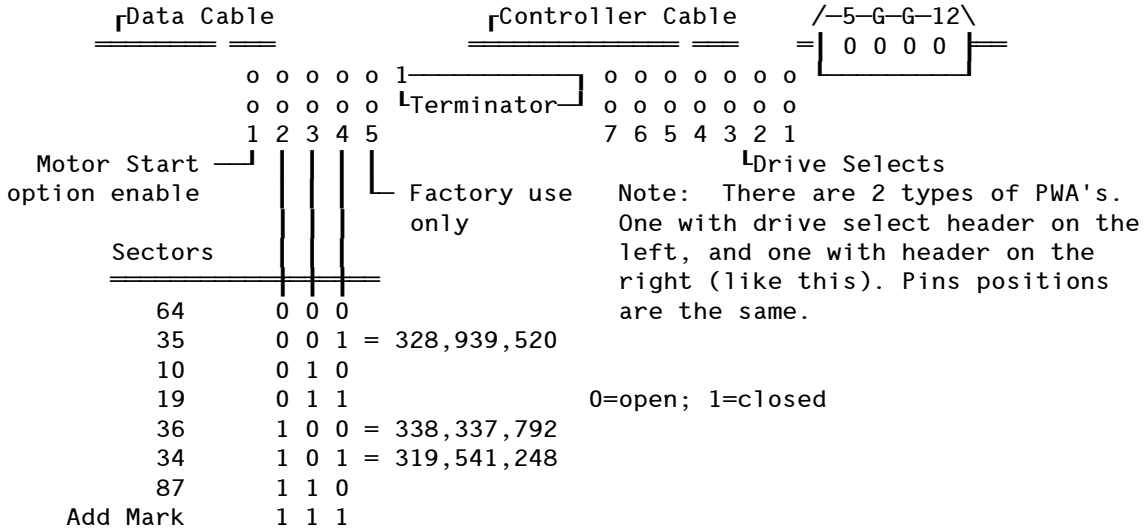


CDC Imprimis 94186-383 Wren 5 / SEAGATE ST-4383E Product Specification



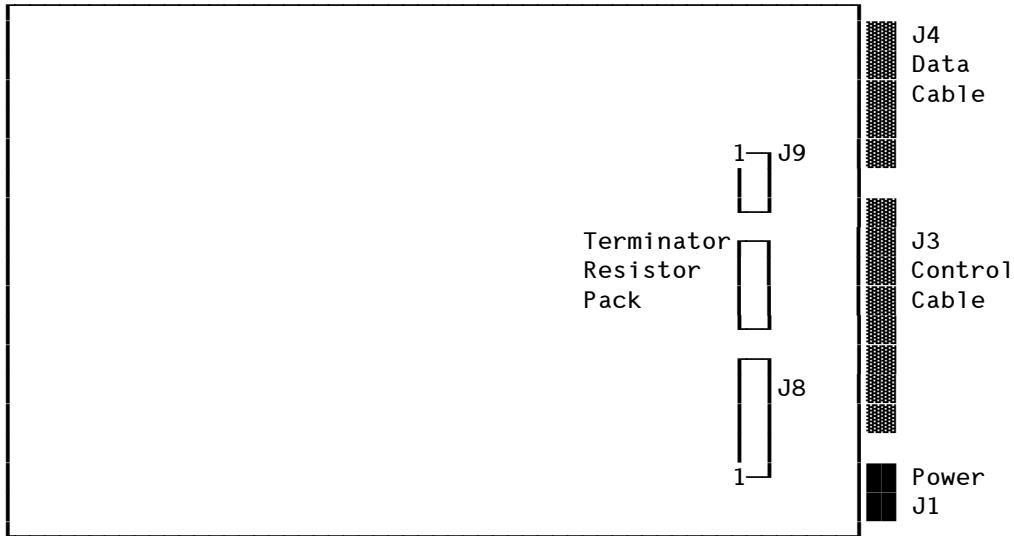
ST-4383E
94186-383 WREN 5 FH

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UNFORMATTED CAPACITY (MB) _____383
FORMATTED CAPACITY (34 SECTORS) (MB) _____319 **
ACTUATOR TYPE _____VOICE COIL
TRACKS _____18356
CYLINDERS _____1412
HEADS _____13
DISCS _____7
MEDIA TYPE _____THIN FILM
RECORDING METHOD _____RLL (2,7)
TRANSFER RATE (mbytes/sec) _____1.25
SPINDLE SPEED (RPM) _____3,600
AVERAGE LATENCY (mSEC) _____8.33
INTERFACE _____ESDI
TPI (TRACKS PER INCH) _____1280
BPI (BITS PER INCH) _____19600
AVERAGE ACCESS (ms) _____18
SINGLE TRACK SEEK (ms) _____4
MAX FULL SEEK (ms) _____40
MTBF (power-on hours) _____100,000
POWER REQUIREMENTS: +12V START-UP (amps) _4.5
                    +12V TYPICAL (amps) _2.0
                    +5V START-UP (amps) _1.4
                    +5V TYPICAL (amps) _0.8
                    TYPICAL (watts) _____23
                    MAXIMUM (watts) _____61
BUFFERED STEP PULSE RATE (micro sec) _____
WRITE PRECOMP (cyl) _____N/A
REDUCED WRITE CURRENT (cyl) _____N/A
LANDING ZONE (cyl) _____AUTO PARK
IBM AT DRIVE TYPE _____*
    
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* MAY REQUIRE A CONTROLLER WITH BIOS SUPPORT, OR FORMATTING AND PARTITIONING SOFTWARE. ALSO, CHECK TO SEE IF YOUR CMOS SETUP HAS A "CUSTOM" OR "USER DEFINABLE" DRIVE TYPE AVAILABLE.

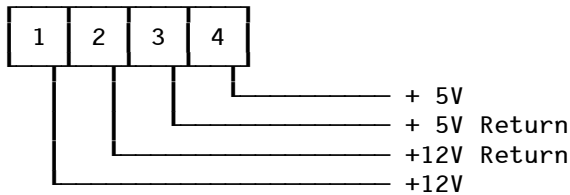
** ESDI controllers which offer an Alternate/Spare sector per track option will format to a capacity = Cyl*Hd*(SPT-1)*512 bytes



Jumper setting

■ = Jumpers are set at factory

J1 Power Connector



J8 Drive select

Drive	1	2	3	4	5	6	7
■ 1	CLOSE	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN
2	OPEN	CLOSE	OPEN	OPEN	OPEN	OPEN	OPEN
3	OPEN	OPEN	CLOSE	OPEN	OPEN	OPEN	OPEN
4	OPEN	OPEN	OPEN	CLOSE	OPEN	OPEN	OPEN
5	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN	OPEN
6	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN
7	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE

Note: Unit select zero (no jumpers) is invalid

Pins on the drive ID select and configuration select header are provided to facilitate manual drive configuration. No devices other than jumpers should be connected to these pins. Connection to external devices (Switches, Connectors, etc.) could adversely affect drive performance. Exact location of these pins and header may be changed without notice.

Drive Select

The following characteristics apply to the Drive Select lines:

1. Logical unit designation for up to 7 drives is performed during installation by installing jumpers on pins on a connector header on the main PWA. The jumpers are installed in a 1 through 7 position configuration to select device addresses 1 through 7. Zero is not a valid address.
2. The controller shall not attempt to select the drive until 1 second after DC power is applied. The Ready output will be valid (whether asserted or negated) within 1 us after the drive is selected.
3. The drive will be selected (and the Drive Selected Signal asserted) within 1 us after the Drive Select lines contain that unit's select address. The drive will be deselected (and the Drive Selected signal negated) within 1 us after the Drive Select lines contain another unit's select address.
4. The Drive Select lines must remain asserted for 1 us after a write operation.
5. When the Drive Select lines are asserted, a head change will occur, requiring a delay before a read or write operation can be initiated.

J9 Motor Start on command

- 1 OPEN Spindle motor starts on power-up
 (* Only on series codes above 01)
 Cylinder selection set for 1,224 cylinder
 (* Only on series code 01 drives)
- CLOSED Spindle motor start command required to start motor
 (* Only on series above 01)
 Cylinder selection set for 1,412 cylinder
 (* Only on series code 01 drives)

* To determine the Series Code of the drive locate the Serial Number printed on the label in a SN xxxxxxxx format. The first two digits denote the series code.

J9 Sector Configuration

Sectors	2	3	4
64	OPEN	OPEN	OPEN
35	OPEN	OPEN	CLOSED
10	OPEN	CLOSED	OPEN
36	CLOSED	OPEN	OPEN
■ 34	CLOSED	OPEN	CLOSED
87	CLOSED	CLOSED	OPEN
**Address mark	CLOSED	CLOSED	CLOSED

** Used with soft sectored controllers that create their own sector boundaries.

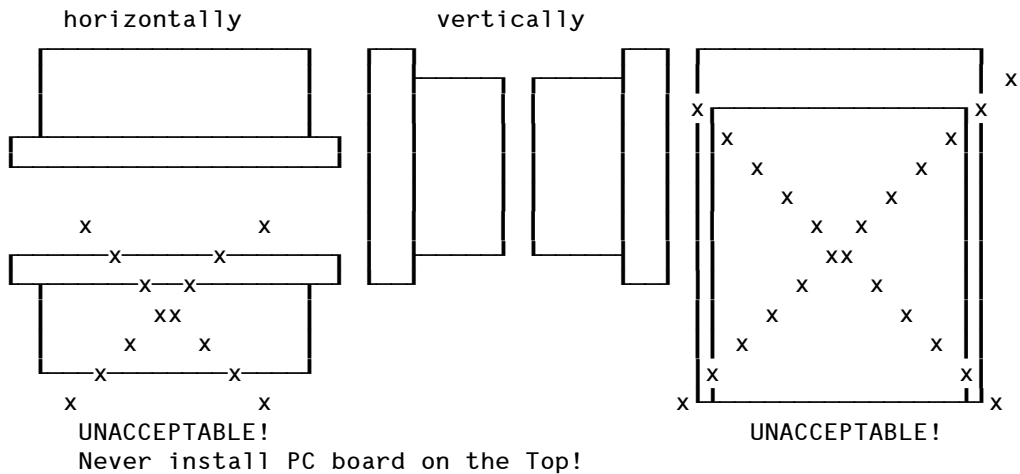
J9 Reserved

- 5 OPEN RESERVED for factory test

SHOULD BE LEFT OPEN!

Notes on installation

Drive mounting



Drive Orientation

Only two drive mounting orientations are permitted: discs in the horizontal plane and discs in the vertical plane. The uppermost surface must be maintained in a level position or drive performance may be adversely affected. In the vertical plane, the drive may be mounted on either side, but not on either end. The drive may be not mounted inverted (upside down) in the horizontal orientation. It is recommended for optimum performance that data written in a given orientation be read in that same orientation.

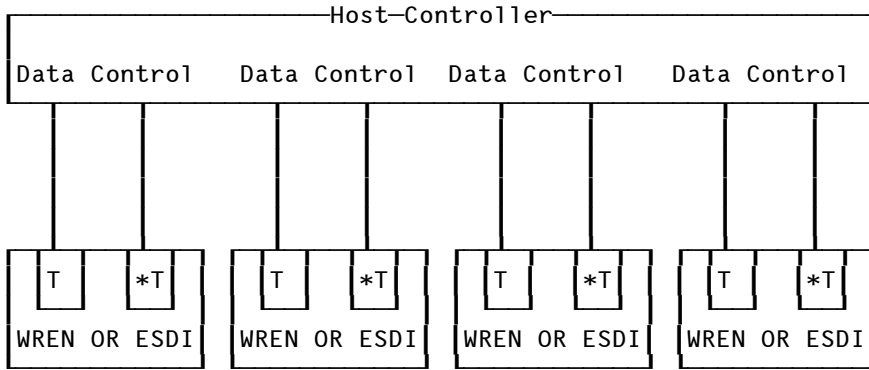
WREN 5 is designed, manufactured, and tested with a "Plug-in and Play" installation philosophy. This minimizes the requirements for highly trained personnel to integrate the WREN 5 into an OEM's system, whether in a factory or field environment.

Cooling

Cabinet cooling must be designed by the customer so that the ambient temperature immediately surrounding the WREN 5 will not exceed temperature limits. Specific consideration should be given to make ensure adequate air circulation around the heat sinks on the circuit board on the rear of the drive.

Interface Cabling Options

View A



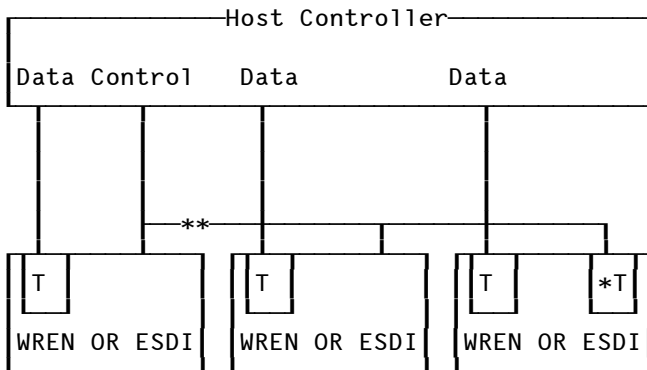
Each control cable length must not exceed 10 feet (3.00m). Each data cable length must not exceed 10 feet (3.00m).

*T indicates removable terminator resistor pack. WREN data ports are permanently terminated.

Radial Configuration

View A shows each drive interfaced to its own control cable, which allows interfacing an arbitrary number of drives and a variety of system operational techniques. Each drive has its data cable and control cable radially connected to the host controller. The length of each individual cable must not exceed 10 feet (3.00 meters). Terminator resistors must be installed in the host controller for each data cable and for each control cable. For this configuration, a terminator resistor pack must be installed in each WREN 5 Disc Drive.

View B



Total control cable length must not exceed 10 feet (3.00m). Each data cable length must not exceed 10 feet (3.00m).

*T indicates removable terminator resistor pack. WREN data ports are permanently terminated.

** A maximum of 7 devices may be interconnected.

Daisychain Configuration

A daisychain configuration incorporates a maximum of seven drives in parallel on a common control cable. Only the drive selected by the host system has its control and data signals enabled through this common interface. View B shows illustrates a daisychain of WREN 5 Disc Drives or other ESDI devices. A terminator resistor pack is required in the host controller for each data cable. Only the last ESDI device in the daisychain requires a terminator resistor pack for the control cable. Terminator resistor packs for the control cable or other drives must be removed. The total combined control cable length (from the controller to the first drive, to the second and subsequent drives) must not be more than 10 feet (3.00 meters).

DC Cable and Connector

The WREN 5 receives DC power through a 4 pin right angle connector mounted on the main circuit board. Recommended part number for the mating connector are provided, but equivalent parts may be used.

Type of cable: 18 AWG
Connector: AMP 1-480424-0
Contacts: AMP 60619-4 (Loose Piece); AMP 61117-4 (Strip)

Data Cable and Connector

The I/O connector for the data interface is a 20 pin board edge connector. The odd pins are located on the back side of the printed circuit board. The even pins are on the front side (down) side of the printed circuit board. A key slot is provided between pins 3 and 5. Seagate recommends keying this connector to prevent installing it upside down. However, the WREN will not be damaged if the connector is installed upside down.

Recommended part numbers for the mating connector are included below, but equivalent parts may be used.

Connector: 20 pin, 3M-3461-0001, AMP 88373-6
Cable: Flat Cable (Stranded AWG 28) 3M-3365-20
Flat Cable (Stranded AWG 28) 3M-3517-20 (Shielded Cable)
Key: AMP 583274-1, 3M-3439-0000

Control Cable and Connector

The I/O connector for the control interface is a 34 pin board edge connector. The odd pins are located on the back (up) side of the printed circuit board and are connected to the ground plane. The even pins are on the front (down) side of the printed circuit board. A key slot is provided between pin 3 and 5. Seagate recommends keying this connector to prevent installing it upside down. However, the WREN will not be damaged if the connector is installed upside down.

Recommended part numbers for the mating connector are included below, but equivalent parts may be used.

Connector: 34 pin, 3M-3463-0001, AMP 88373-3
Key: AMP 583274-1, 3M-3439-0000
Cable: Flat cable (Stranded AWG 28) 3M-3365-34
Flat cable (Stranded AWG 28) 3M-3517-34 (Shielded Cable)
Spectra Strip Twist'n Flat 455-248-34 (Stranded AWG 28 Twisted Pair)

Interface Drivers/Receivers

The WREN 5 uses two types of signals; single ended and balanced differential. The data and clock signals use balanced differential drivers and receivers. All other signals use single ended drivers and receivers.

Single Ended Drivers/Receivers

Transmitter Characteristics

The WREN 5 uses the 74F38 open collector buffer/driver to transmit status to the host. This driver is capable of sinking a current of 40 mA with a low-level output voltage of 0.7V.

Receiver Characteristics

The WREN 5 uses the 74LS14 Hex Inverter with hysteresis gate as a line receiver. The input of each receiver is terminated in a 150 ohm pullup resistor.

Terminator Characteristics

The terminator is a resistor module that plugs into a socket in the last drive in a daisychain. Each drive is furnished with a terminator. Terminators must be removed from all except the last drive on the cable prior to daisychain operation. An equivalent terminator must be provided in the controller on each input signal line from the drive to the controller. Only the control cable resistor module is removable.

Balanced Differential Drivers/Receivers

Transmitter Characteristics

The WREN 5 uses 75158 balanced differential driver. An assertion on the interface is defined when "+" output is more positive than the "-" output.

Receiver Characteristics

The WREN 5 uses 75157 type balanced differential receivers. An assertion one on the interface is defined when the "+" input is more positive than the "-" input.

Terminator Requirements

Each differential receiver in the drive is terminated with a 100 ohm resistor. An equivalent terminator must be provided in the controller on each input signal line from the drive to the controller.

Standards

The WREN 5 has been developed as a system peripherals to the highest standards of design and construction. The WREN 5 depends upon its equipment to provide adequate power and environment in order to achieve optimum performance and compliance with applicable industry and governmental regulations. Special attention must be given in the areas of safety, power distribution, shielding, audible noise control, and temperature regulation.

The WREN 5 complies with Seagate standards.

The WREN 5 is a UL Recognized component per UL478 and a CSA Certified product per CSA C22.2, No. 220-M1986. It also meets the requirements of DIN IEC 380/VDE 0806/8.81, DIN IEC 435/VDE 0805/11.84 and EN 60950/09.87.

The WREN 5, as delivered, is designed for system integration before use. It is supplied as a sub-assembly and is therefore not directly subject to the FCC Rules and

Regulations, Part 15, Subpart J governing EMI of computing devices, and the Radio Interference Regulations of the Canadian Department of Communications.

Media Description

The media used in the WREN 5 has a diameter of approximately 5 ¼ inches (130 mm). The aluminum substrate is coated with a thin film magnetic material, and lubricated to permit the heads to contact the surface when starting and stopping.

Each data surface has either a total of 1412 tracks and is capable of recording 29,482,560 bytes of unformatted data, or has 1224 Tracks capable of recording 25,557,120 Bytes of unformatted data.

Media defects are characterized as correctable or uncorrectable depending on the type and magnitude of the media flaw. Various error correction codes may be implemented. The code chosen should be consistent with Seagate media testing and certification methods. In the WREN 5 media certification is performed using the following standards:

An error burst of 11 bits or less is a correctable error.

An error burst greater than 11 bits in length is an uncorrectable error.

Host systems using the WREN 5 should have, as a minimum, resident capabilities to recognize and map defective tracks and perform track reallocation routines.

1. 1224 or 1412 total tracks per surface.
2. Tracks 0 to be error free on each data surface.
3. 30 defects per surface maximum.
4. Cumulative defects not to exceed 1 per megabyte, based on total available unformatted drive capacity.

Drive/Receiver Characteristics

Logic Level	Drive Output	Receiver Input
High (negated) (0)	≥ 2.5 V; ≤ 5.25 V	≥ 2.0 V; ≤ 5.25 V
Low (asserted) (1)	≤ 0.7 V; ≥ 0.0 V	≤ 0.8 V; ≥ 0.0 V

The difference in the voltages between input and output signals is due to the losses in the cable.

Seek Time

		ST4383E	ST4384E	ST4442E
Track-to-Track	msec. typ.	4	3	3
	msec. max.	5	4	4
	Average msec. typ.	18	14.5	16
	Average msec. max.	20	16.5	18
Latency	msec. avg.	8.33	8.33	8.33

Seek time is defined as the elapsed time from the receipt of a seek command until the drive signals the controller that it is ready to perform another seek or a read/write

function on the new cylinder.

Average seek time is determined by dividing the sum of the time for all possible movements by the total number of movements.

Spindle Speed and Latency

The spindle speed is 3600 ± 0.5% r/min. The speed tolerance includes motor performance and motor control circuit tolerances.

The average latency time is 8.33 milliseconds, based on a nominal disc speed of 3600 r/min. The maximum latency time is 16.67 milliseconds based on a maximum disc speed of 3564 r/min.

Read Data Transfer Rate

The nominal read serial data transfer rate is 10.0 Mbits per second, 1.25 Megabytes per second.

Power Sequencing

Power sequencing is not required for the WREN 5. The drive protects against inadvertent writing during power up and down. Daisychain operation requires that power be maintained on the terminated unit to insure proper termination of the peripherals I/O cables.

Temperature

50°F to 122°F (10°C to 50°C) operating ambient with a maximum gradient of 36° F (20° C) per hour. The maximum temperature is derated linearly to 1.8° F per 1640 feet. Cabinet packaging designs must provide ample air circulation around the WREN 5 to ensure environmental limits are not exceeded as a result of heat transfer from other system components. Operating Ambient is defined as the average temperature 0.25 inch outward from the top of the drive chassis at the middle of the drive (lengthwise). The temperature of the top cover must not exceed 140°F (60° C) when measured at the center of the drive.

Reliability

The following reliability specifications assume correct host/drive operational interface implementation, including all interface timings, power supply voltages, environmental conditions, and appropriate data handling circuits in the host system.

MTBF	100,000 hours
Service Life	5 years
Preventive Maintenance	None required

ESDI (Enhanced Small Device Interface)

2 Cables: 1 each 34-pin Command Cable and 1 each 20-pin Data Cable

ESDI INTERFACE SPECIFICATIONS

CONTROL CABLE (J1/P1 PIN ASSIGNMENTS
(Disk Implementation - Serial Mode)

Command Cable Description

SIGNAL NAME	SIGNAL PIN	GROUND PIN
-HEAD SELECT 2(3)	2	1
-HEAD SELECT 2(2)	4	3
-WRITE GATE	6	5
-CONFIGURATION/STATUS DATA	8	7
-TRANSFER ACK	10	9
-ATTENTION	12	11
-HEAD SELECT 2(0)	14	13
-SECTOR/BYTE CLOCK/ ADDRESS MARK FOUND	16	15
-HEAD SELECT 2(1)	18	17
-INDEX	20	19
-READY	22	21
-TRANSFER REQ	24	23
-DRIVE SELECT 2(0)	26	25
-DRIVE SELECT 2(1)	28	27
-DRIVE SELECT 2(2)	30	29
-READ GATE	32	31
-COMMAND DATA	34	33

DATA CABLE (J2/P2) PIN ASSIGNMENTS
(Disk Implementation - Serial Mode)

SIGNAL NAME	SIGNAL PIN	GROUND PIN
-DRIVE SELECTED	1	
-SECTOR/BYTE CLOCK/ ADDRESS MARK FOUND	2	
-COMMAND COMPLETE	3	
-ADDRESS MARK ENABLE	4	
GROUND		5
+/-WRITE CLOCK	7/8	6
+/-READ REF CLOCK	10/11	9/12
+/-NRZ WRITE DATA	13/14	15/16
+/-NRZ READ DATA	17/18	19
-INDEX	20	