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COMPACT DISCS FOR THE ROBIN HOOD CENTRE

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Background

Most visitors centres, or "Audio Visual" shows in general, have appalling sound recording and reproduction. When commissioned to design the Robin Hood Centre in Nottingham, the concept of remaining in the digital domain from the output of the microphone to the input of the drive amplifier was accepted by the client since he too was aware of the necessity to use sound to its excite people as well as inform them.

Visitors Centres are primarily tourist attractions with a didactit base. The Robin Hood Centre sets out to excite people as well as demonstrate the historical truths as well as the myths surrounding this romantic hero. The stories of Robin Hood have spread all over the world.

In order to properly describe the problems which a designer has in interpreting the quasi-theatrical requirements of a project such as this it is necessary to give a theatrical description, especially since the scenery plan are too large and complex to be satisfactorily reproduced in the proceedings handbook.

A Description of The Robin Hood Visitors Centre

The visitors enter via a ticket office to a place dubbed "The Mediaeval Yard" which is bustling with activity. Visitors are informed about travellers on the road in mediaeval times what kind of traveller would you be ? - a Friar - a Knight - or an escaped villain? Possibly some information about what your name means in terms of mediaeval crafts - a Fletcher - a Thatcher - a Smith or an Abbot. Something of what you would be wearing. How would you have reached Nottingham from your home in mediaeval times how long would it have taken etc?

The audience are assembled in to groups of 15 or less by a mediaeval retainer and when a large door creaks open in the wall you are guided into a darkened space with a pool of light in the centre. The door creeks closed and the light fades down.

The atmospheric sound of wind whistling in the trees fill the space and all around you is darkness. Out of the darkness comes a voice which fills the space and starts to tell you of your surroundings.

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The area is carpeted with moss and leaves and bounded by impenetrable barrier of trees with no paths to mark the way. It is overhung by yawning branches populated with blackbird finch and squirrel - with boar and fox and deer. Here lies the Greenwode home of England's greatest outlaw - Robin Hood.

As the narrator finishes his description of your surroundings an opening appears and reveals a mediaeval Tavern into which you are invited to step. The narrator now become visible in the form of a minstrel (projected image on a screen) and bids you to come into the Tavern and join the rest of the audience. The rest of the audience are sculptures set in relief within the walls and their voices can be heard in the form of merriment. All lights in the Greenwode have not been extinguished and the audience feels duty bound to move into the lightened tavern, after which the door closes. Within the tavern one of the sculptured audience shouts "Tell us the tale of Robin stealing the Sheriff's clothes" - and the story is told in the form of tape slide audio visual interspersed with narration from the minstrel and cheers from the unreal audience.

After a few tales in the Tavern the projected minstrel runs away to be replaced by the Sheriff's guards who instruct you in no uncertain terms to move on into the Sheriffs dungeon because he wishes to address you. The audience follows the instructions (somewhat unwillingly) because they plunged into darkness and the only route is the direction lit by the door to the Dungeon. Again the the door creaks close behind you and you are addressed by the Sheriff (who is a talking head). The Sheriff tells you of the typical punishment which you might receive under his power ranging from ordeal by fire or water, the loss of a hand, a foot or an eye - these being minor by comparison to the methods of execution by all sorts of painful means. As the Sheriff starts to drift off into his own gory daydream the voice of the minstrel is heard to the side and the audience is encouraged escape through a secret passage into a darkened cavern. Within the cavern there is a mediaeval retainer who helps to load the lucky ones upon a magic moving chair (seating up to three people) who will then escape through the City of Nottingham out into the woods and forests in search of their saviour and hero Robin Hood.

Once on the chair the friendly voice of the minstrel appears eerily within the chair and starts to act as courier as the audience passes through alleyways and streets of mediaeval Nottingham, passed a Blacksmith who stops to see these funny people, and a Fletcher whittling arrows, and a Baker in his bakery from which smells of freshly baked bread wafts strongly towards them.

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The audience pass through the town gates and out towards the forest passing a gibbet, a lime pit, a Miller next to his water mill, passed Verderers and Foresters, passed a Cleric and his Page, and on through deep into the forest. Within the forest the sounds of animals scurrying within the undergrowth, the hunt in the distance, the birds twittering in trees, and a flock of startled birds leave a tree with its branches still shaking from the flurry.

The audience are in search of Robin Hood and the truth, and at this point no more should be revealed lest it spoils the enjoyment of the public.

The Technical Requirements

As may have been gleaned from the foregoing description, the sound sources are required to be generated in many forms. Traditionally, the cyclic recordings of sound effects such as bird song, bees, water dripping etc would have been replayed on analogue tape loops, but these suffer from considerable quality degradation. The solid state digital sound store has its uses, but is usually prohibitively expensive when used in a project of this nature which requires more than 80 separate sound sources. The cost of solid state stores is also increased as the available bandwidth is increased to respectable levels.

In terms of digital recording, the only practical medium would be R-DAT but this also suffers from either rewind times, or difficult tape loop editing and modification. For the aforementioned reasons, the Compact Disc was chosen as the medium since it offered fast access time, negligible mechanical wear of the medium, and a proven track record.

Basic Control Techniques of the C.D. Player

The principle of recording each soundtrack on a separate track of the C.D. inherently requires that the track is selected - not only upon power-up, but also in a repeated fashion. To this end, for basic sound effects such as bird's twittering, the C.D. Player could either have its control system accessed via RS232 (but this has been found to be unreliable in previous visitors centres) the alternative being to access the electro mechanical switches which control the transport and to simulate the action of a human pressing the button. This has proved to be an excellent choice, together with the decision to use industry standard FM audio-based cue-signal and decoder systems.

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Synchronisation Techniques

Synchronisation with either inter-related equipment, or with parts of the scenery can be achieved with remarkable simplicity, but at the loss of one channel of recording.

The "Talking Head" is one example where very good synchronisation is needed (i.e. 'lip-sync.'). The cine film is recorded with both an analogue tape machine and a digital tape machine. Both tapes are edited with the film, and a sync. point is physically made in the film prints (called a 'bloop'). The bloop is detected by a microswitch which causes the CD player to change from "pause" mode to "play" mode. Due to the speed at which a CD player reacts to such a command, split-second synchronisation is achieved. From then on the cine and CD machine are free running until either the end, or, in the case of the CD player, until it detects a "pause"cue. In the case of the latter, the next bloop will restart it and thus accomodate loss of sync. due to film stretch or cine motor problems.

In the case of cyclic tracks which are synchronised to the arrival of a chair-load of people, the CD machines are initiated upon power-up with not only the track number, but also a "repeat" command, which is an inherent feature of the CD machine. The track plays until a "pause" command is decoded from the cue track, and the machine is put into "play" by the microswitch being struck (or more accurately, wiped) by the passing chair. The microswitch output may also be buffer-fed to a motor for mechanical effects.

Each chair has its own C.D. player which is powered by a pick-up rail from the chair mechanics system (backed up by a rechargeable battery) via an extremely good regulation circuit. One channel of the audio output is fed directly to a tone/mix/compression circuit which allows for final adjustment of the output sound in the light of experience. The other audio channel is fed to the cuetone detector which detects a "pause" command thus the commentary finishes at a particular point.
The C.D. player is then restarted by means of a microswitch wiping against a striking post attached to the conveyor support system at the appropriate physical point in order to synchronize the commentary with the view to be seen.

Special Applications

It has been realised that in sound effects terms the variable 0 - 10 volts dc output can be used to drive a cross-pair of VCAs which give the impression of a signal panning from left

to right or vice-versa. The dc signal can also be used to drive a cross pair of dimmers and the combination of these two facilities and the aforementioned mechanical effects facilities enables the sound and light to be synchronized such that a very realistic effect of an arrow flying passed the audience can be achieved.

More than one CD player can be linked together such that a "multitrack" system is achieved. The Master CD decodes "pause" and "stop" commands and these, together with the externally generated "reset" and "play"commands are paralleled to the Slave machines. Thus all machines go to their respective tracks upon "reset", play (in silence) until the "pause" command is detected, "play" when directed from an external cue signal, and "stop" when directed from an external cue signal. (The latter being a contingency facility for the software producer.)

Enhancements of the basic system

Since many of the C.D. players are used purely for sound effects, and the output is always processed by a tone/mix/compression circuit, a clean feed of the sound source can be fed and mixed in with other sources in order to provide a composite sound output which is selectable both in terms of content and mix at the commissioning stage.

Cost of Implementation

The requirement to provide some 80 plus sound sources in addition to projection systems, control systems, lighting systems, luminaries, loudspeakers and amplifiers has been estimated to cost between £200,000 and £250,000. By the utilisation of existing technology in terms of audio frequency based simple control systems and propriety domestic grade C.D. players, the necessity to have sophisticated search and marking circuitry has been precluded.

As a result, it is believed that with out jeopardizing flexibility or artistic interpretation, the entire audio, lighting, and projection systems will be supplied, installed and commissioned for under £100,000.00. In terms of value for money for client, it is apparent that this would not of been achieved unless the system designer was not independent of contractor/manufacturers.

It is also interesting to note that in a final check against the cost of providing the same facilities by means of traditional and analogue recording techniques, the result

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would have been a higher cost for the client. Although the aforementioned figures do not include the software production, it is not anticipated that these costs would be appreciably greater. Due to the fact that the cost of pressing custom recorded C.D. has now dropped to about £800 for a minimum run of 500 copies it is apparent that the CD medium could be considered for many more applications than hitherto envisaged.

Footnote

The Robin Hood Centre at Maid Marian Way Nottingham is due to open on May 17th 1989 and it is hoped to provide a conclusion and comment on this particular paper at the Institute of Acoustics reproduce sound conference in Windermere in November 1989.

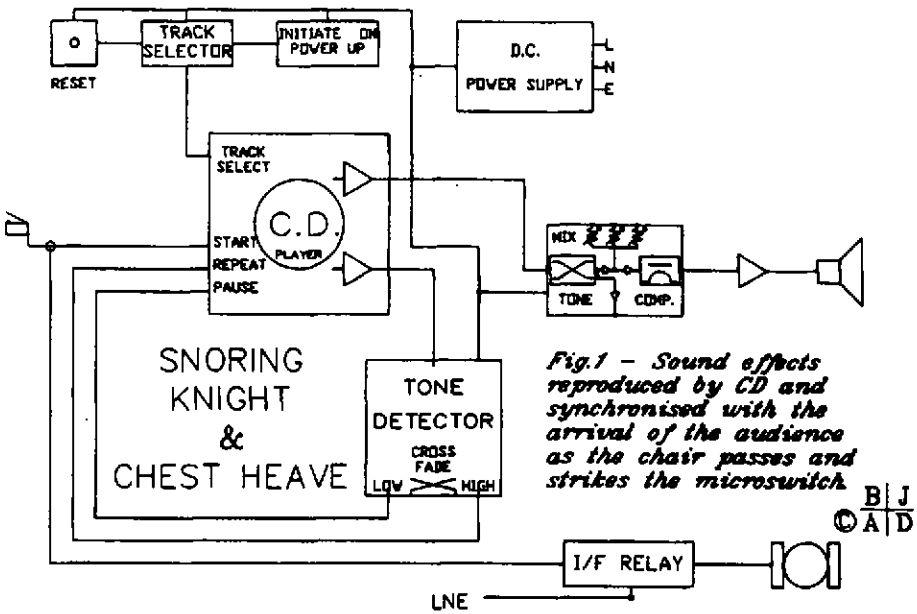

Fig.1 – Sound effects reproduced by CD and synchronised with the arrival of the audience as the chair passes and strikes the microswitch

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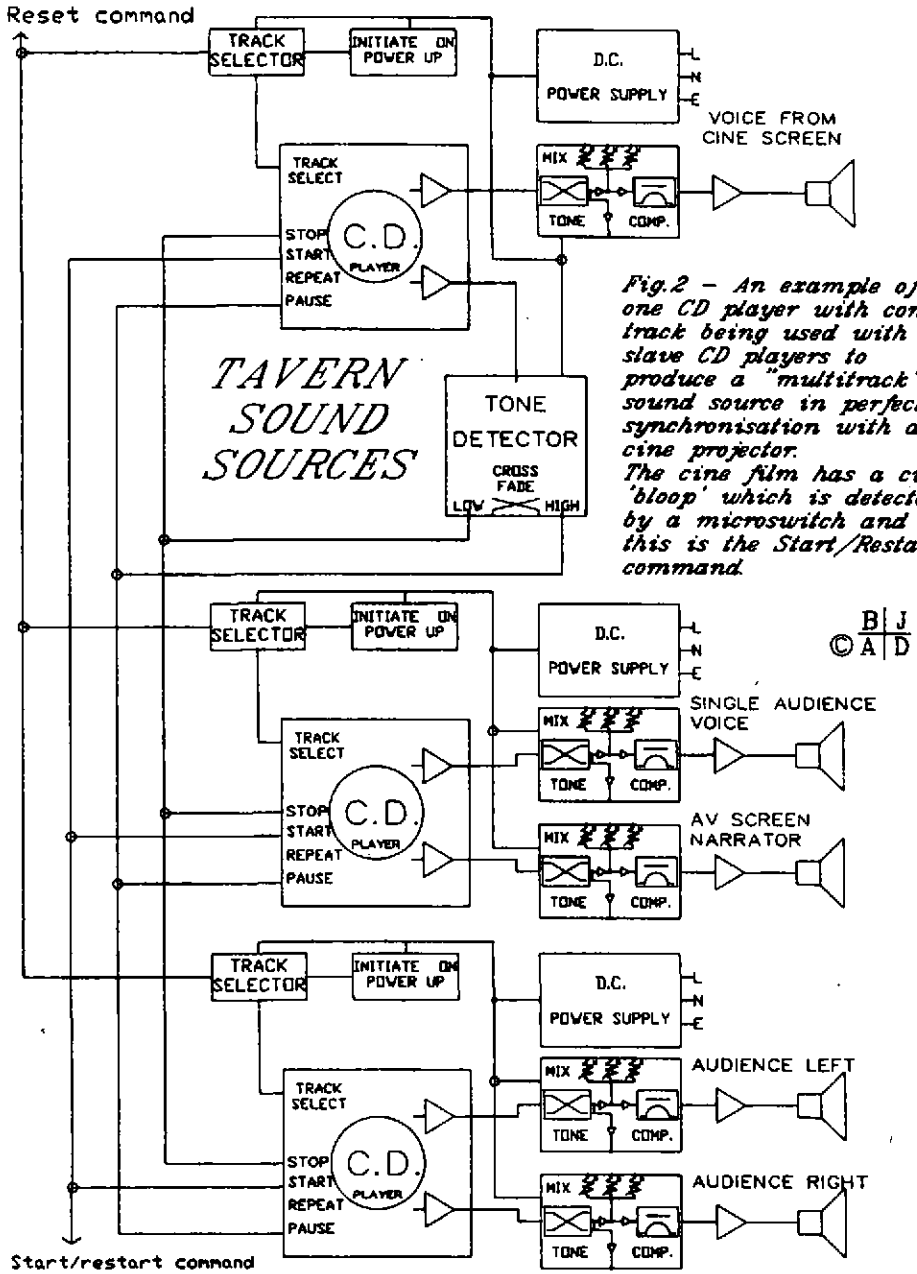

Fig.2 – An example of one CD player with control track being used with slave CD players to produce a "multitrack" sound source in perfect synchronisation with a cine projector. The cine film has a cue 'bloop' which is detected by a microswitch and this is the Start/Restart command.

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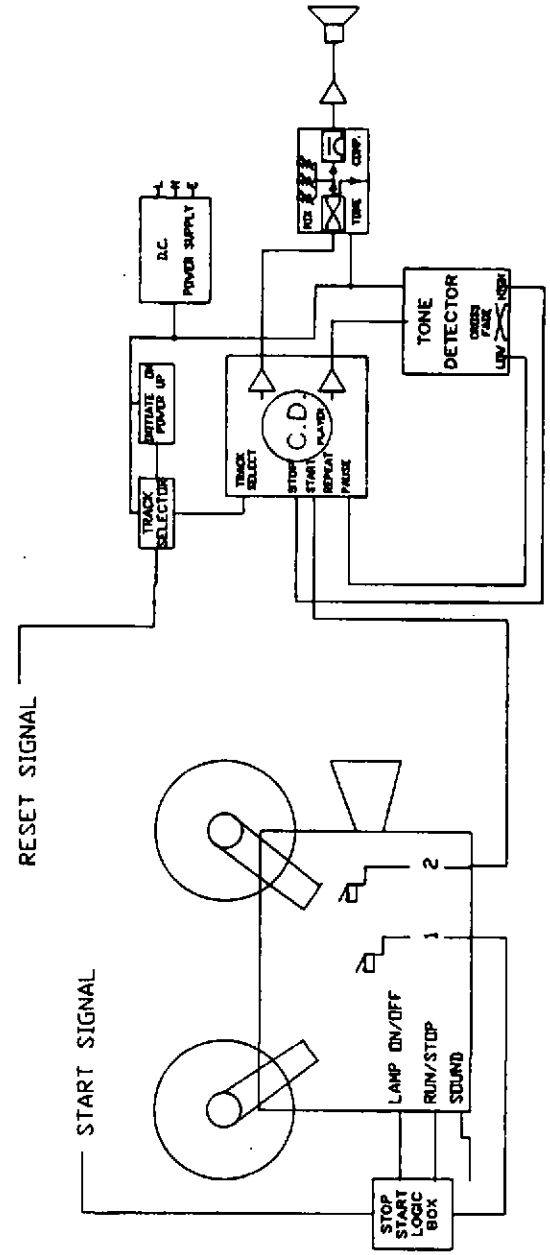

Fig. 3 – Cine projection with symchronised digital sound reproduction

SHERIFF – TALKING HEAD