OPERATING INSTRUCTIONS

FOR

PCC PD MODEL TE-D02

DISK EXERCISER

Document No. 895321 (8-79)

FOREWORD

The PCC PD Model TE-D02 Disk Exerciser is designed to provide the necessary control, data generation and data error detection to checkout or troubleshoot the PCC PD D1000, D3000, and D5000 Disk Drives. The TE-D02 is plug-to-plug compatible with the D3000 disk drives; when used with D1000 and D5000 disk drives, an adapter cable is required. The TE-D02 is capable of handling D1000, D3000, and D5000 configurations including 100 and 200 tpi, 2200 and 4400 bpi, and 1500 and 2400 rpm.

NOTE

The exerciser is designed for use as a maintenance and troubleshooting aid. It may also be used for preliminary Receiving Inspection checks including seek checks, cylinder commands, margin checks, and CE alignment.

Data reliability checks must be made using system computer and controller/formatter.

The exerciser procedures are designed to work in conjunction with the applicable Operating and Service Manual for the disk drive.

NOTE

The exerciser does not provide Sector Commands but allows monitoring of the Sector Pulses.

NOTE

The exerciser will not operate with Diablo versions of the D3000 Disk Drive unless the UNIT SELECT switch on the disk drive is set to the proper position.

CONTROLS AND INDICATORS

Refer to Figure 1 in conjunction with the descriptions given below.

Cylinder Address*

These nine toggle switches select cylinder address. The address is a binary count with 1 the least significant bit and 256 the most significant bit. The command is active when switch is set toward the lettering and Seek Mode* switch is set to M-N or LDC.

Cylinder Address Lamps*

These nine lamps have two functions.

(1) Display Cylinder Address switch position when Seek Mode switch is set to M-N or LDC.

(2) Display the cylinder address that the positioner will move to at the next seek command when Seek Mode switch is set to CRES or INC.

ESL (EXTENDED SELECT)

This switch selects which pair of disks is exercised in a D3000 Extended system. The *up* position provides a logic high. Refer to the applicable Operating and Service Manual for disk pair selected.

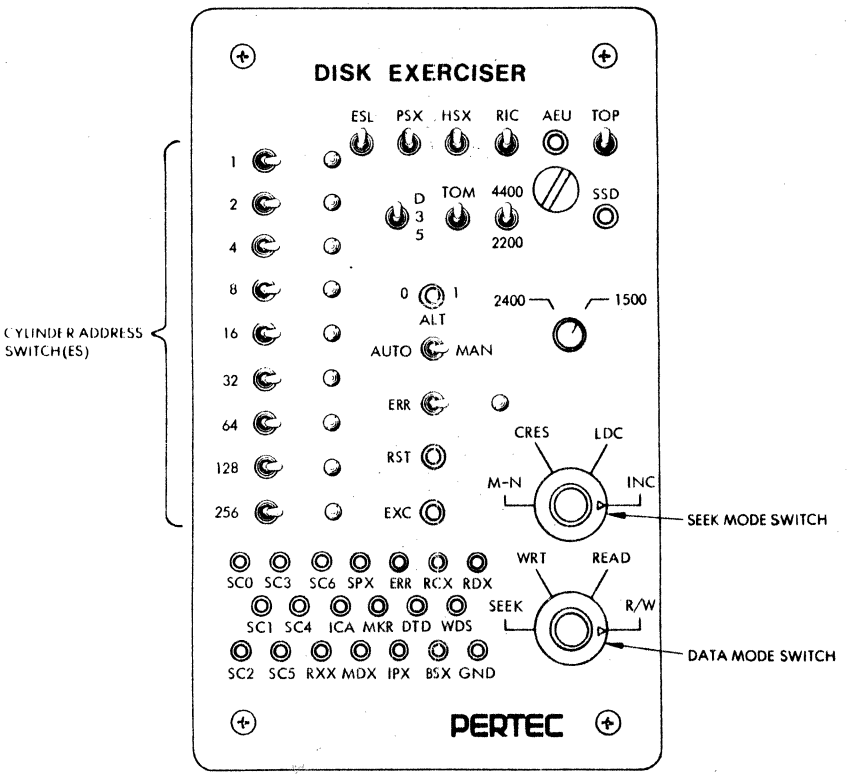

Figure 1. Disk Exerciser Control Panel

*These switch names do not appear on the front panel, but have been assigned to aid in understanding the operation of these switches.

PSX (PLATTER SELECT)

This switch selects which disk is exercised in a dual disk system. The *up* position provides a logic high. Refer to the applicable Operating and Service Manual for disk selected.

HSX (HEAD SELECT)

This switch selects which head is exercised. The *up* position provides a logic high. Refer to the applicable Operating and Service Manual for head selected.

RIC (RESTORE INITIAL CYLINDER)

In the *up* position, provides a low for positioner to seek to the selected cylinder address. In the *down* position, provides a logic high for the positioner to restore to initial cylinder address (000).

AEU (ACTIVATE EMERGENCY UNLOAD)

When pressed, provides a low emergency unload command. On Diablo Interface drives, it may set write protect, AEU or remote start/stop.

TOP (TRACK OFFSET PLUS) (D3000 Only)

In the *down* position, provides plug offset (toward center). In the *up* position, the signal is disabled (refer to Table 1).

TOM (TRACK OFFSET MINUS) (D3000 Only)

In the *down* position, provides minus offset (away from center). In the *up* position, the signal is disabled (refer to Table 1).

D-3-5

This switch selects the disk drive interface. The Diablo Compatible (D1000 and D3000) are selected by 'D'; the Pertec compatible (D1000 and D3000) are selected by '3'; and, the D5000 series is selected by '5'.

0-ALT-1

This switch selects one of three data patterns: all 0s; alternate 1s and 0s; or all 1s. The switch should be used with the Data Mode* switch in either WRT or R/W position.

AUTO/MAN

In the AUTO position, this switch allows automatic operation of the seek mode. In the MAN position, the exerciser is operated manually by EXC switch. The exerciser will not operate in the AUTO mode if the DATA MODE switch is in the WRT or READ position.

ERR

When set towards lettering, the disk will *stop on data error* and the error lamp will light and remain lit until manually reset. When set away from lettering, the disk will register an error on the error lamp, then automatically reset. The disk does not stop in this mode.

RST (RESET)

When pressed and released, this switch manually resets the error lamp and the error detection circuit.

EXC (EXECUTE)

When pressed and released, this switch performs two functions.

(1) Loads the counter with the cylinder address in LDC mode.

(2) Starts the seek operation as set by Seek Mode switch.

Seek Mode*

This switch provides one of four seek commands. The commands are M-N, CRES, LDC, and INC. The modes are described in Modes of Operation.

Data Mode*

This switch provides one of four data modes. The modes are SEEK, WRT, READ, and R/W. These modes are described in Modes of Operation.

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*These switch names do not appear on the front panel, but have been assigned to aid in understanding the operation of these switches.

SSD (START/STOP)

When pressed and released, this switch operates the remote start/stop line on applicable D1000 and D3000 disk drive.

4400/2200

This switch selects bit density (refer to Table 2).

1500/2400

This switch selects disk drive speed (rpm) (refer to Table 2).

Table 1
TRACK OFFSET Operation

TRACK OFFSET PLUS Switch Position	TRACK OFFSET MINUS Switch Position	Operational Condition of Disk Drive
Up	Up	Heads centered over track
Down	Up	Heads offset in plus direction
Up	Down	Heads offset in minus direction
Down	Down	Heads centered over track and reduced read amplifier gain

Table 2
Data Rate

Density (bpi)	Speed (rpm)	Data Rate (MHz)
4400	1500	3.1250
4400	2400	5.0000
2200	1500	1.5625
2200	2400	2.5000

TEST POINTS

Test points are provided on the front panel for disk drive input/output signals to and from the tester. The test points are as follows.

From the disk:

SC0—Sector Bit 1
SC1—Sector Bit 2

SC2—Sector Bit 4
SC3—Sector Bit 8
SC4—Sector Bit 16
SC5—Sector Bit 32
SC6—Sector Bit 64
SPX—Sector Pulse
RCX—Read Clock
RDX—Read Data
ICA—Illegal Cylinder Address
(Logic Address Interlock*)
DTD—Double Track Drive
WDS—Write Data Signal (Write Data and Clock*)
RXX—Ready (File Ready*)
MDX—Malfunction Detected (Write Check*)
IPX—Index Pulse
BSX—Busy (Attention Line*)

From the Tester:

ERR—Data Error
MKR—Internal Clock, used as data sync.

*Diablo Compatible

PRELIMINARY INSTRUCTIONS

(1) Visually check disk drive for damage.

(2) Apply power to drive under test and verify power supplies (adjust if necessary). Refer to Section VI of applicable Operating and Service Manual.

(3) Remove power from drive and connect exerciser to drive.

- D1000—Remove disk drive cover and locate the I/O connectors (J101 and J102). Insert the D1000 exerciser adapter cable (P/N 895082) in the I/O connector; connect cable to exerciser. Select the proper disk speed type (1500/2400) and data rate (4400/2200) on the exerciser switches.
- D3000—Remove disk drive cover and raise the Logic PCBA to the maintenance position. Remove I/O Termination PCBA from the I/O connector. Plug exerciser into the outside connector and secure to bracket with captive screw.
- D5000—Open the front card cage and swing out for access to PCBAs. Remove the I/O cable and terminator board (slots 11 and 13); insert the exerciser cable into either slot. Select the proper disk speed type (1500/ 2400) and data rate (4400/2200) on the exerciser switches.

(4) Set the switches on the exerciser as shown below; refer to applicable Operating and Service Manual to set switches marked *As Required*.

(5) Set Unit Select thumbwheel switch on all types of drives to Position 1 or 3.

(6) Apply power to the drive under test. On models with a remote start/stop, press and release SSD switch on the exerciser.

(7) Using an oscilloscope, monitor IPX test point for index pulse and monitor SPX test point for sector pulses.

Switch	Position
ESL	As Required
PSX	As Required
HSX	As Required
RIC	Up
AEU	Not Applicable
TOP	Up
D-3-5	As Required
TOM	Up
SSD	Not Applicable
0-ALT-1	ALT
ERR	Towards Lettering
AUTO/MAN	AUTO
RST	Not Applicable
EXC	Not Applicable
4400/2200	As Required
1500/2400	As Required
Seek Mode	CRES
Cylinder Address	0
Data Mode	SEEK

MODES OF OPERATION

The following modes of operation are listed as an aid in operating the exerciser. By using the definitions of each control and the *Modes of Operation*, a technician can utilize the exerciser for his specific requirements.

NOTE

These Modes of Operation should be performed on all disk surfaces. These surfaces are determined by the settings of the ESL, PSX, and HSX switches.

A. SEEK CHECKS

(1) Set exerciser per *Preliminary Instructions*.
(2) Set Seek Mode switch to position indicated.
(3) Set Cylinder Address switches to address indicated.
(4) Set Data Mode switch to position indicated.

Crescendo

Press and release EXC switch. The positioner will seek in the following manner, 0—1, 0—2, 0—3, 0—4, etc., to maximum legal cylinder address.

Time

(1) Set Seek Mode switch to LDC and set Cylinder Address switches to 0.
(2) Press and release EXC switch.
(3) Set Seek Mode switch to M—N.
(4) Set Cylinder Address switches to 67 or 134 depending on track density.

The positioner will seek between 0—67 or 0—134 depending on track density. Using an oscilloscope, monitor test point BSX for proper timing.

B. DATA CHECKS

(1) Set exerciser per *Preliminary Instructions*.
(2) Set Data Mode switch to R/W.
(3) Set Seek Mode switch to INC.
(4) Press and release EXC switch.

The disk drive will write and read an alternating 1s and 0s pattern to the maximum legal cylinder address. If an error occurs, the disk drive will stop at the cylinder where the error occurs. If errors do not occur, induce an error by running your fingers over the input diode matrix on the Read/Write PCBA. To continue test after an error has occurred, press and release RST and EXC.

C. CYLINDER ADDRESS CHECKS

(1) Set exerciser per *Preliminary Instructions*
(2) Set Seek Mode switch to LDC and set Cylinder Address switches to 0.
(3) Press and release EXC switch.
(4) Set Seek Mode switch to M—N.
(5) Set Cylinder Address switches to maximum legal address. The positioner will seek from cylinder zero to the maximum cylinder per surface of the disk selected.
(6) Set Cylinder Address switches to maximum legal address plus one. The positioner will remain at zero cylinder address because of an illegal cylinder address.

D. MARGIN CONDITION CHECKS

(1) Set exerciser per *Preliminary Instructions*.
(2) Set Data Mode switch to WRT.
(3) Set Seek Mode switch to INC.
(4) Press and release EXC switch. The disk drive will write an alternating pattern of 1s and 0s.
(5) Press and release RIC. The positioner will return to track 0.
(6) Set Data Mode switch to READ.
(7) Set TOM switch down.
(8) Press and release EXC switch. The disk drive will read an alternating pattern of 1s and 0s offset minus (away from center).
(9) Press and release RIC switch.
(10) Set TOM switch up.
(11) Set TOP switch down.
(12) Press and release EXC switch. The disk drive will read an alternating pattern of 1s and 0s offset plus (towards the center).
(13) Press and release RIC switch.
(14) Set TOM switch down.
(15) Press and release EXC switch. The disk drive will read an alternating pattern of 1s and 0s at one-third the normal gain.
(16) Press and release AEU. The positioner will perform an emergency unload on applicable drives.

After checkout, perform a CE alignment, if necessary. Refer to Section VI of the applicable Operating and Service manual.

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