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**FILM &
VIDEO
REPORT**

Half-inch Video Editing

Greater London Arts Association

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Half-inch Video Editing

USER SPECIFICATION FOR AUTOMATIC HALF-INCH VIDEO EDITING SYSTEMS FOR COMMUNITY USERS

by SUE HALL and JOHN HOPKINS, Research Instrumentality, 42 Theobald's Rd, London WC1X 8NW, January 1976.

Abstract: This is a research report to investigate automatic half-inch video editing and was prompted by the non-availability of low-cost easy-to-use video editing. Existing manual editing effectively puts video production out of reach of the non-specialist because it is so demanding in concentration, time and learned skills. The User Specification should have a lifetime of several years, but the Options are changing from month to month with market developments. This report was commissioned by Greater London Arts Association, prepared through the group effort of video workers, coordinated and written by Sue Hall and John Hopkins, themselves video workers. Videotapes are available of both editing systems mentioned (T P Ltd and Australia Council).

1 INTRODUCTION

This research is made necessary by the lack of suitable editing machines on the market. The requirements of mass production and marketing do not match the requirements of independent, grass-roots video workers.

Many of the technical problems currently experienced are a result of this one fact. Were there a half-inch, solenoid operated reel-to-reel editing deck on the market, this research would be largely unnecessary.

The Greater London Arts Association is to be congratulated in having the determination to initiate a programme of research and development intended to fulfil the needs of a growing number of independent, non-commercial video users. It is hoped that other bodies with Regional and National responsibilities will respond to this initiative and produce the backing that even a modest programme requires.

2 BRIEF

"To research and write the video workers' technical specification for an automated half-inch video editing facility suitable for community use".

Discussion

1 No-one in the UK is using colour portapaks yet, they are all black-and-white. The next generation of editing machines will be colour capable. We have confined our specification to black-and-white editing, on the understanding that colour-capable systems are not necessarily excluded.

2 "Technical specification". We used software and operational criteria in writing the specification. A full technical interpretation requires the services of a video engineer, using this report as a starting point.

3 "Automated". The exact level of automation is a technical question which cannot be precisely answered until a system design is produced by an engineer responsible for research and development of prototype(s).

4 "Half-inch". During the research we encountered video editing using half-inch reel-to-reel, half-inch videocassette (VCR), $\frac{3}{4}$ " videocassette (U-Matic), and 1" editing decks. In the future there may well be systems employing these edit-deck options.

5 "Community"

(a) There is considerable debate as to the meaning of this term. We take it to include both 'local community' and 'community of interest' (which evidently includes the community of non-commercial video users).

(b) Most 'local community' use of video editing systems is done by video resource persons under the instructions of the producing group. This is partly due to the time that editing takes, and would apply even if automatic systems existed. Practically, the great majority of the handling of video editing systems is expected to remain in the hands of experienced video users. This does not however alter

the need for operational and ergonomic simplicity, in order to service the widest possible variety of users.

6 We went beyond the brief in several directions. Options were added to the user specification in an attempt to clarify the situation for non-technical administrators. Between the first draft and the final version these had to be rewritten because of changes in manufacturers lists and plans. A glossary was added at the request of non-technically minded groups. GLAA asked us to provide additional information from participants when the first draft had been submitted, and about half the participants responded. User-requirements covered a much wider range than 'editing'.

3 DESIGN PHILOSOPHY

1 It is not worth spending a lot of money on modifications which will only fit the present generation of machines.

Reasons: Present editing decks will be superseded within the next 12 months by machines with higher performance and versatility. However, these new developments are not totally predictable and one cannot make assumptions based on manufacturers' forward publicity, particularly with respect to launch dates.

2 It is better to modify standard production models as little as possible.

Reasons: Each modification R and D'd increases the cost of development of the programme as a whole. Each modification may produce other problems within the machines, which in turn will have to be resolved.

3 Electronic modifications are preferable to mechanical modifications.

Reasons: It is harder to predict wear and tear, fatigue on mechanical mods. Electronic systems are inherently more adaptable than mechanical systems. (These are also the views of our technical advisers.)

4 There will be a trade-off between an ideal system and costs and development time necessary.

5 Development of control hardware has a higher priority than machine-specific modifications.

Reason: Time-coding, pulse-counting and ancillary control hardware could be used with later generations of editing decks, unlike machine-specific developments.

6 There will be a trade-off of user requirements now against longer term objectives.

Reason: Few current users have experience of automatic editing. As experience grows, the emphasis in their points of view will change.

7 Anything developed in this programme must be an improvement on the Australian and other current versions of the Videographe system.

4 USER REQUIREMENTS

Introduction

User requirements collected covered a much wider range than just half inch black and white automatic editing

Two other independent developments indicate that this is the right course to follow, and their progress will likely do most of the necessary R & D.

(i) The National Film Board of Canada's animation frame-by-frame editing system based on the 3650 type deck probably uses pulse counting to attain this accuracy. If this is so, it could be achieved with European standard 3670 decks.

(ii) An edit run-up pulse counting and display system suitable for any decks will shortly be R & D'd by Snell and Wilcox Ltd for Milton Keynes Development Corporation.

A short-term research target would therefore be to combine the MKDC development with the existing Australian system, referring to any useful information from the NFBC animation programme. This should include a patchboard and any other immediately-achievable essentials.

Advantages: Cheap, easily achievable.

Disadvantages: Inherent lack of proper video insert mode on Sony deck, inability to monitor audio during video insert, no proved long term mechanical reliability of Australian modifications.

(b) Possible solutions to video insert disadvantage: incorporation of flying erase head assembly from Sony 8650 series into 3670 decks; incorporation of double control/audio head from National 3030 series into 3670 decks. These and other possible options resulting from the combination of parts from different series machines should be checked for feasibility by a video engineer.

The viability of the Australian system should be checked against the forthcoming report on their prototype development, and against tapes edited on the system.

At the time of writing (early January 1976) Michael Barrett (CO-AX Milton Keynes) is in Sydney examining the prototype automatic system with a view to purchasing one. He is expected to bring back a detailed report including some videotape edited on the system. This will enable a better judgement of it to be made.

Medium Term Options

The target of a medium term programme would be to develop a new deck based on 1976 high density editing models, coming as near to a fully automated, solenoid operated editing deck as possible, combined with pulse counting and control systems, and maximum flexibility at the editing point. A likely candidate is the National 3060, but there may be a trade-off between full automation and flexibility. There would seem to be three paths towards the ideal system:

(i) Conversion of existing solenoid-operated decks into edit decks by the addition of parts from editing series machines. The National deck on which this idea was based has now been discontinued (January 1976).

(ii) Fully automating the National 3060 edit deck.

(iii) Partially automating the National 3060 edit deck.

(i) Advantages of solenoid-operated decks. Fast forward and Rewind are already fully automated: this could permit automatic search procedures when combined with non-recorded tape-elapsed-time address coding, currently being marketed in the USA by Datatron.

(ii) Advantages: the National deck has greater flexibility (see Short Term Options).

Disadvantages: Full automation presents the same problems as presented by the mechanical modifications to the Sony 3670: a large amount of mechanical modification which is liable to wear and fatigue. (However this might be solved by proper small-batch manufacturing techniques allied to good materials research and heavy testing.) Would again need to be R & D'd from scratch after a feasibility study by video engineer.

(iii) However, there may be a further option – partial automation. In this type of system roll-back is activated

by manual operation of the rewind lever. Counting and stop are automatic, but the machines have to be re-set before running down to edit. The edit sequence is completely automatic. This would be achieved by the installation of a DC motor whose speed could be varied down to zero.

Advantages: No extensive mechanical modifications or installation or solenoids; few electronic modifications; relatively low cost.

Disadvantages: This is a completely untried solution, and would require a short feasibility study. Subsidiary problems could be losing the exact place during manual machine operation; uncertain start-up behaviour rolling down to edit may cause inaccuracies. Larger number of operations required to operate than on Videographe system, slightly more skill required.

It is assumed that pulse-counting timing and control systems are applied to all medium term developments.

The medium term lasts until a manufacturer brings out a high-density, solenoid-operated, next-generation edit deck. National have told us (January 1976) that in mid-1977 they intend to market an automatic cartridge editing system which will be fully EIAJ compatible. The medium term will therefore end when this happens, if it does.

Associated Developments

1 In USA there are already available time-code editing systems suitable for using with low-gauge solenoid-operated decks. These are of two basic types:

- (i) Systems using tape that is time-coded during shooting, requiring time code generator at this stage.
- (ii) Systems using tape-elapsed-time readout as on-line coding. These do not require a pre-coded tape to function.

These systems are the only ones giving true single frame accuracy, and therefore permit accurate editing instructions to be generated at the logging stage by a producer group, who do not have to be present at the actual editing session. They also permit automatic search and retrieval, which further reduces the time taken in editing, especially in on-line/off-line systems.

In November 1975 a portable time-coding unit (Porta-Sun, USA) came on the market for use with Electronic News Gathering.

2 Portapaks. Year-by-year manufacturers upgrade the performance and capability of portapaks. At the same time custom-built improvements are being designed and installed, and are widespread in the USA e.g. those offered by Technisphere Corporation. As has been stated before improvement in portapaks leads to improvement in editing quality.

3 Video Processing. Time-base correctors, sophisticated process amplifiers, aperture correction and genlocks are being developed suitable for low-gauge video e.g. Quantel TBC's, Electrocraft Processors, National and other genlock mixers. As integrated circuits are mass-produced, the cost of these items drops, sometimes rapidly. Since availability to the users is largely a matter of cost, this should improve in the future.

Long-Term Options – the Super-System

This would be based on a new generation of solenoid-operated edit decks, and would incorporate time-code editing, search and retrieve, processing to broadcast standard between decks, colour capability and total remote control of all functions. Such a system could be run in conjunction with a computer.

The dramatic growth of Electronic News Gathering including editing systems using computer controlled Sony U-Matic ¾" videocassette machines, by many broadcast TV stations in the USA, means that at the ¾" level such a Super-system already exists. In the future it remains to be seen whether cassette, reel-to-reel and cartridge systems can all exist together in the same marketplace. The manufacturers themselves seem to doubt this. There is already

evidence that the international marketing cartels are carving up the world into sections in the usual way.

Although the brief for this research specified half-inch there are already community users in Canada, USA and France working with 3/4" U-Matics including editing and portapak which are colour capable.

8 RESEARCH METHODOLOGY

Collection of information

1 Letters were written key persons in other countries concerned with the development of automatic editing: administrators, small service companies, users.

2 Video workers were invited to visit an informal gathering at our premises on Saturday November 1st, 1975. A room was set aside for the display and collection of this information as an on-going 'think-tank'. User comments were written on a paper-covered wall so that all comments could be referred to throughout the day. Representatives of 24 different video groups attended, including some individual artists.

3 A selection of video workers unable to attend the gathering, including some distant from London, were briefed by phone and their responses recorded by phone (with their consent) 24 hours later at our expense. Representatives of 11 different groups participated, including one group (Inter Action) that attended the gathering.

4 At the request of GLAA, we sent the first draft to all participants for their comments and solicited more information (see Appendix 3). About half the participants responded and their feedback has been included into the body of the report where relevant. This added almost two months to the time taken to produce the final report (including Xmas). Originally we were instructed that the original request was 'very urgent'. The first cycle of activity took one month.

Sorting of Information

The information was transcribed item by item and sorted a total of four times, as follows:

1st Sort: Editing Systems Technical Features; Editing Systems Handling Features; Portapaks and Logging; Production and Processing systems (incl. editing); Other comments; Users Questions.

2nd Sort: Half-inch automatic editing; Remainder.

3rd Sort: Convenience; Versatility; Technical Quality.

4th Sort: Essential; Hi priority; Lo priority.

The criteria employed in these sorts are outlined in **Brief and Design Philosophy**.

9 REFERENCES

(1) Technical Report No 1: Establishing a Half-Inch Video Editing Resource, 3rd Edition, Jan 1975. Research Instrumentality.

(2) Technical Report No 2: Establishing a Video Resource Centre, 2nd Edition, June 1975. Research Instrumentality.

(3) CO-AX project - The Production System. by Michael Barrett, Milton Keynes Development Corporation, December 1975.

APPENDIX 1: Points raised falling outside the brief The Portapak

* Portapaks should be improved. To some extent this is already happening e.g. new Sony Rovers are progressively updated by the manufacturers.

* There should be a means to check if the portapak syncs are of requisite quality, the picture stable e.g. waveform monitor and/or oscilloscope.

* There should be a means to check on portapak running

speed (authors note that there is a simple way in which this can be done).

* Any group regularly depending on a portapak for its work should have two portapaks (redundancy).

* Planning for editing. An adequate run-up should be left on the front of every shot: minimum 6 secs, ideal 10 secs.

Portapak: Preferable modifications

* Black level clamp (which stops to black level drifting to grey, esp. in low light conditions).

* Video should be switchable from AGC to manual: where there is sufficient experience on the part of the operator this will give better results e.g. in lighting a scene before shooting, in shooting against the light, etc. This needs a VU meter for level.

* Video: to be able to see the picture on a monitor while recording

(a) to have a cheap RF adaptor enabling the use of domestic TVs.

(b) to have an adaptor in the camera lead with monitor connection.

(c) to install a video out socket on portapak.

* Low light tubes. These enable shooting under normal room-lighting conditions and even lower light levels.

* Lenses. Versatility greatly increased by the use of a wider range of C-mount lenses, such as are used for 16mm movie cameras.

* Microphones. Those supplied for the portapak are unable to use the recording performance of the tape. Quality can be greatly improved by the use of better mics., such as those used by people doing professional audio recording, including mixers.

* Radio mic. mod. This enables much greater flexibility of recording as the mic doesn't have to be connected to the recorder by a wire. Usually expensive, a cheap devt. is under way in Australia, and at the Albany (S. London).

* Audio AGC should be switchable from AGC to manual, with a VU meter for level control. (Merseyside VCU reckon that another way round audio AGC is to record separately e.g. on Uher. then post-sync.)

* Minijack sockets are fragile and should be replaced by Cannon/XLR sockets.

* If a time-coding unit could be developed for use with the portapak, this would be very useful as an aid to logging and automatic editing control, computerised systems, etc.

* Shoulderbrace, which stops random camera shake almost inevitable with hand held cameras. These could be very cheaply made if simple. They cost £60.00 and upwards on the open market.

* A unit enabling two cameras to be driven off one portapak, with cutting or mixing between them.

All these modifications - with the exception of small, portable time-coding - have already been successfully done on American standard portapaks, and many of them are offered as 'standard' mods by small commercial companies in New York e.g. Adwar Corp, Technisphere Corp.

* Portable colour video is eagerly awaited by some users.

Logging

Many non-video users do not understand the need for logging and editing script. More time is used in this stage than in editing itself. It includes viewing and becoming familiar with raw tapes; making a timed log order and length of shots, start and stop times, start and stop cues, content notes and other quality comments; making an editing script, with an exact notation of edits, in and out points, and their sequence for editing.

Because different decks - even from the same manufactu-

rer — have different counter number systems, finding one's way through the raw tapes at editing is a tedious business. Conversion charts are some help, but time-coded tapes are needed for accurate logging. If this were possible, a producer group could specify editing exactly, without necessarily having to do the editing themselves — which would aid public access.

★ A playback VTR with speed intermediate between fast forward and forward would help logging.

Training

There is a generally-felt need that training for logging is desirable. Training for editing is also needed. The development of short, efficient training programmes/courses for production would again aid public access.

★ First time users must be able to learn to use the system in a short time.

Comments on Editing

★ Reel-to-reel/cassette/cartridge

(a) The simplicity and hands-off operation of cassette and cartridge-loaded decks mean that these options are not necessarily ruled out.

(b) Tape life is greater with cassette/cartridge than hands-on reel-to-reel decks.

(c) Using cassette/cartridge would mean low-gauge users changing their editing methods which at present make use of a lot of hands-on 'inching'.

★ One user suggested a 'display meter board' that would enable people to map out the shape of a piece of software on the macro level, while concentrating on the micro level of editing — on a blackboard or whiteboard with an automatic pointer linked to the edit deck.

★ A line-up tape should be provided with every system (and test cards for cameras).

★ The best known editing system is at Electronic Arts Intermix, New York, using converted Sony 8650 half-inch edit decks.

★ Automatic editing should become commonplace.

★ An unmodified Sony 3670 is the worst editing deck.

★ Community users. Many do not have the time to get involved in logging and editing, which is often left to the video worker. One group felt that fine editing should be associated with long-term community projects.

★ Separate viewing systems should be provided, preferably at the editing centre, which would enable viewing and logging to be done separately but near at hand. In the longer term this would allow a more intensive use of editing systems on time-shared basis.

Processing and Post-Production

★ For video processing maintaining maximum quality the following are needed:

(a) Time-Base Corrector, expensive now, cheaper later.

(b) Processing Amplifier (Procamp).

(c) Drop-out compensation.

★ For increasing the scope of production: Mixer with genlock incorporating special effects generator. This would effectively add a small studio to an editing facility, and make crossfading, caption super, feedback possible.

★ An animation system would be good for working with kids.

★ A video synthesiser (and colour capability) would also add to scope of production.

★ A vision selector is much cheaper than a vision mixer and would be a simpler and cheaper alternative.

★ Audio. A 2-channel graphic equaliser, or an audio mixer with equalisation on each channel, would aid quality. A 4-track capstan-servo audio recorder with sel-sync would enable replacement of remixed audio track with lip sync.

★ Titling. A quick method of making titles for camera. Electronic caption generators are getting cheaper.

★ A caption camera suitable for interfacing with slides, print, 8mm film, etc. Another alternative here would be a flying spot scanner for super-8 film (such as is being used in Australian Resource Centres).

Distribution and Duplication

★ The next system would open up distribution possibilities.

★ Users looked forward to the time when hi quality 525-625 and 625-525 standards conversion would permit exchange of tapes between Europe and N. America without optical-dubbing quality loss. (Quantel have just brought out a Frame Store Converter with a 3 megabit memory which may be suitable.)

★ If there is an editing facility there should also be a duplicating facility which can go from any standard to any other standard, including transfer to film (kinescope). Very suitable for a medium-term distribution strategy on e.g. 16mm film cf. National Film Board of Canada.

★ Large screen projectors currently available would be an asset for theatrical showings and performances.

Comments and Questions on the Development Programme

★ When and how will the system be available in the UK?

The prototype should be kept at an accessible point so that many people can test it.

★ What is the lifetime of the system developed going to be?

★ Research work should be carried out and fed back to the manufacturers. As well as modifications there should be continuous testing of new machines.

★ Possible further sources of funding for development programme:

(a) National Film School (suggested) who do not have an automatic editing system yet.

(b) Colin Wilkinson, Merseyside VCU, thought some backing could be found in his region.

APPENDIX 2: Open reel, cartridge and videocassette editing systems

List of Low Gauge Helical Scan Video Formats, UK January 1976

Choice	Format	Manufacturer
1	¼" reel-to-reel	Akai
2	½" EIAJ reel-to-reel	Sony, National, Hitachi, JVC
3	½" EIAJ cartridge (can be loaded with EIAJ reel-to-reel tape)	National, Shibaden
4	½" videocassette (VCR)	Philips plus licensees
5	¾" videocassette (U-Matic)	Sony plus licensees

Choice 1

No editing deck on this standard, in-camera editing only. Not used by a majority of users. Lower bandwidth and quality than other decks.

Choice 2

Most independents use EIAJ portapaks and edit decks. Reel-to-reel permits inching the tape by hand. Timebase stability adequate for state-of-the-art Time Base Correctors. Next generation will be colour capable. Edited masters can be used for distribution if necessary. Only Sony and National still manufacture edit decks on this standard. Automatic system prototypes exist (Australia Council and Television Practitioners Ltd, UK).

Choice 3

Looks promising for the future, as any future edit deck would be fully solenoid operated, and give tape protection. No edit decks at present. Currently only takes

half-hour reels. Colour capable, fully-compatible EIAJ. National state they will bring out an automatic editing system on cartridge in 1977, plus thinner tape to increase running time.

Choice 4

Incompatible with EIAJ standard. Gross Time-base instability; not correctable with state-of-the-art TBCs. High cost of cassettes.

Choice 5

Fully automatic systems are already available, basic cost about £6,000. Colour system. Stereo soundtrack. Already used with computer controlled time-code editing in the USA. Disadvantages for community users: incompatible, therefore tapes must be first transferred to U-matic; capital cost is over twice that anticipated for EIAJ automatic systems.

Further arguments, with approximate costings, are given in **CO-AX Project – The Production System** by Michael Barrett (Ref 3).

APPENDIX 3: Glossary

AUDIO LAG When an edit is made on an unmodified Sony AV 3670 deck, there is a 2-second delay between video and audio signals at the edit point.

AUTOMATIC EDITING An automatic system cuts the time taken to perform an edit from 10 minutes to 30 seconds.

CAPTION INSERT A caption which is put into a sequence using **insert edit** (q.v.).

CAPTION KEY A caption which is put into a sequence using key. Key enables the actual letters to be put into 'holes' in the picture as in 'matte' (film terminology).

CAPTION SUPER Caption is superimposed over the picture i.e. video signal of the caption is added to video signal of the picture.

COLOUR SYNTHESISER An instrument which adds artificial colour to a black-and-white video signal to make a coloured picture.

CONSOLE Specially built desk which houses some of the equipment, and operator's control surfaces.

CONTROL TRACK A continuous series of pulses recorded on to a half-inch videotape by the control track head. On Sony decks this has a frequency of 25Hz (which is half the vertical pulse frequency of the picture).

DOWN TIME Time out of use due to breakdown, etc.

DROP OUT COMPENSATOR This replaces lines of missing information with previous lines in the video signal, which would otherwise show as white horizontal streaks on the picture (drop-out). Drop-out is caused by tape wear.

EDIT MODES The different ways that an editing machine can be switched for editing. Possible modes are **assembly** and **insert**.

Assemble edit: This 'adds on' the next shot to the existing edited sequence. The beginning of the edit is synchronous.

Insert edit: On an existing tape, this substitutes a new shot for part of the prerecorded tape, which retaining the existing control track. Synchronous at beginning and end.

Each type of edit can have the following permutations: Video only, Audio only, Video plus Audio. **Audio only assemble** is also called **audio dub**.

FEED DECK The videotape recorder used to play the original tape into the edit machine.

FIELD One field occurs every 1/50th second. A field consists of 312½ lines (European line standard) of picture information and can be seen when the recorder is switched into 'still' mode.

FRAME Consists of two successive fields and occurs every 1/25th second, which coincides with the control track pulses. It is also a term borrowed from film.

GENLOCK Enables a studio system with vision mixer to be driven from a prerecorded source tape, so that vision mixing is possible. Genlock is a component of some sync.

pulse generators.

GENERATIONS (of tape). First generation tape is the raw material as it is shot. Each time a tape is copied (as in editing, dubbing) a generation is added. Usually an edited master would be 2nd generation and a distribution dub would be 3rd generation, when working with low-gauge video.

GRAPHIC EQUALISER Equalisation enables you to alter the tonal balance of the sound. Graphic equalisation means that the settings on your control panel can be read at a glance and indicate the shaping of the sound spectrum.

HALF-INCH and ONE-INCH EDITING This refers to the tape width used on the edit deck. Half-inch decks are less than half the price of one-inch editing decks.

HARDWARE The equipment, all equipment

INSTABILITY OF EDITS At an edit the picture may appear to be stable i.e. no disturbance is seen. But on copying the tape the copy shows instability. The instability can usually be traced to a disturbance in the trains of sync. pulses in the signal at the edit point, or within a second or two after it.

LOW-GAUGE Applies to videotape up to ¾" in width, and also the equipment which plays it.

ORINATION The making of videotape which is later edited. Often refers to portapak use, hence 'portable origination' etc.

PATCH-BOARD/JACK-FIELD A series of sockets laid out in a panel enabling input and output of various machines to be interconnected in a desired configuration. Useful with a system that can be used with different internal configurations.

PORTAPAK Portable battery-operated low-gauge videotape recorder.

PROCESS AMPLIFIER (Proc.amp.) A device which cleans up and replaces sync. pulses in a video signal, which otherwise suffer from degradation during transfer, leading eventually to instabilities. Sophisticated proc. amps. may include picture 'sharpening' and aperture correction, in addition to black level clamping.

R.F. Radio frequency. An RF signal usually means a signal modulated at radio frequency for the purposes of recording on magnetic tape, transmission through the ether, etc.

SCANS Used loosely here to signify the whole width of the picture. Usually the edge of the scan pattern is not seen because it comes outside the area of the screen.

SOFTWARE The videotape, film, programme, product.

SOLENOID A device which gives a mechanical 'push' when the electrical current through it is turned on: it consists of a copper wire coil acting as an electromagnet, and a rod of ferrous material which is pushed by the magnetic field from the current change in the coil.

SYNC PULSES The basic clock pulses that are part of the video signal. The quality of these pulses – both their shape and their regularity – are critical in low-gauge systems, and degenerates rapidly from generation to generation.

SYNC PULSE GENERATOR Device that originates good quality sync. pulses. Used for driving cameras, vision mixers, etc., in a complex system.

TIME BASE CORRECTOR Device for reprocessing video signals and upgrading the sync. pulse patterns to broadcast quality, both in shape and regularity. Makes it possible to broadcast low-gauge videotape directly (invented as a separate unit, USA, 1973).

VERTICAL INTERVAL EDITING The edit is made between, and not during, fields. It cannot be detected, even in slow motion.

VIDEO HEADS The video recording and playback heads on a VTR. They rotate at high speed and are very delicate.

VIDEO MIXER/SPECIAL EFFECTS GENERATOR Enables the combination of different video signals and usually includes the following functions: cross-fade (mix), wipe, key, super, negative. Mixers often include genlock (q.v.). Signals can only be processed by an SEG/Mixer if they are 'in sync' (synchronous) with each other. Mixers often include sync. pulse generators.

VIDEO FORMATS (LOW GAUGE) These are: (reel-to-reel) ¼", ½"; (cassette) ½", ¾"; (cartridge) ½".

APPENDIX 4: Extract from Technical Report No 2 (available from Research Instrumentality, 42 Theobald's Rd, London WC1).

1.2.4.4. Existing system: Television Practitioners Ltd.

This is the only system available in Europe and is custom-built. We have worked editing on this system on three occasions totalling 12 hours. It represents state-of-the-art and T P Ltd must be congratulated on their initiative. However this system is designed for 'civic' use and not for general production. It displays the following limitations:

- * Inaccurate timing of the beginning of video insert edit, and drift of this function with time up to about 1½ secs.
- * No procamp in system, giving all degradations listed above that could be corrected by a procamp (see 1.2.1).
- * Not all edits took place in the vertical interval (some 5% misplaced), although this could probably be corrected (see 1.2.4.5).
- * Edits cannot actually be seen taking place, although there is a rehearsal facility. This limits the accuracy of real time audio mixing when it depends on the exact picture sequence.
- * An electronic disturbance follows the edit, which is sometimes invisible, but often leaves traces of drop-out-like disturbance on the picture. More serious, the master tape can only be played back on a 3670 deck.
- * During an 8-hour session, continuous random radio noise was introduced on to the master tape and cannot be removed. The cause is not known: it may be produced from within the system, or it may be due to inadequate shielding against incoming etheric radio noise.
- * Audio dub mode no longer exists, thus decreasing the flexibility of the system modes by one-third.
- * No audio playback can be made during insert mode, meaning that inserted cut-away in sync with voice is not possible without complicated stopwatch routine.
- * No audio processing or mixing is possible.
- * Audio level varies on master because the meter used to set the level is too small for easy reading and adjustment.
- * The system required some two hours warm-up time, but after this more disturbance followed edits as time progressed.

APPENDIX 5: Contributors

In person

Michael Barrett, Project Co-Ax, Milton Keynes
Roger Stephens, Institute of Education
Bob Jardine, Media Centre, Milton Keynes

John White, The Albany
Robb La Frenais, Action Space
Simon Partridge, Islington Bus Co., AVW Secretary
Ray Dunning
Elspeth, Media Centre, Milton Keynes
Audrey Bronstein, Inter-Action
Helen Pettit, Brent Family Services Unit
Richard Dunn, Swindon Viewpoint
Mary Sheridan
Steve Herman, Electric Newspaper; Editor, International Times
Fergus Veitch, electronic engineer
Mary Finnigan, Further Design and Communication
Cliff Evans, Time Travellers
David Peel, ex-Prodigal Trust
Peter Bloch, Twenty Four Frames
Peter Donnebauer, artist
David Wilkinson, Hammersmith Borough Council
June Marsh, Videoart
Rod Snell, video engineer
Patrick Thibaut, video worker (Paris)
Graham Wade, journalist
Mr. Dawson, National Panasonic

By telephone

Mike Leggett, Exeter College of Art
Lesley Hilton, Northern Media Resources Group
Maggie Pinhorn, Basement Films
Steve Gough, Cardiff Street Television
Colin Wilkinson, Merseyside Visual Communications Unit
Jim Pearce, Yorkshire Arts Association Communication Centre
Pete Anderson, Lewisham Borough Council
Gale Burns, Inter-Action
Peter Buller, Architectural Association
Jackie Cooper, Architectural Association
Tony Wickert, Liberation Films
Ian Sellar
Mr. Docking, Hitachi-Shibaden
Mr. Frith, Philips UK

On paper

Peanut, Engineer, Swindon Viewpoint
Jean Trudel, National Film Board of Canada
Bill Childs, Film and Television Board, Australia Council
Adwar Corporation, New York
Electronic Arts Intermix, New York
CTL, New York
Eric Seigel, New York
Paula Belkin, France
Mr. Imai, Sony (UK) Ltd
Frank Challenger, Quality of Life Project, Stoke

We gratefully acknowledge the assistance of the Association of Video Workers (London Region) and their secretary, Simon Partridge, as well as all those participating.

Videotapes of T P Ltd and Australia Council prototype editing systems are available from Graft-On! Productions, 42 Theobald's Rd, London WC1X 8NW.

ABOUT R.I.

Research Instrumentality has charitable aims and objects. It was formed in 1975 and incorporates the following existing organisations and functions:

- CENTRE for ADVANCED TELEVISION STUDIES (publications and reference library)
- FANTASY FACTORY (video editing, viewing and technical advice)
- GRAFT-ON! (video production and training)
- R.I. (administration and research)

APPENDIX 6: Video Workers' Editing Hardware Dec 75, including future plans

Name of Group/Individual	Current Editing Hardware	Expected Lifetime	Preferred next time
Borough Film & Video Proj. (Stoke)/ F Challenger	National 3030	3 years	—
Exeter College of Art/ Mike Leggett	Sony 3670 National 3030	5 years	—
CO-AX (Milton Keynes)/ Mike Barrett	—	—	1. ½" openreel pulse readout assisted National 3060 2. Automated Sony 3670 (Australian system plus mods.)
Mary Sheridan, video dancer	Shibaden (Arts Council)	"not very long"	—
London Boro of Lewisham/Pete Anderson	National 3030	—	Hi-density automatic ½" system
Community Media Centre, Milton Keynes/ B. Jardine	Sony 3670	1 year	½" automatic system when commercially available
Brent FSU/Helen Petit	—	—	—
London Boro of Hammersmith/ David Wilkinson	Sony 3670	3-4 years	—
Electric Newspaper/ Steve Herman	—	—	Fully timecoded automatic colour-capable ½" with patchboard
Cardiff Street TV/ Steve Gough	National 3030 (Welsh Arts Council)	—	—
Cliff Evans	Sony 3670 (Fantasy Factory)	already out of date	U-Matic automatic, or next-generation ½" automatic
Simon Partridge (Secretary AVW)	Sony 3670 (Islington B C)	—	Access to ½" automatic when available
Merseyside V C U/ Colin Wilkinson	Sony 3670	3 years	Sony 3670 if before March 1976
Graft-On! productions/ Sue Hall & John Hopkins	Sony 3670 modified (Fantasy Factory)	already out of date	Next generation ½" automatic system
Lesley Hilton/ Northern Media Resources Group	n/a	—	n/a
Peter Donnebauer, artist	n/a	—	n/a

fantasy factory

LOW COST VIDEO SERVICES



SERVICES

BASIC HOURLY COMMUNITY RATES

Viewing
Up to 5 people: 50p
Each extra person over 5: 50p

Transfer/Copying incl. Audio processing
£1.00

Basic Editing incl. Audio mixing and processing
£1.00

Editing plus caption super
£1.50

Studio (with your VTR)
£1.00

Studio + Editing
£2.00

- * These rates are available only to bona fide non-profit individuals or community groups operating without subsidy. They have been held unchanged since 1974.
- * Educational and Voluntary Organisations: Twice basic rate.
- * Commercial, Local and National Authorities: Five times basic rate including operator.

Viewing
Playback from National 3030, Sony AV3670 & CV2100 decks on high quality monitor and sound system. More than one monitor if required.

Transfer
To Sony AV3670 or National 3030 from your playback VTR. Audio processing includes graphic equalisation.

Basic Editing
Mastering on Sony AV3670 hi-density EIAJ standard modified to eliminate audio lag or normal density EIAJ standard on National 3030. 2 high quality monitors with undersean. Audio processing includes graphic equalisation and 6-channel MX12 mixer with microphone and tape inputs, suitable for adding music, voice-over etc to audio track (you bring audio tape deck with standard jack or phono-terminated output leads). Consult with us before deciding on playback deck - be prepared to bring your own.

Studio
2-camera studio measuring 10' x 15' with genlock vision mixer and special effects generator, fast-change caption board; 2 Lavalier neckmics, and 2 AKG hand mics.



Self-Help Maintenance Workshop. This is a room with work bench, service manuals, basic tools and double-beam oscilloscope (courtesy *Vertical Hold*) which is set up to enable you to diagnose common faults in low-gauge video equipment. You do the work yourself. Available at no charge up to May 31st, 1976.

Video Cinema. At present (early 1976) we are holding a series of free playbacks of videotapes by artists, filmmakers, cable TV stations - from home and abroad in colour and black and white. These are listed in *Time Out* in the appropriate week.

HOW TO BOOK

Telephones: direct: 405 6862 Speak to Sue or Hoppy
24 hrs: 834 6524 ext 758

Bookings should be made as far ahead as possible. Its difficult to accept bookings with less than 24 hours notice. Your booking should specify (as well as your name and phone number):

- 1 Which services of Fantasy Factory you want to use.
- 2 Date and time of arrival to start work.
- 3 How much time you think you will need approximately.

Terms Pay cash at end of session; if you want to pay by cheque please send or bring an order on your organisation's letterhead signed by an authorised person.

Cancellations: If you cancel more than 24 hours ahead there is no charge. Cancellation within the last 24 hours is inconvenient and you will be liable for surcharge on the first hour of your next booking. If you arrive late you will be charged at the full rate from the time you booked. Sorry, we've been put out too many times by inconsiderate people.

Other conditions of use:

- * Any software edited or produced must include a main caption crediting Fantasy Factory.
- * You can make coffee, tea, meals, etc here if you bring the ingredients and you wash up!
- * We open at 1 pm. Stay as late as you like.

Access

42 Theobald's Rd is in Central London on a busy main street, near the intersection of Gray's Inn Road, 2 doors from the Holborn Library. Parking at the door is possible for about 5 minutes for unloading; otherwise you have to park on a meter. Vans get less attention from parking wardens if you leave them in the back streets nearby.

- * Nearest tube stations: *Chancery Lane* or *Holborn*
- * Buses pass door: 19, 38, 55, 172

42 Theobald's Rd LONDON WC1X 8NW England

Phones: Direct after 1pm 01-405 6862; 24hr messages 01-834 6524 Ext 758