

STEREO DRAMA WITH DIGITAL  
EQUIPMENT

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## Stereo Drama with Digital Equipment

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### Abstract

At NHK, the production techniques of stereo drama were brought to completion in the 1960's and more recently, digital two-track and multi-track recorders have also been used for drama production.

This started in November, 1985, and the first program was called "Adieus Kentaurus." In November, 1986, there was another such program, "Viva Space College;" and in January, 1987, "Hiroko in Wanderland."

In this article, we shall introduce the new method of production, and the effects it is likely to have on drama programs.

### 0 Introduction

Music software produced by digital means, like CD's, CDV's and LD's, are very popular with the public. But what about drama production? We investigated the best ways of using digital technology from the point of view of a sound engineer.

We asked ourselves: what advantages do digital techniques have over analog techniques? Can digital technology be genuinely creative? Can it make our programs more interesting for our listeners?

In November, 1985, we took a first step with a two-hour stereo radio drama. From that time until December, 1987, we produced more than ten such drams, including three in surround-sound, encoded by the Dolby surround system.

Our main items of equipment were the PCM-3324 24-track recorder and the PCM-3102N two-track recorder.

In this paper, we described the production software, and detail differences introduced by using digital technology.

## 1 Production Flow

Radio drama is rather like movie or television plays, except that there is no picture. The main resources are dialogue, music and sound-effects.

In a radio play, the listener creates his own "Sound world," and if this is effective, the drama will have been a success. The sound engineer has the responsibility of recording and mixing, according to the script, to make the listener's "Sound world" as interesting as possible.

From the point of view of sound quality, radio drama has the problem that many dubbings are necessary. Here, digital recording has the advantage, because its S/N ratio is very large.

Digital recording also has a big dynamic range -- and this is an advantage for recording dialogue, which can range from a quiet whisper to a loud shout; and for sound effects, which can range from the hushed sound of a light breeze to the immense roar of an explosion.

For these reasons, it seems a good idea to use the high S/N ratio and wide dynamic range of digital recording for radio drama. But it is not as easy to use digital recording for drama as it is for music. One problem is that for radio drama, we can't decide on a time-reference until mix-down. In addition, we need a flexibility for combining dialogue, music and effects which is difficult to achieve with digital techniques.

So we used a combination of a digital multi-track recorder and a two-track recorder to attain good sound-quality together with flexibility. (See Figure-1)

## 2 Production Details

Figure 2 shows a typical production-flow for stereo drama, using digital equipment. Figure 2 shows the flow for a surround-sound drama. First, all the material is recorded on a two-track recorder, and then dialogue, music and effects are dubbed in accordance with the time-reference on a multi-track recorder. Next, a mix-down is done; and the final master tape is two-track.

## 2-1 Dialogue Recording

Recording is done segment by segment, using the best microphone placing to achieve the demands of the script. Because of the high resolution of the sound field achieved in digital recording, noise must be kept to a minimum, and the players must beware of making any unnecessary sound.

However, a simple playback easily convinces them of the very high fidelity of digital recording.

One serious difficulty is that hand-editing of digital tape is much more difficult than with analog tape. We asked the actors to perform in long segments, even if they made mistakes.

Usually there are about two hundred edit-points, so we look forward to the time when a reasonable random-access electronic editing system is available.

## 2-2 Sound Effects

Making sound effects is both interesting and exciting. NHK has a big sound-effects library, but these are almost all analog-recorded.

This is the way we achieve good sound-quality. Studio material is recorded on a PCM-3102N, and outdoor material on a PCM-F1, an 8mm VTR, or a portable DAT recorder for our latest programs. After pre-mixing, all the sound-effects are recorded using an analog recorder.

## 2-3 Music Recording

Music is recorded in the usual way on a PCM-3324, and the mix-down is done on a PCM-3102N.

## 2-4 Mix-down

To get an overall picture, and because we were using new techniques, we first did a test mix on an analog copy tape. While doing the test mix, the director derived a correct cue timing.

Something unexpected happened here: we found that there is a delay of about 0.3 or 0.5 second at the D/A converter. But when you're mixing, it is all precisely timed, and you cannot tolerate a lag even of only 0.3 second.

We corrected for this lag in a very primitive way: when the director gave his cue, the tape operator picked it up a little fast and started the two-track recorder a little early. That's what we call REAL fusion between analog and digital techniques!

After we had finished dubbing with the right combination and timing, we mixed down using a CPU-assisted console.

### 3. Changes introduced by Digital Techniques

We recognise that there is a study assignment into the sound quality of digital equipment, but at the same time, we are sure that digital techniques will be of advantage to radio drama production.

We monitored the reaction of listeners, who enjoyed the programs at home.

We should like to mention some relevant aspects of digital equipment. We must achieve sophisticated nuances in dialogue recording, and to preserve a true ambience field at the recording stage, digital techniques are superior. However, we are still looking into miking problems, because if we use the same miking techniques as for analog recording, we get many unwanted sibilants due to transients. We are looking for a transient limiter which will work like the "soft-knee" tape in analog recording.

The excellent S/N ratio and phase response of digital equipment exposes differences of sound quality from the microphone, the pre-amplifier, the equalizer, and so on, so especially at mixing points we must be more careful with the reverb, equalizing and fader controls than with analog recording.

#### 4 Conclusion

"I don't even know what digital recording is -- but I experienced a 'sound world' I had never heard before."  
"I really enjoyed the transparent sound of the program."

We got many letters with phrases like these.

We enjoyed digital production, but before we started some people were worried about its merits. Would the listener appreciate the improved broadcast sound quality -- or was the advantage only for digital music?

We are sure that, with appropriate improvements, digital equipment will open up a new world of radio drama.

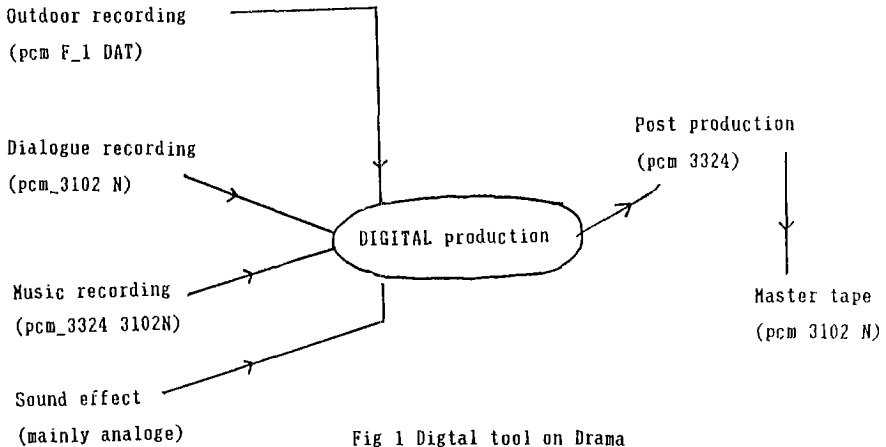


Fig 1 Digital tool on Drama

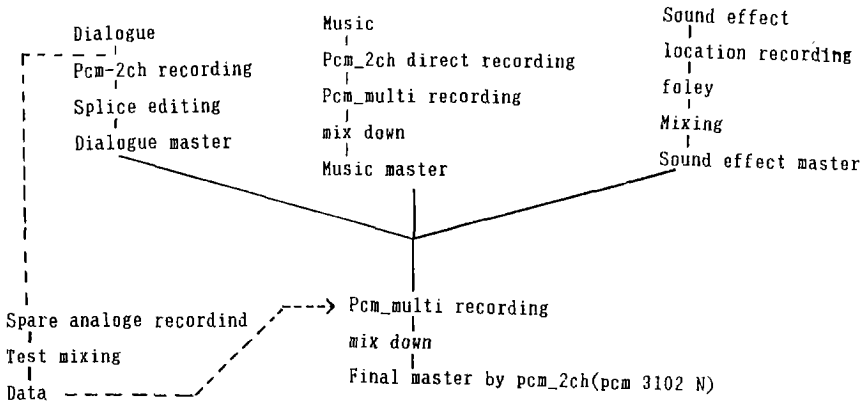


Fig 2 production flow in stereo

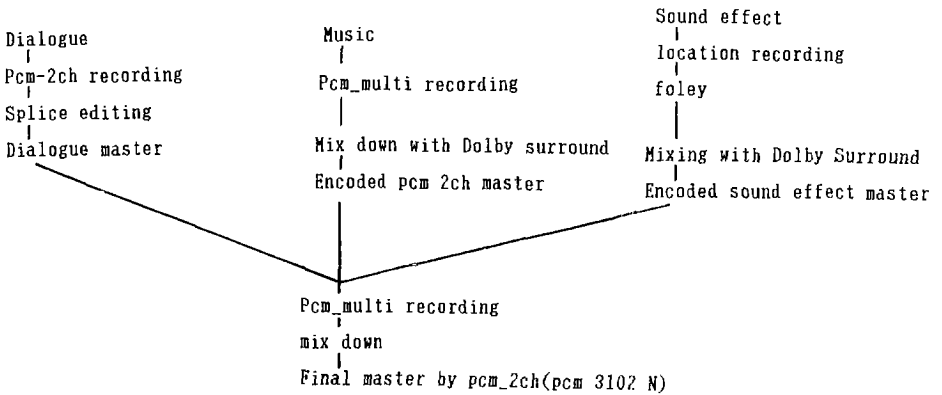


Fig 3 production flow in surround



photo 1 dialogue recording



photo 2 outdoor rec with portable DAT





photo 3 2 track pcm 3102 N recorder

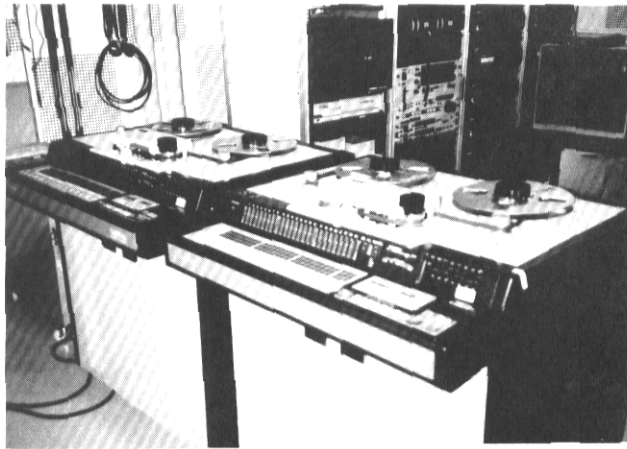


photo 4 24 track pcm 3324 recorder



photo 5 mixdown CD-809st(front view)



photo 6 above same (rear view)

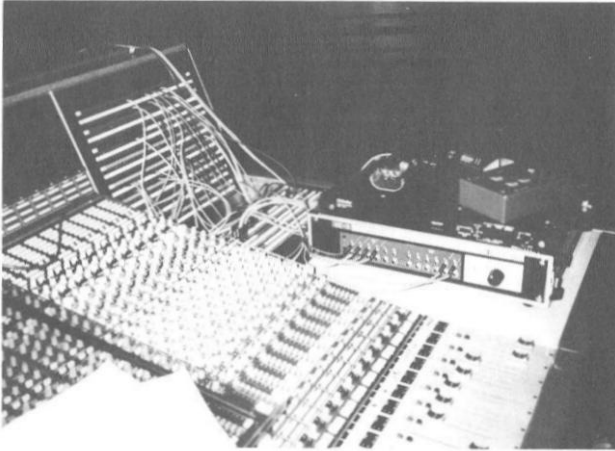


photo 7 surround enc/decoder