configuration can be found in the application specific manuals eg. EDL, Sony P2 and Evertz emulation.

4.41 BAUD RATE
9600bAud / 300 bAud / 1200bAud / 2400bAud / 19200 bd

The BAUD rate is user selectable to any one of the above standard baud rates. After a hard reset the unit will select 9600 BAUD.

4.42 PARITY
NO   PAr / EVEN PAr / Odd PAr
The type of data parity bit is user selectable. After a hard reset the unit will select **NO   Par** as its default mode.

4.43 STOP BITS
1 StOP / 2 StOP
The number off stop bits is user selectable, the default setting is 1 stop bit.

4.5 VIDEO CONFIGURATION

In VIDEO 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. The first three selections are as follows:-

PAL / NtSC
INSErt -1 / INSErt 0 / INSErt 1
GUtLn ??

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 VIDEO CONFIGURATION, SERIAL CONFIGURATION, CONFIGURATION and SETUP modes are exited. The parameters are then set as selected whilst in setup, CONFIGURATION, VIDEO CONFIGURATION or SERIAL CONFIGURATION.

4.51 INSERTER STANDARD: PAL / NtSC

This flag sets the expected video standard for the inserter.If set to PAL the unit will operate correctly on NTSC but any insertion at the bottom of the screen will not be displayed since there are less lines per field.

4.52 INSERTER OFFSET: INSErt -1 / INSErt 0 / INSErt 1

The timecode inserter is set to insert correctly assuming that the reference video is in phase with the inserter video. When the film is stationary the current valued are not adjusted before insertion. When the unit is in play one frame is added before insertion since two insertion buffers are used one of which is updated whilst the other is displayed. This option allows a +/1 one frame offset to be added to the inserted video.

4.53 VITC GENERATOR LINE: GUtLn 19

When the VITC generator is fitted this parameter defines the line numbers onto which the VITC is inserted. The VITC is inserted to two lines separated by one empty line, thus if line 19 is selected then VITC will be inserted on lines 19 & 21.

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.

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

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** | F | R | E | E | R | U | N |

_____

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:-

Setting	**Nominal**	**SELECT**	
_____	10:00:00:00	GEN T.	Generator Reset Time
_____	00:00:00:00	GEN U.	Generator Reset USER
_____	F0:00:00:00	FILM F.	Generator Reset Film Feet

CONFIGURATION

Setting	**Nominal**	**Options**
_____	25	GEn Std 24, 25, 29, 30
_____	Video	GEn rEF XTAL, Video, Line, External, Film
_____	24	Film Std 24, 25, 30
_____	GUSR SEt	GUSR SEt / GU FEEt / GU EdGE
_____	LEAd 00	LEAd 00 - 30
_____	PPF - 02	PPF - 001 - 100
_____	GSPd PPP	GSPd PPP / GSPd SPH / GSPd PPH / GSPd SPP
_____	bi-PHASE	bi-PHASE / tACH dir
_____	dir A	dir A / dir b
_____	CONt OFF	CONt OFF / CONt ON
_____	S Cod ON	S CodE ON/ S Cod OFF
_____	35 nn	35 nn / 16 nn
_____	bURSy 06	0 - 29
_____	Norn Out	Norn Out / PLAY Out / SYNC Out
_____	FrZ dISP	FrZ dISP / FrZ ENd / FrZ LOOP
_____	dELAY 50	0 - 99
_____	PLS Vid	PLS Vid / PULSE Et / PS NAINS
_____	NoLocOut	NoLocOut / ConF Loc / FrZ Frnd / FrEE Loc / SEt Loc
_____	9600bAud	9600bAud/300 bAud/1200bAud/2400bAud/4800bAud/19200bd
_____	NO PAr	NO PAr / EVEN PAr / Odd PAr
_____	1 STOP	1 StOP / 2 StOP
_____	PAL	PAL /NtSC

_____	INSERt 0	INSERt 0 / INSERt 1 / INSERt -1
_____	GUtLn 19	GUtLn 6 - 25

5.00 INSERTER
GENERATOR-TIMECODE, GENERATOR-USER, FILM-TIME, FILM-FEET

This unit can simultaneously display the generator timecode, generator USER bits, film time, and film footage. To adjust any of these first use the SELECT key to select one of **GEN, GENU, FILM T, FILM F** (see section 4.10 for 16/35 mm selection). All the following parameters may then be adjusted:-

5.01 ENABLE/DISABLE
To enable/disable the insertion first select the required data with the **SELECT** key, then depress the **INSERT** key, to enable/disable the insertion. The **INSERT** LED is illuminated when the selected data insertion is enabled.

5.02 STYLE
There are four different styles of timecode insertion available for each insertion as follows-

1) White numerals on a dark grey background.

2) Black numerals on a light grey background.

3) White numerals with no background.

4) Black numerals with no background.

To change the style, select the required data, hold the **INSERT** key depressed and depress the **STYLE** key. Each time the **STYLE** key is depressed the style will increment once.

5.03 SIZE
There are seven different sizes of numerals available from 10 lines by 8 pixels to 40 lines by 32 pixels.

To change the size,select the required data, hold the **INSERT** key depressed and depress width by 8 pixels, when at maximum size the next depression of the **SIZE** key will cause the size to revert to 10 lines by 8 pixels.

5.04 POSITION
Both the horizontal and the vertical position on the screen may be changed in increments of 8 pixels and 10 lines respectively.

To change the vertical position, select the required data, hold the **INSERT** key depressed and depress the **INC** key to move up the screen and the **DEC** key to move down the screen.

To change the horizontal position, hold the **INSERT** key depressed and depress the **<** key or **>** key as required.

Note: the screen "wraps round" in both directions, eg. to move from top of screen to bottom it is often quicker to use the **INC** key.

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. If the Current Configuration is locked out then the first depression will remove the lockout, the second will perform the **SOFT RESET**.

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.

8.00 REAR PANEL CONNECTIONS

8.01 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

Later units are supplied with a voltage selector switch.

8.02 OUTPUT XLR

The 3 pin XLR OUTPUT plug is a balanced output from the Time Code 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

8.03 EXT. REF. BNC

The EXT REF BNC is connected to the reference input of the time code 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.

8.04 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

8.05 INSERT I/P BNC

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 the telecine.

8.06 INSERT O/P BNC's

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

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

8.07 SERIAL 'D'

The SERIAL 'D' plug if fitted is connected to a RS232 port on the CPU board. A male 9 pin 'D' connector is mounted on the rear panel with screw lock. The pin connections are as follows:-

1	DTR
2	Tx data
3	Rx data
4	RTS
5	CTS
6	DSR
7	GROUND
8	DCD
9	+5 volt

The SERIAL port is normally connected to the REMOTE CONTROL unit or the PRINTER. The printer connection should be made to the following pins:-

9 way	Function	Printer
2	Tx data	
5	CTS	
7	Ground	

8.08 INPUT DIN CONNECTOR

The INPUT DIN socket is connected to the film interface board. The connector on the panel is female, 5 pin and 180 degree with latch. The pin connections are as follows:-

INPUT	FUNCTION		PCB
1	Dir/Biphase A +		5
2	Ground		4
3	Tach/Biphase B +		7
4	Dir/Biphase A -	6	
5	Tach/Biphase B -		8
6	+5v Internal via 470R		
7	+5v Internal via 470R		

VIEW FROM REAR

+5v Internal	7 o	o 6	+5v Internal	
Tach/Biphase B+	3 o	o 1	Dir/Biphase A +	
Tach/Biphase B-	5 o	o 4	Dir/Biphase A -	
		o2		
		Ground		

The Bi-Phase inputs are opto-isolated and floating, each input has a 470R resistor in series for use with a 5v signal. If the input signal is greater than 12v an external series resistor should be fitted.

Note: No connection is required to the ground input (pin 2) unless the internal +5v feed is used, this should only be used for a screen connection where the screen is NOT grounded elsewhere.

8.09 PARALLEL 'D' CONNECTOR

This connector is used for control and tally signals. The connector on the panel is a female 37 way 'D' with screw lock. The connections are as follows:-

PIN No.	FUNCTION
1	Play tally Collector
2	Play tally emitter
3	Opto input +
4	Opto output -
5	0v
6	+5v via 100R resistor
7	Tach output (open collector)
8	Direction output (open collector)
9	Gen Reset input -
10	Gen Reset input +
34	Switch 28 opto (-)
16	Switch 27 opto (-) Stop
35	Switch 26 opto (-) Start
17	Switch 25 opto (-) G. Rst
18	0v
37	Switch opto common (+)
19	+5v

The Gen Reset input has a 470 ohm series resistor for use with a 5v signal. If the input signal is greater than 12v an external series resistor should be fitted.

The play tally output is an opto isolated transistor and is internally limited to a maximum current of approximately 10mA.

The Tach output and Direction output are added when requested, they are NOT opto isolated.

8.10 AUX output XLR (option)

The 3 pin XLR AUX plug is a balanced output from the Pulse 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

This output is a sine wave derived from the selected reference. Where no reference is selected (XTAL or FILM) the last selected reference is used.

APPENDIX: HARDWARE SETUP

A.00 VIDEO CARD

A.10 Inserter

A.11 Input termination

The input of the inserter is terminated by R29(75ohm), This resistor is mounted on saddle pins to facilitate user modification if required.

A.12 Video Gain

The video Gain may be adjusted from 0dB to +8dB by adjusting VR2.

A.13 Video Frequency Response

The video frequency response may be adjusted via VC1.

A.14 Inserter White Level

After the video gain has been set the peak inserter white level may be set by enabling the timecode insert, and then adjusting VR1.

A.15 Inserter Stability

U17, R10, R11, C16 and VR3 (VR3 is labled X2 on older designs) form the Oscillator for the video character generator. VR3 adjusts the frequency of the oscillator. The frequency of this oscillator determines the stability and horizontal character size of the inserter.

Note 1. This preset should only be set after the unit has been allowed to reach its operating temperature.

Note 2. If U17 is replaced it may be necessary to change the value of R11.

B.00 FILMCODER CARD : CB8802

B.01 BIPHASE INPUT

The Biphase input is opto-isolated, where insufficient drive is available it may be necessary to reduce the load by changing R13 and R14 from 1K to 2K2.

B.02 TIMECODE OUTPUT

The timecode output clock is generated by a phase lock loop U17, the reference for the PLL is generated from the crystal reference by U13. The crystal frame rate signal is locked by software to the selected external reference. The stability of the PLL may be adjusted by VR3 when generating code at nominal speed.

The generator is capable of generating timecode at three different speeds. Play speed, 1/4 play speed and 4* play speed. This may be selected during configuration Lo On and Hi On. At low speeds VR4 should be used to adjust the stability of the PLL.

Test point 1, pin 12 of U17 should be used when setting VR3 and VR4. This point is normally high and is low for the duration of any difference between the reference input and the output feedback of the PLL.

The time code output level is adjusted by VR2(LEV). The timecode output is balanced with a source impedance of 330 ohms on each leg (R1 and R3).

To adjust the generator presets remove the base cover, this facilitates access to the 3 presets. The presets are labled on the track side of the board! To access the presets from the top, switch of power, remove video board, and switch on power. The unit will function as a reader/generator without the video board.

C.00 PSU Board

C.01 Colour Frame detection

VR1 is used to setup the colour frame detection circuit in PAL mode. VR2 is used to set up the colour frame detection circuit in NTSC mode.

To set the colour frame detection, connect a SPG with a colour frame reference output to the video reference input. set the unit for video reference, 8 field colour lock, and PAL or NTSC. Connect one channel of an oscilloscope to the colour field flag output on the SPG, connect pin of U23 on the TCR pcb to the second channel of the oscilloscope. Then adjust VR1(PAL) or VR2(NTSC) so that the two signals are in phase.

The colour frame detection is not currently used on the FilmCoder.