A gap separates the end of the header and the beginning of the data. The data area consists of a read synchronization pattern, a data address mark, 128 data bytes (64 words), and a CRC word that checks the integrity of the data. An interrecord gap follows the data field. The SSSD format is summarized in Table 1-15.

1.11.2 Double-Density Diskette Format

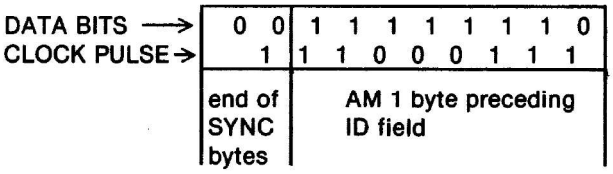
The flexible disk system records DSDD diskettes using modified FM (MFM) encoding techniques. The diskette is recorded in a Texas Instruments format, Figure 1-23. The diskette is organized into 77 cylinders that consist of a track on the lower surface (side 0) and the corresponding track on the upper surface (side 1).

A single hardware-generated index mark occurs during each revolution. Each of the 26 sectors starts with an ID header that includes a read synchronization pattern, ID address mark, and three words that identify the surface, cylinder, number of records per track (26), record number, and byte count per record (288 bytes/record). A CRC word verifies the integrity of the header.

A gap separates the data area from the end of the ID header. The data area consists of a read synchronization pattern, a data address mark and 288 bytes (144 words) of data followed by a CRC word that verifies data integrity. The DSDD format is summarized in Table 1-16.

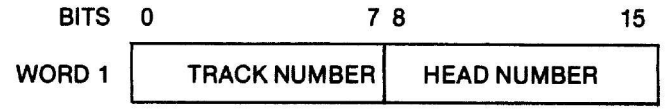
Table 1-15. FD800 Diskette Recording Format Summary

Field	Explanation
SYNC (Synchronization)	Each SYNC field contains six bytes of zeros. The SYNC field synchronizes the disk drive circuitry to the information being read from the diskette.
AM 1 (ID Address mark)	Address mark 1 consists of a unique byte that violates the normal FM encoding rules. AM 1 precedes the ID field and has missing clock pulses as indicated by zeros in the clock pattern of the following diagram.



Data pattern = >FE Clock pattern = >C7

ID (Identification)	The ID field contains four bytes (two words) that identify the address and size of the sector. These four bytes are as follows:



In word 1, the track number will be a maximum of 76, or >00 to >4C. The head number will always be 00.

Table 1-15. FD800 Diskette Recording Format Summary (Continued)

Field	Explanation
	BITS 0 7 8 15 WORD 2 | RECORD NUMBER | RECORD LENGTH In word 2, the record number will be a maximum of 26, or >01 to >1A. The record length is 128 bytes and is indicated as 00.
CRC (Cyclic redundancy check)	There are two CRC words, one following the ID field and one following the data record. The CRC word following the ID field is generated when formatting the diskette. The contents of this CRC word is determined by the header data, AM 1 thru ID 2. The contents of the data CRC word is determined by the data address mark (AM 2) and the data record. CRC words are recalculated during a read operation. The results of each recalculation are checked against the recorded CRC words. If the CRC words compare, the ID or data record was read correctly.
GAP 2 (Intrarecord gap)	The GAP 2 field consists of 11 bytes of >00s.
AM 2 (Data address mark)	The AM 2 field is either >FB or >F8. Field >FB identifies the field that follows as a data record. Field >F8 identifies the field that follows as a control record (IBM deleted data). AM 2 has missing clock pulses as indicated by zeros in the clock pattern of the following diagram. DATA BITS → | 0 0 | 1 1 1 1 1 0 X X CLOCK PULSE → | 1 | 1 1 0 0 0 1 1 1 end of SYNC bytes | AM 2 byte preceding data field XX = 11 for >FB, 00 for >F8 Clock pattern = >C7

Table 1-15. FD800 Diskette Recording Format Summary (Continued)

Field	Explanation
DATA RECORD	The DATA RECORD field contains 128 bytes of data or control records. In a control record, the first byte is used to indicate defective or deleted records as follows: , = Defective Record (Alternate Physical Record Relocation) D = Deleted Record F = Defective Record (Sequential Physical Record Relocation)
GAP 1	The GAP 1 field consists of two bytes of >00s followed by a variable number of >00 bytes depending on the diskette speed and record length.
GAP 3	The GAP 3 field consists of a variable number of >00 bytes (nominally 46 bytes).
AM 3 (Track address mark)	The AM 3 field is always >FC. It identifies the start of a track (referenced to the index hole in the diskette). AM 3 has missing clock pulses as indicated by zeros in the clock pattern of the following diagram. DATA BITS ⟶ 0 0 1 1 1 1 1 1 0 0 CLOCK PULSE⟶ 1 1 1 0 1 0 1 1 1 end of SYNC bytes | AM 3 byte Data pattern = >FC Clock pattern = >D7

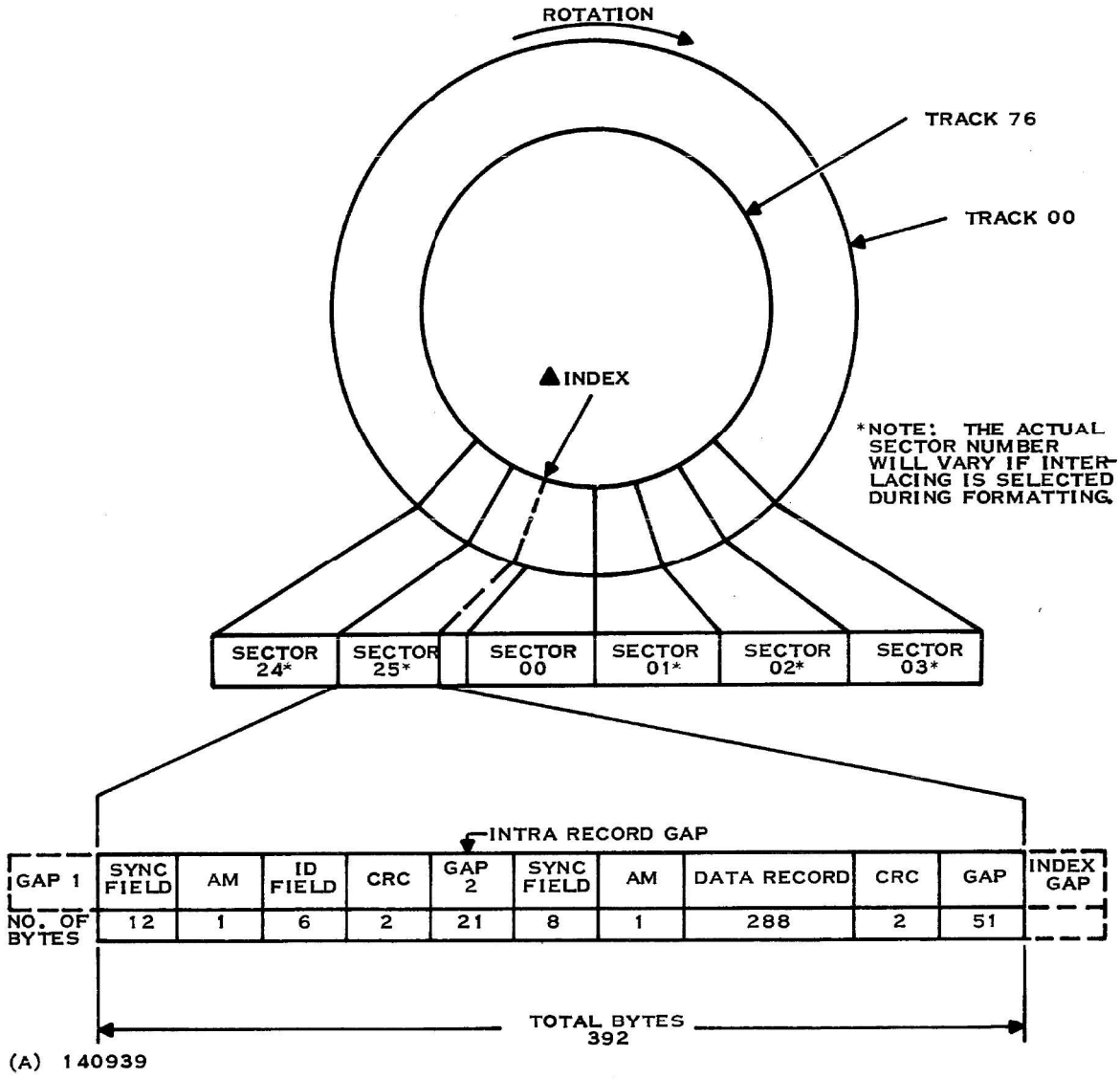
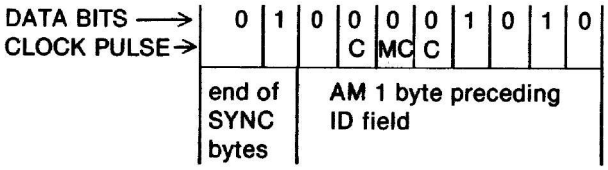


Figure 1-23. Double-Density Diskette Format

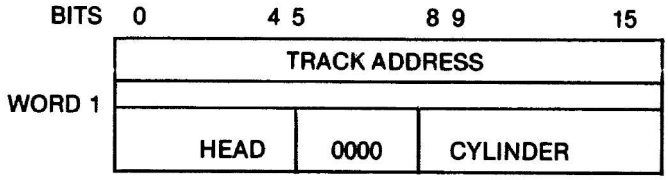
Table 1-16. FD1000 Diskette Recording Format Summary

Field	Explanation
SYNC (Synchronization)	There are two synchronization fields, a 12-byte SYNC field for the sector ID header and an 8-byte SYNC field for the data record. Separate SYNC fields are required because sector headers and data are written at different times (and possibly on different machines). There is no predictable phase relationship between clocks generated at these different times. The SYNC fields provide a clock/data pattern to lock the data separator phase lock loop to the records on the diskette. The SYNC pattern is 01010101 (>55).
AM 1 (Address Mark 1)	Address mark 1 consists of one unique byte that violates the normal MFM encoding rules to allow synchronization on both bit and byte levels. AM 1 precedes the ID field and has a data value of 00001010 with no transition for the third zero marked MC in the following diagram.

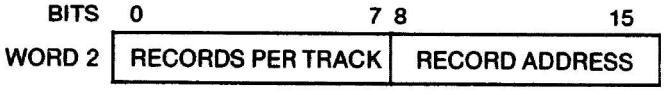


C = clock pulse MC = missing clock pulse normally provided for MFM encoding

ID (Identification)	The identification field contains six bytes (three words) as follows:



Word 1 is the track address on which this ID is recorded. The head address is in bits 1 through 4 and the cylinder address is in bits 9 through 15. Bits 5 through 8 are always zero.



Word 2 contains the number of records (sectors) per track and the record address. The maximum record address is >19.

Table 1-16. FD1000 Diskette Recording Format Summary (Continued)

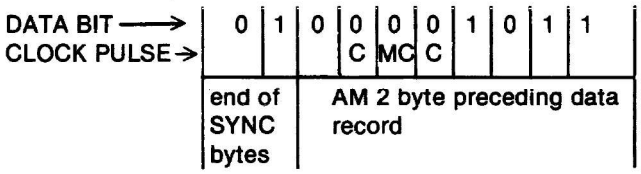
Field	Explanation
	Word 3 contains the byte counter that defines the size of the record following the recorded ID. All records on a track are of the same fixed length of 288 bytes. The byte counter of the ID word will be checked by the controller as part of the ID location check during any data transfer operation.
CRC (Cyclic Redundancy Check)	The CRC character is the 16-bit remainder value generated, on a WRITE DATA or FORMAT operation, by performing a polynomial division of the string of bits that includes the address mark and the data field. The polynomial divisor is selected to provide the best error detection probability. The selected divisor is the standard CRC-CCITT polynomial described with the CRC logic (Section 2). To further reduce the possibility of a false CRC error, a partial remainder value of >FFFF is preset into the CRC generator prior to any CRC generation or checking operation. During an ID location or READ DATA data field transfer operation, the address mark and following data, including the previously written CRC value are again divided by the divisor polynomial. If the data does not contain any errors, the resulting remainder value in the CRC generator will be 0000. Any other value indicates that the data integrity has been lost.
GAP 2 (Intrarecord gap)	An intrarecord gap consisting of 21 bytes of >55 occurs after a WRITE FORMAT command. The gap can pick up undefined bits after write data commands because the write turn-on transition occurs in this gap.
AM 2 (Address mark 2)	Address mark 2 consists of one unique byte that violates the normal MFM encoding rules to allow synchronization on both bit and byte levels. AM 2 precedes the data record and has a data value of 00001011 with no transition for the third zero (marked MC on the following diagram).  C = clock pulse MC = missing clock pulse normally provided for MFM encoding
DATA RECORD	The data is recorded as 16 bit words following the data address mark. The data length is fixed at 144 words (288 bytes). The data is always followed by a CRC field.

Table 1-16. FD1000 Diskette Recording Format Summary (Continued)

Field	Explanation
GAP 3 (Interrecord gap)	Gap 3 is an interrecord gap called the postamble. This gap compensates for rotation speed timing tolerances and prevents writing into the ID area of the next record. When the FORMAT command is executed, the controller writes 51 bytes of >55 (816 microseconds) in the gap.
INDEX GAP (Gap 1)	The index gap length depends upon the actual speed of the drive. This gap compensates for the speed tolerance.