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# International Standard



# 8063/2

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## Information processing — Data interchange on 6,30 mm (0.25 in) wide magnetic tape cartridge using IMFM recording at 252 ftpmm (6 400 ftpi) — Part 2: Track format and method of recording for data interchange in start/stop mode

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*Traitement de l'information — Échange de données sur cartouche pour bande magnétique de 6,30 mm (0,25 in) de large utilisant un enregistrement IMFM à 252 ftpmm (6 400 ftpi) — Partie 2: Schéma de pistes et méthode d'enregistrement pour l'échange de données en mode marche/arrêt*

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Price based on 4 pages

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8063/2 was prepared by Technical Committee ISO/TC 97, *Information processing systems*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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# Information processing — Data interchange on 6,30 mm (0.25 in) wide magnetic tape cartridge using IMFM recording at 252 ftpmm (6 400 ftpi) —

## Part 2: Track format and method of recording for data interchange in start/stop mode

### 1 Scope and field of application

ISO 8063 specifies the characteristics of a tape cartridge using 6,30 mm (0.25 in) wide magnetic tape for data interchange between data processing systems.

ISO 8063/1 specifies the dimensional, physical and magnetic characteristics of the cartridge, and the track layout.

This part of ISO 8063 specifies the quality of the recorded signals, and the track format to be used on a 6,30 mm (0.25 in) magnetic tape cartridge, recorded at 252 ftpmm (6 400 ftpi) using IMFM recording and the start/stop mode of operation.

Together with the labelling scheme specified in ISO 4341, ISO 8063/1 and ISO 8063/2 provide for full data interchange between data processing systems.

NOTE — Numeric values in the SI and/or Imperial measurement system in this part of ISO 8063 may have been rounded off and therefore are consistent with, but not exactly equal to, each other. Either system may be used, but the two should be neither intermixed nor reconverted. The original design was made using the Imperial measurement system.

ISO 8063 applies to cartridges used for data interchange. Where it applies for testing only, this is specifically stated.

### 2 Conformance

A 6,30 mm (0.25 in) wide magnetic tape cartridge shall be in conformance with ISO 8063 if it meets all mandatory requirements of both ISO 8063/1 and ISO 8063/2.

### 3 References

ISO 646, *Information processing — ISO 7-bit coded character set for information interchange*.

ISO 2022, *Information processing — ISO 7-bit and 8-bit coded character sets — Code extension techniques*.

ISO 4341, *Information processing — Magnetic tape cassette and cartridge labelling and file structure for information interchange*.

ISO 4873, *Information processing — ISO 8-bit code — Structure and rules for implementation*.

### 4 Data representation

Characters shall be represented by means of the ISO 7-bit coded character set (see ISO 646) and, where required, by its 7-bit or 8-bit extensions (see ISO 2022) or by means of the ISO 8-bit coded character set (see ISO 4873).

#### 4.1 Recording of 7-bit coded characters

Each 7-bit coded character shall be recorded in bit positions B1 to B7 of an 8-bit byte; bit-position B8 shall always be recorded with ZERO. The relationship shall be as shown in figure 1.

#### 4.2 Recording of 8-bit coded characters

Each 8-bit coded character shall be recorded in bit positions B1 to B8 of an 8-bit byte. The relationship shall be as shown in figure 2.

### 5 Recording

#### 5.1 Method of recording

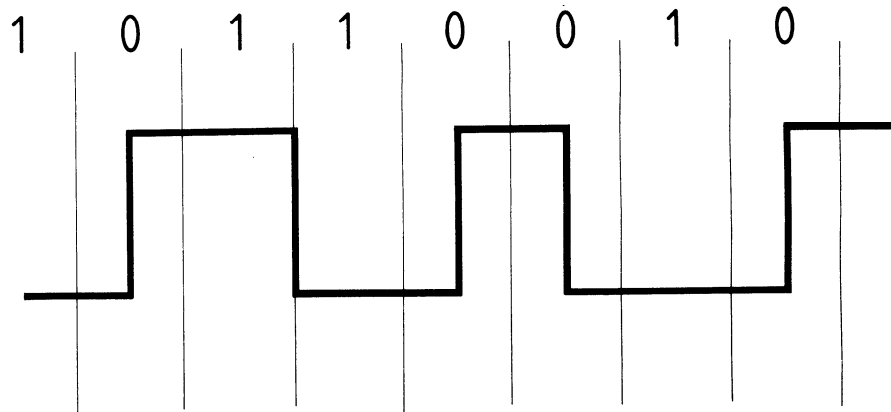
The method of recording shall be Inverted Modified Frequency Modulation (IMFM) for which the conditions shall be

Bits of the 7-bit combination	0	b7	b6	b5	b4	b3	b2	b1
Bit-positions in the byte	B8	B7	B6	B5	B4	B3	B2	B1

Figure 1

Bits of the 8-bit combination	b8	b7	b6	b5	b4	b3	b2	b1
Bit-positions in the byte	B8	B7	B6	B5	B4	B3	B2	B1

Figure 2



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Figure 3

- a) a flux transition shall be written at the centre of a bit cell containing a ZERO;
- b) a flux transition shall be written at the cell boundary between consecutive bit cells containing ONES.

**5.4 Flux transition spacing**

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**5.4.1 Effect of asymmetry**

At nominal recording density the average variation of spacing between consecutive flux transitions, taken over 32 flux transition spacings, shall not be greater than 2 % (see figure 4).

**5.4.2 Effect of data patterns**

In each of the two possible sequences of flux transitions defined by bit pattern 00000010000001000000 the spacing  $d_1$  between the two ZERO flux transitions preceding the ONE bit cell shall not exceed the average of the four earlier flux transition spacings by more than 12 %.

Similarly, the spacing  $d_2$  between the two ZERO flux transitions following the ONE bit cell shall not exceed the average of the four subsequent flux transition spacings by more than 12 % (see figure 5).

**5.5 Signal amplitude of the interchanged cartridge**

**5.5.1** The average peak-to-peak signal amplitude at 252 ftpmm (6 400 ftpi) shall not deviate by more than  $\pm \frac{50}{30}$  % from  $SRA_{252}$ .

Averaging shall be done over a minimum of 6 400 flux transitions, which may be segmented into blocks

**5.5.2** No peak-to-peak signal amplitude at 126 ftpmm (3 200 ftpi) shall be more than three times  $SRA_{252}$ .

See figure 3.

**5.2 Measurement**

All signal measurements shall be made at the point in the read chain where the amplitude is proportional to the rate of change of flux in the read head. The ratio of tape speed to the surface speed of the belt capstan shall be assumed to be exactly 0,76.

**5.3 Density of recording**

**5.3.1** The nominal recording density shall be 252 ftpmm (6 400 ftpi). The nominal bit cell length shall be 3,97  $\mu$ m (156  $\mu$ in).

**5.3.2** The long-term average bit cell length shall be the average bit cell length measured over at least 500 000 flux transitions. It shall be within  $\pm 3$  % of the nominal bit cell length.

**5.3.3** The short-term average bit cell length, referred to a particular bit cell, shall be the average of the lengths of the preceding four bit cells. It shall be within  $\pm 7$  % of the long-term average bit cell length and shall be within  $\pm 2$  % of the average bit cell length of any string of 128 consecutive bit cells containing the said particular bit cell.

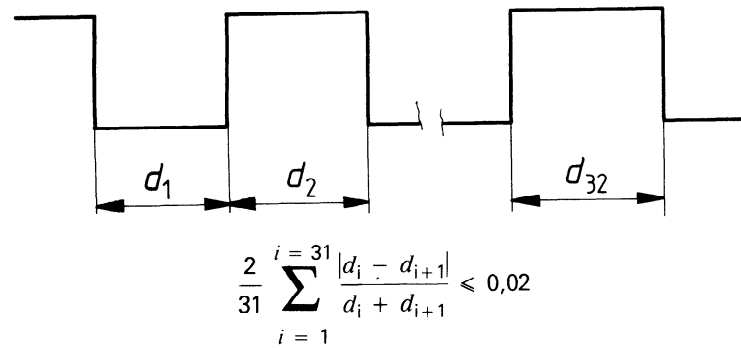
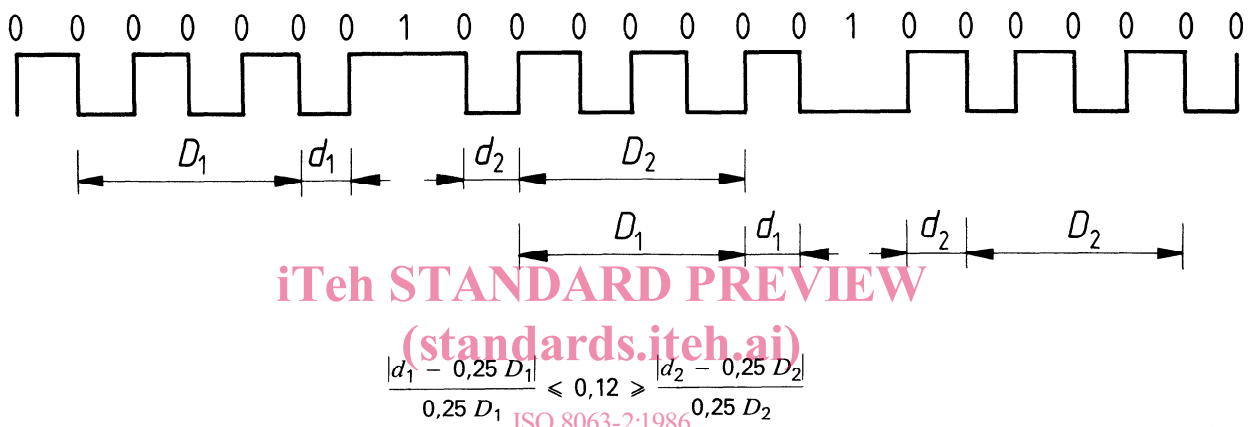


Figure 4



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 Figure 5

**5.6 Minimum signal amplitude**

No cartridge, when interchanged, shall contain flux transitions the base-to-peak amplitudes of which are less than 35 % of half SRA<sub>252</sub>.

**5.7 Erasure**

After erasure, any signal amplitude shall be less than 3 % of the SRA<sub>252</sub>.

**5.8 Recording offset angle**

On any track the angle that a flux transition across the track makes with a line perpendicular to Reference Plane B shall not exceed 9 minutes of arc.

**6 Track format**

The layout and positioning of tracks shall be as specified in ISO 8063/1.

**6.1 Use of tracks**

Each track shall be a data track and shall be written serially in the direction from the BOT marker to the EOT marker. No data

for interchange shall be written between the BOT marker and the LP marker. Data for interchange shall be written after sensing the LP marker and may continue to be written after sensing the EW marker.

**6.2 Location of characters on the tracks**

Each character shall be located in a byte of eight bit positions along the track numbered from 1 to 8 in order of recording.

**6.3 Sequence of recording**

The least-significant bit shall be recorded first. The information to be interchanged shall be recorded serially by bit and by character.

Bit-positions: ...4321 87654321 8765432...

Forward tape motion:

Resulting recording direction:

**6.4 Data block**

A data block shall consist of a preamble, a data portion, a CRC character and a postamble (see figure 6).

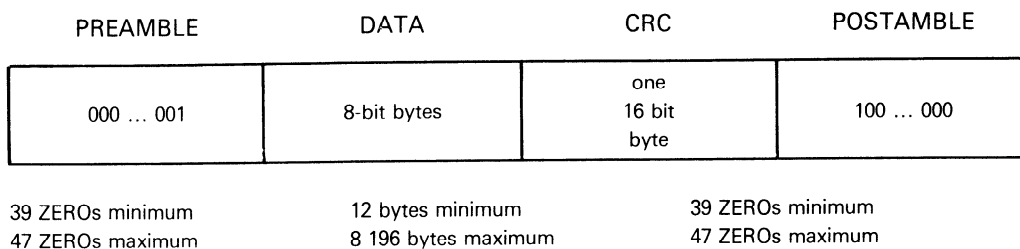


Figure 6

**6.4.1 Preamble**

The preamble, consisting of not less than 39 ZEROs and not more than 47 ZEROs followed by a single ONE, shall be written immediately preceding data in each data block.

**6.4.2 Data portion**

The data portion of a data block shall contain a minimum of 12 data bytes and a maximum of 8 192 data bytes.

**6.4.3 Cyclic Redundancy Check (CRC)**

The 16 bits following the data portion of a data block shall be a Cyclic Redundancy Check (CRC) character. This 16-bit character shall be written in each data block following the data portion and immediately preceding the postamble, the least significant bit being recorded first. The polynomial generating the CRC shall be

$$x^{16} + x^{15} + x^2 + 1$$

**6.4.4 Postamble**

The postamble, consisting of a ONE followed by not less than 39 ZEROs and not more than 47 ZEROs, shall be written immediately following the CRC in each data block.

**6.5 Control block**

A control block shall consist of a preamble, two bytes of eight ZEROs, and a postamble.

**6.6 Gaps**

**6.6.1 Integrity of gaps**

The gaps shall be erased.

**6.6.2 Initial gap**

The gap between the LP marker and the first data block shall be 152,4 mm min. (6 in min.) and 1,2 m max. (48 in max.).

**6.6.3 Interblock gaps**

The interblock gap shall have a minimum length of 31 mm (1.22 in) and a maximum length of 1,2 m (48 in). Any gap in excess of 1,2 m (48 in) shall be considered as the end of data on this track.

NOTE — The ability to start or stop within a gap of a given length is dependent on the tape speed selected from the range specified in ISO 8063/1 sub-clause 7.5 and the acceleration and deceleration also specified in ISO 8063/1 sub-clause 7.7.