COMMODORE

MODEL 8280

8" FLOPPY SUBSYSTEM

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1.0 INTRODUCTION

This document describes the functional and physical specifications for the Commodore 8280 8" diskette subsystem.

2.0 RELATED DOCUMENTS

1. Western Digital FD1797-02 Floppy Disk Controller Specification
2. Tandon Model TM848 Production Specification, 210069-Rev. X3
3. IBM Diskettes 1, 2 and 2D OEM Information, GA21-9388-0
4. Commodore Users Manual for Dual Floppy Disk Drives, 320899
5. Dysan Corporation 240/2A Diskette Alignmen Instructions

3.0 GENERAL DESCRIPTION

8280 8" diskette subsystem is designed to interface with Commodore PET/CBM series of personal computers. The system uses standard IBM (or equivalent) formatted 8" diskettes. Normal system operation as described in the Commodore Users Manual is supported using IBM 2D diskettes (doubled-sided, double density - IBM P/N 1766872) or equivalent. The system is also capable of reading and writing (not formatting) IBM 1 diskettes (single-sided, single-density - IBM P/N 2305845) and IBM 2 diskettes (double-sided, single-density - IBM P/N 2736700). This capability is supported at the user level only (ref: Section 4.0 - Programming). The system supports 128/256 byte sector sizes only. Each system consists of:

- Two TM848-2 Diskette Drives
- DOS/Controller Printed Circuit Board
- Power Supply

4.0 PROGRAMMING

All of the functions specified in the Commodore Users Manual for Dual Floppy Disk Drives, P/N 320899, apply to the 8" system. Doubled sided diskettes must be used and must be formatted with the HEADER command before using for system operation. Reading and writing to IBM formatted diskettes can be accomplished through the use of the PRINT#15 statements as follows:

DE = Density (0-Double, 255-Single)
T = Track (0-76)
S = Sector (1-26)
H = Head (0-1)
C = Command (8-Read, 9-Write)
D = Drive (0-1)
B = Buffer Size (128/256)

```
Open 15,8,15
Print#15,"M-W"CHR$(161)CHR$(16)CHR$(1)(DE)          Set density
Print#15,"M-W"CHR$(43)CHR$(16)CHR$(2)CHR$(T)CHR$(S+H*32)  Set track, sector, head
Print#15,"M-W"CHR$(4)CHR$(16)CHR$(1)CHR$(C*16+D)    Set command, drive
Print#15,"M-R"CHR$(4)CHR$(16)
Get#15,S$:S$=S$+CHR$(0)                             Read controller status
If ASC (S$))127 then GOTO (*-1)                     Wait controller done
If ASC (S$)()0 then STOP                            If error
For I=0 to B-1                                      Read Buffer
Print#15,"M-R"CHR$(I)CHR$(18)
Get#15,A$:A$=A$+CHR$(0)
        :
Next I
```

5.0 SPECIFICATION SUMMARY

5.1 Drive

HEAD WEAR GUARANTEE

   Head Wear Guarantee: 15,000 media contact hours

MEDIA AND MEDIA WEAR GUARANTEE

   Media: 203.20 mm (8.0 inch) Industry Standard Diskette
   Wear Guarantee: 3.0×10^6 passes per track minimum

TRACKS

   Number of Tracks: 154, 77 per surface

   Spacing: .529 mm (20.8 millinches)

   Inside Track Radius: 51.50 mm (2.03 inches), Side 0
                        49.42 mm (1.95 inches), Side 1

ACCESS TIMES

   Track-To-Track: 3 milliseconds
   Heads Settling Time: 15 milliseconds
   Average Access Time, including head settling time: 91 milliseconds

DISK ROTATIONAL SPEED

   Motor Start Time: 0.5 second, maximum
   Average Latency, including seek and disk travel: 83 milliseconds
   Disk Rotational Speed: 360 RPM
   Instantaneous Speed Variation (ISV): +-1.25%

RECORDING CAPACITY AND METHOD

        Flux Changes Per Inch, Inside Track:
            6536 FCI, Side 0
            6816 FCI, Side 1
        Transfer Rate:
            250K Bits per second, single density
            500K Bits per second, double density
        Unformatted Recording Capacity:
            0.8 MBytes per disk, single density
            1.6 MBytes per disk, double density
        IBM Format Recording Capacity:
            0.6 MBytes, single density
            1.2 MBytes, double density
        Recording Method:
            FM, Single Density
            MFM, Double Density

MEAN TIME BEFORE FAILURE

        MTBF: 10,000 power-on hours

MEAN TIME TO REPAIR

        MTTR: 30 minutes

PERIODIC MAINTENANCE

        Typical Periodic Maintenance: Every 10,000 power-on hours
                                        (see Maintenance Schedule, OEM manual)

COMPONENT LIFE

        Average Component Life: 15,000 power-on hours

OPTIONS

The following option must be installed in the TM848-2 drives to assure proper
system operation:

                    - U3 Pins 13-4 Cut
                    - M3 Strap Cut
                    - M4 Strap In
                    - C Strap In

This allows external motor on control.

5.2 DOS/Controller

The DOS/Controller interface conforms to IEEE-488. The controller utilizes a Western Digital FD1797-02 LSI chip. Refer to the Western Digital FD179X Specification for a detailed description of operation. The DOS section conforms to Commodore Dual Floppy Disk System requirements. Track formats are IBM 3740 (single density-FM) and System 34 (double density-MFM) compatible.

5.3 System Specification

PHYSICAL

    Height: 8 inches
    Width: 15 inches
    Depth: 16.5 inches
    Weight: 30.5 lb

ELECTRICAL

    Power Requirements
      Voltage: 100, 117, 220 or 240 VAC (+-10%)
      Frequency: 50 or 60 Hz
      Power: 100 Watts

ENVIRONMENTAL

    Operating
      Temperature: 4.4°C to 46°C (40°F to 115°F)
      Relative Humidity: 20% to 80% (non-condensing)
      Altitude: 1000 ft below sea level
                          50,000 ft above sea level
    Non-Operating
      Temperature: -40°C to 71°C (-40°F to 160°F)
      Relative Humidity: 20% to 80%

5.4 Voltage Options

TRANSFORMER 1: 100 or 117 VAC
                50 or 60 Hz

TRANSFORMER 2: 220 or 240 VAC
                50 or 60 Hz

NOTE: Both transformers have optional taps to be selected and hard wired in.

5.5 Acceptance Test

The Commodore 8280 8" diskette subsystem shall accept and pass Commodore's 970130 soft error test for the Commodore 8280 8" subsystem. The error criteria for the acceptance test shall be that the system shall transfer 10^8 bits allowing no more than one countable error. A countable error in this context is defined as an error that persists after the first retry. The subsystem shall not have any hard errors.

A hard error in this context is defined as an error that persists after 9 retries. The test conditions shall not have any error correcting codes. When reading an IBM properly formatted diskette, the diskette, the subsystem shall recover the data in less than 10 retries.

Note: Any unit that fails the soft error test shall be retried on mutually agreed media. If the unit passes on the mutually agreed media, the failure shall be attributed to media failure and not system failure.

6.0   Software Changes

The Commodore 8280   8" Diskette Subsystem will not accept
a "BACKUP" command (basic 4.0), and will respond with a syntax
error. This command was omitted, for each 8" diskette has an
individule BAD TRACK, SECTOR list which maps out deficient loc-
ations in the media, and the BACKUP command was a sector by sec-
tor copy. Disk backup may be accomplished by first issuing a
format command, followed by a COPY Dx to Dx.