

THE COMPUTER LEARNING CENTRE SYSTEM

for

COMPUTER AIDED INSTRUCTION

TECHNICAL SPECIFICATION

of

The System installed on a Personal Computer

Nov 26th 1986

Spec 2.3

G.A. Freed

When the training message calls for VIDEO or AUDIO:-

- * *NISC, PAL, 525 and 625 line video*
- * *Full overlay of text, high or med. res. color graphics*
- * *Supports controllers for videodisk and tape players*
- * *Supports speech compressor and voice actuator*
- * *Delivers video with two interrelated flows of control*
- * *Interposes video segments in screen sequence*
- * *Superimposes video on separate flow of screen activities.*

If you want to combine PROGRAMMING expertise:-

- * *System delivers most MS-Dos software as a screen call*
- * *Animation, simulation may be incorporated*
- * *Other C.B.T. systems modules can be interposed*
- * *Delivery system trap keyboard strings passed to other software*
- * *Parameters causing branching may be passed from other software*
- * *Centralised teacher issuing of lessons in a network*
- * *Complete recording of student performance*
- * *4GL tools for student and course report generation.*

Video Tutor Holdings is a member of a consortium which is shortlisted to establish a computer-based learning industry in Queensland.

PEOPLE

G.A. Freed

Gerry Freed is a well known consultant to the investment capital industry. He has made a large personal financial commitment to the C.L.C. and provides its financial management. He has set up and managed successful technology based businesses in several countries.

As a director of the Illawarra Technology Centre and a Sydney University commercial initiative he is deeply involved in the support and commercialisation of academic research.

Ralph Tobias.

During a long and distinguished career in the Federal Public Service, Ralph Tobias was responsible for a number of creative initiatives. With the Dept of Productivity and then the Dept of Science and Technology. He was the inspiration behind the InterScan project, Defence Offsets, Technology Transfer Council, Enterprise Workshop scheme, Innovation Centres and he convened the Espie report on capital funding which led to the establishment of the M.I.C. scheme.

While on secondment to industry he conceived the contribution computers could make to industrial training which led to the formation of VTH Ltd., of which he is now a director. He was the designer of the Manly Junior sailing dinghy and was personally responsible for training many hundreds of young sailors.

Dr George Kelen

Dr Kelen is an Australian cardiologist whose career has developed in both the U.S.A. and Australia. He is a world authority on various software applications in clinical instrumentation. With his detailed knowledge of personal computers and machine level software as well as an involvement in medical education, he has made the major contribution in the detailed design of the CLC authoring system. He is currently resident in New York and is a director and shareholder of VTH Ltd, actively involved by computer link.

In addition we have drawn on a network of educators, ergonomic designers and computer programmers who continue to be available.

THE COMPUTER LEARNING CENTRE# SYSTEM

THE COMPUTER LEARNING CENTRE System is an Australian developed, computer based teaching system which combines the features and facilities of the computer with those of video tape and disk players to create and provide personalised, interactive teaching courses.

THE COMPUTER LEARNING CENTRE system facilitates the production of teaching courses incorporating a private, personalised and flexible approach to providing people with new knowledge and skills. People can schedule their learning sessions to their own learning pace and time convenience.

THE COMPUTER LEARNING CENTRE system has a unique ability to teach computer skills. It can operate and control the program being taught by the educational courseware.

THE COMPUTER LEARNING CENTRE system can be used as a single terminal learning station and also in a multiple workstation network.

THE COMPUTER LEARNING CENTRE single station system can include the following software components:

- an authoring system consisting of

- a screen editor

- a librarian

- a course compiler

- text and graphics screen capture utilities

- word processing file converters

- graphics editors

- program language interpreters and compilers

- other peripheral control software

- a run-time system
- a multi station management system
- a video tape and disk controller
- a video overlay controller
- a video cassette recorder or disk player
- a printer
- other peripheral devices

THE COMPUTER LEARNING CENTRE system will run on the Sperry PC and on IBM PC compatible computers using the PC.DOS* and MS-DOS# operating systems. It will be ported to some UNIX^ and UNIX derived operating systems.

THE COMPUTER LEARNING CENTRE system course material can consist of:

- Author generated passive screens

- Author generated interactive screens requiring responses from the student

- Copies of existing screens from both the course itself and other programs

- 'Live' screen access to other programs during lessons

- Tasks undertaken using specific programs

- Author generated video segments, and video segments derived from other sources

- Interactive tests for the student which can be tracked into revisions of previous material and/or extended material with more detailed explanations

THE COMPUTER CENTRE system separates the process of material preparation and lesson construction for ease of editing.

THE COMPUTER LEARNING CENTRE simplifies converting old material to lessons and the creation of manuals by two way word processor file conversion.

THE COMPUTER LEARNING CENTRE management system 'tracks' the progress of students over a series of teaching sessions.

THE COMPUTER LEARNING CENTRE authoring system provides standard lesson configurations on default. It also provides both menu driven and command driven controls to enable authors to create any desired screen configuration.

THE COMPUTER LEARNING CENTRE system through its flexibility, responsiveness and speed, enables new courses to be created in the shortest time.

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* MS-DOS is copyright to the Microsoft Corporation

^ UNIX is copyright to the Bell Laboratories

THE COMPUTER LEARNING CENTRE is a Registered Business Name of
Video Tutor Holdings Pty Ltd

PHILOSOPHY

Each computer supplier has designed their own operating system to get the best performance from their hardware. This has had the undesirable effect for their users, that only software written for their particular operating system can be used. Over the last three years this situation has changed, with the introduction of Ms-Dos and Unix. These operating systems have become an effective industry standard and software developers have become almost totally committed to new developments using them. The C.L.C. recognises the benefit of this to their users, as it not only makes available many thousands of proven programs but a continuing stream of new ones.

The CLC authoring system was written in 'C' the language of Unix to run under Ms-Dos. In view of continuing developments in computer graphics, artificial intelligence, CD-Rom, videodisks and speech communication, it was designed to avoid locking the user into the present state of the art.

To achieve this and also to maximise author productivity, the presentation and course creation tasks have been separated. Text based activities such as training manuals and text display are relegated to a word processor. Many such word processors are available for the P.C., each having particular benefits including familiarity to individual users. The CLC system takes the output from any of these and converts it to a computer screen presentation. Screen based presentations are created using a special editor concentrating on the visual appearance and layout including color, considered critical to trainee acceptability.

Similarly a number of graphics editors exist with differing capability. Efficient usage is dependent on personal skills and experience, so we have made a point of allowing the author to choose their favourite. It is an area of intense development as the needs for such things as animation and cartoon editing to be simplified for an average artist, have been recognised. The CLC system will integrate presentation material from these, benefiting from their development for much wider markets than C.B.T.

The industries active research in expert systems and artificial intelligence will eventually lead to much more ability to respond flexibly to student psychology. When available, the CLC system will take full advantage. The process of presentation creation is totally separated from material preparation. This simplifies archiving, retrieval and modification. The CLC compiler is an expert system in its own right and minimises the programming to be done by an author.

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The student's progress is continuously monitored by the CLC runtime module and the data gathered written to a file which may be read by a number of 4GL data base managers. This gives the further freedom that the user can design the reporting, on-line monitoring or student records to match their needs. As these grow with experience then the user can expand their database structures to match.

In video technology there is a plateau with video tape. The costs are low because of large consumer markets. Within Australia there is a large volume of U-matic and V.H.S. material in current use. The economics of training departments forces them to consider use of existing footage. Long access time will always limit its value in interactive applications.

Videodisk overcomes this but the present systems on offer are read only. This produces a different limitation, as it is only practical in well defined applications not needing post editing. Systems overcoming this are emerging. The CLC system will control videodisk players directly and videotape players through internal controller cards. It is expected that the software will handle the anticipated read/write systems. Because of the modular nature of the CLC software, changes that may be needed to match future developments will be straight forward and will not inconvenience users.

DEVELOPMENT POTENTIAL

The CLC system is a self contained proprietary product. With the product being a series of modules written in 'C', it is possible to order special developments or enhancements. The CLC personnel are available to work with customers to develop jointly the training and marketing ideas that will emerge from their operational experience.

OPEN INTEGRATION OF SYSTEM

In addition to material prepared on the CLC, segments can be created using the huge range of languages and application packages available on the P.C. This extends to the incorporation of presentation material produced on other authoring programs with special attributes, such as PILOT. The CLC authoring modules allow the capture of screens from working P.C. or Sperry mainframe program for editing and use. The CLC delivery system allows the presentation of active programs from other sources.

OPEN GRAPHICS

A variety of graphics editors including the PC graphics set, medium and high resolution color can be used. These include Polaroid Palette which will also create 35 mm slides and screens from packages such as Lotus 1-2-3. No delays in switching color images as image capacity is limited only by disk storage.

OPEN ARCHITECTURE

THE CLC system may be used to deliver presentations on individual PC's or on networks. Unique screen capture facilities enable images to be captured and edited from most MS-Dos application packages, Sperry mainframes using STEP and other computers on the network. Under UNIX further system architectures are available.

C.M.L. INTEGRATION.

User data and presentation performance information is written in a file format recognised by several 4gl data base managers including Dataflex. This allows the user to create reports and statistics anywhere on the network or on a linked mainframe. This makes it effective as a tool for market research. A recent application in the U.S.A enabled the Republican Party to gather voting attitudes while presenting video disk promotional material. Complete integration with databases on mainframes is made possible. It enables material delivered on the CLC system to be part of a total marketing strategy.

VIDEO INTERACTION

With the growing range of video controllers for the P.C. full interaction with video tape of both standards is available. This includes single screen overlay of video and computer images. The CLC system includes direct and full interaction with videodisk.

AUTHOR PRODUCTIVITY

The CLC system is a program generator, reducing the need of the author to 'program' to a minimum. The system converts standard format word processing files to screen text speeding text production. It converts screen material to word processing format, again speeding dramatically the production of associated training documentation. The system separates material preparation and presentation construction. This allows material to be archived, which maximises usage of authored work. Using a document reader, old training material can be converted to screens and text files for editing and incorporation. Video Cameras are available which create a graphics image from a still frame. With these photographs, published material and real life scenes may be captured and edited.

GROWTH PATH

The P.C is an industry standard. A world wide software industry is devoted to new applications and performance enhancements. Most of these can be utilised by the CLC system as is. Its modular program construction in 'C' allows us to easily add links to future developments. As a typical example Speech response and computer compressed speech output are now available. It is expected that this approach will be greatly improved over the next few years. It will remain compatible with the CLC usage of MS-Dos on the P.C. As more productive animation and cartoon editors are developed the author will be able to acquire these and deliver the output using the CLC system.

Porting to OS-2 presents no special problems. It may be expected to simplify and improve the graphics, TV video interface.

The configuration of a network of P.C.'s with a port to a mainframe allows for the storage of training material on the mainframe with supervisor managed student logon. It also allows for the consolidation of such databases as personnel and training records.

PREFERRED HARDWARE AND SOFTWARE.

We are continually evaluating hardware and software which may have value in a training or marketing application, selecting from the huge range of P.C. products. We are currently supporting the following preferred choices. However, nearly all P.C. software can be delivered with the CLC system and special provision can be made to accept new hardware configurations.

Material Sources.

Video Tape VHS, Beta, Umatic, PAL & N.T.S.C.

Sound tracks on video tape or recorded by digital compression.

Graphics Images in 640 X 400 or 320 X 200 pixel resolution, 4 or 15 colors.

Video frames converted from live camera, tape or disk to graphics computer screens.

Text screens created on the CLC editor.

Text screens derived from word processing packages such as The Word, Wordstar and Multimate.

Text screens derived from documents using the Document Reader. Animated sequences using Pilot or Basic.

Screens, graphics or text, captured from running programs on main frames or P.C.'s from such programs as Lotus 1-2-3 and using the CLC capture utilities.

Graphics produced on Mouse or Tablet drawn screens in color and high resolution using PC Paintbrush, PC Paint or Dr. Halo.

Images downloaded from Viatel or other videotext services.

Delivery Systems

For computer presentation any I.B.M. compatible P.C. with the appropriate graphics cards and color monitors.

We have had satisfactory experience with I.B.M., President, Sperry, A.T. & T., DEC Vaxmate, Corona and others.

Interactive input may be from keyboard, simple keypad or touch screen. Memory size depends on interleaved programs that may be incorporated.

For certain configurations a network may be preferred with the material centrally stored on hard disk. We use Novell or Sperry link.

For interactive video we prefer Sony U-Matic tape for ruggedness and the Sony Videodisk players. Also we have good experience with the latest Sony Multiscan high resolution dual input projection monitors for group viewing. We do support all four videodisk player suppliers, Sony, Hitachi, Pioneer and Phillips.

The computer control may be direct via the RS-232 port for the videodisks. We use the BCD controller card for tape and disk player control as these accept common commands.

The most effective presentations need overlaid video and computer images for maximum impact. For this we recommend the Microkey overlay cards which are obtainable in medium and high resolution color versions.

For speech compression and delivery we will support the Sperry Votrak card.

Normal presentation transport is on 5 1/4 in 360k floppy disks. They may be on A.T. format 1.2Mb disks if requested.

The list of options increases daily as the CLC system was specially designed to develop with innovations on the the P.C. concept. Contact us directly for details on how to incorporate your favourite hardware or software, and if needed get a quote for special drivers.

VERSIONS

Three versions of the CLC Authoring System have been introduced with common features.

Version 4.1

Version 4.1 may be considered as the starter level. It incorporates the authoring modules to prepare and compile straightforward interactive courses using text and medium resolution color screens. It includes the appropriate run time modules to show the lessons on color or mono screens.

Version 5.

Version 5 increases the range of video interaction available. It permits overlay and allows for a separate flow of control of the video and computer activities. The additional video commands replace the CLC audio commands. The video editor provided is "BlueLog 2" from BCD Associates, replacing the CLC Tape Editor "Tape55".

Version 7

Version 7 includes all the features of version 5. In addition, it supports high resolution graphics and overlays. Graphics screens to be displayed may be in either 320X200 medium resolution color or 640X400 high resolution color. Medium resolution screens are stored in 16k uncompressed files and the recommended editor is PCPaint, allowing 15 colors. High resolution screens are stored in the compressed format produced by the recommended editor - PCPaintbrush. The associated graphics card and monitor allow a palette of 255 colors.

A student log file is created to allow network management of students and courses. The log file is updated during course use to provide a performance record. The file produced can be read by a database management program and user designed reports displayed and printed. The recommended program is "Dataflex".

A CLC program "Stepdump" is available to facilitate capture of screens whilst using the P.C. as a terminal to Sperry mainframes.

A variety of user specified options can be provided for the simultaneous use of video tape and videodisk players. The use of the BCD VIPC controller allows for all computer controlled Betamax, VHS and U-Matic players to be used without change of course commands. Sony, Pioneer and Philips videodisk players are also supported and are interchangeable without course alterations.

Version 8 SIMULATOR CONTROLLER

This version has substantial additions to the run time module to provide 'hooks' to real time control of I/O lines and a number of user defined algorithms. The application is in the control of simulators. Included in the computer is an I/O card carrying 48 lines of information to interrogate the status of switches or controls on the simulator. Output to change indicators etc. on the simulator can be simple on/off or analogue levels set by a D to A converter. In addition the video presentation, with computer 'head up' overlay can be adjusted in speed. This version is supplied with a limited source license for the run time module to allow user additions written in 'C'.

DESCRIPTION OF SYSTEM OPERATION

Version 4.1

THE AUTHORING SYSTEM

The Authoring System is composed of a number of software tools which enable the course material to be programmed into the computer, recorded onto the audio and video tape recorders, and finally assembled into the order and logic specified by the author, (tests/answers and related return paths etc). It consists of:

THE SCREEN EDITOR

The Screen Editor enables the author to create the individual screens of a course. It enables the author to configure screens into presentations considered most likely to get the message across.

The Screen Editor includes a full set of IBM character and graphics symbols, and also provision for allocating specific attributes to each character, including a choice of:

15 character colors

7 background colors

reverse video

flashing and

highlight

The Screen Editor provides for screen configurations which include:

40 or 80 columns

24 or 25 lines

single or double borders

'windows' of selected dimensions, with wraparound line return within the 'window'

The functions of the Screen Editor include:

character insert and delete

line insert and delete

block move and carryover from screen to screen

'painting' of characters by character or 'window'

fast cursor movements

screen numbering

screen search commands to any screen and specifically to next, previous, first and last screens.

'help' screens at any time

file retrieval and saving

temporary exit to DOS activities

THE LIBRARIAN

The Librarian is the screen management system providing for screens from any number of files to be:

accessed

sorted

viewed

merged

to form working files for a course.

It allows printing of screen files and conversion to word processing files.

TARGET SCREEN CAPTURE

Target screen capture enables a selected number of target* programs working under MS-DOS to be interrupted and selected screens translated into standard COMPUTER LEARNING CENTRE screens and filed for incorporation into courses.

These include both graphics and text screens.

Special versions can be provided for certain other target programs.

* 'Target' programs are existing, external programs which are either the object of the course itself e.g. WORDSTAR#, or are used as supporting tools to the course.

WORDSTAR is copyright to the MicroPro International Corporation

WORD PROCESSOR SCREEN CONVERSION

Word processing screen conversion translates single screens of Wordstar and ASCII files into COMPUTER LEARNING CENTRE screens for editing and adding attributes.

TAPE EDITOR

The Video Editor provides computer control of video tape recorders and disk players, creating and printing a cueing file.

This enables the author to scan the tapes to determine the numerically defined addresses of video recorded segments which the author requires to relate to specific screens.

COURSE COMPILER

Compiles the various screens and audio and video segments in the order specified by the author and using the Librarian created screen sequences to form the run-time course.

The Compiler operates by considering each course segment as being related to a specific screen.

These segments may be:

- information screens
- test screens
- target program screen activities
- audio segments
- video segments

The Compiler allows the author to overlay part screens to show answers and/or to provide additional information.

The authors define their standard information screen, test screen, audio segment and video segment. These definitions apply to all screens compiled, but may be overridden for individual screens.

Test Screen Options

Test screens provide the facility to revise previous screens and to 'skip' screens depending on student response.

The test screens provide for:

- multiple choices (up to 6)
- matching sets (up to 6)
- selection of alternatives (up to 6)
- questions with specific answers
- questions with defined answers using 'wild cards'
- decision prompts for course routing

TARGET PROGRAMS

The COMPUTER LEARNING CENTRE system will allow the parallel running of the course with selected target programs such as Wordstar, allowing the student to enter and exit the target program in accordance with the screen schedule determined by the author.

The COMPUTER LEARNING CENTRE system provides for a 'command filter' to only allow defined target system commands to be actioned. This feature prevents the student from getting 'lost' through keying an incorrect command. This is a programmed feature provided by quotation from the C.L.C.

The Target Program facility provides for:

- loading the target program

- loading and saving working files

- loading and saving file generated templates

Each target program must be configured to run under the operating system used.

STUDENT COMMANDS

The author can program the course to allow the student to:

- go back and forward a screen

- call up a help screen

in all cases the audio and video segments will remain synchronised to the screens.

RUN-TIME SYSTEM

The Run-time system is normally generated by the process of compiling. A service is available to generate special run time packages for custom courses.

SPECIAL HARDWARE

VIDEO TAPE CONTROLLER

The video tape controller is a card that has to be fitted in the P.C. or an external controller connected to the serial port.

VIDEO DISK CONTROLLER

A program module is provided which controls a Pioneer player through the serial port. Other controller modules for Phillips and Sony can be provided or a controller card may be used.

VIDEO OVERLAY

Overlay of computer images on video is obtained by resynchronising the video using a genlock card fitted in the computer. This allows the use of a composite/R.G.B. high resolution video monitor to be used, replacing the computer monitor.

Version 5

Menu selections include calling the video editor program Bluelog2 and the graphics editor.

Video flow of control is extended to form a parallel path to the computer interactive control. Video may be interposed linearly as a task in the main lesson sequence or called as a background to interactive activity. The video may be authored to then operate between specified frame numbers while the computer follows any interactive path. Resynchronisation may be defined at any point in the computer activities by halting the video and merging the control flow.

Version 7

MANAGEMENT SYSTEM

The Management System is available for multi-station applications. It is available as a series of modules which can be configured to customer's requirements.

The Management System provides the following facilities:

- user passwords
- student identification and account details
- student course activity and performance monitoring
- course activity break points
- account control and billing
- supervisor console control

The file structure is defined in 'C' in the attached specification.

Spec 2.3

ADDENDA

to

THE CLC AUTHORIZING SYSTEM

Manual 4.1

April 17 1988

VERSION 5

Page 3-2

1) Audio or Video Tape editing

At this time is limited to video tape editing. With this utility you may control the recorder from the computer keyboard. The application is to review the video material and record the frame addresses for compiling.

Page 7-1 Add

Higher resolution screens for Australian video overlay use a version of the Tecmar GraphicsMaster card operating at 640 X 400 pixels and 15 colours. This requires the use of PC Paintbrush which should be installed in a directory named \PCPB according to the manufacturer's instructions.

Page 7-2 Advanced Add

When using PC-Eye frame grabbing system it supports a version of Dr Halo as graphics editor. This stores images in another format. To use in the CLC SHOW they must be stored as PC Paintbrush files. To achieve this enter PC Paintbrush and then exit which leaves its capture facility memory resident. Then run IMIGIT the PC-Eye editor, grab the frame and edit it. Save the screen for back up. Then remove the borders and the cursor, invoke the PC-Paintbrush save utility and restore the screen with a PCX extension to differentiate it.

After para. on SHOWPIC add

SHOWTEC

Showtec functions in the same manner as Showpic but it displays high resolution Tecmar screens.

Page 8-5

Does the lesson use audio tape at all?

Replaced by:-

Does the lesson use video at all?

Information Screens
Replaced by:-

```

The information screen is standardised as:-
If this is a GRAPHICS screen, what is its name? .....
Video accompaniment (Y/N) .....
Top left corner Row: (1-25) ..... Column: (1-80) .....
Bottom right corner Row: (1-25) ..... Column: (1-80) .....
Action taken to goto next screen is to press:
(NONE,ANY,F1-F10,SPACE,RET,PGUP) .....
Action taken to goto previous screen is to press:
(NONE,F1-F10,BS,PGDN) .....
Action taken to redo present screen is to press:
(NONE,F1-F10) .....
Do you want the video terminated at end of activity (Y/N)? .....
If any other key pressed ignore or goto a help screen (I/H) .....
The Help screen number to goto is (01-99) .....
If no action is taken screen changes after (000-999)seconds .....
Then goes to Next screen or Help screen (N/H) .....
The Help screen number to goto is (01-99) .....
If other, next screen number is (1,999) .....
How many times may the student view this screen (1-999) .....
If exceeded,then the Help screen to goto is (01-99) .....
Do you want to action changes in advance to a target(Y/N)... .....
Do you wish to change anything (Y/N) .....

```

If you answer Y to this question, then each information screen presented for compiling will be followed by a video menu. If there are only a few video related screens or no video at all then you should answer N.

Page 8-9

Do you want the screen change held until end of audio (Y/N)?

Replaced by:-

Do you want the video terminated at end of activity (Y/N)?

If you have initiated a video segment at the start of an information screen activity, then it may be allowed to continue to its last frame with the subsequent computer activities being overlaid.

If you require this, then answer N.

Alternatively, you may wish to show the video only during the period of display of the information screen or you may wish to terminate a previously started video segment. In this case, answer Y. Generally the usage would be Y, which should be selected as the standard.

This facility allows also for the use of the video player to provide audio only segments linked to the information screens.

Page 11-5

Replace the whole page by:-

VIDEOTAPE

Because of the long access time of videotape (3 minutes typical end to end) it is not an ideal medium for computer aided instruction.

This can be mitigated by careful course design which never leaves a blank screen while the videotape player is searching and by ordering the video material into a logical sequence.

The BCD VIPC controller supported will control a wide range of players including all the major formats, U-Matic, Betamax and VHS.

The controller senses which one and provides appropriate commands.

The system is specified for U-Matic but the other formats can be used without authoring modifications.

Overlay is provided on the Video Associates Labs. Microkey System overlay and genlock card. This offers a variety of overlay modes and supports Australian standard video formats.

Reference should be made to the suppliers manuals for editing and preparing tapes and for the connections to the players.

The standard tape editor called by the Authoring System is Bluelog2, a program based on one supplied by BCD.

After selecting it for use, respond 1 followed by Enter on the first screen. After a short pause the working screen will be displayed. The bottom line shows the way the Function Keys operate the recorder. The last one "OPlay" refers to the function key F10 which will start the recorder in play mode. It is necessary to be in lower case on the keyboard to use these keys and to enter BCD commands. These commands, described in the BCD manual, may be entered on the command line and will be actioned after adding Enter. The first command should be INIT which attempts to start the recorder and seek a frame number. If this fails then check the recorder connections. If they appear correct enter command VERS. If this does not produce a statement of the BCD version number, the BCD card or its installation is at fault.

A new tape will not have a BCD timing track on it. This may be recorded on the audio track 1 or left track, using WRIT and WRGO commands. Remember that this will overwrite the audio on that track, so make certain your audio is on track 2.

In upper case pressing I and O will create a cueing list of frame numbers, listing the In and Out frame numbers.

On completion of tape editing return to lower case and enter quit followed by Enter. Confirm with Y Enter and the System returns you to its main menus.

Page 12-1 and 12-2

Delete chapter 12 - Audio.

