TC-4

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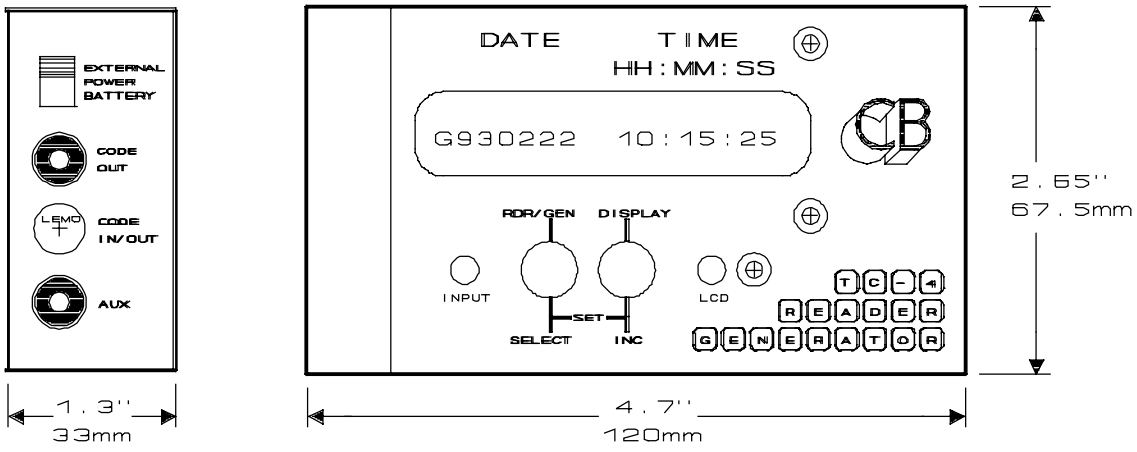
TC-4 PORTABLE LTC READER/GENERATOR

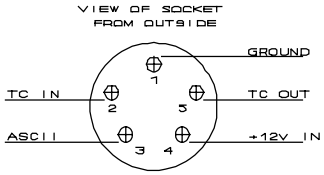
* TEMPERATURE COMPENSATED CRYSTAL . Accuracy approx. 1 frame a Day
* MULTI-STANDARD GENERATOR . . . . . EBU, SMPTE, DROP, FILM
* INTERNAL IN REAL TIME CLOCK . . . . . Time of Day on Switch on
* AMPS. RECOMMENDED USER BIT ASSIGNMENT . . . . Date, Month, Unit, Reel
* AATON FORMAT . . . . . Date, Month, Year, Production
* BURST MODE . . . . . 1..99 Frame Timecode Burst on Record Command
* JAM GENERATOR FROM READER . . . . . Accurate to 1/80th Frame
* LCD DISPLAY . . . . . 16 Character Display
* LONG BATTERY LIFE . . . . . 50+ Hours on a 9 volt Alkaline battery
* 5 PIN LEMO IN/OUT CONNECTOR . . . . . Aaton/Nagra Compatible
* ADDITIONAL OUTPUT CONNECTOR . . . . . Phono
* LIGHT WEIGHT . . . . . 100gms Including Battery
* SMALL SIZE 125x65x25mm
* EXTERNAL 12 Volt INPUT . . . . . Via the Lemo connector

OPTIONS

* VIDEO SYNC OUTPUT . . . . . 5v Composite Black

The TC-4 is designed as a Master/Slave location timecode Generator, When switched on the generator is preset with the current Time, Month, Date, Reel number and Unit number. A 16 character LCD display enables the user to check all parameters easily.





TEMPERATURE COMPENSATED CRYSTAL

The Monolithic Digital Temperature Compensated Crystal Oscillator (DTCXO) is accurate to 1 part per million over a temperature range of -30◦C to +85◦C. This translates to multiple TC-4 units maintaining a relative accuracy of 1 frame per day providing that all units are left ON! For multiple TC-4 to keep the same time, one should be designated master and be used to set the others.

REAL TIME CLOCK

The internal real time clock is powered by a separate ni-cad battery and uses a standard 32KHz watch XTAL. The clock chip is designed to consume very low power and will run for several months without the unit being switched on. When the unit is switched on the current TIME and DATE are read from the clock chip and the generator is set to the nearest second. To preserve battery life this is not run from the temperature compensated crystal and does not have the same accuracy.

USER BIT ALLOCATION

Timecode USER bits are split into eight 4 bit groups. The generator user bit groups are allocated as follows:-

AMPS

DAY	User Groups 1 & 2 (Hours)
MONTH	User Groups 3 & 4 (Minutes)
UNIT	User Group 5 (Seconds Tens)
REEL	User Group 6, 7 & 8 (Seconds Units & Frames)

All data except the UNIT number is stored as BCD so that it can be read on a standard reader display.

AATON

DAY	User Groups 1 & 2 (Hours)
MONTH	User Groups 3 & 4 (Minutes)
YEAR	User Group 5 & 6 (Seconds Tens)
PRODUCTION	User Group 7 & 8 (Frames)

BURST

When Burst is enabled (Set BURST to a non-zero Value) a 0v input on the Record Switch input will enable the timecode output for BURST frames. Whist the Timecode burst is output the BURST RELAY DRIVE output is taken to +5v.

JAM

Jam will be enabled when the TC-4 is Switched to Reader or after 8 frames without code. The Generator phase and data will be updated from the next reader timecode frame, JAM will then be disabled. At this point the generator TIME, MONTH, and DATE will be set from the reader data. **The Unit number and Reel Number will not be changed!** The Generator phase is set to an accuracy of 1/160th of a frame. By setting Multiple TC-4's from a single unit an initial accuracy of 1/80th of a frame may be obtained.

LCD DISPLAY

The user may select and display any of the following :-

READER/GENERATOR	**RANGE:-**	**GEN DISPLAY**
DATE & TIME		GYYMMDD HH:MM:SS
REEL NUMBER & TIME	0-999	GRL-??? HH:MM:SS
UNIT NUMBER & TIME	0-F	GUNIT-? HH:MM:SS

The Left hand key selects Reader or Generator as designated by the first letter on the Display (R=Reader, G=Generator). The Right hand key selects the display mode.

STANDARDS

The **TC-4** may be set to any of the following timecode standards:-

GSTD-25	25 frame per second **EBU** timecode.
GSTD-30	30 frame per second **SMPTE NON-DROP** timecode.
GSTD-24	24 frame per second **FILM** timecode.
GSTD-29	29.97 frame per second **SMPTE NON-DROP** timecode.
GST-29D	29.97 frame per second **SMPTE DROP FRAME** timecode.

Note: GSTD-29 will not keep real time, but will drift by 108 frames per hour. Entering and leaving setup will set the clock incorrectly.

BATTERY LIFE

The TC-4 consumes approximately 10mA, when the battery voltage drops below 5.5 volts the LCD contrast will change. At this point we recommend that the battery is changed at the next convenient time. However the unit will continue to generate timecode even when the LCD display is no longer visible. The following table shows nominal battery performance, battery life is dependant on load and frequency of usage, a Zinc/Carbon or Zinc Chloride battery will last longer used for 4 hours a day than if used for continuously.:-

TYPE	**CAPACITY**	**LIFE**	**COST £**	**£/HOUR**
Ni-Cad	0.11Ah	10 Hours	5.00	Rechargeable
Zinc Carbon	0.27Ah	22 Hours	0.90	0.040
Zinc Chloride	0.38Ah	32 Hours	1.30	0.041
Alkaline	0.53Ah	50 Hours	2.60	0.052
Zinc Air	1.50Ah	136 Hours	7.50	0.055

Use Zinc Air batteries for longest battery life and Zinc Chloride for best cost performance. The TC-4 is supplied with a Zinc Chloride battery.

If the video output option is fitted then the battery life will be reduced by approximately 20%.

LEMO CONNECTIONS

1 Ground
2 Timecode Input
3 Not used
4 12 volt input, the TC-4 will operate between 6 & 30 volts
5 Timecode Output

SETUP

1) In the normal mode select the display to setup, Time and Date, Reel Number, Unit Number or Standard.
2) Depress both keys simultaneously (Left Key, followed by Right key) to enter setup, then release both keys.
3) Use the Left hand key to move the cursor (time, date or reel).
4) Use the Right hand key to increment the selected number.
5) Depress both keys simultaneously (Left key, followed by Right key) to leave Setup, then release both keys.

Note: On leaving setup there will be a 1 bit drop-out on the timecode output.

APPLICATION TIPS

1) When you have to set the time on more than one TC-4, first set up one unit and then use that unit to Jam the other TC-4 units. By entering and leaving setup on the TC-4 the data from the generator is transferred to the real time clock.

   To set the clock after JAM enter and then exit the SETUP mode by depressing both keys simultaneously.

2) If you enter setup and wish to leave without setting the clock then turn the TC-4 off and then on.

3) To reset the unit to the current time of day after jam: turn switch the unit off and then on.