PART 8
DISKS

CHAPTER 11
RK8-E DISK DRIVE CONTROLLER

SECTION 1   INTRODUCTION

11.1   PURPOSE

The RK8-E (Figure 11-1) provides the interface between the PDP-8/E OMNIBUS and the RK05 Disk Drive. As a part of this function the RK8-E
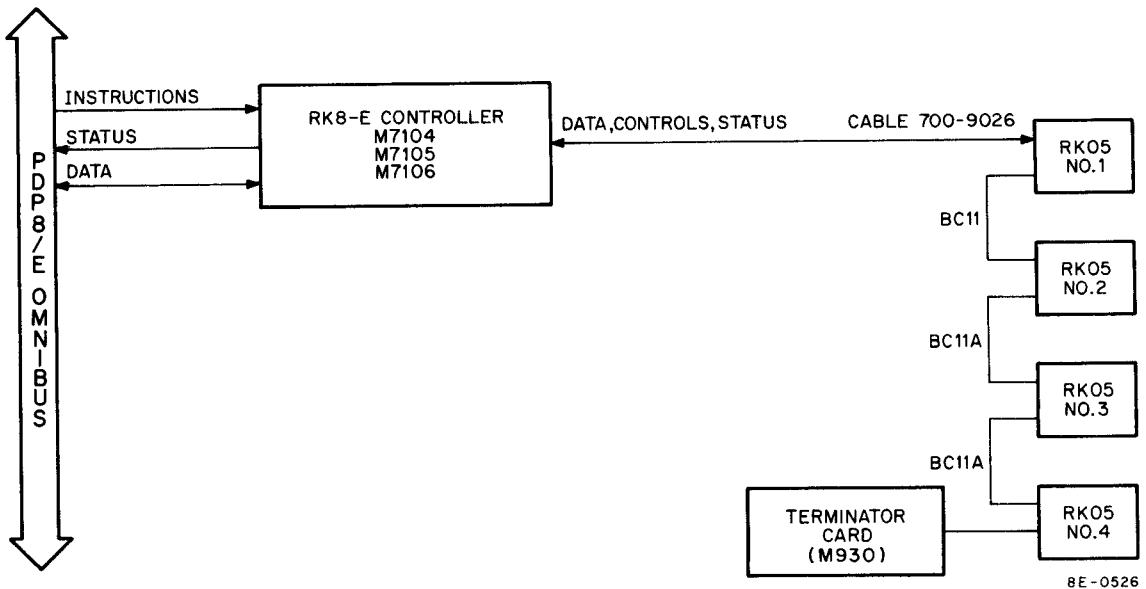

Figure 11-1   RK8-E Controller and RK05 Disk Drive
System Block Diagram

a.   Decodes programmed IOT instructions.

b.   Accepts and stores current address, command, and extended memory address words.

c.   Selects the designated RK05 and starts the designated operation.

d.   Jointly (with the selected RK05) locates the disk address (track, sector, and surface).

e.   Generates interrupts and skips for status checking operations.

f.   Generates break requests to initiate single cycle data breaks (data transfers to or from memory).

g.   Buffers the input/output data and performs related conversions (serial to parallel and parallel to serial).

h.   Performs housekeeping chores for single cycle data break data transfers (i.e., increments Current Address Register and provides sequential memory addresses).

i.   Counts bits and words in a transfer to determine when to end a data transfer.

j.   Generates and checks CRC (parity) for each sector.

k.   Provides flags to indicate current conditions and error status.

l.   Provides logic to aid in the maintenance of the RK8-E and RK05.

11.2 PHYSICAL DESCRIPTION

The RK8-E consists of the following quad modules, which are inserted into the OMNIBUS and used to control up to 4 (maximum) RK05 Disk Drives.

- M7104, RK8-E Data Buffer Register and Status Module

- M7105, RK8-E Major Registers Module

- M7106, RK8-E Control Module

The RK8-E modules are inserted into the OMNIBUS and connected together with H851 Top Connectors. The RK8-E is connected to the RK05 Disk Drives by a 7009026 cable.

11.2.1 RK05 Disk Drive

The RK05 Disk Drive contains the drive electronics and mechanism for accepting and releasing the disk, positioning the read/write heads, and reading and writing data from the RK8-E control. The drive contains a removable disk cartridge, control logic, and a power supply. No power is supplied to the RK05 by the RK8-E, and the RK05 supplies no power to the RK8-E. Table 11-1 lists the RK05 Disk Drive specifications.

NOTE
The specifications in Table 11-1 apply to the RK05 when it is used with the RK8-E and a 16-sector cartridge. The RK05 may be used in other systems with other controllers and sector formats.

11.3 RECORDING METHODS AND FORMATS

This section describes the recording methods and the format used to write data on and read data from the RK05 Disk Drives.

Table 11-1

RK05 Disk Drive Specifications

Characteristic	Specification
Cylinder, Track, and Sector	
Cylinder Density	200 CPI
Cylinders/Drive	203
Tracks/Cylinder	2
Sectors/Track	16
Sectors/Cylinder	32
Bit Density and Storage	
Bit Density	2200 BPI
Bits/Cylinder	120,000
Bits/Sector	3750
Bits/Drive	24 million
Data Word Storage	
Words/Sector	400_8 or 256_{10}
Words/Track	$10,000_8$ or 4096_{10}
Words/Cylinder	$20,000$ or 8192_{10}
Words/Disk	1616K
Transfer Rate	
Word Transfer	8.32 usec
Bit Transfer Rate	1440 kHz
Recording Method	Double Frequency

11.3.1 Double Frequency Recording Method

The RK8-E uses the double frequency recording method. During a write operation, the RK8-E control generates timing pulses called Write Data Clock pulses (Figure 11-2). The time between the pulses is called a bit cell (space for writing data). A pulse within the bit cell represents a data 1 and the absence of a pulse represents a data 0. The clock pulse and data (0 or 1) are sent to the drive as Write Data and Clock pulses. Each pulse is recorded on the disk as a flux transition. A pulse representing a data 1 and the clock pulses cause a change in direction of current flow through the write heads and thus a change in the magnetic flux on the surface of the disk. Zero data bits do not cause a change in current flow through the write head; thus, there is no change in the magnetic flux on the surface of the disk.

During a read operation, the drive electronics separates the bit cell flux transitions and the data flux transitions. The bit cell flux transitions are sent to the RK8-E as Read Data Clock pulses and the data transitions are sent as Read Data pulses (serial bits of data).

11-3