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COMPACT DISCS FOR THE ROBIN HOOD CENTRE - II

Stephen P. Jones

B J Auditorium Design
159, Mortimer Street, Herne Bay, Kent, CT6 5HE.

Compact Disc Systems for the Robin Hood Centre Part II

Introduction

At the Reproduced Sound Conference in Windermere 1988, the design concepts of the compact disc systems for the Robin Hood Visitors Centre were described. (Proc. I.O.A. Vol 10 Part 7 (1988)). This paper is presented as a sequel and the differences between the original design and the actual finished article will be highlighted, together with some of the problems which had to be solved in the course of the project. But first it would be useful to describe the project in overall terms and, as it were, set the scene:

The concepts of such a visitors centre was originally created by Jonathan Bean who is a film and T.V. designer, and Graham Black who is an archaeologist and past curator of Nottingham Museum. The original team included Andrew James who is a local entrepreneurial architect and Nesbitt & Son solicitors. The project Commenced in April 1988 and was funded by two Business Expansion Scheme share issues which were supplemented by direct share purchase by Nottinghamshire County Council, Nottingham City Council, and Nottingham Evening Post each of £100,000. The total capitalisation was just under £2 million and the centre opened to the public on May 27th 1989 after a 14 month building and fitting programme.

Project Description

Visitors assemble in a Medieval Yard where the sounds and smells of animals supplement a tape-slide audio visual presentation which sets the scene of England, and in particular, Nottinghamshire in the 13th century.

A medieval retainer group up to 15 people together and leads them through a large door where they enter a darkened Greenwode area. When the door has closed, the projected scenery changes (in the form of tape-slide audio visual) and the voice of Robert Hardy introduces this visual journey through the Greenwode to the Tavern.

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At this point the Greenwode plunges into darkness as the wall reveals a door into the Tavern where 'locals' are sitting listening to a minstrel bard telling tales of how Robin Hood outwitted the Sheriff. He stops his tale to beckon the audience in and the door closes behind them as he starts a new tale.

After a couple of tales the sound of heavy footsteps come from above and a trap door above slams open to reveal Sir Guy of Guisbourne - the savage henchman for the Sheriff who commands you to leave the Tavern to see the Sheriff in his dungeon. With much noise of soldiers behind you and encouraged by the light, you enter the dungeon where, at the top of a staircase the Sheriff (who is a talking head) addresses you and tells of all the nasty things he does to people who support Robin Hood.

Just as the Sheriff is reaching the peak of his raving, the Minstrel beckons you to follow him to the secret cavern to escape. The cavern, complete with damp and dank candlelit walls, is the place a medieval retainer helps you to board, three at a time, into a magic chair which will transport you on your journey in search of Robin Hood.

Once in the chair, the voice of the Minstrel appears to come from behind your shoulder (multilingual - 8 languages so far) and starts to described the street scenes to you as travel through the streets of Nottingham.

Once out of the town gates, the glory of the greenwood in summer is displayed, followed by a rocky crop and ..... whoosh, ping..... an ambush. Rushing down and onwards the minstrel on your on your shoulder ask help of an old hermit in his cave (Pepper's Ghost effect) before being swung around and around through a perilous forest ultimately to reveal Robin Hood holding the severed head of Guy of Guisbourne with the blood still dripping.

Now there is a clearing around a major oak where the smell of the roast venison wafts towards you and Alan'a'Dale is playing his lute to entertain the King at his outlaws' feast table, complete with Robin Hood proposing a toast to the King's health.

The magic chair stops and you are helped off by maidens who hand you a rub-off question card. Now on foot you make your way through the didactic exhibition in search of clues to help you answer the questions about what is fiction and what is fact in the tales of Robin Hood. Upstairs and many facts later, the Sheriff and Maid Marian judge your answers and for 50p will certify you "pardoned" or an "outlaw".

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The Compact Disc Concept

In the initial stages of the tour, the audio visual shows, the dynamic lighting, the cine projector and the sound are all controlled from a computer as subsystems. In the case of the A.V. shows and the sound effects, the C.D. players are started at cue points and allow to run 'wild' (i.e. without further synchronisation) until their own one track resets them in 'pause' mode. Some C.D. players in this walk-through section of the show had to be replaced with digital sound stores because of eleventh hour production problems, but multiple sound system for the Tavern area which is synchronised with the cine projector was eventually retained.

The localised sound tracks in the ride area were recorded with a cue track such that upon detection of the cue, the C.D. player was put into 'pause' mode where it waited for a switch closure from the chair hitting a micro-switch to change the mode to the 'play' condition.

There were a total of 36 localised sound tracks generated by 27 C.D. players - all using the same discs.

The sound in the chair proved to be the most difficult by far - not in terms of the C.D. principle, but the problems associated with a moving chair system. Each of the 28 chairs has its own C.D. system which consists of a C.D. player, a controller, an amplifier and loudspeaker, a battery and charger, and a track selection panel.

The English language is on Track 1, and therefore a 'play' command will start it playing Track 1 anyway. The first part of the recording is a pulse on the cue track which makes the player go to the 'pause' mode. If whilst in this 'pause' mode a different language button is pressed (by the medieval retainer) the control unit pulses out the appropriate number of 'skip tracks' commands. A switch closure from the track then sets the player into 'play' mode. At the end of every section of the commentary there is a cue tone and hence the machine the machine is put into 'pause' and waits until 'play' is reinitiated by a switch closure. Thus the recording for the whole commentary is one track per language, and the scene described by the commentary is achieved by merely re-starting the machine when the chair arrives at that point in the ride.

Reset of the play system is achieved by decoding a cue tone of a different frequency which activates the 'stop' command of the player.

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Outboard Circuit Details

Every C.D. player in the system is modified to simply bring out the deck functions for remote momentary contacts from the controller. The controller was designed to have DIP switches such that players of different makes could be used in future and the degree of modification to the player is kept to a minimum.

The line level audio output is connected to a tone/mix section which allows clean feed sends and mix inputs. Thus the individual effects tracks can be solo or a combination of sounds. The mix section is fed into a power amplifier capable of delivering 30 watts into 8 ohms when using 18 volt rails derived from a mains power supply, or 20 watts when run from a 12v battery.

Where cue tracks are used, the second audio channel is connected directly to a tone detection circuit whose output is fed back to the machine control section.

Identical chassis are used for the control unit and only those component sections or connectors necessary for that particular format are loaded on.

The chairs are fitted with proprietary 12v 28AH batteries via a change-over circuit to a charger. The mains lead to the charger is plugged into floor-mounted sockets at night time so that charging can take place without the pressure of the public.

The initial design and installation used microswitches fitted to the chair support pole which were activated by a simple vane attached to the drive track in order to restart the C.D. player at the appropriate point for the commentary. The designer incorporated a spin section (Perilous Forest) where the chairs rotated 720° and did not 'rewind' themselves. The final design of the C.D. control unit was irrevocably delayed whilst a solution to the problem of achieving a reliable switch closure for any chair orientation was considered. It was decided to 'rewind' the chairs in the maintenance area in order to be able to use a simple cable-wrapping technique and thus have wire connections rather than slip-rings or whatever. Unfortunately the chair turning mechanics could not survive this extra turning action and an electronics solution had to be found.

Proximity switches and reed relays were tried unsuccessfully and eventually an infra red beam system was installed. The lack of switching rendered the C.D. system unusable until the infra-red system was manufactured and installed, so the first three months operation of the centre relied upon car cassette machines with

tapes that had to be changed every time the chairs passed through the maintenance bay.

Just to add to the problem, the chairs are supported on nylon wheels which create massive static charges whenever the pusher arm disengages (downhill and coasting). The static was sending the control circuitry wild and was eventually solved by using static grounding strips up to the track housing.

Synopsis of the Equipment

Sound: 50 effects tracks on 30 C.D. player feeding 72 loudspeakers plus 28 chairs fitted with battery powered C.D. systems using one of 8 language tracks. All sound tracks recorded on two disc pressings.

Lighting: 134 luminaires fed from 98 dimmers of which a maximum of 30 were dynamically controlled either from the A.V. computer or from timer crossfade circuits triggered by chairtrack microswitches.

A.V. System: 2 sets each of 6 slide projectors with either C.D. or digital sound store sound tracks controlled by one master computer and one slave computer sync-locked by SMPTE time code, plus two cine projectors using endless loop film, one of which sync-locked to a drive tone.

Special Effects: Hatshake, trapdoor, candle snuff, motor mouse, dovecote fan, flight of dish-cloths, Woody Woodpecker, beehive, arrows, plus water pumps for dungeon drip, cavern drip, baby wee, mill, waterfall, blood and wine. (Special effects by Jeff Baggott)

Implementation

Some of the implementation problems have already been described, but perhaps the most basic problem was the lack of a definitive plan of campaign rather than the 'create on the move' approach which the designer and producer followed. This led to a continuous stream of software changes whose implication on the system design caused confusion, and above all, delay, from the research stage right through to the opening day and beyond.

The similarities between a visitors centre and a new theatre do not end with the artistic demands; but the adage of "The show must go on" is always upheld, despite the fact that three out of the four critical main contractors were late (including the

electronics contractor) and panic action at the eleventh hour actually making the delays longer rather than shorter. Apart from the 7 day per week 24 hour site operation, there were over 80 people working continuous for the final 48 hours prior to the press day - including the Managing Director painting the walls of the ticket office!

Conclusion

The compact disc has been proved to be a thoroughly reliable cost effective solution for projects which require cyclical sound reproduction of a large number of tracks of recording.

The application of compact disc has been greatly helped by the standardisation of machine control techniques which subsequently allow quite complex operational requirements to be achieved relatively simply.

The variation on the basic design used at Robin Hood Centre include:-

Continuous looped sound effects of 1 second to 10 minute duration.

Synchronised sound effects.

Multiple track sound effects for simple pseudo-periphony.

Multiple language synchronised commentary.

Note: Schematic showing the basic C.D. system design were given in the original paper presented at the Reproduced Sound Conference, Windermere 1988 - Proc.I.O.A. Vol 10 Part 7 (1988)