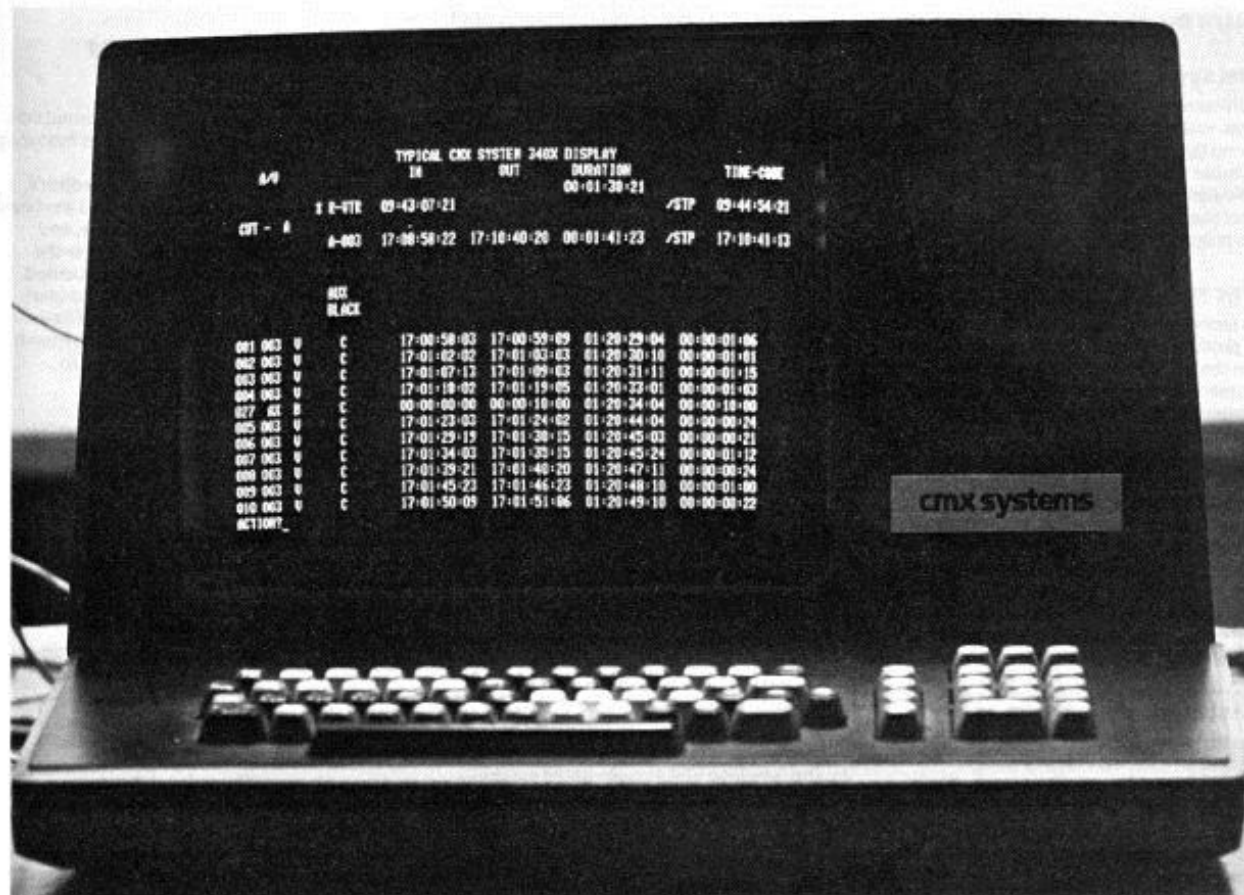




Marconi Broadcasting Studio Systems

340X Video Tape Editing System

B4900



Features

Total system flexibility

Advanced distribution processing

Intelligent Interface (I²) gives complete control of all inputs, including video and audio recorders, telecine, disc machines, switchers etc.

Full range of operating facilities

Since the introduction of the SMPTE/EBU time code, there have been a number of methodical advances by CMX in the development of sophisticated editing systems using this code for building master tapes and work prints with correct colour phasing and absolute accuracy.

By delegating machine control and reporting functions to an Intelligent Interface (I²), the 340X System allows expanded editing capabilities. Simultaneous operations, real time assembly, multiple record etc. are now possible. This novel concept is made possible through the use of the latest microprocessor LSI technology which was not readily available a few years ago. Editing flexibility has been advanced by this new approach to multiple machine control.

Intelligent Interface (I²)

The key element in this remarkable new editing system is a dedicated device called an Intelligent Interface or (I²), that connects to every picture and sound source, as well as any control element in the programme assembly path. For the first time, it is possible to intermarry quad VTRs, ATRs, helical machines, slo-mo discs, and audio/video mixers in order to create the composite programme master tape or work print.

The dedicated I² unit connected to each device is a special 16-bit microprocessor with powerful capabilities. Its programmable read only memories (PROM) allow special programming to match the unique characteristics of each unit being controlled. Such parameters as reel inertia, lock-up requirements, wind accelerations, and dynamic braking are calculated and entered into the I².

Control interfaces are available for most currently used professional video and audio recorders, as well as a variety of special effects switchers. The I² can be provided to control any desired post production device.

Operating features

The equipment can be configured into various editing systems of ascending capabilities which match the needs of the user. There are many optional operating features which can be incorporated. These options provide the following features:

1. Look ahead

This feature is designed to add a useful expansion to automatic assembly. With look ahead, the central computer allows the pre-parking of up coming machines to the next cue point to decrease the assembly time for following events. (Real time programme assembly is theoretically possible).

2. Reel summary

As a further refinement of the look ahead function, reel summary adds the capability of reviewing the complete edit decision list by reel number. Events requiring multiple reels are indicated along with the reel numbers. The operator can then determine the best critical path to programme assembly.

3. Sync roll. ('Edit on the Fly')

A new technique of production style editing in a post production setting is called sync roll or 'edit on the fly'. This method depends on the source material being recorded simultaneously from several cameras on as many recorders. In playback, the editor sees the different camera views and can create an edit decision list based on actual post production manipulation of the picture sources. The edit decision list is automatically generated from the actions of the editor. This feature has great potential for time savings in programme production, because it allows for all editing to take place in post production instead of the current practice wherein 80% of editing is done via camera cuts.

4. Master/slave operation

The master/slave feature provides a means of controlling an external video or audio recorder so that it runs synchronously with the VTRs under system control. It is intended to be used with multi-track audio recorders which are used to 'sweeten' sound tracks of the VTR programme audio.

5. Multiple record machines

Since each VTR generation reduces the image quality, there are instances when the customer will want a copy tape that is not dubbed down from the edited master. During programme assembly, multiple record makes it possible to use more than one VTR in the record mode — multiple masters are generated simultaneously.

6. Asynchronous code

In the case of an asynchronous time code, this feature still provides lockup to the degree that edits can be made even though there is a loss of frame accuracy. Non-synchronous codes are imprecise by definition, but where no other alternative exists, this feature provides a means of coping with a poorly recorded tape.

7. Jam sync mode

With the jam sync feature, sequential time code data may be recorded on a previously blank record edit master tape. The previous code 'slaves' the generator, then at the edit point starts recording time code in the VTR 'assemble edit' mode. It is only possible to do

'assemble' type edits. This feature requires that the stem have an integral time code generator with a slave (jam sync) option.

8. Second audio track

Many VTRs are now equipped with second audio tracks which can be used for either stereo applications or for bi-lingual narrative. This feature provides a means for editing on either audio track 1, audio track 2, or both simultaneously.

Device Interfaces

The I² unit is a 7 inch (17.8mm) rack-mounted module containing the appropriate circuit cards that perform the machine control functions assigned to them by the central computer. There are several kinds of I² interface units specifically designed for VTR control, switcher manipulation, or the integration of peripheral picture and sound sources into the programme production. Interface units are available for most of the popular and commonly used VTRs in television production centres as well as a wide variety of production switchers and multitrack synchronous audio recorders.

Interface Functions, VTR

For the VTR interface unit, the functions delegated to it for controlling the recorder to which it is connected, or for which it is installed are as follows:

- 1) To initiate and end all the operational modes such as play, record, rewind, fast forward, and stop. The interface unit does this through the normal remote control connector plug usually provided by the original manufacturer.
- 2) The I² unit reads the frame code at all transport speeds and uses this positional information to search and cue tapes. Cued pre-rolls are made within the lock-up capabilities of the particular VTR being operated, the characteristics of which have been programmed into the microprocessor.
- 3) The interface unit assures frame accuracy of the tape position for the operation initiated by it. This is accomplished through a comparison of frame parity of the VTR source and synchronizing it to a set target to produce a clearly colour-phased transition at the edit point.
- 4) The interface controls editor timing on the VTR under its direction. Since different format VTRs use very different editor timing methods, the differences must be pre-established on each VTR type, or in some cases on each VTR, so that smooth, accurate edits are achieved by the system.

Note:

All communication between the central computer and the interface modules is of a serial nature and is over two twisted pair of cables. There is no practical limit to the possible separation between the central computer and the machine interface unit. System control of remote VTRs, etc. are even possible through telephone modems.

Interface Functions, Switcher

The switcher interface unit is intended to control the video signal routing from the input sources to the 'record' VTR. A minimum system would have a switcher in which 'cuts' only are controlled by the interface unit. If an effects switcher is employed, the I² will control 8 crosspoints (including aux and black) in a minimum of two video and two

audio busses in addition to the mode of operation of the mix amplifier; the cut, mix, and wipe keys; and the special wipe keys in the switcher.

The switcher I² functions are as follows:

- 1) Control precise video and audio signal switching at the time dictated by the selected frame address numbers.
- 2) Instruct the switcher to perform a timed fade or dissolve when called for by the editor.
- 3) Control audio and video switching separately as required for a split edit.

The number of commands that the switcher I² can issue to the switcher under its control is only limited by the switcher's own input/output capacity and its peripheral features.

Central Processor (Computer)

The minicomputer which is at the central core of this editing system is assigned the following functions:

- 1) Accept and interpret the human editor's instructions as received through a keyboard or a prepared punched paper tape, and transmit these instructions out over the twisted pair to each of the I²s concerned. The instructions are in serial (computer) language format, and are received and stored in the appropriate I² for subsequent machine control. The computer also strobes the I² to verify receipt of instructions and proper command operation.
- 2) Schedule all videotape (or other) recorder activity so that the proper sequencing of the programme material is automatically obtained.
- 3) The minicomputer also determines the protocol of the various functions and machine delegations. As a result, it allocates instructions on a descending priority basis, assuring that no lesser function interferes with the orderly time sequencing required for the planned programme assembly.
- 4) As a convenience feature, the minicomputer also manages the edit decision list producing both an alphanumeric readout in real time sequence and, when instructed to do so, a hard copy printout. The edit decision list may also be converted to a punched paper tape and put through a reader for verification or auto assembly of the programme edits.

In summary, the central computer is tailored in capacity to best meet a given studio's needs. It is utilized to its maximum efficiency by sharing its functions with the microprocessor in the I²s, thus keeping its superior data handling capabilities accessible for the more complex functions.

Computer Options

The assembly of an editing system requires a number of advance decisions on the part of the user with regard to capacity and function of their particular editing system. A wide range of primary and secondary options that cater to different levels of editing needs is offered.

The minicomputers available are as follows:

- 1) CP-3001
A PDP 11/04 with a 16K core memory and the capability of controlling four VTRs and a switcher (5 devices).
- 2) CP-3003
A PDP 11/04 with a 16K core memory and the capability of controlling seven VTRs and a switcher (8 devices).
- 3) Additional communication channels are available at extra cost. A total of 32 channels is possible although only eight

selected devices may be controlled simultaneously. A switching arrangement permits access to any of the thirty-two I² units in a maximized system.

4) IG-3031 General Purpose Interface

This option is designated as a general purpose interface which provides the capability of handling up to sixteen events during a thirty-second period preceding the edit and on up to 30 minutes later. In typical use, this interface would initiate a film projector on cue, change slides on a telecine, start on audio recorder, or other peripheral device. There are also momentary and continuous relay contact points that can be wired in to accommodate requirements.

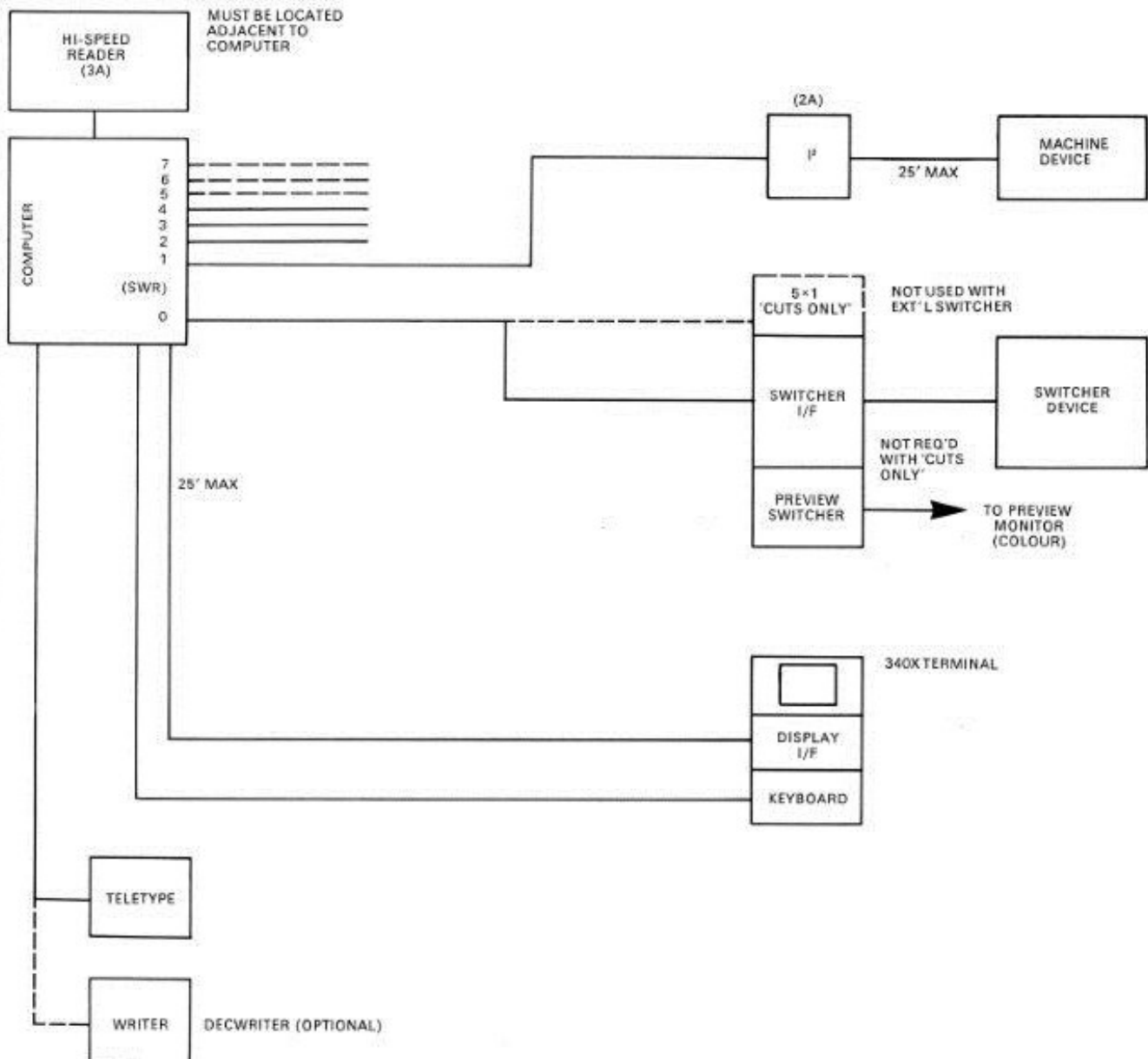
Ordering Information

In order to ensure that you are supplied with equipment exactly to your requirements please make sure that the ordering information is clear. When ordering please state:

- 1) Television standard employed.
- 2) A.C. voltage on which equipment is to operate.
- 3) Manufacturer, model and serial number of videotape recorders to be utilized.
- 4) Manufacturer, model and serial number of video/audio switcher if existing unit to be utilized.
- 5) Precise detail of operating features for the system.
- 6) Which computer option do you wish to use.
- 7) Exact cable length requirements between computer and Intelligent Interface (I²).
- 8) If additional handbooks are required.
- 9) If spares are required.

Dimensions

Height	Width	Depth	Power Consumption
High-speed reader			
227mm (10.5in)	483mm (19in)	368mm (14.5in)	3A
Computer 5-8 port			
133mm (5.25in)	483mm (19in)	622mm (24.5in)	5A
16 port			
133mm (5.25in)	483mm (19in)	673mm (26.5in)	5A
I²			
178mm (7in)	483mm (19in)	368mm (14.5in)	2A
'Cuts only' and switcher panel			
178mm (7in)	483mm (19in)	368mm (14.5in)	0.5A
340X Terminal			
356mm (14in)	508mm (20in)	584mm (23in)	1A
Teletype			
1118mm (44in)	558mm (22in)	508mm (20in)	5A
Decwriter			
864mm (34in)	698mm (27.5in)	610mm (24in)	2A



Typical system diagram