

RECOMMENDATION ITU-R BR.779-2

Operating practices for digital television recording

(Question ITU-R 239/11)

(1992-1997-2003)

The ITU Radiocommunication Assembly,

considering

- a) that the exchange of television programmes is very important and extensive;
- b) that international standardization of the media and of the recording formats used for programme exchange offers both economic and operational advantages;
- c) that the alignment of operational practices used in connection with the recording and play-back of television programmes is highly desirable,

recommends

1 that for international exchange of digitally recorded television programmes the operating practices should be those in Annex 1.

Annex 1**1 Presentation of recordings**

Recordings of a single programme of a duration up to the maximum cassette play time should be contained in one cassette.

Separate programmes should always be on separate cassettes.

Cassettes containing short-form events (events less than three minutes) may contain multiple events.

The recording format used shall be identified.

2 Programme identification

The content of a recorded digital television cassette should be identified by at least the following information, to be provided on a label attached to the cassette itself, and on another label attached to the cassette container:

- a) name of the organization which made the recording;
- b) title of the programme, or title, sub-title and episode number;
- c) library number (reference number) of the programme or of the cassette;
- d) total number of cassettes, and number of the cassette in the sequence, if the programme is on more than one cassette;
- e) total playing time, and playing time of the programme material recorded on each cassette;

- f) longitudinal time code address for the start of the programme;
- g) television scanning standard used;
- h) audio channel allocation: monophonic, stereophonic multi-channel, discrete or multiplexed;
- j) aspect ratio of the image and protected area of the image;
- k) closed caption data;
- l) other metadata.

It would be beneficial, in view of the implementation of fully automated television stations, if at least information items b), c), d), e) and f), were also provided in the form of a bar code or memory label attached to each recorded cassette.

The information required above should be provided in at least one of the official languages of the ITU.

3 Leaders

Programme material recorded on digital television cassettes should be preceded and followed by appropriate leaders as shown in Table 1:

TABLE 1

	Duration (s)	Picture and sound content
Thread up leader	5	Blank tape
Identification leader	15	Aural and/or visual identification
Cue-up leader	8	Aural and/or visual count-down, 10 to 2
	2	Black and silence
		PROGRAMME MATERIAL
Run-out trailer	30	Black and silence (minimum)

Information shown on the identification leader should match that shown on the labels (see § 2).

The cue-up leader, the programme material and the run-out trailer should appear on the tape as an uninterrupted recording.

4 Cue audio track

In the case of a complete programme, the longitudinal (editing) audio should preferably be a replica of the programme sound, complete with its identification and countdown leader; it may however be interspersed with additional cues to identify segments of the programme, as needed.

5 Time and control code

The time address information to be used as reference for the exchange of recordings should be the one carried on the longitudinal time and control track. In the case of the exchange of a finished edited programme, such time address information should be continuous and monotonically increasing. Furthermore, the same time addresses should preferably (but not mandatorily) appear also on the time and control code multiplexed with the video information, and on the time and control code multiplexed on the digital audio channel that carries the finished programme sound. Programme data carried in the user bits of the longitudinal time and control signals should match information shown on the programme identification label.

Both time codes (longitudinal time-code (LTC) and vertical interval time-code (VITC)) should match and be continuous for the duration of the recording. The time code should not pass through 0000 hours during the recording.

If the recording is derived by decoding a composite PAL signal, then the time code should be referenced to the 8-field PAL sequence. For NTSC systems the time code should be referenced to the NTSC 4-field sequence.

6 Allocation of mono, stereo and multichannel audio channels, and the use of audio channels as data recording channels

The audio channel assignments for mono and stereo available on digital television tape recordings should be allocated as shown in Tables 2 and 3.

The analogue cue track, when present, is a users' track and is available at the users' discretion.

Correct relative phasing and synchronization of music and effects tracks to the final mix should be maintained at all times.

Compressed multichannel audio, carried as a data representation by an AES-3 two-channel interface, shall be recorded on the tracks 3 and 4 of a 4-track digital video tape recorder (VTR). When VTR tracks 3 and 4 carry the data representation of multichannel audio, the VTR tracks 1 and 2 will carry a suitably downmixed left/right surround sound version.

Both VTR tracks 1 and 2, and 3 and 4 should be in sync with the vision as recorded on tape.

Signal assignments of case 9 (see Table 2) multichannel compressed audio multiplex carried as data by an AES-3 interface should be as follows:

- left-signal
- right-signal
- centre-signal
- low frequency effects (LFE)-signal
- left surround-signal
- right surround-signal
- left or freely assignable-signal
- right or freely assignable-signal.

TABLE 2
Allocation of audio/data channels on 4-track digital television tape-recording formats

Case VTR Track	1	2	3	4	5	6	7	8	9	10
	Monophonic programme	Stereophonic programme	Two complete stereophonic programmes	Programmes with separate comment			Non-mixed monophonic programme	Stereophonic programme and second audio programme	Multi-channel audio	Four-channel uncompressed
				Monophonic	Stereophonic international sound	Stereophonic				
1	Complete monophonic mix	Complete mix, left	First programme complete mix, left	Commentary	First commentary	Commentary left	Speech (commentary)	Complete mix, left	Left total	Left
2	Blank ^{(1), (2)}	Complete mix, right	First programme complete mix, right	Blank ⁽²⁾	Second commentary	Commentary right	Music	Complete mix, right	Right total	Right
3	International sound	International sound, left	Second programme complete mix, left	International sound	International sound, left	International sound, left	Effects 1	Second audio programme	Audio multiplex	Centre
4	Blank	International sound, right	Second programme complete mix, right	Blank	International sound right	International sound, right	Effects 2	Blank	Audio multiplex	Monophonic surround (MS) (see Rec. ITU-R BR.1384)

⁽¹⁾ The internal practice of some organizations is to record identical monophonic signals on tracks 1 and 2.

⁽²⁾ Some organizations prefer that the audio track allocation of digital Betacam recordings is the same as that used for analogue Betacam recordings (see Recommendation ITU-R BR.778) so that the same replay equipment can be used to replay either format without the need to reroute the audio signals. In these circumstances the international sound can be recorded on track 2 of the digital Betacam tape as well as, or instead of, on track 3. If such a recording is used for international exchange this should be clearly shown on the labels and recording report.

Case 1 – Single monophonic programme content

This is the case where a single monophonic sound accompanies the video content of the programme. In such a case, the monophonic programme content represents the complete programme sound mix but, for the purpose of international exchange, it can be accompanied by the so-called “international sound” – the complete monophonic mix of music, effects, etc. lacking only the speech which can be added in the dubbing process in order to obtain a complete monophonic programme sound mix in a language different from the original one.

Case 2 – Single stereophonic programme content

This case is similar to case 1, but a single complete stereophonic sound accompanies the video content of the programme. In this case, as in case 1, the stereophonic programme sound represents the complete programme sound mix and it can be accompanied by a complete stereophonic mix of music and all effects – a stereophonic international sound – which may be used by the receiving organization for dubbing.

Case 3 – Two complete stereophonic programme contents

In this case, the video content of the recorded television programme is accompanied by two different complete stereophonic programme mix sounds. The difference may be the language or any other component.

NOTE 1 – In the case where two different stereophonic programme sounds are recorded with the same video programme content, the sending organization should provide written information on the nature of each of the two sounds.

Case 4 – Monophonic programme with separate commentary

When original news or documentary recordings with monophonic sound are exchanged, it is always expected that it is possible to dub them in a different language; they should therefore contain a complete international sound, i.e. the sound recorded on the spot with all ambiance, original speech, etc. which can be mixed later, by the receiving organization, with a new commentary in its own language.

Case 5 and Case 6 – Stereophonic programme with separate commentary

There is a similarity between these cases and case 4 but, since these involve stereophonic sound, all channels are used and the sound dubbing has to be done on a copy of the original recording where the complete stereophonic mix can be re-recorded on channels 1 and 2, or the stereophonic commentary in a different language and the stereophonic international sound can be recorded on channels 1, 2, 3 and 4 respectively.

Case 7 – Single monophonic programme content non-mixed

In this case, the video content of the programme is accompanied by a non-mixed monophonic programme sound, i.e. the speech or commentary, the music and the effects are not mixed together.

Such a configuration permits mixing at a later stage during the re-recording or dubbing of that particular tape. In general, such a case may appear when unfinished programmes, or programming segments, are exchanged (for example: one broadcasting organization may collect inserts from different sources in order to assemble a combined programme).

Case 8 – Stereophonic programme and second audio programme (SAP) (in some countries also known as descriptive audio for the sight-impaired audience)

In this case, a complete stereophonic programme is accompanied by a monophonic second audio programme. Under the circumstances of use of a second audio programme, the transmitted quality is of a lower quality than normal programme sound.

Case 9 – Uncompressed left and right programme sounds, and compressed audio recorded as data

In this case, the audio tracks 3 and 4 of the VTR are used as data recording tracks, while tracks 1 and 2 are used to record uncompressed left and right signals. The use of the audio tracks as data tracks is usually applied when multichannel sound is necessary. It should be noted that not all VTRs are capable of handling carriage of data, detection of the channel status bit of the AES-3 bit stream by the VTR is required as a minimum. The left/right uncompressed signals may be used to create a surround representation.

Case 10 – Left, right, centre and monophonic surround programme sounds

In this case, uncompressed L, R, C and MS (monophonic surround) are recorded on the four VTR tracks as indicated in Table 2. This recording format is known as 3/1 and is derived from Recommendation ITU-R BR.1384, Table 1.

Longitudinal audio channel

In all cases described above, the longitudinal audio channel, if present, should preferably contain a complete monophonic programme mix or, if this is not practicable, the content of audio channel 1.

TABLE 3

Audio track assignments for 8 channel sound systems – Track allocation

Track	Channel
1	Left
2	Right
3	Centre
4	LFE
5	Left sound ⁽¹⁾
6	Right sound ⁽¹⁾
7	Unassigned channel A
8	Unassigned channel B

⁽¹⁾ In the case of programmes using the 3/1 multichannel sound format, the MS (–3 dB) signal should be placed on both tracks 5 and 6. This allows a programme with a single surround channel to be treated as a programme with two surround channels.

NOTE 1 – Other channel assignment practices which apply to specific countries and in specific circumstances can be found in Appendix 1 to Annex 1 of Recommendation ITU-R BR.1384.

NOTE 2 – Unused tracks should not carry any other signal. They should be left silent. This is to eliminate the possibility of operational error.

