

CONTROL DATA® 9760, 9762, 9764 and 9766 STORAGE MODULE DRIVE FAMILY DESIGNED FOR **oem** ORIGINAL EQUIPMENT MANUFACTURERS



9764

9762

9760

9766

GENERAL DESCRIPTION

The Control Data Storage Module Drives (SMD) are random-access rotating memories which use removable disk packs as their storage media. This SMD family is comprised of the CDC® 9760 (40 MB), 9762 (80 MB), 9764 (150 MB), and the 9766 (300 MB) Drives.

The basic drive unit has four main components: Power supply, logic chassis, air filtration, and deck. The deck holds the drive spindle assembly and voice coil positioning mechanism. Head positioning is performed by a closed-loop, proportional servo system driving a voice coil linear actuator.

Family characteristics within this SMD series include common styling, common interface and identical transfer rates (compatible formats). These features allow greater system flexibility and permit the use of common spare parts and test equipment.

This SMD family incorporates the most advanced technology available and provides high performance, high reliability, and high accessibility.

STANDARD FEATURES

- I/O connectors suitable for flat cable
- Pluggable power supply
- Phase-locked oscillator/data separator
- NRZ to MFM data encoder with write compensation
- Daisy chaining of up to 16 drives
- Address mark detection for variable sectoring
- Switch-selectable fixed sectoring
- Spindle brake
- Write protect
- Power sequencing
- Logic address by logic plug
- Acoustic cabinetry for 9764/66 (optional on 9760/62)
- Prewired for dual-channel field kit

OPTIONS

- Dual-channel I/O (factory installed or field kit)
- Pack access cover interlock kit
- Cabinet options for 9760/62:
 - Rack mount (for 30-in or 36-in rack depth)
 - Pedestal cabinet
 - Acoustic cabinet
 - Drawer mount for base of acoustic cabinet which allows 2x configuration

INTERFACE SIGNALS

Input Signals From Controller

Unit Select Tag — Leading edge samples the unit select bit lines for storage. The remaining true level enables the unit to stay selected.

Unit Select 2⁰ 2³ — Carry binary logical address of the unit to be selected.

Cylinder Select Tag — Leading edge loads the absolute address from the 10-bit bus lines and the trailing edge initiates the seek.

Head Select Tag — Leading edge loads the head address from the 10-bit lines.

Control Select Tag 3 — Used as gate enable which provides control information from the 10-bit bus lines and must be true for the entire control operation. Bus lines contain the following control information:

Bit 0 Write Gate — Enables the write driver.

Bit 1 Read Gate — Enables digital read data on the transmission lines.

Leading edge of Read Gate triggers the read chain to synchronize on all-zeros pattern.

NOTE: Data Strobe and Carriage Offset signals are intended to be an aid in recovering marginal data.

Bit 2 Servo Offset Plus — Actuator offset from the nominal On Cylinder position toward the spindle.

Bit 3 Servo Offset Minus — Actuator offset from the nominal On Cylinder position away from the spindle.

Bit 4 Fault Clear — Will clear the fault flip-flop if the fault condition no longer exists.

Bit 5 AM Enable — Address Mark Enable line, in conjunction with Write Gate or Read Gate, allows write or recovery of Address Marks. When AM Enable is true while Write Gate is true, the writer stops toggling and erases data, creating an Address Mark. Write Fault detection in the unit is inhibited by this signal. When AM Enable is true while Read Gate is true, an analog voltage comparator detects the absence of read signal. If the duration of the erased area is greater than 16 bits, an Address Mark Found signal is issued.

Bit 6 RTZ — Pulse sent to the SMD will cause the actuator to seek to Track 0, reset the Head Register, and clear the Seek Error flip-flop. This seek is significantly longer than a normal seek to Track 0, and should only be used for recalibration; not data acquisition.

Bit 7 Data Strobe Early — SMD PLO Data Separator will strobe data at a time earlier than nominal.

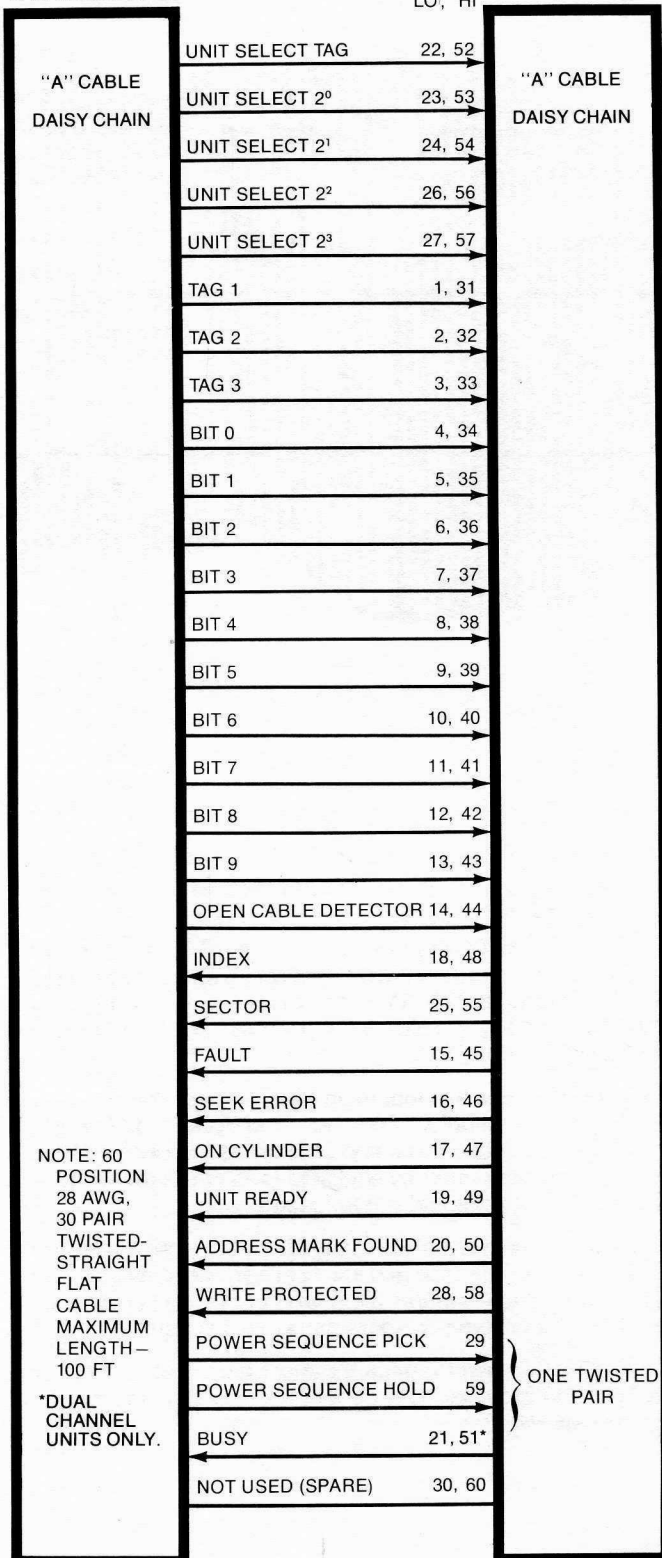
Bit 8 Data Strobe Late — SMD PLO Data Separator will strobe data at a time later than nominal.

Bit 9 Release (Dual Channel Only) — Will release channel priority reserve in the SMD, making alternate channel access possible after selection by the other channel ceases. If the unit is to function with "Reserve Timer" feature, release will occur from 500 ns to 10 seconds (customer selectable), following the last selection of the SMD. Enabling Release will always clear Reserve and allow alternate channel access independent of the Reserve Timer Feature. The Reserve Timer is enabled by means of a switch on the I/O board. Inhibiting the Reserve Timer causes the SMD to stay Reserved until specifically released by the operating channel. By using switches on the I/O board, it is also possible to absolutely reserve an SMD to one channel or the other.

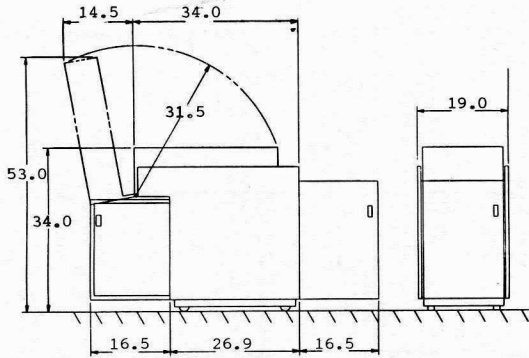
CONTROLLER

LO, HI

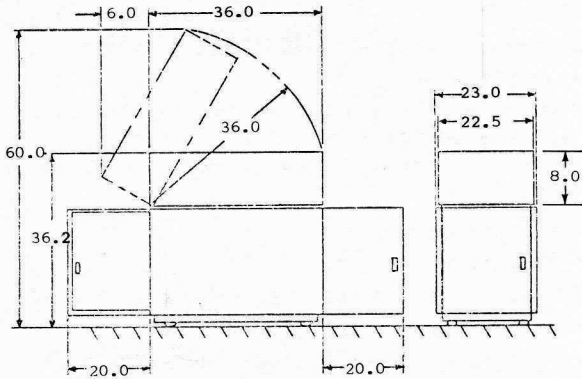
SMD



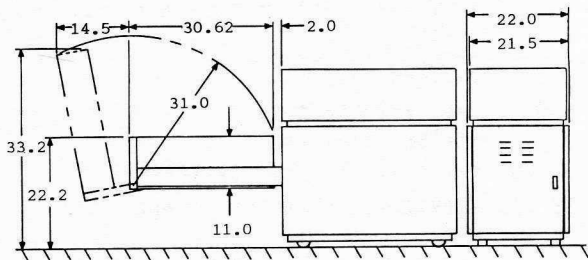
CUSTOM SITE PLANNING
WITH THE SMD FAMILY



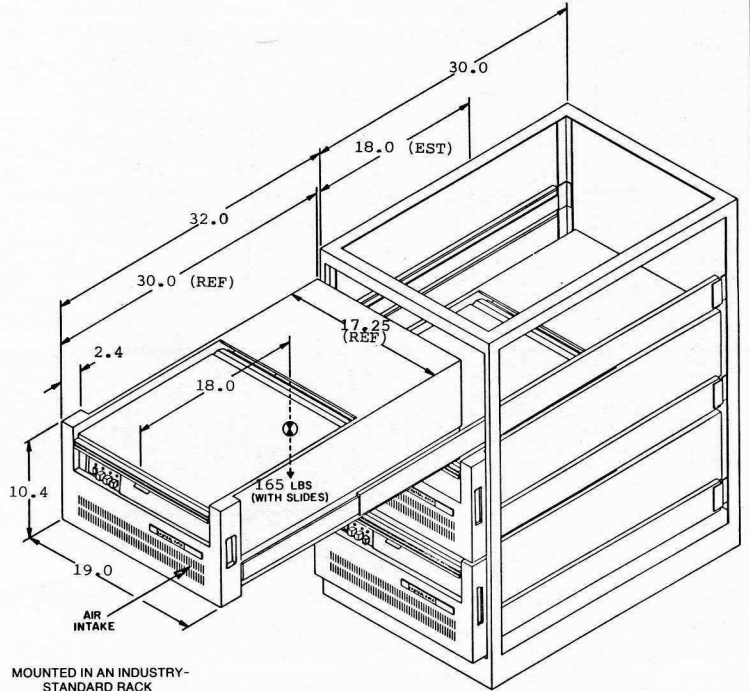
PEDESTAL CABINET



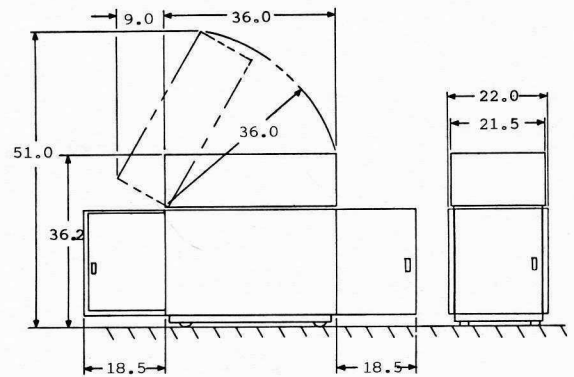
9764/66 ACOUSTIC CABINET



9760/62 DRAWER FOR
ACOUSTIC CABINET



30" RACK MOUNT
(36" Rack Mount Also Available)



9760/62 ACOUSTIC CABINET

SPECIFICATIONS

Capacity (20 160 bytes per track, unformatted)—

SMD Unit:	9760	9762	9764	9766
Bytes Per Spindle (8-bit bytes):	40 MB	80 MB	150 MB	300 MB
Tracks Per Surface:	404	808	404	808
Spare Tracks Per Surface:	7	15	7	15
Track Density (TPI):	192	384	192	384
Track Spacing (inches):	0.0052	0.0026	0.0052	0.0026
Data Surfaces:	5	5	19	19
Servo Surfaces:	1	1	1	1

Disk Pack —

CDC Model:	9876	9877	9883-91	9883-91
CDC CE Pack Model:	9876-51	9877-51	9883-51	9883-51
Recording Disks:	3	3	10	10
Protective Disks:	2	2	2	2
Diameter: 14 in				
Coating: Magnetic oxide				

Performance (processing speed) —
 Data Transfer Rate: 1.2 megabytes per second
 Spindle Speed: 3600 r/min
 Bit Density: 6038 bpi, inner track
 4038 bpi, outer track

Accessing Time —
 Max Full Stroke: 55 ms
 Average: 30 ms
 Max, One Track: 6 ms

Latency Time —
 Maximum: 16.7 ms
 Average: 8.3 ms

Recording Heads —

	9760	9762	9764	9766
Read/Write Type:	5	5	19	19
Servo Type:	1	1	1	1
Read/Write Width (inches):	0.004	0.002	0.004	0.002
Type: Self-loading, single gap, no erase				

Physical Characteristics —

	9760/62				9764/66
	PEDESTAL CABINET	ACOUSTIC CABINET	ACOUSTIC WITH DRAWER	30" or 36" RACK MOUNT	ACOUSTIC CABINET
Height:	34 in (864mm)	36.2 in (920mm)	36.2 in (920mm)	10.5 in (267mm)	36.2 in (920mm)
Width:	19 in (483mm)	23 in (584mm)	23 in (584mm)	23 in (584mm)	23 in (584mm)
Depth:	34 in (864mm)	36 in (914mm)	36 in (914mm)	30 in (762mm)	36 in (914mm)
Weight:	243 lbs (110kg)	340 lbs (155kg)	567 lbs (258kg)	160 lbs (73kg)	556 lbs (252kg)

Specifications subject to change without notice

CONTROL DATA SALES OFFICES ARE LOCATED IN
 PRINCIPAL CITIES THROUGHOUT THE WORLD
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 BOX 0, MINNEAPOLIS, MINNESOTA 55440
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Power Requirements —

	9760/62		9764/66	
Voltage:	120	220/240	208/230	220/240
Frequency:	60	50	60	50
Phase:	Single	Single	Single	Single
Current, Max Operating:	8.2	5.2	8.0	8.5
Btu/h:	1800	2390	3960	3960
Connectors (Nema type):	5-15P	None	L6-20P	None

Environmental —

Operating Temperature: 59°F to 90°F (15°C to 32.2°C)
 Operating Humidity: 20% to 80% RH
 Nonoperating Temperature: -40°F to +158°F (-40.4°C to 70.0°C)
 Nonoperating Humidity: 5% to 95% RH

Reliability and Service —

MTBF: Greater than 4000 hours
 MTTR: Less than 1.5 hours
 Service Life: Five years

Data Error Rate —

Recoverable: Not more than one error in 10¹⁰ bits transferred

Preventive Maintenance —

Quarterly: Clean or replace primary filter, general inspection
 Semiannually: General inspection and cleaning
 Biennially: Replace absolute filter (annually for industrial environments)

Maintenance Features —

- No read/write adjustments
- Servo adjustments; one for 9762, three for 9760/64/66
- Two voltage adjustments (regulated ± 5V)
- Fault trap indicators to isolate problems quickly
- Head alignment kit available
- Breakers for ac and dc power
- Elapsed-time meter
- Field test unit available for head alignment, accessing, and read/write operations

Operator Control Panel —

- Start/Stop switch with indicator
- Logic plug with Ready indicator
- Fault Clear switch with Fault Status indicator
- Write Protect switch with Protected indicator