

**9914V 9-TRACK TAPE UNIT  
USER/DIAGNOSTIC MANUAL**

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**Draft Issue L**

Stock Number 123488/xx

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## **Preface**

### **Damage in Transit**

Unpack the equipment and examine it thoroughly to ascertain whether any damage has occurred in transit. Report immediately any such damage to the agent or manufacturer. Retain all packing pieces, in case a return to manufacturer should be necessary.

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# Table of Contents

## Section 1 Introduction

1.1	9914V Features . . . . .	1 - 1
1.1.1	Short-Form Specification . . . . .	1 - 2
1.2	Tape Speeds . . . . .	1 - 3
1.2.1	Data Rates . . . . .	1 - 3
1.3	Tape Loading . . . . .	1 - 3
1.4	Operator Controls and Indicators . . . . .	1 - 4
1.5	Diagnostics . . . . .	1 - 4
1.6	Interfaces . . . . .	1 - 4
1.6.1	Industry Standard . . . . .	1 - 4
1.6.2	SCSI . . . . .	1 - 5
1.6.3	Pertec Cache . . . . .	1 - 5
1.6.4	Super SCSI . . . . .	1 - 5
1.7	Technical Description . . . . .	1 - 5
1.8	Reposition Cycle . . . . .	1 - 6
1.9	Data Capacity . . . . .	1 - 6
1.10	Associated Documentation . . . . .	1 - 7

## Section 2 Installation and Checkout Procedures

2.1	Uncrating and Inspection . . . . .	2 - 1
2.1.1	Uncrating the 9914V . . . . .	2 - 1
2.1.2	Inspection . . . . .	2 - 1
2.2	Preparing for Mains Supply Connection . . . . .	2 - 1
2.2.1	Supply Suitability Checks . . . . .	2 - 1
2.2.2	Supply Voltage Resetting . . . . .	2 - 2
2.2.3	Wiring the Supply Plug . . . . .	2 - 3
2.2.3.1	Outside the USA . . . . .	2 - 3
2.2.3.2	Within the USA . . . . .	2 - 3
2.2.6	DC Supply Connections . . . . .	2 - 4
2.2.7	DC Input Power Safety . . . . .	2 - 5
2.3	Rack Mounting . . . . .	2 - 5
2.3.1	Fitting Sequence, Using Rack Clamps . . . . .	2 - 5
2.3.2	Fitting Sequence, Using Fixing Screws . . . . .	2 - 9
2.3.3	Fitting Sequence, Using Customised Mounting Frame . . . . .	2 - 9
2.4	Configuration, Link and Switch Options . . . . .	2 - 11
2.4.1	Termination Power . . . . .	2 - 11
2.4.2	Control Functions . . . . .	2 - 11
2.4.2.1	Displaying/Modifying Options . . . . .	2 - 11
2.4.2.2	Operator Options . . . . .	2 - 12
2.4.3	Analogue Data Paths Board . . . . .	2 - 12
2.4.4	Digital Data Paths Board . . . . .	2 - 12
2.4.5	Optional Interface boards . . . . .	2 - 12

2.5	Initial Checkout . . . . .	2 - 13
2.6	Final Checkout . . . . .	2 - 13

**Section 3 Operation**

3.1	Operator Functions . . . . .	3 - 1
3.2	Controls and Indicators . . . . .	3 - 1
	3.2.1 Controls . . . . .	3 - 2
	3.2.2 Indicators . . . . .	3 - 3
3.3	The 8-Character Display . . . . .	3 - 3
	3.3.1 Power-up Indications . . . . .	3 - 4
	3.3.2 Diagnostic Indications . . . . .	3 - 4
	3.3.3 General Indications . . . . .	3 - 5
	3.3.4 On-line Indications . . . . .	3 - 6
3.4	Automatic Self-Checks . . . . .	3 - 8
	3.4.1 Power-on Checks . . . . .	3 - 8
	3.4.2 Other Automatic Checks . . . . .	3 - 8
3.5	Door Interlocks . . . . .	3 - 8
3.6	Loading and Unloading . . . . .	3 - 8
	3.6.1 General . . . . .	3 - 8
	3.6.2 Power-on Procedure . . . . .	3 - 9
	3.6.3 Loading the Tape Reel . . . . .	3 - 9
	3.6.4 Demounting the Tape Reel . . . . .	3 - 11
	3.6.5 Threading/Unthreading Indications . . . . .	3 - 12
	3.6.6 Threading the Tape by Hand . . . . .	3 - 13
	3.6.8 Switching off with Tape Threaded . . . . .	3 - 14
3.7	9914V Problems . . . . .	3 - 14
3.8	Density Selection/Interrogation . . . . .	3 - 14

**Section 4 Diagnostics**

4.1	Diagnostics - from the Operator's Panel . . . . .	4 - 1
	4.1.1 Operator Diagnostics . . . . .	4 - 1
	4.1.2 Diagnostics Mode . . . . .	4 - 1
	4.1.3 Program Selection . . . . .	4 - 2
	4.1.4 Running a Program . . . . .	4 - 2
	4.1.5 Program Stacks . . . . .	4 - 2
	4.1.6 Program Loops . . . . .	4 - 2
	4.1.7 Program Examples . . . . .	4 - 3
	4.1.7.1 Program 01 . . . . .	4 - 3
	4.1.7.2 Programs 04, 44, & 30 in a Stack . . . . .	4 - 3
	4.1.8 Default Status . . . . .	4 - 4
4.2	Diagnostics - Operation via the Interface . . . . .	4 - 4
	4.2.1 Running a Program Stack . . . . .	4 - 4
	4.2.2 Running Individual Programs . . . . .	4 - 5

4.3	Program Descriptions and Error Codes . . . . .	4 - 5
4.4	Status Bytes . . . . .	4 - 26
4.4.1	Status Byte Encoding . . . . .	4 - 26

**Section 5 Routine Cleaning**

5.1	Cleaning Intervals . . . . .	5 - 1
5.2	Cleaning Procedures . . . . .	5 - 2
5.2.1	Access to the Tape Path . . . . .	5 - 2
5.2.2	Tape Path Cleaning . . . . .	5 - 2
5.2.3	Other Cleaning . . . . .	5 - 2

**Section 6 Pertec Interface**

**Appendix A Basic Configuration Options**

**Appendix B SCSI Options**

**Appendix C PCI Options**

**Appendix D Super SCSI Options**

**Reader's Comment**



## List of Tables

1.2.1	9914V Data Rates . . . . .	1 - 3
1.9(a)	Tape Lengths . . . . .	1 - 6
1.9(b)	9914V Data Capacities . . . . .	1 - 7
2.2.4	Plug Wiring - Outside the USA . . . . .	2 - 3
2.2.5	Plug Wiring - Within the USA . . . . .	2 - 4
3.6.2	9914V Power-on Sequence . . . . .	3 - 9
3.6.3	9914V Tape Loading Procedure . . . . .	3 - 10
4.1	Command Line Weighting . . . . .	4 - 5
4.3.1	Log Sense Format . . . . .	4 - 17
4.4(a)	Full Status Bytes, 01 to 09 . . . . .	4 - 28
4.4(b)	Full Status Bytes, 10 to 17 . . . . .	4 - 29
4.4(c)	Condensed Status Bytes . . . . .	4 - 30
5.1	Cleaning Schedules and Materials . . . . .	5 - 1
6.1	Input Pin Assignments . . . . .	6 - 1
6.2	Output Pin Assignments . . . . .	6 - 2
6.3	Pertec Command Coding . . . . .	6 - 3
A.1(a)	Basic Configuration Options . . . . .	A - 2
A.1(b)	Basic Configuration Options . . . . .	A - 3
B.1(a)	SCSI Options, PROM 123996 Revision 01 . . . . .	B - 2
B.1(b)	SCSI Options, PROM 123996 Revisions 02 & 03 & PROM 124180 Revision 01 . . . . .	B - 3
B.1(c)	SCSI Options, PROM 123996 Revision 04 . . . . .	B - 4
B.1(d)	SCSI Options, PROM 123996 Revisions 05 & 06 . . . . .	B - 5
B.1(e)	SCSI 4-bit Code Compatibilities . . . . .	B - 6
C.1(a)	Pertec Cache Options, PROM 123707 Revision 04 . . . . .	C - 2
C.1(b)	Pertec Cache Options, Encoding . . . . .	C - 3
D.1(a)	Super SCSI Options, PROM 124610 Revision 01 . . . . .	D - 2
D.1(b)	Super SCSI 4-bit Code Compatibilities . . . . .	B - 3

## List of Figures

1.1	9914V General View . . . . .	1 - 1
1.8	Simplified Reposition Cycle . . . . .	1 - 6
2.2.2	Voltage Setting . . . . .	2 - 2
2.2.6	DC Power Connections . . . . .	2 - 4
2.3.1.1	9914V Rack Clamp Locations . . . . .	2 - 6
2.3.1.2	9914V Rack Clamp Detail . . . . .	2 - 7
2.3.1.3	9914V Rack Clamp Access . . . . .	2 - 8
2.3.2.1	9914V Rack Screw Locations . . . . .	2 - 10
2.6	Connector Locations, SCSI Interfaces . . . . .	2 - 14
3.2	Front Panel Controls and Indicators . . . . .	3 - 1
5.1	Tape Path Components . . . . .	5 - 3

## User/Diagnostic Manual Amendments

Revision	Details	Date
Draft Issue A	Discussion document only	Mar 1990
Draft Issue B	Complete update	Apr 1990
Draft Issue C	Diagnostic programs 9, 10 & 24 added	Nov 1990
Draft Issue D	Rack mounting details added Diagnostic programs 03, 19, 34 & 35 added SCSI and Pertec Cache option tables updated	Dec 1991
Draft Issue E	Side-hinging loading door incorporated DC power input connection added	Jan 1992
Draft Issue F	Loading door hinged on right hand side DC power input connection deleted	Apr 1992
Draft Issue G	Vertical support warning added to Section 2.3	Oct 1992
Draft Issue H	Page size changed to American Quarto. Super SCSI included. Mains connection details tabulated. More detail added to rack-mounting instructions. Tape threading instructions tabulated and re-grouped. CFC-free cleaning materials substituted. Appendices B, C, & D added.	Nov 1992
Draft Issue I	<i>This letter was not used.</i>	
Draft Issue J	DC current added to Section 1.1.1. Dimensions corrected in Section 1.1.1. Loading instructions of Section 3.6 corrected. Cosmetic change to Appendix D.	Dec 1992
Draft Issue K	DC connection text updated (Section 2.2.6). DC power connections illustration added (Figure 2.2.6). Cosmetic changes to Section 4. Bit 7 of config byte 08 added to Appendix A.	Jan 1993
Draft Issue L	Many fine-tuning changes. Non-unique code compatibilities added to Appendices B & D.	Mar 1993

*This page has no technical content*

# 1.

## Introduction

The 9914V is a 9-Track Tape Unit packaged in a vertical format, featuring quad density and suitable for mounting in a shallow 19-inch rack. It is a derivative of the well-proven and highly-regarded 9914 tape unit, with its GCR capability and optional buffered interfaces.

The 9914V has an easy-loading tape system which will accept reel sizes from 6 to 10.5 inches diameter. The tape is visible through the loading door at the front of the 9914V so that the operator can verify tape tension and tape motion. Routine cleaning is facilitated by opening the loading door to gain access to the tape path components.

The optional interfaces are SCSI, Super SCSI, or buffered Pertec Cache, their connections to the host computer are made at the rear of the 9914V.

### 1.1 9914V Features

- 42 ips and 125 ips streaming, interface selectable
- Up to 270 MByte unformatted data capacity
- All four IBM compatible tape data formats to ANSI/ECMA specifications
- Integral unit (no external boxes for any data format or interface)
- 8-character alphanumeric display for easy operator interpretation
- Three levels of micro-diagnostics; power-on, operator, and host; host diagnostics via either Pertec or either SCSI interface
- Auto-threading, actuated by door closure or from the operator's panel
- Occupies less than 10 inches rack depth

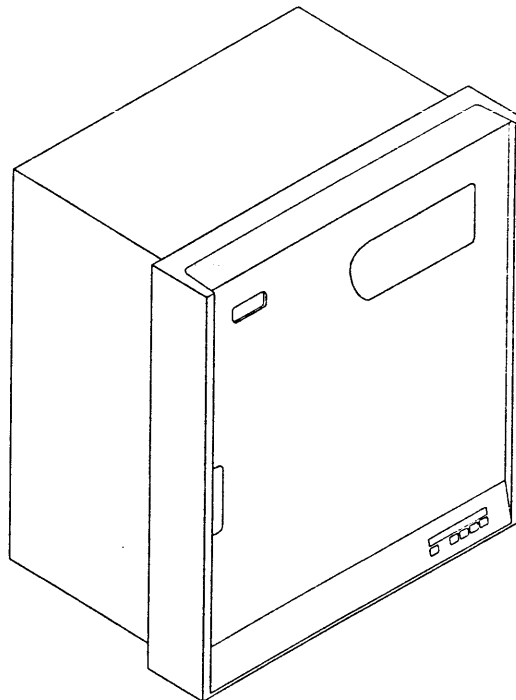


FIGURE 1.1 9914V: GENERAL VIEW

### 1.1.1 Short-Form Specification

Reels	10.5, 8.5, 7 or 6 inch on a standard IBM hub (267, 216, 178, or 152 mm)
Tape	Standard 12.7 mm (0.5 in) wide computer tape to ANSI X3.40 or ECMA 62 specification. (1.0 mil tape if extra data capacity is required)
Tape Tension	285 gm (10 oz) nominal
Format	IBM compatible to ECMA 62 or ANSI X3.22 or ANSI X3.39 specification. (there is no published ANSI or ECMA 3200 bpi specification)
Tape Speeds	Depends on the selected density, usually 42/125 ips:

	Standard 9914V		Special Order	
	Low	High	Low	High
800 NRZ	42	125	50	100
1600 PE	42	125	50	100
3200 PE	62	62	50	50
6250 GCR	42	125	50	100
All speeds are in inches per second (ips)				

Weight (unpacked) <i>(approximate)</i>	46 kg (101 lb)
Supply Requirements	100, 120, 220 or 240 V ac, +10 -15%, 48-62 Hz 190 VA working 40-56 V dc: 3.4 A average current @ 48 V

#### Dimensions:

##### *Behind face:*

Height	589 mm (23.2 in)
Width	426 mm (16.8 in)
Depth	245 mm ( 9.6 in)

##### *Overall:*

Height	609 mm (24.0 in)
Width	482 mm (19.0 in)
Depth	330 mm (13.0 in)

Note: Screened cable connectors increase the depth dimension, by the connector depth and the cable bending radius.

Temperature	Operating +10 to +40 °C
Other parameters	Set out in the 9914V Product Specification

## 1.2 Tape Speeds

At most densities, one of two tape speeds may be selected according to the application:

- (a) the low speed (where the tape can be rapidly repositioned between data blocks) for situations where the host cannot sustain data transfer at high rates;
- (b) the high speed (where data is normally transferred on-the-fly) where the host can sustain fast transfers and thereby achieve a high average data rate.

### 1.2.1 Data Rates

When a block is being transferred to tape, each byte is accepted by the 9914V at a rate determined by the tape speed, recording density (GCR, PE or NRZ), and interface (unbuffered Pertec, SCSI or buffered Pertec). At 800, 1600, and 6250 bpi, the user may select from two streaming speeds. The inter-relationship of tape speed and synchronous data rate for the unbuffered Pertec interface is detailed in Table 1.1. Where the SCSI or Pertec Cache board is fitted, the burst rate may be higher.

Density ( <i>bpi</i> )	NRZ 800		PE 1600		DPE 3200		GCR 6250	
	Lo	Hi	Lo	Hi	Lo	Lo	Lo	Hi
Data rates ( <i>kB/s</i> ):								
42/125 ips	33.3	100	66.6	200	200	200	260	781
50/100 ips	40	80	80	160	80	80	312	625
Note: 42 ips is actually 41.66 ips; 62 ips is actually 62.5 ips								

TABLE 1.2 9914V DATA RATES

## 1.3 Tape Loading

In order to load tape into the 9914V, the operator has to open the loading door and push the tape reel on the self-centring hub in the loading chamber; the pushing action both locates the reel and locks it onto the hub. The auto-threading procedure is usually initiated when the loading door is closed; the tape is then threaded, tensioned, and advanced to BOT (which is indicated on the display).

The user may (via configuration option 04) actuate threading from the operator's panel 'LD/ONL' button in preference to auto thread-on-closure, Section 2 details this option.

This loading system makes for simple, speedy and reliable tape threading, without the operator touching the tape surfaces and with the milestones indicated on the operator's display.

For operator safety, the 9914V is interlocked so that its loading door must be shut before loading can commence or tape motion be initiated.

No take-up spool need be fitted, since this is built into the 9914V and should only be removed by service personnel.

Tape loading is described in more detail in Section 3.

## 1.4 Operator Controls and Indicators

The operator controls, the 8-character display, and the backlit legends are located at the front of the 9914V on the right-hand side. In diagnostic mode, the controls adopt secondary functions as printed on each button membrane.

In general the alphanumeric display gives temporary internal status, activity, or diagnostic information while the backlit legends inform of permanent status such as Write Enable.

All controls and indicators are described in detail in Section 3.

## 1.5 Diagnostics

When power is applied to the 9914V, the self-test diagnostics are automatically invoked to check basic internal functions which would otherwise inhibit normal use of the 9914V.

The operator may use diagnostic mode to run a range of internal diagnostic programs which are suitable for assurance of machine integrity, and for first-line diagnosis of faults. These programs may be selected from a program suite to include full data tests with or without tape motion. Diagnostic programs can be run individually, grouped together or looped. Special Status Byte registers are allocated for error logging, status, and diagnostic information; the operator may display these bytes using the front panel controls.

The host computer may also call diagnostic programs (individually, stacked, or looped) by special commands across the interface. Diagnostic results are available to the host computer by using Request Status type commands to acquire status bytes via the interface Read Data lines. The status bytes are tabulated in Section 4 and described in detail in the 9914V Product Specification.

The diagnostic programs and error messages are described in Section 4; an overview of the available features is set out below:

- Power-on health check
- Front panel or host operation
- 8-character alpha-numeric display of status and fault code
- Simple dual operation of control buttons
- Run/pass/fail indication
- Dedicated program stack, tailored stack, or program looping
- Error logging facility - report on request by host computer

## 1.6 Interfaces

The 9914V may operate with one of several interfaces.

### 1.6.1 Industry Standard

The unbuffered Enhanced Pertec interface is implemented by factory-fitting a printed edge connector board (with the industry-compatible two-connector layout) at the rear of the 9914V.



The Pertec interface supports encoded inputs for various commands, the unallocated combinations are used by the Company to provide additional commands for such purposes as controlling the resident diagnostic programs, or accessing status byte data; the command set and pin connections are both set out in Section 6. This feature gives the user improved control without requiring extra interface lines.

### **1.6.2 SCSI**

The SCSI interface option is implemented using a single printed circuit board, fitted within the 9914. The SCSI interface bus is connected via a shielded socket (at the rear of the 9914). Both single-ended and differential variants are available.

### **1.6.3 Pertec Cache**

The buffered cache option is implemented using a single printed circuit board, fitted within the 9914. Buffered Pertec interface signals are made via a screened connector box (at the rear of the 9914).

### **1.6.4 Super SCSI**

The Super SCSI interface option is implemented using a single printed circuit board, within the 9914. The SCSI interface bus is connected via a shielded socket (at the rear of the 9914). Single-ended, differential, and dual variants are available.

## **1.7 Technical Description**

The 9914V is constructed around an aluminium alloy deck casting which is machined to accommodate the mechanical sub-assemblies, and hinged to a box-section enclosure which also carries the electronic sub-assemblies.

Access to the tape path area for routine cleaning is by way of a hinged loading door, revealing the entire tape path when opened.

The 9914V has a short tape path using one tension arm which returns to a rest position in the absence of tape tension to simplify the tape lacing path. The unique supply hub design enables the tape reel to be located squarely and clamped firmly by a simply pushing action. When the self-threading procedure has been initiated, the tape is threaded by air pressure through the tape path, taken up on the take-up reel, tensioned, and moved forward until BOT is reached, without any further operator involvement. The fixed take-up spool is of special Company design to enable this loading procedure.

To gain access to the tape path, personnel may pull the loading door handle to open the loading door and expose the entire tape path.

For access to the data electronic assemblies and the rear of the deck casting, the 9914V casting may be hinged forward. The card cage may then be hinged forward to gain access to the data boards. It is not envisaged that there will be any circumstances when it will be required to demount the 9914V from the rack.

## 1.8 Reposition Cycles

The 9914V employs long starts and stops while still recording tape with normal inter block gaps (IBG). The microprocessor controlled servos, together with the tachometer (which is driven by the contact of the tape around its roller) and tape position encoder, accurately reposition the tape, allowing relatively long stop and start distances to be used with space-back routines. Following a 'stop', a space-back reposition sequence is implemented, to a point where the tape can achieve streaming speed before the next block. (see Figure 1.8)

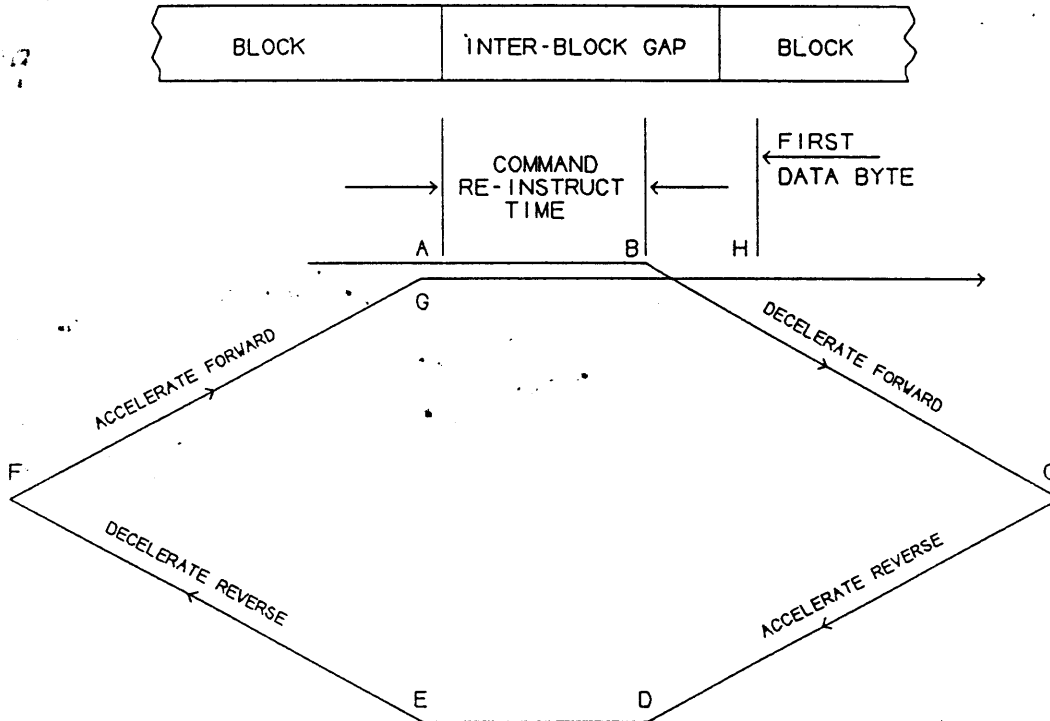


FIGURE 1.8 SIMPLIFIED REPOSITION CYCLE

## 1.9 Data Capacity

Table 1.9 (a) shows lengths of tape normally supplied on standard tape reels.

Reel diameter (inches)	Tape length (feet)	
	1.5 mil	1.0 mil
6.0	400	600
7.0	600	900
8.5	1200	1800
10.5	2400	3600

TABLE 1.9 (a) TAPE LENGTHS

Table 1.9 (b) shows unformatted data capacities and illustrates the variation of formatted capacity (in Mbytes) with block size, assuming an IBG of 0.6 inch at 800 through 3200 bpi and 0.4 inch at 6250 bpi.

Density (bpi)	Tape length (feet)	Unformatted capacity	Formatted capacity		
			1K	8K	64K
800	600	5.7	3.9	5.4	5.7
800	2400	23	15	21	23
800	3600	34	23	32	34
1600	600	11	5.7	10	11
1600	2400	46	22	40	45
1600	3600	69	34	61	68
3200	600	23	7.8	18	22
3200	2400	92	31	74	89
3200	3600	138	46	111	134
6250	600	45	12	33	43
6250	2400	180	50	135	172
6250	3600	270	75	203	258

TABLE 1.9 (b) 9914V DATA CAPACITIES (Mbytes)

## 1.10 Associated Documentation

The following *M4 Data* documents provide additional information relating to the 9914V.

124654	9914V Product Specification
123489 (CM 1089)	9914V 9-Track Tape Unit Servicing Manual
121780	SCSI User Manual
121789	Pertec Cache Interface Product Description
124658	Super SCSI User Manual

The following STK documents provide additional information relating to the 9914V.

M G8015-A	9914V Product Specification
95 124766 xx	9914V 9-Track Tape Unit Servicing Manual
95 121798 xx	9914 SCSI User Manual
95 121799 xx	9914 Pertec Cache Interface Product Description
95 124767 xx	9914 Enhanced SCSI User Manual

The following documents provide background information on data recording.

ANSI X3.22 (1983)	Recorded magnetic tape for information interchange (800 CPI NRZ).
ANSI X3.39 (1986)	Recorded magnetic tape for information interchange (1600 CPI PE).
ANSI X3.40 (1983)	Unrecorded magnetic tape for information interchange (9-track 800 bpi NRZ, 1600 bpi PE & 6250 bpi GCR).
ANSI X3.54 (1986)	Recorded magnetic tape for information interchange (6250 bpi GCR).
ANSI X3.131-1986	Small Computer Systems Interface.
ANSI S12.10-1985	Methods for the Measurement and Designation of Noise Emitted by Computer and Business Equipment.
ECMA 62	Data interchange on 12.7 mm (0.5 inch) 9-track magnetic tape. (NRZ, PE & GCR).

The following documents are published requirements for RFI limits.

VDE 0871	Radio interference suppression of radio frequency equipment for industrial and medical (ISM) and similar purposes.
CFR Rules 47-15J	Code of Federal Regulations. <i>15J = RFI requirements for computing devices.</i>

# 2.

## Installation and Checkout

This section outlines the contents of the 9914V crate, describes how to wire the mains lead, how to mount the unit in a rack, the operator options, and how to check out the unit.

### 2.1 Uncrating and Inspection

#### 2.1.1 Uncrating the 9914V

The 9914V is packed in special impact-absorbing materials which are placed inside a heavy-duty cardboard box.

Any unpacking instructions are enclosed in a polythene envelope attached to the upper face of the cardboard box. Note: do not lay the unpacked 9914V on it's back.

Packed dimensions:

<i>millimetres</i>	380 H x 605 W x 800 D
<i>inches</i>	15.0 x 23.8 x 31.5

Packed weight: 54 kg (119 lb).  
(*approximate*)

#### 2.1.2 Inspection

The packing box should contain the 9914V itself and associated items such as:

- an ac mains supply lead with a moulded IEC socket, (not with dc-powered machines);
- manual(s) as specified with the order:  
a 9914V User/Diagnostic Manual, *and/or* 9914V Servicing Manual,  
a 9914 SCSI (or Super SCSI) User Manual, *or* a 9914 Pertec Cache Product Description;
- rack-mounting accessories;
- other hardware, if specified on the order.

After the 9914V has been uncrated it should be visually checked for any damage that may have occurred during transit.

All items should be checked off against the requirements of the order.

### 2.2 Preparing for Mains Supply Connection

The sections up to 2.2.5 include the checks which should be made before an ac-powered 9914V is connected to a mains supply. Connection to a dc supply is described in Section 2.2.6.

#### 2.2.1 Supply Suitability Checks

1. The ac-powered 9914V must be connected to a nearby mains socket outlet (or a double-pole switch with contact gaps in excess of 3 mm) as part of it's installation. This is necessary because the 9914V mains switch does not isolate both mains connections.
2. The 9914V should be checked for supply setting, which is printed on a label at the rear of the machine. The actual setting, which is visible on the mains input socket (see Figure 2.2.2) must match this, otherwise the setting must be changed and the fuse rating checked.

## 2.2.2 Supply Voltage Resetting

Follow this procedure only if the input voltage selection setting is incompatible with the site supply voltage; otherwise go to ' Wiring the Supply Plug '. Four ac settings are possible, 100/120 V or 220/240 V, the input frequency may be between 48 and 62 Hz.

*Note: when it is proposed to use the 9914V on the 120 V setting, but the supply is known to be consistently below 110 V, the input voltage setting should be changed to 100 V.*

### a) Changing the Voltage Setting

- i) disconnect the supply lead from the input socket;
- ii) insert a 5 mm flat-bladed screwdriver where illustrated (in Figure 2.2.2) and hinge the panel open;
- iii) withdraw the barrel-shaped voltage selector mechanism and re-insert with the new voltage facing outwards, do not attempt to rotate the selector barrel in-situ;
- iv) withdraw the fuse holder and install the new fuse (referring to (b) below to ensure the correct rating).

### b) Supply Fuse Rating (Littelfuse type 313 is suitable)

- For 100/120 V settings, FS1 is a 1.25", 4 A, slow-blow;
- For 220/240 V settings, FS1 is a 1.25", 2 A, slow-blow.

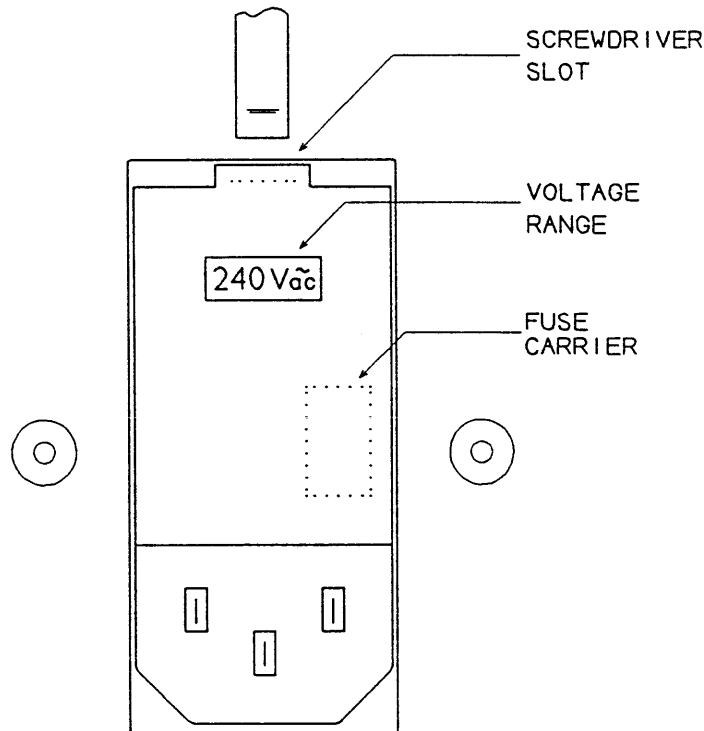


FIGURE 2.2.2 VOLTAGE SETTING

### 2.2.3 Wiring the Supply Plug

#### Warning - the 9914V must be earthed

The moulded IEC socket on the supply lead fits a chassis-mounted plug located at the rear of the 9914V. When the other end of the supply lead is unterminated, a suitable plug must be attached.

As the colours of the cores in the 9914V mains lead may not correspond with the coloured markings identifying the terminals in your plug, the following sections relate core colour to pin identification.

### 2.2.4 Outside the USA

Connect the cores as tabulated in Table 2.2.4.

Core which is coloured:	Must be connected to the terminal in the plug which is:
green and yellow	marked with the letter E, <i>or</i> coloured green and yellow, <i>or</i> marked with the earth symbol ( $\frac{\perp}{-}$ )
blue	marked with the letter N, <i>or</i> coloured black
brown	marked with the letter L, <i>or</i> coloured red

Table 2.2.4 PLUG WIRING - OUTSIDE THE USA

Note: 2-pin plugs are not suitable. The earth wire must be 'grounded' for safety reasons.

The following translations of pin functions and colours is given.

English	Français	Deutsch
LIVE (brown)	LIGNE (Brun)	POSITIV (Braun)
NEUTRAL (Blue)	NEUTRE (Bleu)	NEGATIV (Blau)
EARTH (Green/Yellow)	TERRE (Vert/Jaune)	ERDE (Gelb/Grün)

### 2.2.5 Within the USA

Connect the cores as tabulated in Table 2.2.5.

Core which is coloured:	Must be connected to the terminal in the plug which is:
green and yellow, <i>or</i> green (US-style lead)	half-round gold (ie the earth)
blue, <i>or</i> white (US-style lead)	flat silver (ie the neutral)
brown, <i>or</i> black (US-style lead)	flat gold (ie the live)

Table 2.2.5 PLUG WIRING - WITHIN THE USA

## 2.2.6 DC Supply Connections

The customer is required to provide his own connection leads from his supply source to the 9914V.

Connections are made to the rear of the 9914V, to spade connectors. There are two male 6.3 mm spade contacts (identified " - " and " + ") and an adjacent 8-32 insert which takes the 8-32 screw supplied with the 9914V. Figure 2.2.6 shows a close-up view of the connectors.

Connecting wire should have a minimum rating of 10 A dc continuous, it is recommended that the cable length be kept to a minimum to reduce voltage drops. If crimp connections are used, care should be taken to ensure that the wire diameter, insulation thickness, terminator and crimp tool are all compatible.

It is suggested that the ground connection is made using an 8-32 or M4-size ring tag and it is recommended that the shakeproof washers supplied be fitted one on either side of the ring tag.

When the connections have been made, it is recommended that the cables be secured by means of the cable tie which is fitted to the rear of the unit for strain relief.

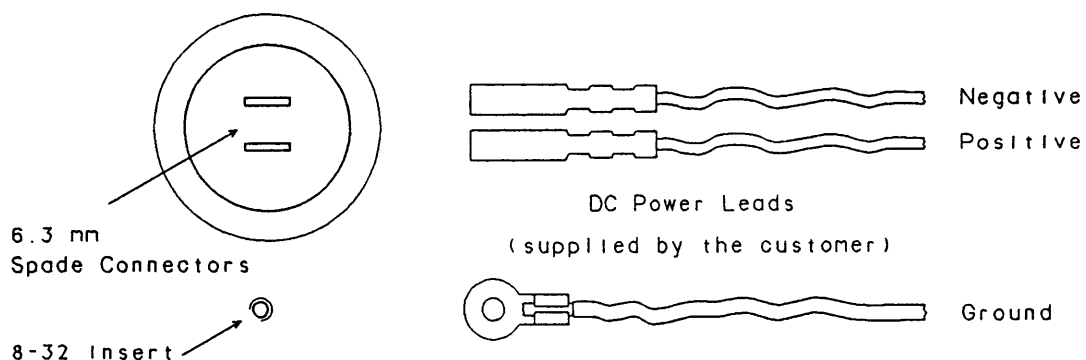


Figure 2.2.6 DC POWER CONNECTIONS



## 2.2.7 DC Input Power Safety

In order to meet the safety requirements of BS 7002 (or EN 60950) for a class 1 machine, a safety earth must be fitted to the terminal marked with the "fir tree" sign (shown in Table 2.2.4 and defined in No. 5019a of IEC Publication 417).

The dc power input hardware has been designed so that (when the connecting cable ends are fitted with compatible insulating boots and pushed fully home when installed) the installer cannot touch non-ELV parts of the power system.

Where the dc 9914V is run from a mains-derived supply, the installer must ensure that the dc supply conforms to the isolation requirements on the caution label near the power input connectors.

## 2.3 Rack Mounting

The 9914V may be fitted by several methods.

- a) In a standard 19-inch EIA rack, using it's customer-specified rack clamps. **Warning:** the customer must provide a base tray which supports the weight of the 9914V.
- b) In a standard 19-inch EIA rack, using fixing screws which are inserted from the rear of the front opening and engage with tapped holes in the 9914V's mounting frame.
- c) In a wider-than-standard rack, using fixing screws which are inserted from the rear of the customer's mounting frame and engage with tapped holes in the 9914V's mounting frame.

### Fitting Precautions

It is advisable to ensure that the equipment rack has either a low centre of gravity with the 9914V installed or, alternatively, has forward protruding feet. This precaution is necessary to reduce the possibility of toppling when the 9914V is hinged out.

It is recommended that the rack be adequately ventilated and that a ventilation panel be fitted at the top. Warm air emerges from the louvres at the top of the 9914V.

Note: do not lay the unpacked 9914V on it's back.

### 2.3.1 Fitting Sequence, Using Rack Clamps

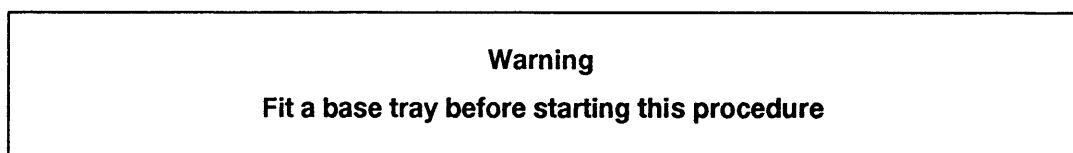


Figure 2.3.1.1 shows a rear view of the 9914V and illustrates where the rack clamps are located.

- i) Check that a base tray is securely fitted and is substantial enough to support the 9914V's weight. **Warning:** the tray must both locate the 9914V while the rack clamps are engaged and subsequently keep the unit in place if the rack is moved.
- ii) Check that the mains supply lead is disconnected.
- iii) Ensure that the rack clamps are set in the vertical position (ie parallel to the sides of the rack, as shown in Figure 2.3.1.2).

Note: an Allen Key is supplied with the 9914V.

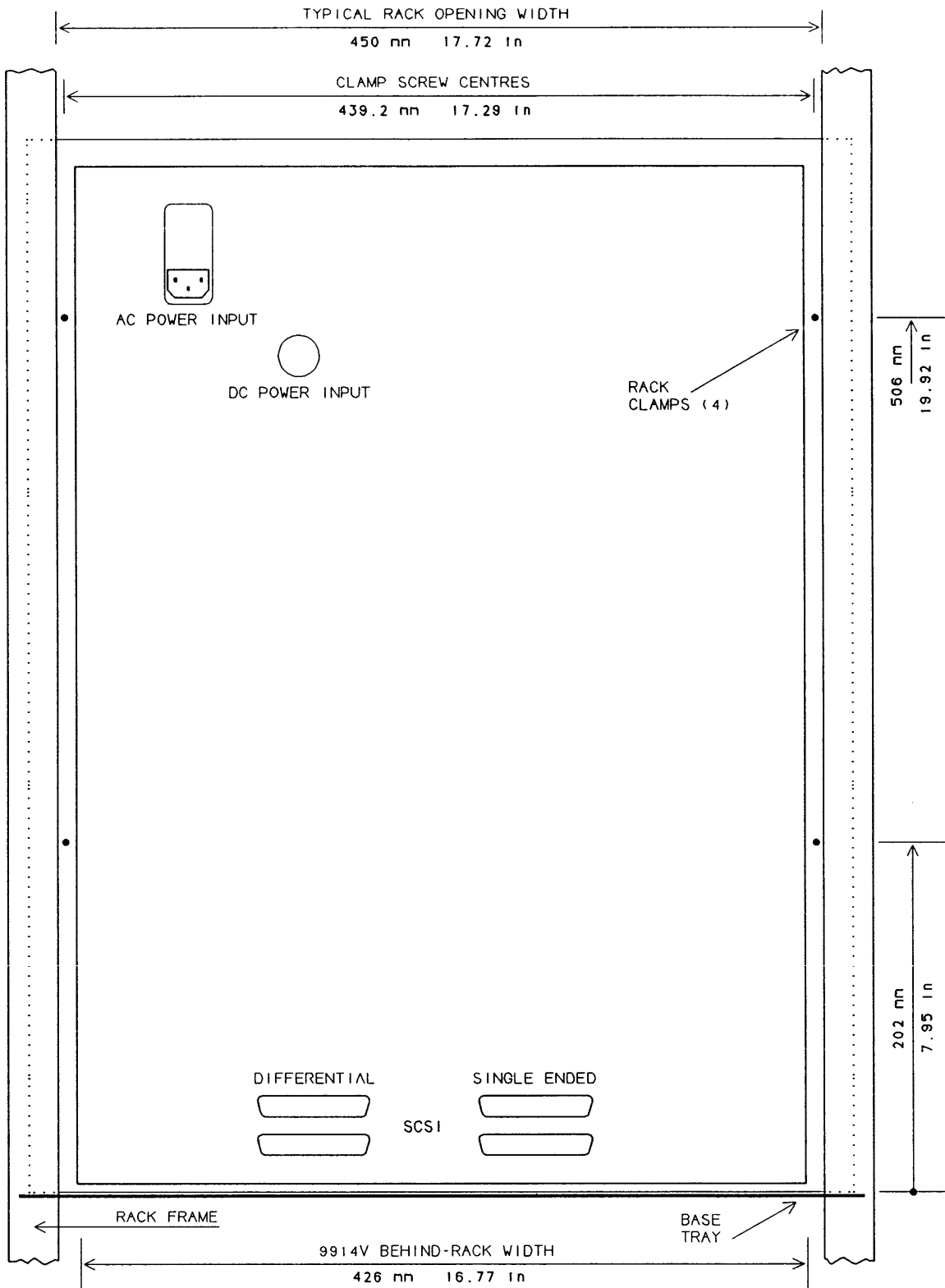


Figure 2.3.1.1 9914V RACK CLAMP LOCATIONS

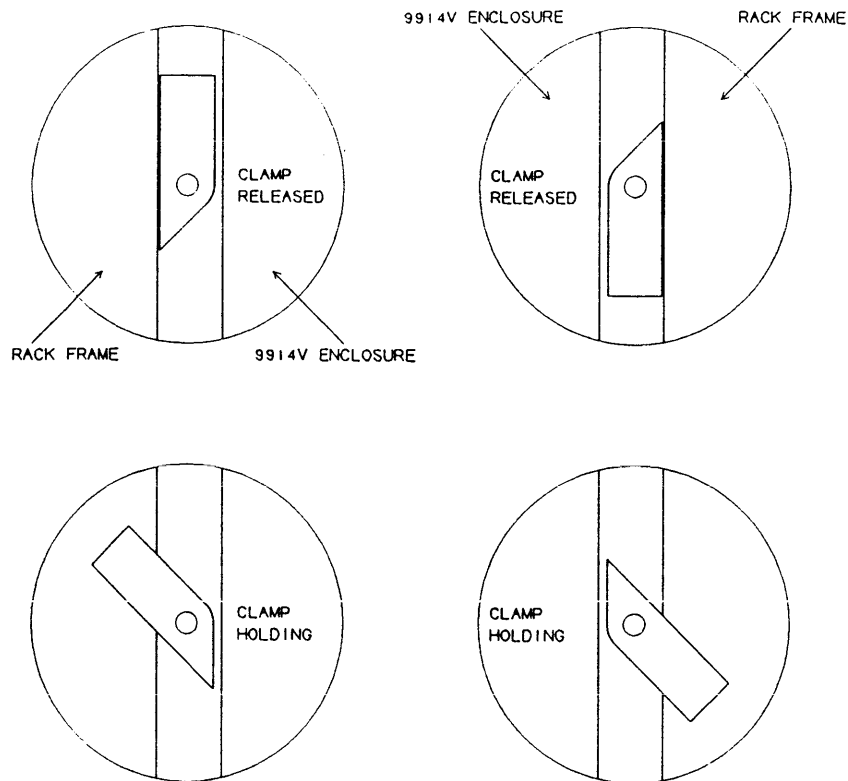


Figure 2.3.1.2 9914V RACK CLAMP DETAIL

**Warning**

**The 9914V should not be lifted by one person**

- iv) With a second person, lift the 9914V and *keeping it vertical*, place it on the base tray and fully into the rack.

Note: steps (v) to (ix) must be executed in sequence.

- v) Open the loading door. Undo the screw securing the deck casting to the base frame (this is located in the top right hand corner). Close the loading door securely.
- vi) Check that the loading door is fully closed. Note whether the clamps are free to rotate and engage the rack frame.
- vii) With a second person to push against the 9914V's mounting frame, pull down the deck casting.

If the rack clamps did not have sufficient clearance at step (vi), rotate them anticlockwise until there is sufficient clearance and then align the clamps to the 'released' positions of Figure 2.3.1.2.

If the rack clamps did have sufficient clearance at step (vi), insert the 5 mm A/F Allen key into each topmost clamp screw (annotated '1' in Figure 2.3.1.3) and rotate continuously clockwise until tight. Do not rotate anticlockwise because this may mis-align the clamp.

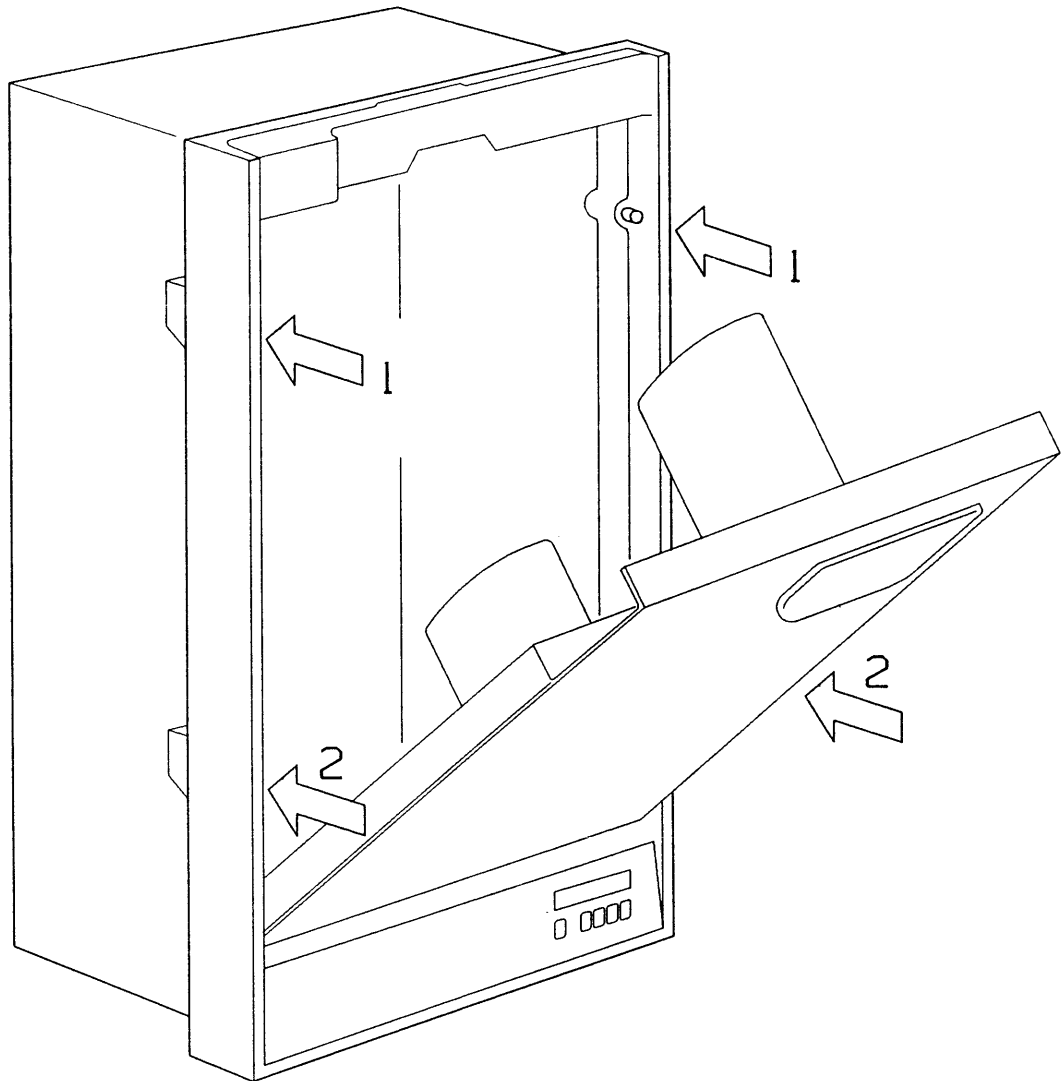


Figure 2.3.1.3 9914V RACK CLAMP ACCESS

- viii) Use the same Allen key to tighten each clamp screw (annotated ' 2 ' in Figure 2.3.1.3) by rotating continuously clockwise until tight. Do not rotate anticlockwise because this may mis-align the clamp.

Close the deck casting.

- ix) Check that all four rack clamps have rotated to the ' holding ' positions of Figure 2.3.1.2. If not, repeat the steps from (vi) onwards.
- x) Open the loading door and tighten the screw securing the deck casting to the base frame.

Close the loading door.

Note that the fitting procedure involved a total of four rack clamps.

### 2.3.2 Fitting Sequence, Using Fixing Screws

Figure 2.3.2.1 shows a rear view of the 9914V and illustrates where the fixing screws are located.

- i) If a base tray has been fitted, check it is securely fitted and is substantial enough to support the 9914V's weight.
- ii) Check that the mains supply lead is disconnected.

**Warning**  
**The 9914V should not be lifted by one person**

- iii) Check there is access to the rear of the front rack members, in order to fit the fixing screws later. The sides of some racks are detachable.
- iv) Check there are 6 fixing screws, 1/4 UNC, with a minimum thread depth of 19 mm (3/4 in) available.
- v) With a second person, lift the 9914V and *keeping it vertical*, place it in the rack at its intended height.
- vi) Fit the top two fixing screws, hand tight.
- vii) Fit the other four fixing screws, hand tight.
- viii) Tighten all six fixing screws fully.
- ix) Pull down the deck casting. Check that it hinges without obstruction.

### 2.3.3 Fitting Sequence, Using Customised Mounting Frame

Where a customised mounting frame is used, the customer must use a compatible procedure which takes account of the design of the frame.

The general principles of undertaking only two-man lifts and ensuring any base tray is substantial still apply.

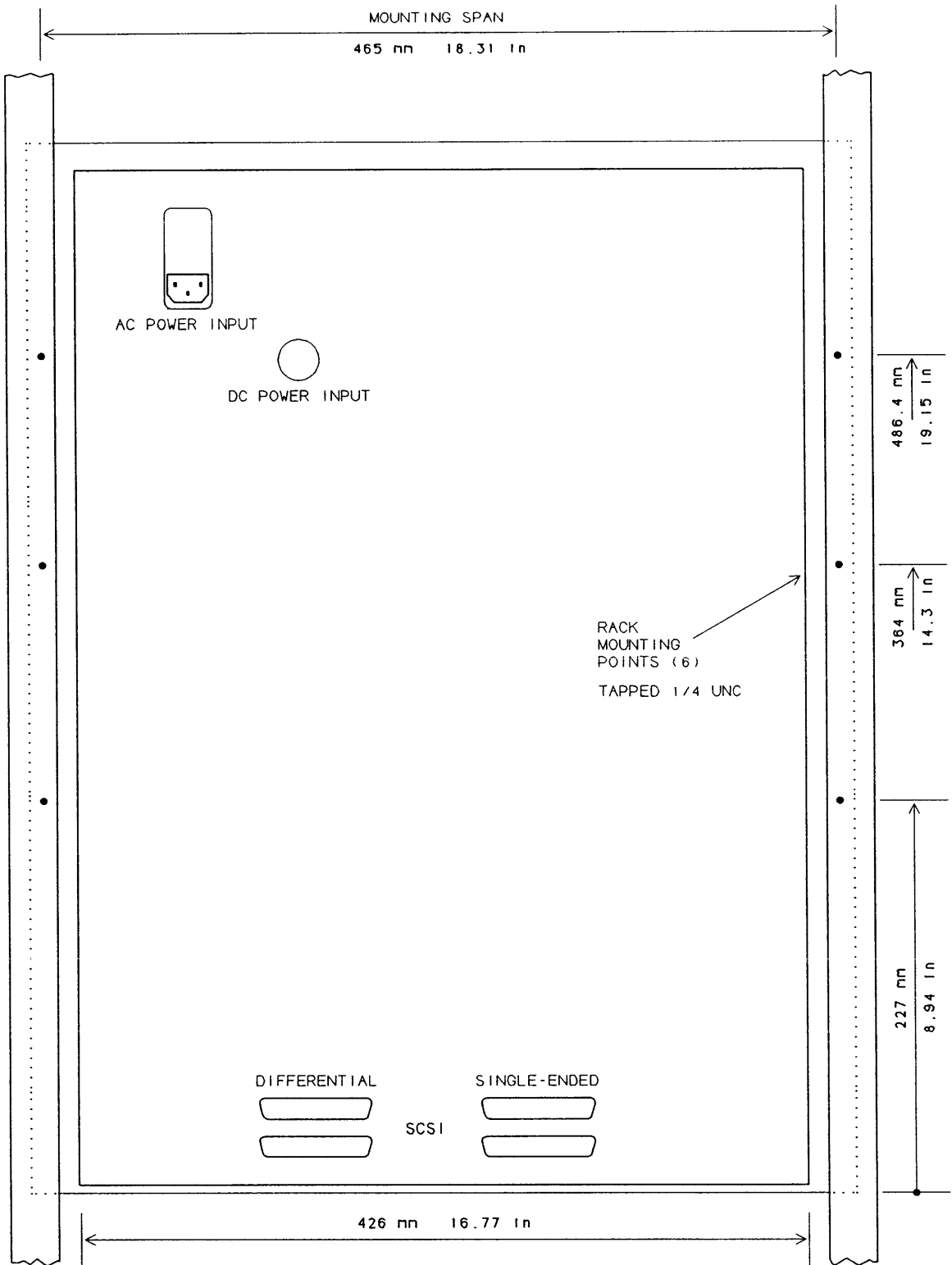


Figure 2.3.2.1 9914V RACK SCREW LOCATIONS

## 2.4 Configuration, Link and Switch Options

### 2.4.1 Termination Power

A link is provided on the Data Control board to allow for the position of the 9914V in a daisy-chain configuration. The link settings are:

Link Position	Termination Power source
Away from board edge (int)	internal +5V
Near board edge (ext)	external +5V

Any other links on the Control board are set during manufacture and should only be altered by trained service personnel.

### 2.4.2 Operator Functions

Most operator control options are held in non-volatile RAM, which can be examined or altered by running diagnostic program 67. This section describes how to alter options which do not affect the operation of the host software or the format of data written to the tape.

#### 2.4.2.1 Displaying/Modifying Options

Run diagnostic program 67, using the following procedure.

Check that the 9914V is not exchanging data with the host, take the 9914V off-line. Press the DIAG button to bring up the ' Test 00 ' display, use the ' tens ' and ' units ' buttons until the display reads ' Test 67 '. Press ' run/stop ', the display indicates as follows at the various steps.

- |         |   |
|---------|---|
| OPT 01  | Indicated upon first entering diagnostic program 67, the desired option number (which is flashing) can now be changed by depressing the ' units ' button.   |
| OPT 05  | When the desired option is displayed, press DIAG.   |
| UNIT 01 | Indicated after the desired option has been selected, and DIAG has been pressed. This is the current setting of option 05.<br>If option 05 is to be altered, use the ' tens ' and ' units ' buttons to display its new setting, otherwise proceed to the next step. |
| UNIT 02 | When the required option setting is displayed, press DIAG to revert to displaying option numbers.   |
| OPT 02  | If no further options are to be changed, press ' run/stop ' to exit diagnostic program 67, otherwise repeat the procedure for other option(s).  |

### 2.4.2.2 Operator Options

The displays associated with the operator options are tabulated next.

<b>Config Byte 01 Duration of density display</b>	
DNSDIS-1	Density displayed until ' run/stop ' or ' tens ' pressed
DNSDIS-0	Density displayed for 5 seconds only.
Config Byte 02 <i>This option has no function on the 9914V model.</i>	
<b>Config Byte 03 Auto on-line</b>	
Aut Open	9914V automatically goes on-line after threading has completed.
Man Open	9914V is on-line only after ' LD/ONL ' is pressed.
<b>Config Byte 04 Auto load</b>	
AutoLoad	9914V automatically threads tape to BOT on closing the door.
Man Load	9914V threads tape when ' LD/ONL ' button is pressed.
<b>Config Byte 05 Unit address</b>	
Unit XX	Where XX is the current unit address (valid in the range 0 to 7).

Warning: there are configuration bytes numbered beyond 05, but these may re-configure the 9914V so as to alter its response to the host or change the format of recorded data. Configuration bytes 06 to 17 should only be changed by personnel who are fully conversant with the system, these engineer options are listed under diagnostic program 67 in Section 4, and tabulated in Appendix A.

### 2.4.3 Analogue Data Paths Board

There are no switch or link option settings on this board.

### 2.4.4 Digital Data Paths Board

There are no switch or link option settings on this board.  
(The potentiometers are set during manufacture, they must not be subsequently adjusted in the field).

### 2.4.5 Optional Interface Boards

When an optional interface board is fitted, the user should refer to the appropriate manual:

SCSI Interface	User Manual 121780
Pertec Cache Interface	Product Description 121789
Super SCSI Interface	User Manual 124658



## 2.5 Initial Checkout

The user who is not already familiar with the 9914V controls and indicators is advised at this point to read Section 3 to gain some familiarity with the 9914V's operations.

To prove the 9914V's integrity:

- i) Check that the 9914V's supply voltage selection is correct (see Section 2.2.1).
- ii) Remove any protective packaging from the read/write heads.
- iii) Check that the 9914V is switched off, connect the supply lead to the input socket.
- iv) Switch on the 9914V, after several seconds the display panel indication should be ' TESTING ', then ' LOCATING ', and finally ' NO TAPE ', otherwise see Section 3 for fault messages.  
**Warning: the 9914V mains switch does not isolate both mains connections (a warning to this effect follows, in German):**  
Die Trennung vom Netz erfolgt durch Zeichen des Netzstecker!  
(Isolation from the mains is only guaranteed by removing the mains plug).
- v) Load a scratch tape; read ' Loading and Unloading ' in Section 3 if this procedure is unfamiliar.
- vi) Run diagnostic program 01; this is a check of machine integrity, including writing data to the tape.
- vii) When diagnostic program 01 has passed, the 9914V is ready for on-line use.

## 2.6 Final Checkout

Caution: the 9914V is designed to meet several RFI requirements, for *industrial* use. If operated in a *residential* environment, it has a high potential for causing interference. **The user must correct this**, by the use of screened interface cables and/or rack mounting.

When the 9914V is fitted with a buffered interface, and the interface bus cable is not completely enclosed within a cabinet where precautions are taken to limit radiated emission, shielded connectors and cables should be used. A suitable SCSI connector (3M socket type 3565-2002 or Sun-style type 8350-8005) may already be fitted to the 9914V.

- i) Set power off.
- ii) Connect the interface cables, the SCSI interface connections are shown in Figure 2.6.
- iii) Set power on, re-load the tape, and run the host diagnostic or commissioning program to prove the complete system.
- iv) Remove any protective peel-off sheet which is attached to the tape path cover.

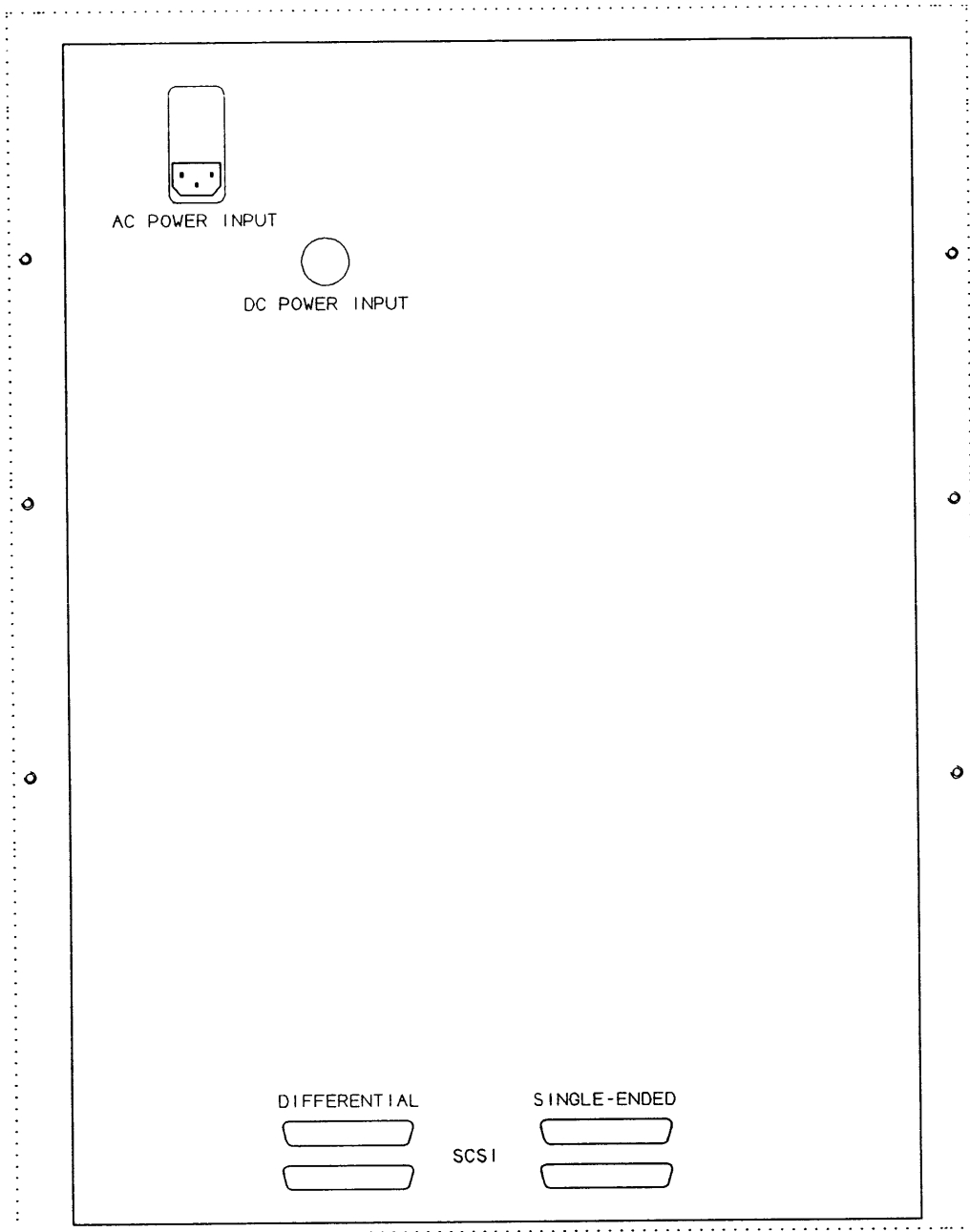


Figure 2.6 CONNECTOR LOCATIONS, SCSI INTERFACES

# 3.

# Operation

This section describes the functions of the operator-accessible controls and indicators.

## 3.1 Operator Functions

The operator is able to perform any of the following functions:

- Switch the 9914V power on or off at the front panel.
- Select the recording density.
- Check and/or change any operator options.
- Mount a tape reel, and thread the tape.
- Call diagnostic mode in order to run diagnostic programs, *or* identify the servo, data, or SCSI firmware revisions, *or* analyse the status bytes.
- Cancel diagnostic mode.
- Set the 9914V online, (the host then has control of the 9914V).
- Set the 9914V offline.
- Rewind the tape to BOT, and/or unthread the tape.
- Demount the tape reel.

## 3.2 Controls and Indicators

Figure 3.2 is a facsimile of the operator's panel.

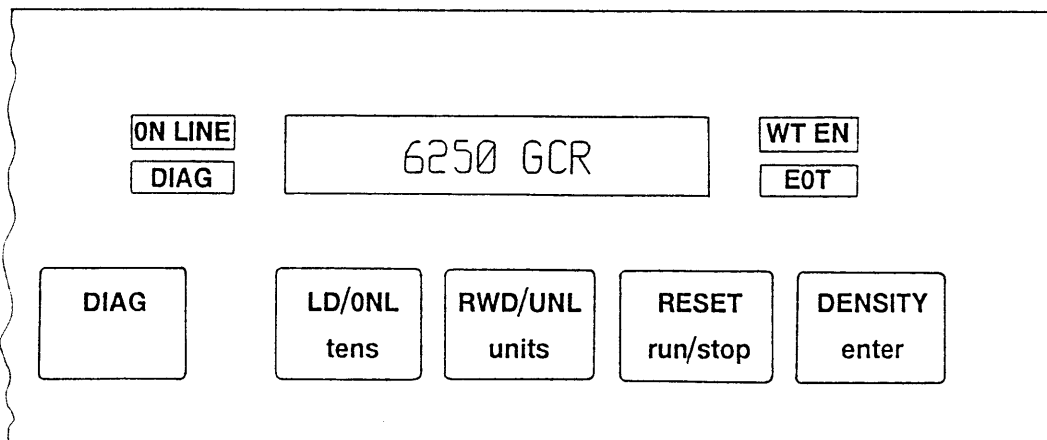


FIGURE 3.2 FRONT PANEL CONTROLS AND INDICATORS

### 3.2.1 Controls

<i>Power on/off</i>	This single-pole, two-position power switch is located at the front right hand side of the 9914V and connects mains input power to the power supply unit. When set to off, the power supply outputs are not active but mains power is still present within the 9914V.
DIAG	Diagnostic mode is alternately set or cancelled by pressing this button. If DIAG is not illuminated, press to set diagnostic mode; if DIAG is illuminated and a program is not active, press to cancel diagnostic mode. This function of the DIAG control is ineffective when the 9914V is online.  When certain diagnostic programs are active, DIAG is sometimes used for special functions within the program.
LD/ONL	Press to initiate threading, or to set the 9914V online when threading has completed.  Note: option 04 is normally set to automatically initiate threading when the loading door is closed). Option 03 is normally set to automatically place the 9914V online when threading has completed.
RWD/UNL	Press (when the 9914V is not online) to rewind the tape to BOT. Press (when BOT is indicated) to unthread the tape (ie completely rewind the tape onto the reel, prior to the operator unclamping it.  <i>Note: if RESET is held pressed while RWD/UNL is momentarily depressed, the subsequent rewind takes the tape beyond BOT and into the unthreading sequence.</i>
RESET	Use to set the 9914V offline and for cancelling threading or unthreading sequences.
DENSITY	Normally used to select the required operating density or check the current density setting (Section 3.7 gives precise operating details); exceptionally used in specific instances for other functions.
tens	In diagnostic mode, ' tens ' is used to select the tens digit of the program number. Press and hold in order to increment the displayed program number approximately every second. When the desired number is displayed, release the button.
units	Used in a similar manner to the ' tens ', this button is used to select the units digit of a diagnostic program.
run/stop	Used to start or stop a program or program stack. When a program number is displayed, pressing ' run/stop ' starts that program running; when a program is running, pressing ' run/stop ' stops that program running, pressing again usually either restarts the program from the beginning, or (if running a stack of programs) starts the next program of the stack.  If a firmware halt exists in a program, then the operator actions should be obeyed, and ' run/stop ' pressed to continue.

enter	Normally used to enter a program number to a sequential list of programs known as the program stack, exceptionally used in specific instances for other functions.
-------	--

### 3.2.2 Indicators

WT EN	WT EN is illuminated when a Write Enable ring has been detected on the supply tape reel. The ring is sensed during the threading sequence and WT EN is activated near the end of the sequence.
-------	--

If the indicator is not illuminated after the threading sequence has completed, the Write Enable ring was not detected. All subsequent operator diagnostic programs involving writing, and all host Write commands will be rejected.

ONLINE	When ONLINE is illuminated, the host is able to communicate with the 9914V. The 9914V may be set offline either by a host command, or by depression of the RESET button.
--------	--

DIAG	Diagnostic mode indicates that the 9914V is either running, or is ready to run, diagnostic programs. This applies both under operator control and under host control.
------	---

EOT	This is illuminated when the EOT marker is opposite the photo detector in the tape path. Note that this differs from the EOT indication on the 8-character display, where ' EOT ' denotes operation at or beyond the marker.
-----	--

EIGHT CHARACTER DISPLAY	The alphanumeric display is always illuminated, after power-on, with information such as BOT, READY, or REWIND. In some instances, a scrolled message is displayed to convey more precise information than is possible with an abbreviated message.
-------------------------------	---

## 3.3 The 8-Character Display

This section lists the messages which are placed in the 8-character display, they are classified by operating mode or circumstance. The special and scrolled messages associated with diagnostic mode are set out in Section 4.

*Note: the display is illuminated at all times after power-on. If the 8-character display is not illuminated, and none of the status indicators are illuminated, check that the front panel mains switch is set to ' 1 '. If there are no displays with power on, this could indicate a mains supply failure or a 9914V fault.*

### 3.3.1 Power-up Indications

When power is applied to the 9914V, a series of power-up tests are run by the internal diagnostics, with ' TESTING ' indicated. If a malfunction occurs, the display changes to one of the following indications.

After a successful completion of the power-on tests, the display momentarily indicates OK and then LOCATING; the operator may then mount a tape reel (as set out in Section 3.6) and initiate the threading sequence.

Most fault indications which are preceded by ' \*\* ' require the attention of an engineer, and are therefore described in the 9914V Servicing Manual.

<i>blank display</i>	Mains power is not available, <i>or</i> the +5 V supply is not present, <i>or</i> the Servo Control bus is faulty.
CON VAL X	(X in the range 1 to 7), usually a missing or disconnected sub-assembly.
OK	The power-up checks have been successfully completed.
POWER	A fault has been found with the Power Supply board, while all the internal dc power supply lines were being checked.
TESTING	The power-up checks are in progress.

### 3.3.2 Diagnostic Indications

This section lists diagnostic indications which occur during operator initiated diagnostics, online diagnostic messages are listed in Section 3.3.4.

DENS ERR	Selected density is not available (programs 82 & 83).
HALT XX	' run/stop ' was pressed while a program was still running.
NO KEY	The called diagnostic program requires the service key code to be entered before it can run; this applies to programs where the internal configuration of the 9914V may be affected by running the program.
NO TEST	A non-existent diagnostic program has been called, <i>or</i> the stack was empty when program 99 was called.
Offline	The tape is tensioned and forward of BOT with the 9914V not in diagnostic mode, and not online.

Pass 05	A diagnostic program (in this case, program 05) has passed.
Run 51	A diagnostic program (in this case, program 51) is running.
STK FULL	The diagnostic stack is fully loaded with 30 programs.
TEST 00	Diagnostic mode has just been entered.

### 3.3.3 General Indications

These indications could occur during offline or online operation; messages which are unique to a particular mode (eg threading) are described in other sections.

EOT	End-of-tape has been detected, the current working area is therefore at or beyond the EOT marker.
IN LIMIT	The tension arm has reached the limit of its travel, tape tension has usually been lost.
LID OPEN	Threading has been initiated, but the tape path cover thumb-screw fasteners are not secured.
Offline	The tape is tensioned and forward of BOT with the 9914V not in diagnostic mode, and not online.
OK	The 9914V does not have a fault condition.
ONLINE	The 9914V is online to the host, and able to respond to host commands.
READY	Tape has been threaded, and the 9914V is ready to accept host commands.
REWIND	The tape is rewinding following either host or operator Rewind command, this operation completes at BOT. If RESET is pressed during rewinding, tape motion stops and the 'REWIND' indication is replaced by 'Offline'.
REW/UNLD	An operator Rewind & Unload (ie Unthread) command has been given by holding RESET depressed while RWD/UNL is depressed.
UNLOAD	An unload (ie unthreading) sequence is in progress following the pressing of the RWD/UNL button while BOT was indicated. As the unthreading sequence nears completion, the reel is unclamped and the display briefly indicates OK before indicating READY (which is the completion of unthreading).
>	Forward tape motion is in progress (usually displayed when a diagnostic program is running).
<	Reverse tape motion is in progress (usually displayed when a diagnostic program is running).

### 3.3.4 Online Indications

The following indications can occur when the 9914V is online but not running diagnostics. Generally, the display remains until the next command is received.

Blank	A forward Read or Space interface command has been terminated after 9 m (30 ft) of blank tape (ie no data activity found).
Deselect	Unit online to interface, but not selected by host computer (ie de-selected), and not at BOT.
Diag Stk	Diagnostic stack entry in progress.
Diag Ded	Dedicated diagnostic stack running (program 01).
EOTLIM	The tape has passed 3.6 metres (12 feet) beyond EOT and the 9914V has been commanded to move tape further forwards.
Erase FL	An Erase Fixed Length command was accepted, at low speed.
Erase FL +	An Erase Fixed Length command was accepted, at high speed.
Erase VL	An Erase Variable Length command was accepted, at low speed.
Erase VL +	An Erase Variable Length command was accepted, at high speed.
Ex Sense	The extended (ie the full) status bytes were accessed.
** IDENT	No identifier (compatible with the selected density) found on leaving BOT.
Ld Point	The tape is at BOT, and the 9914V is online (note, BOT is indicated when offline in the same position).
Read	A Read command was accepted, at low speed.
Read +	A Read command was accepted, at high speed.
Read Only	A a write command has been given to a file protected tape (ie WT EN is not illuminated). If writing is required, the operator must fit a Write Enable ring to the tape reel.
READY	The 9914V is online to the interface but no commands have been received. (Display shows ' Ld Point ' when at the BOT marker).
Reject	The last command received was rejected (for reasons other than file protect), the reason is flagged in status byte F9.  ' Reject ' usually remains displayed until an acceptable command is received; exceptionally (if BOT is found during a Reverse Read) BOT is displayed. Placing the 9914V offline removes ' Reject ' from the display.
Rev Read	A Reverse Read command was accepted (with data transfer) at low speed.



Rev Read +	A Reverse Read command was accepted (with data transfer) at high speed.
Rewind	Tape is rewinding to BOT.
REW/UNLD	A Rewind & Unload (ie Unthread) command has been given; the sequence rewinds tape to BOT and then continues until the tape is fully on the supply reel, and the reel unclamped. The ONLINE legend then extinguishes.
SecErase	An Security Erase command was accepted.
Sense	The condensed status bytes were accessed.
SpcFwd	A Space Forward command was accepted, at low speed.
SpcFwd +	A Space Forward command was accepted, at high speed.
SpcRev	A Space Reverse command was accepted, at low speed.
SpcRev +	A Space Reverse command was accepted, at high speed.
Srch Fig	A file search forward (ignoring data) command was accepted, at low speed.
Srch Fig +	A file search forward (ignoring data) command was accepted, at high speed.
Srch Fwd	A File Search Forward command was accepted, at low speed.
Srch Fwd +	A File Search Forward command was accepted, at high speed.
Srch Rev	A File Search Reverse command was accepted, at low speed.
Srch Rev +	A File Search Reverse command was accepted, at high speed.
Srch Rig	A File Search Reverse (ignoring data) command was accepted, at low speed.
Srch Rig +	A File Search Reverse (ignoring data) command was accepted, at high speed.
STUCK!!	The tape appears to be stuck at the heads. Check the cleanliness of the tape path. If clean, consider discarding that tape.
** Write	No write current was detected in the heads.
Write	A Write command was accepted, at low speed.
Write +	A Write command was accepted, at high speed.
Write FM	A Write File Mark command was accepted, at low speed.
Write FM +	A Write File Mark command was accepted, at high speed.

800 NRZ	800 bpi NRZ density.
1600 PE	1600 bpi PE density.
3200 DPE	3200 bpi (double PE) density.
6250 GCR	6250 bpi GCR density.

## 3.4 Automatic Self-Checks

### 3.4.1 Power-on Checks

When power is applied to the 9914V, a self-check routine of the fundamental functions is automatically initiated to detect failures which would otherwise inhibit its further use. The error messages are set out in Section 3.3.1.

### 3.4.2 Other Automatic Checks

Continuous power-fail checks are made when 9914V is not selected, error messages are as for power-on checks. Note that the host computer can request diagnostic tests when data transfers are not in progress, in which case the DIAG legend illuminates while the diagnostics are running.

## 3.5 Door Interlocks

The loading door operates a sensor when it is closed. The threading sequence cannot commence until it is properly closed.

**Caution:** do not open the loading door after tape has been tensioned. If the 9914V is online it will go offline; close the door and press LN/ONL to restore the online condition.

## 3.6 Threading and Unthreading

### 3.6.1 General

Before carrying out the following operating procedures, users should be familiar with the care of tapes. Reels should not be handled by the flange and should always be placed in a canister (or enclosed in a protective outer ring) when not in use.

**Caution:** once the tape has been tensioned, avoid opening the loading door. If the 9914V is on-line, it changes to off-line; if tape is in motion, tape motion ceases. To restore the status quo, the loading door must be securely closed and ' LD/ONL ' must be pressed to place the 9914V online.

### 3.6.2 Power-on Procedure

To power on the 9914V, proceed as follows:

- i) Set the power switch at the front of the 9914V to on ('1').
  - If there is no tape reel in the loading chamber, the display sequences as in Table 3.6.2.
  - If there is a tape reel in the loading chamber, the display begins as in Table 3.6.2 but proceeds from LOCATING to the LOADING stage of Table 3.6.3.
- ii) Power-on fault indications are listed in Section 3.3.1.

Display	Status	Duration	9914V Activity
TESTING	DIAG	Several seconds	Power-on health check Other indicators flash momentarily
OK	-	Momentary	Health check ok
LOCATING	ONLINE	Several seconds	Checking a tape reel is present, supply hub rotates anti-clockwise
NO TAPE	-	Momentary	Reel not detected on the SU hub
<i>Scrolled message*</i>			Tape reel may now be clamped, see next section.

\* The message begins 'To load tape press LD/ONL ....'

TABLE 3.6.2 9914V POWER-ON SEQUENCE

### 3.6.3 Loading the Tape Reel

#### a) Power-on without a tape reel clamped

When there was no tape reel in the loading chamber, follow this procedure; otherwise follow the instructions in (b) below.

- i) Select a reel of tape.
- ii) Ensure that the Write Enable ring is either fitted to permit writing, or removed to prevent over-writing of existing data.
- iii) Ensure the tape end is free; for new reels remove the adhesive strip and/or rubber block which constrains the free end to the tape pack.
- iv) At the end of the power-on sequence described in Section 3.6.2, the loading door may then be opened to mount the tape reel on the supply hub. It is advisable to wait for the scrolled message before mounting a tape reel, in case an internal fault prohibits further use.
- v) Place the tape reel on the self-centering supply hub with the Write Enable ring towards the casting.

- vi) Close the loading door. Press ' LD/ONL '. Events should follow the sequence of Table 3.6.3 from ' LOADING '.

Should tape loading malfunction, the possible display indications are listed in Section 3.6.4.

Display	Status	Duration	9914V Activity
<i>Scrolled message</i>	ONLINE	Infinite	<i>Waiting Open the loading door</i>
	READY		<i>Mount a reel of tape on the SU hub (Write Enable ring towards the casting) Close the loading door</i>
LOCATING	-	Several seconds	Checking the reel is seated
LOADING	-	Several seconds	Threading and tensioning the tape
XXX REEL	(WT EN)	Several seconds	Determining the reel size, XXX could be SML, MED, or LRG
Analyse	-	Several seconds	Density determination, result is displayed for a few seconds
Ld Point	-	Infinite	Tape is at BOT and 9914V is online, or tape is at BOT and 9914V is offline
BOT	-	Infinite	

Notes to Table 3.6.3

- Ensure the tape reel is placed with the Write Enable ring nearer the casting.
- If DOOR is indicated, close the loading door securely.
- If the 9914V is needed online at BOT, press LD/ONL.
- Online status to the host is not set until BOT is reached.

TABLE 3.6.3 9914V TAPE LOADING PROCEDURE

**b) Power-on with a tape reel inserted**

If the 9914V has just been powered on with a tape reel, threading is automatic and follows the sequence of Table 3.6.3 from ' TESTING ' onwards.

This feature is effective before or after BOT.

**c) Substituting a Tape Reel**

- Remove the current reel of tape, by following the procedure described in Section 3.6.4.
- Mount the next reel, close the loading door, then watch the unit execute the procedure from the READY indication of Table 3.6.3.

### 3.6.4 Unloading the Tape Reel

#### a) Removing the tape reel (with power on)

*Note 1: if the unthreading sequence is commenced inadvertently it can be cancelled by first pressing the RESET, then pressing LD/ONL to resume threading (in order to resume, the tape will probably move to BOT).*

*Note 2: for tape protection, place the reel of tape in a dust proof cover and store in a safe place.*

- i) To avoid loss of data, check that the host computer is not accessing the 9914V. If the display shows ' Offline ', unloading may proceed without loss of data; but many of the indications in Section 3.3.4 suggest that data transfer is still in progress. Tape motion also suggests that data transfer is still in progress.
- ii) Set the 9914V offline by pressing RESET, or (if in diagnostic mode) press the ' DIAG ' control once to leave diagnostic mode (ie the DIAG legend not illuminated).  
*Note: if the 9914V does not go offline immediately RESET is pressed, it may be because the SCSI (or PCI) buffer contains partly processed data. That process will continue to completion before the offline condition is allowed; do not assume the RESET button has a fault.*
- iii) If ' Offline ' is displayed, hold RESET depressed while RWD/UNL is pressed, the tape rewinds (with REW/UNLD indicated) through BOT until the tape is fully rewound onto the supply reel (it is then ok to open the loading door).
- iv) When the display indicates READY the loading door may be opened.

#### b) Removing the tape reel (during a power failure)

If power to the 9914V is cut off, and it is essential that the reel of tape is recovered without waiting for power to be restored, the following procedure enables the user to do so. The user should be aware that the time required to rewind the tape increases according to the amount of tape on the take-up spool (ie the lower fixed reel).

- i) Set power off. This is essential for safety reasons.
- ii) Open the loading door, rotate the supply reel anti-clockwise until all the tape has been rewound.
- iii) Press the hub release button (ie the centre portion of the hub).
- iv) Lift off the unclamped supply reel.
- v) Close the loading door.

### 3.6.5 Threading/Unthreading Indications

These indications occur during threading and unthreading sequences plus some other conditions when the 9914V is under manual control.

Analyse	The tape has reached BOT and the data circuits are reading the ident burst to determine it's recorded density.
BOT	Tape is at BOT and threading is complete. When set online, the display changes to 'Ld Point' and the 9914V is able to respond to host commands.
DOOR	The loading door was open, after a threading sequence began.
HUB LOCK	Shortly after threading has been initiated, the reel has been clamped onto the supply hub.
HUB ERR 1	Incorrect seating of the supply reel on the supply hub.
HUB ERR 2	Incorrect seating of the supply reel on the supply hub.
HUB SOL	The 'located' flags are not changing, the hub lock solenoid may not have locked the supply hub.
IN LIMIT	The tension arm has reached the limit of its travel, tape tension has been lost.
LRG REEL	Near the end of the threading sequence, the firmware has detected that a large (10.5 inch) reel has been used.
LOADING	Reel clamping has been confirmed, and tape is being threaded along the tape path.
LOCATING	The positive location of the supply reel is being confirmed.
MED REEL	Near the end of the threading sequence, the firmware has detected that a medium (8.5 inch) reel has been used.
N I C	Not In Chute; during the early stages of threading, tape was not detected in the tape path chute (the tape end was attracted to the bulk, the foam pad had not been removed, or the loading fan was not operational).
NO TAPE	After threading had been initiated, the reel locating circuits did not conclude successfully, ie no tape reel was present on the supply hub.
N T U	No Take Up; during the later stages of threading, tape was not gripped onto the take-up spool. No tach pulses were detected.
OK	The power-up checks have been successfully completed, or the 9914V is idle and does not have a fault condition.

REEL INV	During the early stages of threading, the tape reel was found to be inserted with the Write Protect ring uppermost.
RESET	The RESET button was sensed as permanently depressed.
REWIND	The tape is rewinding following either host or operator rewind command, this sequence completes at BOT. If RESET is pressed during rewinding, tape motion stops and the REWIND indication is replaced by ' Offline '.
REW/UNLD	An operator Rewind & Unload (ie Unthread) command has been given by holding RESET depressed while RWD/UNL is depressed.
SML REEL	Near the end of the threading sequence, the firmware has detected that a small (6 or 7 inch) reel has been used.
** TAB	The BOT tab was not detected, near the end of the threading sequence.
TAPE NOT IN CHUTE	<i>Scrolled message.</i> The tape end has not blown clear of the bulk.
UNLOAD	An unthread sequence is in progress following the pressing of the RWD/UNL button with BOT indicated. When the unthreading sequence is complete the display changes to READY.

### 3.6.6 Threading the Tape by Hand

Since the 9914V is designed for fully automatic threading, it is not normally necessary (or desirable) to manually thread the tape except under fault conditions such as a failed loading fan.

- i) Set power off. This is essential for safety reasons.
- ii) Open the loading door, push the tape reel centrally onto the supply hub.
- iii) Thread the tape through to the take-up hub.
- iv) Wind on about two turns (an access hole is provided to facilitate take-up) until the tape is pulled through when the tape-up reel is rotated.
- v) Close the loading door.
- vi) Set power on.

The threading firmware senses that tape is already threaded and proceeds to check for clamping, tension the tape, and search for BOT without the operator taking any further action. Threading indications and fault messages are set out in Section 3.6.4.

### 3.6.7 Switching off with Tape Threaded

It is good practice to ensure that the tape is unthreaded (or at least returned to BOT) before switching off. The reel servo circuits are designed with a dynamic braking effect to prevent tape loops forming following power failures or accidental switching off.

## 3.7 9914V Problems

The operator's display indications are set out in Section 3.3. Read this section to determine whether the 9914V is suitable for further operation; if not, rewind the tape and unclamp the reel.

In general, it is only necessary to switch off when some obvious hazard is present; removing power from one 9914V in a daisy-chain configuration may disable the whole configuration.

Possible causes of failure or loss of tape tension are

- mains supply interruption: when the power is restored, allow the tape to re-tension as described in Section 3.6.3(b);
- servo fault; the tape traverses to one end (or remains motionless), regardless of any host command or the RESET button;
- tape running off at EOT; caused by either a fault in the controller or program, or failure of the EOT detection circuits;
- failure to see BOT reflective marker; 9914V fault, marker absent, or marker too far down the tape.

## 3.8 Density Selection/Interrogation

When the recording density option is set to enable operator selection (as opposed to host selection), the density can sometimes be interrogated and/or changed via the DENSITY button, with the current density setting indicated on the 8-character display. The selection/interrogation methods and rules are described next.

### a) After power-on checks.

When the power-on checks have finished, the density defaults to the setting in the option bytes and is not displayed. Should the density button be pressed, the display does not indicate density because it is not relevant until a tape reel is present (ie no read or write operation can take place).

### b) Immediately After Threading

When the Analyse function has been enabled (byte 06, bit 2), it determines the tape density at the end of the threading sequence (the tape can be seen moving to and fro, and 'Analyse' is displayed). 6250 or 1600 bpi ident bursts cause selection of the corresponding density, no ident defaults to the option byte setting, blank tape or an alien format defaults to the power-up default setting.

Manual density selection when threaded, at BOT, and offline, consists of depressing the DENSITY button to cause the display to cycle continuously through the available densities. Whichever density is displayed when DENSITY is released becomes the new recording density during the next online command.

### c) Online

The density setting cannot be updated from the front panel when the 9914V is online, but can be checked at any time by pressing the DENSITY button. The current setting is shown for a short time before the display reverts to its previous indication.



**d) During Diagnostic Mode**

Density selection in diagnostics is special because four programs are allocated specifically for this purpose. Diagnostic programs operate in conjunction with the Data Control firmware for density selection, thus if the 9914V was set to 1600 bpi before diagnostic mode was entered, and altered to 6250 bpi during diagnostics, it will remain at 6250 bpi on leaving diagnostic mode.

When running diagnostic programs, it is recommended that the density is specifically set (by programs 41-44), rather than relying on a previous setting. If a program fails and an error of the form ' F29 Er01 ' is displayed, the current density may be displayed by pressing ' enter '. To continue the program, it is then necessary to press DIAG to skip the error, followed by ' run/stop ' to continue the program.

*This page has no technical content*

# 4.

## Diagnostics

The 9914V's diagnostics offer a selection of programs (numbered 00 to 99), many of which are useful to the operator and may be controlled from the operator's panel.

The pass and fail messages which are displayed for most diagnostic programs are given in self-explanatory alphanumeric format.

During failure conditions, the brief error message usually contains the failed program number and the error code. These messages assist service personnel in locating the possible faulty Field Replacement Unit (FRU).

Some program descriptions make reference to interface signal names (eg ICER, IHER, IFBY), these are defined in the 9914V Product Specification.

*Note: because some diagnostic programs write data to tape, it is good practice to load a scratch tape before invoking diagnostic mode.*

### 4.1 Diagnostics - from the Operator's Panel

#### 4.1.1 Operator Diagnostics

Most diagnostic programs may be controlled from the front panel, those which cannot are host-specific functions.

The operator may use the diagnostics:

- to confirm primary functions such as tape motion;
- for proof of machine integrity; by running preset stacks;
- to inspect the record of machine performance;
- to aid identification of faulty FRUs when failures occur;
- to identify the current control, data, and SCSI firmware revisions.

Fault-finding procedures which go beyond the scope of operating diagnostic programs are described in the 9914V Servicing Manual.

#### 4.1.2 Diagnostic Mode

The operator diagnostics mode is entered by pressing the DIAG button, which is ignored when the 9914V is on-line. When the diagnostics mode has just been entered, the diagnostic display indicates ' Test 00 ', indicating program 00. This is a non-operative condition, because the operator is expected to select a program number.

*Note: it is quite legal for the DIAG legend to be illuminated when the 9914V is on-line; this means that the host is running diagnostics.*

The front panel controls can be taken out of their diagnostic functions (and returned to normal operation) by choosing a time when no diagnostic program is running and pressing the DIAG button a second time.

### 4.1.3 Program Selection

Individual programs are selected by pressing and holding either the ' tens ' or the ' units ' buttons.

### 4.1.4 Running a Program

*Note: because some diagnostic programs write data to tape, it is good practice to load a scratch tape before invoking diagnostic mode.*

A program is run by pressing the ' run/stop ' button once; depressing the ' run/stop ' button a second time stops the program.

The display ' No test ' indicates that there is no function allocated to the selected program number, or that function has not yet been implemented, or program 99 was called when the stack was empty.

The display ' No Key ' indicates that the selected program number requires the service key code to be entered. This access right applies to programs which are capable of altering the internal configuration of the 9914V, or the read/write parameters; only service engineers should use these programs.

If a connector or a printed circuit board is missing, a message comes up after power-on, with two leading asterisks (\*\*). These indications usually require the attention of a service engineer.

While a diagnostic program is running, the program number is continuously displayed in the right-hand characters, with an ' Runng ' on the left; ' Runng 05 ' indicates that program 05 is running. If a test program fails, the program number and the appropriate error code are displayed in the form ' F29 Er01 ' (failed program 29, error 01).

When a test program is successfully executed, the program number is prefixed by ' Pass '; ' Pass 12 ' indicates successful completion of program 12. Where a program requires operator action the required action is scrolled on the display.

### 4.1.5 Program Stacks

If an individual selection of programs is required, a sequence of programs may be added to the stack by use of the ' enter ' button, which adds the currently displayed program to the stack.

To run the stack, display program 99 and press ' run/stop '.

The stack is cleared by running program 98.

### 4.1.6 Program Loops

To run the stack continuously, display program 99 and press ' enter '. Then display program 99 and press ' run/stop '.

## 4.1.7 Program Examples

### 4.1.7.1 Program 01

With the scratch tape loaded and the 9914V off-line:

- a) press DIAG, the display should indicate ' Test 00 ';
- b) operate the ' units ' button to set 01;
- c) press ' run/stop ' once;
- d) the tests run for several minutes, after which a pass is denoted by ' Pass 98 ' (98 is the last program number in the preset stack). A failure is denoted by a message of the form ' F29 Er01 '; ' enter ' may be pressed to indicate the current density and speed eg ' 6250 Hi ', but to continue running the program DIAG must then be pressed (to skip the error) and then ' run/stop '.

### 4.1.7.2 Programs 04, 44, & 30 in a Stack

With the scratch tape loaded and the 9914V off-line:

- a) Press DIAG;  
*Note: steps (b) and (c) are unnecessary if no program has been entered into the stack since power-up;*
- b) operate the ' tens ' and ' units ' buttons to set program 98 (to clear the stack);
- c) press ' run/stop ', ' Pass 98 ' should be displayed (the program stack is now empty);
- d) set program 04;
- e) press ' enter ' (to enter program 04 into the stack);
- f) set program 44;
- g) press ' enter ' (to enter program 44 into the stack);
- h) set program 30;
- j) press ' enter ' (to enter program 30 into the stack);
- k) set program 99 (to run the program stack);
- l) press ' run/stop ';
- m) programs 04, 44 and 30 run sequentially and, if successful, ' Pass 30 ' is displayed when completed.

### 4.1.8 Default Status

Default status consists of the internal settings which are assigned to diagnostic mode at power-up, as follows:

speed . . . . .	low
density . . . . .	as set by config byte
language . . . . .	English
N = . . . . .	255 <sub>10</sub> (FF <sub>16</sub> )
block length . . . . .	4096 bytes.

If power is removed from the 9914V, diagnostic mode will revert to default status when the power is restored.

## 4.2 Diagnostics - Via the Interface

This section deals with the running of programs via the Pertec interface.

The host can command the 9914V to run any of the programs between 00 to 31; these may be run singly, entered into a stack, or a preset stack of programs can be run. The user may wish to utilise diagnostics during idle moments when data transfers or searches are not required.

*Note: because some diagnostic programs write data to tape, it is good practice to load a scratch tape before invoking diagnostic mode.*

### Interface Diagnostic Features

- Interface diagnostics function without operator intervention.
- Host is able to ascertain machine integrity prior to data dumps.
- Hard error (IHER) sets if a test fails, remains clear when a test passes.
- Machine integrity can be tested by use of non-corruptive tests (ie data is not written to the tape).
- Status byte(s) may be accessed by the host to reveal error counts, failing program number, and/or detailed failure causes.

Diagnostics may also be run over the SCSI interface. The principles are very similar and use the Send Diagnostic and Receive Diagnostic Results commands, details of which are set out in the SCSI User Manuals.

### 4.2.1 Running a Program Stack

Program stacks containing between 1 and 30 programs may be entered and run by the host. This is initiated by the host issuing a Diagnostic Stack Entry command (Table 6.3). The command immediately clears the current stack, the host may then follow with it's tailored stack of program numbers.

The user should be aware that 2<sup>5</sup> equates to 32, therefore only programs 00 to 31 may be entered via the Pertec interface.

The five encoded command lines are used for transmitting program numbers (weighted as in Table 4.1) to the 9914V. The IGO signal is used to strobe the command (and subsequent program numbers) into the 9914V; the IDBY line goes true for 500  $\mu$ s for each program number received by the 9914V.

Command line	IERASE	IEDIT	IWFM	IWRITE	IREV
Line weight	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>

TABLE 4.1 COMMAND LINE WEIGHTING

When the last number has been entered; program 02 must then be entered to run the tailored stack, in the same sequential order as the programs were entered.

Note: the Company have avoided the provision of extra command lines for operating the 9914V diagnostics by using previously unused combinations to provide additional commands for diagnostic program operation.

#### 4.2.2 Running Individual Programs

A single program is merely a special case of a stack, ie a stack of one; the method of the previous paragraph therefore applies.

If a confidence check is required, the host gives the Dedicated Diagnostic Test command. The 9914V then replaces the current stack with diagnostic program 01 (which is a preset sequence of tests designed to constitute a confidence checkout) and runs the stack without any further host action.

### 4.3 Program Descriptions and Error Codes

This section lists the 9914V diagnostic programs which have operator applications, describes their purpose, and lists their error codes.

Some higher-numbered error codes are common to many diagnostic programs and not listed under Error Codes in the program descriptions which follow, these common codes are listed next.

#### Common Error Codes

89	No Write Enable ring was detected on the tape reel
90	No write current was detected at the heads
98	Data Control board timeout elapsed while waiting for a response from the SCSI board
99	Data Control board timeout elapsed while waiting for results from the SCSI board

No	FUNCTION	No	FUNCTION
00	NULL PROGRAM	50	STEP FORWARD ( <i>low speed</i> )
01	CONFIDENCE CHECK	51	STEP REVERSE ( <i>low speed</i> )
02	RUN STACK FROM HOST	52	ALTERNATE FWD/REV ( <i>low speed</i> )
03	ILWD LINE CHECK	53	STEP FORWARD ( <i>high speed</i> )
04	AUTO SERVO CHECK	54	STEP REVERSE ( <i>high speed</i> )
05	DATA CHANNELS CHECK ( <i>non-corruptive</i> )	55	ALTERNATE FWD/REV ( <i>high speed</i> )
06	DATA CHANNELS CHECK ( <i>corruptive</i> )	56	
07	ADP E-E	57	
08	DDP E-E	58	
09	DATA CHANNEL ERROR REPORTING	59	
10	SET PARAMETERS OF PROGRAM 01	60	ERASE TO EOT
11	SET HIGH SPEED	61	
12	SET LOW SPEED	62	WRITE ALL ONES TO EOT
13	SET N	63	READ FWD TO EOT ( <i>low speed</i> )
14	SET BLOCK LENGTH	64	READ FWD TO EOT ( <i>high speed</i> )
15	SELECT NON-STREAMING	65	READ REV TO BOT ( <i>low speed</i> )
16	SELECT STREAMING	66	READ REV TO BOT ( <i>high speed</i> )
17	FAILURE SKIP	67	EXAMINE/MODIFY OPTIONS
18	INCREMENT LOOP COUNTER	68	EXAMINE FULL STATUS BYTES
19	IRD* & IWD* LINE CHECKS	69	INITIALISE STATUS BYTES
20	SET ALL ZEROS DATA	70	EXAMINE PROM REVISIONS
21	SET ALL ONES DATA	71	EXAMINE/MODIFY LANGUAGE
22	SET ALTERNATE 1/0 DATA	72	OPERATOR DISPLAY CHECK
23	SET PSEUDO RANDOM DATA	73	INTERNAL VOLTAGE CHECK
24	SET FAIL LIMITS	74	<i>Reserved</i>
25	WRITE, BACKSPACE, READ (N blocks)	75	<i>Reserved</i>
26	WRITE N BLOCKS	76	<i>Reserved</i>
27	SPACE REVERSE N BLOCKS	77	<i>Reserved</i>
28	READ FORWARD N BLOCKS	78	<i>Reserved</i>
29	READ REVERSE N BLOCKS	79	<i>Reserved</i>
30	REWIND	80	<i>Reserved</i>
31	WRITE & CHECK FILE MARK	81	<i>Reserved</i>
32	SPACE FORWARD N BLOCKS	82	<i>Reserved</i>
33	WRITE IDENT	83	<i>Reserved</i>
34	COMMAND TRACE	84	<i>Reserved</i>
35	LOG SENSE DATA	85	
36		86	
37		87	
38		88	
39		89	
40		90	
41	SET 800 bpi	91	
42	SET 1600 bpi	92	
43	SET 3200 bpi	93	EXAMINE LOOP COUNT
44	SET 6250 bpi	94	CLEAR LOOP COUNT
45	SENSORS CHECK	95	<i>Reserved</i>
46	FILE PROTECT CHECK	96	
47	TENSION ARM POSITION	97	MODIFY PROGRAM STACK
48	TENSION ARM DAMPING	98	CLEAR PROGRAM STACK
49	SERVO SETTINGS CHECK	99	RUN PROGRAM STACK



<b>Program 00</b>	<b>Null Program</b>
Description	This program is useful for entering on the stack with a view to later alterations (eg placed first for later substitution by Failure Skip, program 17) or to delete previous unwanted entries using program 97.
Error Codes	<i>None</i>
<b>Program 01</b>	<b>Machine Integrity Test</b>
Note	The operator should be aware that the last program in this stack clears the stack. Therefore program 01 should be added to the end of a stack with caution.
Description	A dedicated sequence of programs (to check the functionality of the 9914V) which are placed in the stack. Programs 73, 4 & 30 are run before some proven pre-conditions are set, then certain programs are run:  (GCR) 44, 05, 03, 19, 44, 12, 05, 26, 29, 28, 11, 05, 26, 29, 28; (DPE) 43, 11, 05, 26, 29, 28; (PE) 42, 12, 05, 26, 29, 28, 11, 05, 26, 29, 28; (NRZ) 41, 12, 26, 29, 28, 11, 26, 29, 28.
Exit	When program 01 passes, the pre-set parameters remain and the stack is cleared.
Error Codes	See individual programs.  If the program is intended to tolerate a few errors, use program 24 to set the fail limits; otherwise a single error (say) when reading counts as a program failure. Raising the fail limits can allow for dropouts during reading.
Notes	If the SCSI (or PCI) board is not fitted, program 01 runs but omits the data-related parts.  If the SCSI (or PCI) board is not fitted, program 01 should not be run continuously.  The SCSI system bus must be properly terminated, either by resistor packs within the 9914V or by maintaining power on the terminating unit.
<b>Program 02</b>	<b>Run Stack from Host</b>
Note	Cannot be run from the front panel. If called up by the operator, ' No test ' is displayed.
Description	Used by the host to run the 9914V program stack, previously entered across the Pertec interface.  The DIAG legend illuminates for the duration of the program stack.

**Program 03 ILWD Line Checks**

**Note** Program 03 is not provided with all firmware revisions, in which case ' No test ' is displayed when ' run/stop ' is pressed.

**Description** Verifies the operation of the ILWD signal (which is part of the unbuffered Pertec interface) by writing a block in E-E mode and applying a timeout during which ILWD must respond.

**Error Codes** 01 SCSI (or PCI) board not detected, *or*  
incompatible with Data Control firmware  
03 DDP fault  
12 Command error  
14 Timeout waiting for command (from SCSI (or PCI))  
23 ILWD occurred early  
24 ILWD not received

**Program 04 Auto Servo Checkout**

**Description** Exercises the tape servo system; a tape needs to be loaded, but not necessarily at BOT.

**Error Codes** The test has failed if tape tension is lost.

**Program 05 Data Channels Check (Non-corruptive)**

**Notes** The SCSI (or PCI) board must be installed for program 05 to run. Program 05 does not apply to NRZ density.

**Description** Incorporate self-contained tests, designed to check the data channel and isolate a faulty FRU by writing data patterns via E-E paths through the analogue and digital electronics sections. Data is not written to tape.

When there are no errors, tests equivalent to program 09 automatically are run.

**Note** The status which is flagged by two dead tracks is determined by configuration byte 07.

**Error Codes** 01 SCSI (or PCI) board not detected, *or*  
incompatible with Data Control firmware  
03 DDP fault  
04 ADP fault  
12 Interface command not Write.  
13 Timeout expired while waiting for block  
14 Timeout expired while waiting for command (from SCSI (or PCI) board)  
15 ADP fault - no ICER status on 1-track kill  
16 DDP fault - no ICER status on 1-track kill  
17 ADP fault - IHER status on 1-track kill  
18 DDP fault - IHER status on 1-track kill  
19 ADP fault - no IHER status on 3-track kill  
20 DDP fault - no IHER status on 3-track kill  
21 NRZ selected  
22 IFBY reset unexpectedly

89 No write ring.  
90 No write current.

**Program 06 Data Channels Check (Corruptive)**

**Notes** The SCSI (or PCI) board must be installed for program 06 to run.  
Programs 06 does not apply to NRZ density.

**Description** Incorporates self-contained tests, designed to check the data channel and isolate a faulty FRU by writing data patterns via E-E paths through the analogue and digital electronics sections.  
Data is written to tape.

When there are no errors, tests equivalent to program 09 are automatically run.

**Note** The status which is flagged by two dead tracks is determined by configuration byte 07.

**Error Codes**

- 01 SCSI (or PCI) board not detected, or incompatible with Data Control firmware
- 02 Head/pre-amplifier fault, or ADP fault
- 03 DDP fault
- 04 ADP fault
- 12 Interface command not Write.
- 13 Timeout expired while waiting for block
- 14 Timeout expired while waiting for command (from SCSI (or PCI) board)
- 15 ADP fault - no ICER status on 1-track kill
- 16 DDP fault - no ICER status on 1-track kill
- 17 ADP fault - IHER status on 1-track kill
- 18 DDP fault - IHER status on 1-track kill
- 19 ADP fault - no IHER status on 3-track kill
- 20 DDP fault - no IHER status on 3-track kill
- 21 NRZ selected
- 22 IFBY reset unexpectedly

89 No write ring.  
90 No write current.

**Program 07 ADP E-E Check (not applicable to NRZ)**  
**Program 08 DDP E-E Check**

**Note** The SCSI (or PCI) interface should be removed, so that the internal 9914V Pertec interface is free.

**Description** When run from the front panel (or over the Pertec interface), these programs place the relevant board in E-E (electronics-to-electronics) mode and set the 9914V to 'on-line' status (which is not indicated at the front panel), in anticipation of one or more interface Write commands. The program ends with relevant board taken out of E-E mode, and the 9914V set off-line to the interface.

When run on-line, the programs expect one interface Write command. Programs 07 & 08 are designed for use with the SCSI (or PCI) board removed, because the internal 9914V Pertec bus is used.

- Error Codes
- 01 NRZ density selected (*program 07 only*).
  - 02 Interface command not Write.
  - 03 Timeout expired while waiting for block.
  - 04 Timeout expired while waiting for Write command.

**Program 09 Data Channel Error Reporting**

Note The SCSI (or PCI) board must be installed for program 09 to run.

Description The ADP board is placed in E-E (electronics-to-electronics) mode and each track is killed in turn while a block is written; ICER error is expected, but not IHER.

If the error status is incorrect, the test is repeated with the DDP in E-E mode.

Three tracks are then killed while a block is written, IHER status is expected. On error, the DDP is placed in E-E mode to isolate the faulty board.

Note The status which is flagged by two dead tracks is determined by configuration byte 07.

- Error Codes
- 01 SCSI (or PCI) board not detected, *or* incompatible with Data Control firmware
  - 12 Interface command not Write.
  - 13 Timeout expired while waiting for block
  - 14 Timeout expired while waiting for command (from SCSI (or PCI) board)
  - 15 ADP fault - no ICER status on 1-track kill
  - 16 DDP fault - no ICER status on 1-track kill
  - 17 ADP fault - IHER status on 1-track kill
  - 18 DDP fault - IHER status on 1-track kill
  - 19 ADP fault - no IHER status on 3-track kill
  - 20 DDP fault - no IHER status on 3-track kill
  - 21 NRZ selected
  - 22 IFBY reset unexpectedly

**Program 10 Set Parameters of Program 01**

Description Allows the number of blocks, block length, and data pattern used by program 01 to be selected for its exclusive use. The defaults are tabulated next.

Program	Condition(s)
13	N = 50
14	Block length = 4K
15	Set non-streaming
23	Pseudo random data
24	W Rty = 4, W Err = 4, R Rty = 0, R Err = 0.

Program 10 may be used if the required pre-conditions differ from those.

The value of N is first presented, to be changed (by the method of program 13) or skipped by pressing DENSITY; the block length is presented second, to be changed (by the method of program 14) or skipped by pressing DENSITY; the data pattern is presented third, to be changed by pressing ' units ' until the required pattern is displayed before pressing DENSITY or ' run/stop ' to set that pattern.

Error Codes *None*

Notes Once program 10 has been run and the data pattern set, program 01 uses that pattern until power is removed, even if programs 20 - 23 are run.

No purpose is served by running program 10 across the interface, since all its features are available via specific diagnostic programs.

**Program 11 Set High Speed**

Note High tape speed is not available at 3200 bpi density.

Description Program 11 sets the higher tape speed, prior to starting other programs. When run ' Hi speed ' is displayed for 1 second.

Error Codes *None*

**Program 12 Set Low Speed**

Description This enables the operator to set the lower tape speed, prior to starting other programs. When run ' Lo speed ' is displayed for 1 second.

Error Codes *None*

**Program 13 Set N**

Note The program should not be entered onto the stack because operator intervention is required.

Description Allows the operator or host to set N to a new value which is used by subsequent programs, unless overridden by program 01. N may be in the range from 1 to 255<sub>10</sub>.

Operator Allows the operator to update N, which is indicated on the display, by the use of DIAG, ' tens ', or ' units ' buttons. The ' run/stop ' button is pressed when the desired value is displayed. N is set from the time of update, not just when the stack is subsequently run.

Host When an SCSI command is sent (as described in the SCSI User Manual), the host effectively updates N. The new value of N is active while the SCSI command is running, but N reverts to its previous value afterwards.

Error Codes *None*

<b>Program 14</b>	<b>Set Block Length</b>
Description	<p>Sets the length of subsequent data blocks for programs which write data to tape. Blocks may normally be from 1 byte up to 32 Kbytes long, in increments of powers of two. Some programs restrict the block length.</p> <p>When run from the front panel, the display indicates (say) LEN = 16K, to increase the block size, use the ' tens ' button, to decrease the size, use the ' units ' button.</p> <p>When run from the interface, the length is transferred as described in the 9914V Servicing Manual.</p>
Error Codes	<i>None</i>
<b>Program 15</b>	<b>Select Non-Streaming</b>
Description	Sets the 9914V write and read programs so that the tape is repositioned after each block is traversed.
Error Codes	<i>None</i>
<b>Program 16</b>	<b>Select Streaming</b>
Description	Sets the 9914V write and read programs so that the tape is kept in motion after each block is traversed (ie streaming mode).
Error Codes	<i>None</i>
<b>Program 17</b>	<b>Failure Skip</b>
Note	Is only effective when entered in a program stack.
Description	<p>Causes subsequent failing programs to be aborted, thus allowing a stack to skip to the next program without stopping on errors.</p> <p>Status bytes F4 (and C4) are incremented each time an error occurs, up to a maximum of FF<sub>16</sub> (255<sub>10</sub>).</p>
Error Codes	<i>None</i>
<b>Program 18</b>	<b>Increment Loop Counter</b>
Description	<p>When entered in a program stack, program 18 increments a counter, typically to record the number of times the stack loops (assuming program 99 is at the end of the stack). The user may subsequently use programs 93/94 to examine/clear the loop counter.</p> <p>The counter increments up to 9,999<sub>10</sub>, then sticks without overflowing.</p>
Error Codes	<i>None</i>
<b>Program 19</b>	<b>IRD* &amp; IWD* Line Checks</b>
Note	Program 19 is not provided with all firmware revisions, in which case ' No test ' is displayed when ' run/stop ' is pressed.

Description Verifies the operation of the read and write data lines (which are part of the unbuffered Pertec interface) by executing a write-rewind-read sequence and comparing the data.

Error Codes 01 SCSI (or PCI) board not detected, *or*  
incompatible with Data Control firmware  
02 IFBY line in error  
03 IRD\* or IWD\* line(s) in error  
04 Timeout waiting for IDBY false  
89 No write ring

**Program 20 Set All Zeros Data**  
**Program 21 Set All Ones Data**  
**Program 22 Set Alternate 1/0 Data**  
**Program 23 Set Pseudo Random Data**

Note The SCSI (or PCI) board must be installed for programs 20 - 23 to run.

Description Used to set the data pattern, preferably immediately prior to running program 25 or 26.

Error Codes 01 SCSI (or PCI) board not detected, *or*  
incompatible with Data Control firmware.

**Program 24 Set Fail Limits**

Description Sets the number of errors which are encountered before programs 25, 26, 28, or 29 are deemed to have failed, when run from the front panel. When writing, any error causes a 'backspace & erase' so that each re-try takes place over a fresh piece of tape until the re-try count is reached or writing is successful.

When run, the limits may be changed by means of the 'tens' and 'units' buttons:

W Rty = number of write re-tries per block, before 'fail' is logged

W Err = number of block failures before 'fail' is logged

R Rty = number of read re-tries per block, before 'fail' is logged

R Err = number of block failures before 'fail' is logged.

The various re-try results are treated as follows.

If no error occurs on the first read/write attempt, the program proceeds to the next block.

If an error occurs, and W Rty or R Rty have not reached the limit, a re-try is executed on the current block, after W Rty/R Rty has been incremented.

If no error occurs during a re-try, W Rty/R Rty is cleared to zero, and W Err/R Err is incremented.

If an error occurs and W Rty, W Err, R Rty, or R Err has reached the limit, the test fails.

Error Codes *None*

**Program 25 Write, Backspace, Read**

Description Writes (streaming) N blocks of data with:

- speed as selected by program 11 or 12;
- N as set by program 13;
- block length (maximum 16K) as set by program 14;
- data pattern as set by programs 20 - 23;
- failure limits as set by program 24 (front panel only);
- density as selected by programs 41 - 44.

The program then reverse-spaces, and reads the blocks.

Error Codes 01 SCSI (or PCI) board not detected, *or*  
incompatible with Data Control firmware  
02 IHER - status bytes will reveal the cause  
03 ICER - status bytes will reveal the cause

Note After an error, press ' enter ' to display the density and speed

89 No write ring  
90 No write current

**Program 26 Write N Blocks**

Description Writes N blocks of data with:

- speed as selected by program 11 or 12;
- N as set by program 13;
- block length (maximum 16K) as set by program 14;
- streaming/non-streaming as set by program 15 or 16;
- data pattern as set by programs 20 - 23;
- failure limits as set by program 24 (front panel only);
- density as selected by programs 41 - 44.

Error Codes 01 SCSI (or PCI) board not detected, *or*  
incompatible with Data Control firmware  
02 IHER - status bytes will reveal the cause  
03 ICER - status bytes will reveal the cause

Note After an error, press ' enter ' to display the density and speed

89 No write ring  
90 No write current

**Program 27 Space Reverse N Blocks**

Description Spaces reverse over N blocks with:

- low speed automatically selected;
- N as selected by program 13;
- data content being ignored.

Error Codes 01 SCSI (or PCI) board not detected, *or*  
incompatible with Data Control firmware



**Program 28**    **Read FWD N Blocks**  
Description    Reads forward N formatted blocks while looking for status errors, with;  
- speed as selected by program 11 or 12;  
- N as set by program 13;  
- failure limits as set by program 24 (front panel only);  
- density as selected by programs 41 - 44.

Error Codes    01 SCSI (or PCI) board not detected, *or*  
                  incompatible with Data Control firmware  
                  02 IHER - status bytes will reveal the cause  
                  03 ICER - status bytes will reveal the cause

Note            After an error, press ' enter ' to display the density and speed

**Program 29**    **Read Reverse N Blocks**  
Description    Reads N data blocks in reverse while looking for status errors with:  
- low speed automatically selected;  
- N as set by program 13;  
- failure limits as set by program 24 (front panel only);  
- density as selected by programs 41 - 44.

Error Codes    01 SCSI (or PCI) board not detected, *or*  
                  incompatible with Data Control firmware  
                  02 IHER - status bytes will reveal the cause  
                  03 ICER - status bytes will reveal the cause

Note            After an error, press ' enter ' to display the density and speed

**Program 30**    **Rewind Tape**  
Description    Tape is rewound to BOT, may be used for positioning the tape prior to  
                  running other programs.

Error Codes    *None*

**Program 31**    **Write & Check Filemark**  
Description    Writes a file mark to tape in the current density format, checking that File  
                  Mark status is seen at the read heads as the tape passes.

Error Codes    01 Timeout expired while waiting for ' block true '  
                  02 Timeout expired while waiting for ' block false '  
                  03 No File Mark status.  
  
                  89 No write ring  
                  90 No write current

**Program 32    Space Forward N Blocks**

Description    Spaces forward over N blocks with:  
- the speed selected by program 11 or 12;  
- N as selected by program 13;  
- data content being ignored.

Error Codes    01 SCSI (or PCI) board not detected, *or*  
                  incompatible with Data Control firmware.

**Program 33    Write Ident (& rewind)**

Description    Writes an identity burst (appropriate to the selected diagnostic density) to  
                  tape, then rewinds to BOT.

Error Codes    01 Error writing ident at low speed  
                  02 Error writing ARA level burst at low speed  
                  03 Error writing ARA ID burst at low speed  
                  10 Density error, status byte F10 defines detail  
                  11-20 As 01-03, at high speed.  
  
                  89 No write ring  
                  90 No write current.

**Program 34    Command Trace**

Note            Program 34 is not provided with all firmware revisions, in which case ' No  
                  test ' is displayed when ' run/stop ' is pressed.

Description    Allows the last 16 SCSI commands to the 9914V to be examined using the  
                  front panel display.

The displayed format is 

G-cHJsKL
----------

 interpreted as follows:

Display	Meaning	Notes
G	G = table number	0 = most recent 1 = next previous; press ' tens ' to advance the table number
cHJ	c = command HJ = command code	FFh = no command
sKL	s = status KL = completion status	FFh = no completion status

		7	6	5	4	3	2	1	0
bit									
dec	hex								
byte 0	00	SCSI Command							
byte 1	01	Completion Status							
byte 2	02	0	0	0	0	0	0	Initiator ID	
byte 3	03	0	0	0	0	0	0	Target ID	
byte 4	04	SCSI Sense Byte 0							
byte 5	05	SCSI Sense Byte 1							
byte 6	06	SCSI Sense Byte 2							
byte 7	07	SCSI Sense Byte 3							
byte 8	08	SCSI Sense Byte 4							
byte 9	09	SCSI Sense Byte 5							
byte 10	0A	SCSI Sense Byte 6							
byte 11	0B	SCSI Sense Byte 12							
byte 12	0C	SCSI Sense Byte 13							
byte 13	0D	9914V Status Validity (00 = valid)							
byte 14	0E	9914V Status Byte F5							
byte 15	0F	9914V Status Byte F6							
byte 16	10	9914V Status Byte F7							
byte 17	11	9914V Status Byte F8							
byte 18	12	9914V Status Byte F9							
byte 19	13	9914V Status Byte F10							
byte 20	14	9914V Status Byte F11							
byte 21	15	9914V Status Byte F12							
byte 22	16	9914V Status Byte F14							

TABLE 4.3.1 LOG SENSE FORMAT

**Program 35 Log Sense Data**

**Note** Program 35 is not provided with all firmware revisions, in which case ' No test ' is displayed when ' run/stop ' is pressed.

**Description** Allows the SCSI SENSE / LUN status trace buffer held by the 9914V to be examined using the front panel display.

The displayed format is 

M-NP QR
---------

 interpreted as follows:

Display	Meaning	Notes
M	M = table number	0 = most recent 1 = next previous; press ' tens ' to advance the table number
NP	NP = table entry	press ' units ' to advance the table entry
QR	QR = contents of entry NP	

- Program 41** SET 800 bpi
- Program 42** SET 1600 bpi
- Program 43** SET 3200 bpi
- Program 44** SET 6250 bpi

**Description** Changes the data encoding circuits to handle the stated density. When non-diagnostic mode is restored, the density remains at this new setting.

**Note** When running diagnostic programs, it is recommended that the density is specifically set by these programs, rather than relying on a previous setting.

**Error Codes** 01 Selected density not available  
02 DDP board fault.

**Program 45 Sensors Check**

**Note** Tape should not be loaded.  
If it is at BOT, the program will unload, otherwise rewind the tape first.

**Description** Indicates the state of the sensors used during tape loading and operation. The display registers a letter which should be interpreted as follows:

Letter	C	R	B	E	W	L
Sensor	in-chute	reel located	BOT	EOT enable	write limit	tension
Meaning of letter	chute clear	flag detected	marker present	marker present	flag detected	not in limit

The WT EN legend is lit when the flag is detected.

Additionally the operator may check the operation of the loading fan: press ' enter ', the loading fan is activated.

Error Codes *None*

**Program 46 File Protect Test**

Note Tape should not be loaded.  
If it is at BOT, the program will unload, otherwise rewind the tape first.

Description The operator is requested to remove the write enable ring, insert the tape reel, and then press the ' tens ' button. The program then checks that no ring has been detected.

The operator is next requested to fit the write ring and then press ' tens '. The program then checks that the ring has been detected.

Error Codes 01 Ring detected, but no ring fitted.  
02 Ring not detected, but ring fitted.

**Program 47 Tension Arm Position**

Note Tape should not be tensioned for this test.

Description The display first indicates ' LIMIT XXX ', where XXX is a three-digit number related to the output from the tension arm position sensor.

As the arm is moved away from its rest end, the LIMIT part of the message should disappear (denoting that the arm is no longer at its travel limit) and the XXX number should increase until the far end limit is encountered, when LIMIT should re-appear.

This sequence verifies that the tension arm output and limit flags are visible to the servo microprocessor. Checking the orientation and absolute output of the tension arm is covered in the 9914V Servicing Manual.

Error Codes *None*

<b>Program 48</b>	<b>Tension Arm Damping</b>
Note	Tape should be unloaded for this test.
Description	<p>Displays the fly time of the tension arm, between the limit flags, under the influence of the tension arm spring and the tension arm damper.</p> <p>The operator moves the arm (against its spring) to its far end stop and allows the arm to fly unobstructed to its rest end stop. The time displayed is in milli-seconds.</p> <p>The fly-time range of the tension arm is set out in the 9914V Servicing Manual.</p>
Error Codes	<i>None</i>
<b>Program 49</b>	<b>Servo Settings Check</b>
Warning	Only a trained service engineer should run this program, after removing any tape from the machine, as described in the 9914V Servicing Manual.
<b>Program 50</b>	<b>Step Forward (low speed)</b>
Description	<p>The tape is stepped forward at low speed to EOT.</p> <p>The size of the steps may be altered by holding the ' tens ' or ' units ' button.</p>
Error Codes	<i>None</i>
<b>Program 51</b>	<b>Step Reverse (low speed)</b>
Description	<p>The tape is stepped in reverse at low speed to BOT.</p> <p>The size of the steps may be altered by holding the ' tens ' or ' units ' button.</p>
Error Codes	<i>None</i>
<b>Program 52</b>	<b>Alternate Forward / Reverse (low speed)</b>
Description	<p>The tape is run alternately forward / reverse, at the low speed.</p> <p>The size of the steps may be altered by holding the ' tens ' or ' units ' button.</p>
Error Codes	<i>None</i>
<b>Program 53</b>	<b>Step Forward (high speed)</b>
Description	<p>The tape is stepped forward at high speed to EOT.</p> <p>The size of the steps may be altered by holding the ' tens ' or ' units ' button.</p>
Error Codes	<i>None</i>

<b>Program 54</b>	<b>Step Reverse (high speed)</b>
Description	The tape is stepped reverse at high speed to BOT. The size of the steps may be altered by holding the ' tens ' or ' units ' button.
Error Codes	<i>None</i>
<b>Program 55</b>	<b>Alternate Forward / Reverse (high speed)</b>
Description	The tape is alternated at high speed. The size of the steps may be altered by holding the ' tens ' or ' units ' button.
Error Codes	<i>None</i>
<b>Program 60</b>	<b>Erase to EOT &amp; Rewind</b>
Description	The tape is erased to EOT at the speed selected by program 11 or 12. The tape is rewound when EOT is reached.
Error Codes	89 No write ring 90 No write current.
<b>Program 62</b>	<b>Write All Ones to EOT &amp; Rewind</b>
Description	"All 1s" data is written to EOT, with: - speed as selected by program 11 or 12; - density as selected by programs 41 - 44; The tape is rewound when EOT is detected.
Error Codes	89 No write ring 90 No write current.
<b>Program 63</b>	<b>Read Forward to EOT (low speed)</b>
Description	The tape is run forward to EOT, with the read circuits enabled.
Error Codes	<i>None</i>
<b>Program 64</b>	<b>Read Forward to EOT (high speed)</b>
Description	The tape is run forward to EOT, with the read circuits enabled.
Error Codes	<i>None</i>
<b>Program 65</b>	<b>Read Reverse to BOT (low speed)</b>
Description	The tape is run reverse at low speed to BOT, with the read circuits enabled.
Error Codes	<i>None</i>

<b>Program 66</b>	<b>Read Reverse to BOT (high speed)</b>
Description	The tape is run reverse at high speed to BOT, with the read circuits enabled.
Error Codes	<i>None</i>
<b>Program 67</b>	<b>Examine / Modify Options</b>
Description	Displays the configuration bytes, the presentation and full meanings of options 01 to 05 are described in Section 2.  Configuration Bytes 01 to 05 are:  config byte 01 - duration of density display; config byte 02 - <i>not applicable the 9914V model</i> ; config byte 03 - auto on-line after loading; config byte 04 - auto-load, actuated by door closure; config byte 05 - unit address.  Configuration bytes 06 to 19 are displayed in hexadecimal notation, they are tabulated in Appendix A, and described in the 9914V Servicing Manual.
Warning	Changing configuration bytes 06 to 19 may affect the response of the 9914V to the host, and / or the format of recorded data.  Configuration Bytes 06 to 19 are:  config byte 06 - host interface options A; config byte 07 - host interface options B; config byte 08 - host interface options C; config byte 09 - host interface options D; config byte 10 - conditions which set 'incomplete'; config byte 11 - conditions which set 'reject'; config byte 12 - write gap size; config byte 13 - miscellaneous A; config byte 14 - SCSI (or Pertec Cache) config bytes A; config byte 15 - SCSI (or Pertec Cache) config bytes B; config byte 16 - density configurations; config byte 17 - SCSI (or Pertec Cache) config bytes C; config byte 18 - miscellaneous B; config byte 19 - SCSI options D.
Error Codes	<i>None</i>



**Program 68    Examine Full Status Bytes**

**Description**    Program 68 displays all the full status bytes by a method similar to program 67, the display indicates as follows at the various steps:

*SNS F01*    Indicated upon first entering diagnostic program 68, during this ' byte selection ' phase, the status byte number can be changed by using the ' tens ' and ' units ' buttons.

*SNS F05*    When the desired byte is displayed, press DIAG.

*11000100*    Typical indication after the desired byte has been selected, and DIAG has been pressed. This is the current setting of status byte F05 (left digit is most significant).

                  Press DIAG again to return to the ' byte selection ' phase.

*SNS F05*    If no further bytes are to be examined, press ' run/stop ' to exit diagnostic program 68, otherwise repeat the procedure for the next byte.

**Error Codes**    *None*

**Program 69    Initialise Status Bytes**

**Description**    Clears most of the status bytes to zero, or (where otherwise applicable) presets them to the correct value.

                  All error logs are thereby cleared, ensuring that future status byte contents reflect only future operations.

**Error Codes**    *None*

**Program 70    Examine PROM Revisions**

**Description**    Displays the installed servo, data, and SCSI PROM revisions, in the form of a scrolled message. With earlier 9914V's, the SCSI firmware revision must be obtained via the interface Inquiry command.

**Error Codes**    *None (incompatibilities are indicated at power-up).*

**Program 71    Examine / Modify Language**

**Note**    The language may have been previously set via the interface, which may subsequently over-ride any setting made with program 71.

**Description**    The current language appears on the display. The language of the display messages may be changed by pressing:

                  ' tens '                    next available language;  
                  ' units '                    previous language.

                  When the chosen language has been selected, press ' run/stop ' to exit program 71 with that language.

**Error Codes**    *None*

<b>Program 72</b>	<b>Operator Display Check</b>
Description	Causes all the legends and display segments on the control panel to illuminate in turn; the alpha-numeric display cycles through its character set.
Error Codes	<i>None</i>
<b>Program 73</b>	<b>Internal Voltage Check</b>
Description	Measures the internal regulated voltage lines to ensure that they are operational. This avoids having to probe inside the machine.
Error Codes	01 +12 V 02 -12 V 03 <i>reserved</i> 04 -5 V 05 +24 V
<b>Prog. 74-84</b>	<i>Reserved</i>
Description	Allow the service engineer to set internal parameters of the 9914V, as described in the 9914V Servicing Manual.
<b>Program 93</b>	<b>Examine Loop Count</b>
Description	Displays the loop count (accumulated by program 18) in decimal.
Error Codes	<i>None</i>
<b>Program 94</b>	<b>Clear Loop Counter</b>
Description	Clears the loop counter (which was described in program 18).
Error Codes	<i>None</i>
<b>Program 95</b>	<i>Reserved for servicing functions.</i>
<b>Program 97</b>	<b>Modify Operator Stack</b>
Note	Program 97 should not be entered onto the stack.
Description	Allows the operator to step through the existing stack by pressing the ' enter ' button.  To substitute a program, select the new number (using the ' tens ' / ' units ' buttons) and then press ' enter ' .  A program in the stack may be effectively deleted by changing it to program 00.
Error Codes	<i>None</i>

**Program 98    Clear Operator Stack**

**Description**    Program 98 clears the current program stack.

**Error Codes**    *None*

**Program 99    Run Operator Stack**

**Description**    When program 99 is called, the current program stack is run sequentially, starting at the first program entered.

If program 99 is entered onto the program stack it causes the stack to loop back to the first entry and repeat.

**Error Codes**    See details of individual programs entered onto the stack.

## 4.4 Status Bytes

The 9914V compiles 17 status bytes, which may be accessed or cleared by the operator or the host; this group of 17 is referred to as the Full Status Byte Block. A Condensed Status Byte Block of 9 bytes is also available to the host, these contain less detail than the full block but are broadly compatible with the sense bytes of the 8900 / 9800 / 9900 family of *M4 Data* 9-track tape units.

The full and condensed status byte blocks are tabulated in Tables 4.4, full descriptions of their functions are set out in the 9914V Product Specification.

Diagnostic program 68 may be used to examine the full status bytes.

### 4.4.1 Status Byte Encoding

Byte F17 base models are encoded as follows:

bit 7	bit 6	bit 5	bit 4	Base model
0	0	0	0	9800
0	0	0	1	9903
0	0	1	0	8900
0	0	1	1	8924
0	1	0	0	<i>reserved</i>
0	1	0	1	9914 (includes 9914V)

*This page has no technical content,  
the status bytes begin on page 28.*

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
F1 WRITE ERROR LOG	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
F2 READ ERROR LOG	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup> /	2 <sup>0</sup>
F3 DIAG PROG No	-	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
F4 DIAG ERR CODE	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
F5 TRACK IN ERR (PE)	TIE 7	TIE 6	TIE 5	TIE 4	TIE 3	TIE 2	TIE 1	TIE 0
F6 H ERR (PE/GCR)	0 (always)	IDENT FOUND	CER	VPE	SKEW	MTE	FALSE POSTAMBLE	FALSE PREAMBLE
F6 HARD ERR (NRZ)	1 (always)	-	-	-	-	LRCE	CRCE	VPE
F7 SUPP TO F6	REJECT	INCOMPLETE	EOT LIMIT	EARLY EOT	DENSITY ERROR	EOT	FILE MARK LAST BLOCK	INTERFACE WRT PARITY
F8	RWFAIL	RRD BOT	FSR BOT	BLANK TAPE	IFEN	DATA GLITCH NO BLOCK	GAP IN R-A-W DATA	NOT WRITING
F9	-	-	-	EOTLIM CMD	INV CMD	REV @ BOT	WRT FPTD	DENS /BOT

TABLE 4.4(a) FULL STATUS BYTES 01 TO 09

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
F10 EXP OF DENSITY	NO IDENT	NO ARA	NO ARA ID	-	IDENT WRT	ARA WRT	ARA ID WRT	CONFIG
F11 GCR STATUS 1	ACRC	CRC	UNCER	2-TRACK ERROR	1-TRACK ERROR	CRC GROUP ERROR	RCHAR ERROR	PCHAR ERROR
F12 GCR STATUS 2	-	-	-	-	FORMAT ERROR 1	FORMAT ERROR 2	NOT SYNCH	-
F13 <i>reserved</i>	-	-	-	-	-	-	-	-
F14	DENSITY SOURCE (see below)		-	-	-	-	DENSITY MISMATCH	-
F15 IDENT BYTE 1	DENSITY SELECTED (see below)		-	-	6250 bpi	800 bpi	3200 bpi	1600 bpi
F16 IDENT BYTE 2	BASE MODEL TYPE (see Section 4.4.1)				-	-	SCSI (or PCI) FITTED	<i>reserved</i>
F17 <i>reserved</i>	-	-	-	-	-	-	-	-

Byte F14 encoding:

bit 7	bit 6	
0	0	Analyse found known density
0	1	Default density, blank tape
1	0	Default density, alien format
1	1	No assigned meaning

Byte F15 encoding:

bit 7	bit 6	
0	0	1600 bpi PE
0	1	3200 bpi PE
1	0	800 bpi NRZ
1	1	6250 bpi GCR

TABLE 4.4(b) FULL STATUS BYTES 10 TO 17

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
C1 WRITE ERR LOG	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
C2 READ ERR LOG	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
C3 DIAG PROG No	-	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
C4 DIAG ERR CODE	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
C5 TRACK IN ERR	TIE 7	TIE 6	TIE 5	TIE 4	TIE 3	TIE 2	TIE 1	TIE 0
C6 H ERR (PE/GCR)	0 (always)	IDENT FOUND	CER	VPE	SKEW	MTE	FALSE POSTAMBLE	FALSE PREAMBLE
C6 HARD ERR (NRZ)	1 (always)	-	-	-	-	LRCE	CRCE	VPE
C7 SUPP TO C6	RWFAIL	INCOMPLETE	REJECT TAPE	BLANK ERROR	DENSITY	EOT	FILE MARK LAST BLOCK	NOT WRITING
F8 EXTRA STATUS	DENSITY SOURCE (see byte F14)		-	DATA GLITCH NO BLOCK	GAP IN R-A-W DATA	-	DENSITY MISMATCH	INTERFACE WRT PARITY
F9 DENSITIES	DENSITY SELECTED (see byte F15)		EOT LIMIT	EARLY EOT	6250 bpi	800 bpi (densities available)	3200 bpi	1600 bpi

TABLE 4.4(c) CONDENSED STATUS BYTES C1 TO C9



# 5.

## Routine Cleaning

The 9914V requires no preventive maintenance, but routine cleaning is essential if low error rates are to be achieved.

### 5.1 Cleaning Intervals

At an installation where the 9914V has not previously been used, the cleaning schedule in Table 5.1 should be initiated. The tape path should be inspected at regular intervals, and the error rates monitored, until a less frequent schedule can be implemented.

The locations of the assemblies are shown in Figure 5.1.

Assembly	Cleaning Frequency	Suitable Cleaner
Heads, tape cleaner, bollards, rollers.	Daily if in continuous tape motion	' TexPads ' (IPA-moistened pads), <i>or</i> non-CFC equivalent
<b>Warning:</b> <b>the edges of the sapphire tape cleaner are extremely sharp.</b> <b>Observe great care when cleaning.</b>		
Tacho roller	As above	As above
Painted surfaces	As required	' Amberclens ' anti-static foaming cleaner, <i>or</i> non-CFC equivalent
Window in loading door	As required	' Ambersil ' glass cleaner <i>or</i> non-CFC equivalent

TABLE 5.1 CLEANING SCHEDULES AND MATERIALS

**Note: avoid inhaling an excess of fumes from any cleaning fluid.**

## 5.2 Cleaning Procedures

This section describes access to the tape path components, and sets out notes regarding the cleaning methods.

### 5.2.1. Access to the Tape Path

Pull the handle on the loading door in order to hinge it open.

### 5.2.2. Tape Path Cleaning

The tape path components are shown in Figure 5.1

- a) Using the recommended cleaning pad, carefully wipe the surfaces of the head to remove all traces of dirt and oxide; in extreme cases it may be necessary to use a scrubbing action to remove hard oxide deposits.

**Warning: the edges of the sapphire tape cleaner are extremely sharp. Observe great care when cleaning.**

- b) Using the recommended cleaning pad, wipe the tape cleaner, particularly the front edge where debris may have accumulated.
- c) Inspect the remaining tape path components and, if necessary, wipe clean the tape contact surfaces of the roller guides, tension arm roller, and the surface of the tachometer roller.

#### Cautions:

- i) Do not use alcohol-based fluid (eg IPA) or any other solvents on plastic or painted parts.
- ii) Do not allow cleaning fluid to enter pre-greased roller bearings.
- iii) Clean any dirt or oxide which may have gathered around the take-up and supply hub areas.
- iv) Close the loading door.

### 5.2.3. Other Cleaning

- a) Use anti-static cleaner and cloth on the loading door window.
- b) Wipe the fascia and painted surfaces, avoid using an excess of cleaning fluid.

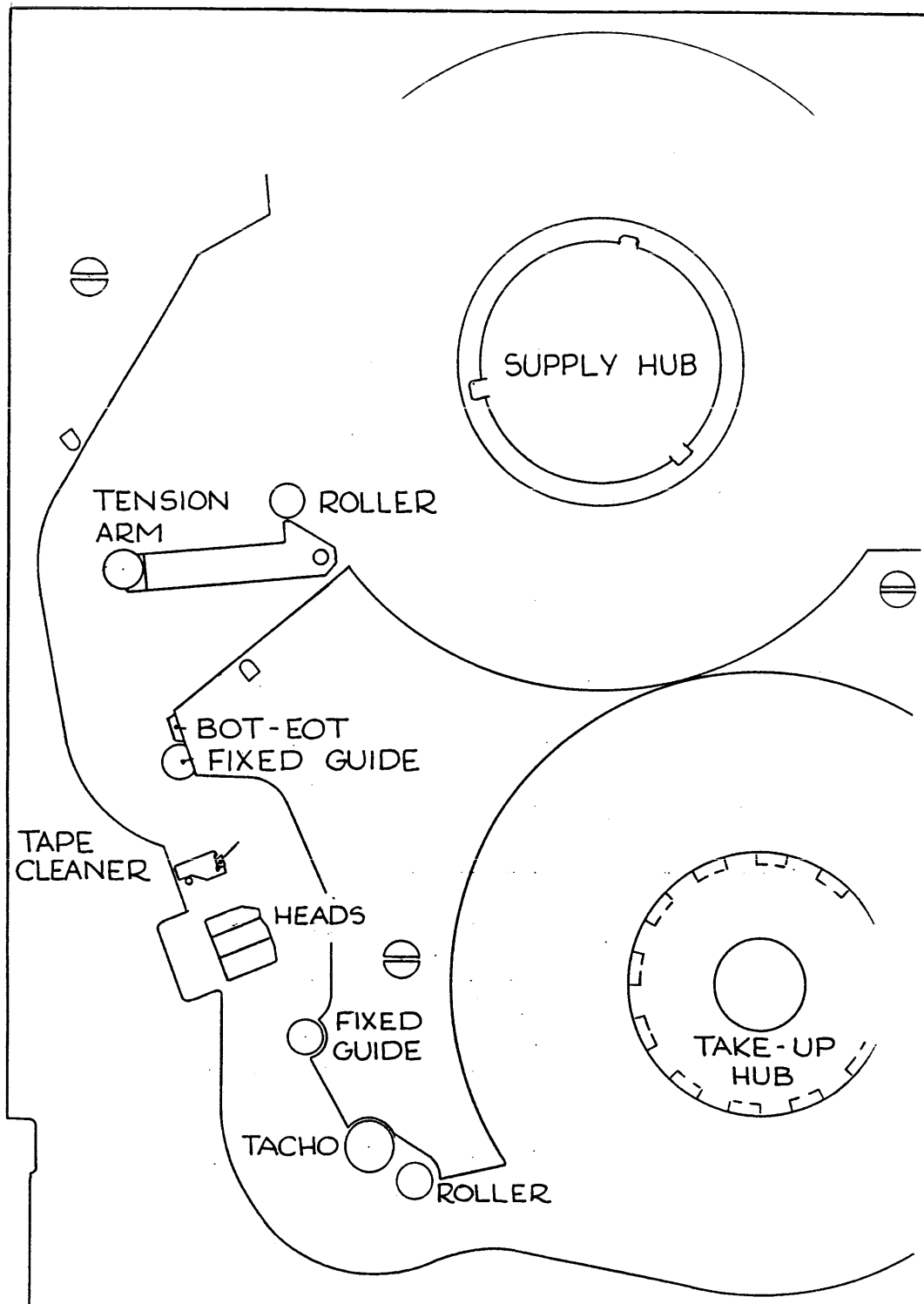


FIGURE 5.1 TAPE PATH COMPONENTS

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# 6.

## Pertec Interface

Both the unbuffered and buffered Pertec Cache Interface signals are brought out via connectors mounted on an extension at the rear of the 9914V.

Both interfaces use the familiar Pertec layout - two dual 25-way printed edge connectors P1 and P2, both numbered 1 to 50. Pin assignments are listed in Tables 6.1 and 6.2. Command codings are listed in Table 6.3.

Plug	Pin	Mnemonic	Signal name
1	4 (3)	ILWD	Last word
1	6 (5)	IWD4	Write Data 4
1	8 (7)	IGO	Initiate Command
1	10 (9)	IWD0	Write Data 0
1	12 (11)	IWD1	Write Data 1
1	14 (13)	-	<i>Reserved</i>
1	18 (17)	IREV	Reverse/Forward
1	20 (19)	IREW	Rewind
1	22 (21)	IWDP	Write Data Parity
1	24 (23)	IWD7	Write Data 7
1	26 (25)	IWD3	Write Data 3
1	28 (27)	IWD6	Write Data 6
1	30 (29)	IWD2	Write Data 2
1	32 (31)	IWD5	Write Data 5
1	34 (33)	IWRT	Write/Read
1	36 (35)	-	<i>Reserved</i>
1	38 (37)	IEDIT	Edit
1	40 (39)	IERASE	Erase
1	42 (41)	IWFM	Write File Mark
1	46 (45)	ITAD0	Transport Address 0
2	18 (17)	IFEN	Formatter Enable
2	24 (23)	IOFL	Off-line
2	46 (45)	ITAD1	Transport Address 1
2	48 (47)	IFAD	Formatter Address
2	50 (49)	IHISP	High Speed Select

**Notes:**

1. The ground pin associated with each signal pin is in brackets.
2. For compatibility with similar ' Pertec ' interfaces, PL1 pin 36 and PL2 pin 50 can be transposed by implementation of a configuration option. See Appendix A.

TABLE 6.1 INPUT PIN ASSIGNMENTS

There is a Pertec Cache Interface Product Description, which gives details of its signal functions and various operating modes.

Note: the SCSI bus I/O is connected via a single 50-way connector, at the rear of the 9914V. Its pin assignments differ greatly from Pertec and are listed the SCSI user manuals.

Plug	Pin	Mnemonic	Signal name
1	2 (1)	IFBY	Formatter Busy
1	44 (43)		Reserved
1	48 (47)	IRD2	Read Data 2
1	50 (49)	IRD3	Read Data 3
2	1 (-)	IRDp	Read Data Parity
2	2 (-)	IRD0	Read Data 0
2	3 (-)	IRD1	Read Data 1
2	4 (-)	ILDp	Load Point
2	6 (5)	IRD4	Read Data 4
2	8 (7)	IRD7	Read Data 7
2	10 (9)	IRD6	Read Data 6
2	12 (11)	IHER	Hard Error
2	14 (13)	IFMK	File Mark
2	16 (15)	IIDENT	PE Identification
2	20 (19)	IRD5	Read Data 5
2	22 (21)	IEOT	End of Tape
2	26 (25)	INRZ	NRZ Selected
2	28 (27)	IRDY	Ready
2	30 (29)	IRWD	Rewinding
2	32 (31)	IFPT	File Protect
2	34 (33)	IRSTR	Read Strobe
2	36 (35)	IWSTR	Write Strobe
2	38 (37)	IDBY	Data Busy
2	40 (39)	ISPEED	Hi Speed Selected
2	42 (41)	ICER	Corrected Error
2	44 (43)	IONL	On Line

Notes:

1. The ground pin associated with each signal pin is in brackets.
2. For compatibility with similar 'Pertec' interfaces, PL1 pin 36 and PL2 pin 50 can be transposed by implementation of a configuration option.
3. ISPEED is asserted at 62 ips, because this is a higher speed than 42 ips.

TABLE 6.2 OUTPUT PIN ASSIGNMENTS

Command	Encoded command lines				
	IREV	IWRITE	IWFM	IEDIT	IERASE
Read Forward	0	0	0	0	0
Space Forward	0	0	0	0	1
File Search Forward	0	0	1	0	0
File Search Forward (Ignore Data)	0	0	1	0	1
Write	0	1	0	0	0
Erase (Variable Length)	0	1	0	0	1
Reserved	0	1	0	1	0
Write File Mark	0	1	1	0	0
Erase (Fixed Length)	0	1	1	0	1
Reserved	0	1	1	1	0
Security Erase (To EOT)	0	1	1	1	1
Read Reverse (Normal)	1	0	0	0	0
Space Reverse	1	0	0	0	1
Reserved	1	0	0	1	0
File Search Reverse	1	0	1	0	0
File Search Reverse (Ignore Data)	1	0	1	0	1
Access Condensed Sense Bytes	1	1	0	1	1
Access Full Sense Bytes	1	1	0	1	0
Dedicated Diagnostic Test	1	1	1	1	0
Set Density to 800 bpi NRZ	1	1	0	0	1
Set Density to 1600 bpi PE	0	0	1	1	1
Set Density to 3200 bpi PE <sup>note 1</sup>	1	0	1	1	1
Set Density to 6250 bpi GCR	1	1	0	0	0
Diagnostic Stack Entry	1	1	1	1	1

Notes:

1. If bit 4 of config byte 16 is set, this code changes from 'select 3200' to 'select 6250'. 3200 bpi is then not available.
2. When the Pertec Cache Interface is used, there are additional cache-specific commands which are set out in the Pertec Cache Interface Product Description.

TABLE 6.3 PERTEC COMMAND CODING

*This page has no technical content*



# A.

## Basic Configuration Options

This appendix tabulates the basic 9914V configuration options, which are present in every 9914V whether unbuffered Pertec, 'standard' SCSI, Pertec cache, or Super SCSI.

Other appendices tabulate the options which are specific to the special interfaces mentioned above.

Option	Meaning
01	DNSDIS-1 = Density displayed until ' run/stop ' or ' tens ' pressed DNSDIS-0 = Density displayed for 5 seconds only
02	— = <i>This option has no function with the 9914V model</i>
03	Aut ONL = 9914V automatically goes on-line after threading has completed Man ONL = 9914V is on-line only after ' LD/ONL ' is pressed
04	AutoLoad = 9914V automatically threads tape to BOT on closing the door Man Load = 9914V threads tape when ' LD/ONL ' button is pressed
05	Unit <i>XX</i> = Where <i>XX</i> is the current unit address (valid in the range 0 to 7)

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
06 HOST I/F A	EOT LATCHED	OFFLINE, NO REWIND	REJECT WR IF IN EOT LIMIT	IWDP CHECKED, IHER IF ERROR	PE/NRZ IWDP WRITTEN	ANALYSE INHIBITED	INRZ SET IF GCR ACTIVE	WRITE AT NEW DENSITY
07 HOST I/F B	GCR ←	PE FM GAP IS NORMAL IBG	DPE	NRZ →	NRZ LRC & CRC, WITH STROBES	GCR ICER IF 2-TRK ERR	IRSTRs AFTER PE ERROR	AGC ON WRITE
08 HOST I/F C	PE/GCR WR CER FL AS HER	IFBY CLEARS EARLY	LDG EDGE IGO SETS IFBY	IFEN HIGH RESETS CMD	SET IHER IF LONG BLOCK	MSB ←	Bit 1 UNIT ADDRESS	LSB →
09 HOST I/F D	3200 IDENT NOT READ	3200 IDENT NOT WRITTEN	IHER & ICER PULSED	BOT IDENT ERR IGNORED	INV CMD CYCLES IDBY & IFBY	3200 bpi READ ONLY	DEN MISMATCH SETS IHER	NO IDENT ASSUMES 3200

TABLE A.1(a) BASIC CONFIGURATION OPTIONS

10 'INCOMPLETE'	NO R-A-W DATA	BOT DURING READ REV	BOT DURING FILE SCH REV	BLANK TAPE DURING READ	IFEN ASSERTED DURING CMD	DATA GLITCH NO BLOCK	GAP IN R-A-W DATA	NO ERASE CURRENT
11 'REJECT'	-	-	-	FWD CMD AT EOT LIMIT	INVALID COMMAND	REV CMD AT BOT	WRITE TO FP TAPE	SET DEN AWAY FROM BOT
12 IBG SIZE	← GCR — Detailed in the 9914V Servicing Manual				PE/NRZ — →			
13 MISC A	REWIND AT SLOWER SPEED	BUFF I/F FITTED	customer option	BUFF OPTIONS FROM NVR	SPEED SELECT VIA OP PANEL	HIGH SPEED AT POWER-ON	customer option	customer option
14, 15 & 17 SCSI/PCI	See other appendices							
16 DENSITY	← POWER-UP DEFAULT — see tables below			HOST INTERFACE SELECTION — →			HOST I/F CHANGE ENABLED FRONT PANEL	
18 MISC B	-	-	HIGH DISABLE ON-LINE SPEEDS	LOW	6250 bpi	3200 bpi	1600 bpi	800 bpi
19 SCSI	Customer options, not provided with earlier PROM revisions							

Power-up default:

b7	b6	b5	
0	0	x	800 bpi NRZ
0	1	x	1600 bpi PE
1	0	x	3200 bpi DPE
1	1	x	6250 bpi GCR

Host interface selection:

b4	b3	b2	
x	0	x	Standard encoded commands
x	1	x	Option A encoded commands
x	x	0	IHISP PL2-50, IHIDEN PL1-36
x	x	1	IHISP/IHIDEN exchanged
1	x	x	Pertec code 10111 = select 6250, not 3200

Note: functions are as stated when the bit is set to '1'.

TABLE A.1(b) BASIC CONFIGURATION OPTIONS

*This page has no technical content*

# B.

## SCSI Options

This appendix tabulates the 'standard' SCSI options. Detailed descriptions of the options (and of the command set) are set out in the SCSI User Manual.

Note that this feature differs from the Super SCSI, which uses a different board and has a faster specification.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
13 MISC A	*	SCSI FITTED	*	SCSI OPTIONS FROM NVR	*	*	*	*
14 SCSI A	PARITY CHECKED	DISCONNECT ENABLED	ATTENTION REPORTING	RECOV'D ERR REPORTING	HIGH SPEED BURST MODE	REM DEN, SP OR BUFFER'D	CODE COMPATIBILITY	CODE COMPATIBILITY
15 SCSI B	FM STATUS WR/RD/SP	CC ON RD/SP INTO EOT	WR FAIL STOP BOT SIDE	CODE COMPATIBILITY	LOOK-AHEAD READ	MSB ←	SCSI ID	LSB →
16	*	*	*	*	*	*	*	*
17 SCSI C	-	-	-	-	LOOK-AHEAD READ TERMINATION ← consecutive file marks, see below →			
18	*	*	*	*	*	*	*	*

Code Compatibility (3-bit):

B15 b4	B14 b1	B14 b0	
1	0	1	<i>M4 Data std</i>
1	1	0	<i>STK std</i>
x	x	x	<i>reserved</i>

Look-Ahead Read termination:

b3	b2	b1	b0	
0	0	0	0	255 file marks
0	0	0	1	1 file mark
0	0	1	0	2 file marks
.	.	.	.	and so on
1	1	1	1	15 file marks

TABLE B.1(a) SCSI OPTIONS, PROM 123996 revision 01

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
13 MISC A	*	SCSI FITTED	*	SCSI OPTIONS FROM NVR	*	*	*	*
14 SCSI A	PARITY CHECKED	DISCONNECT ENABLED	ATTENTION REPORTING	RECOV'D ERR REPORTING	HIGH SPEED BURST MODE	CODE COMPATIBILITY	CODE COMPATIBILITY	CODE COMPATIBILITY
15 SCSI B	FM STATUS WR/RD/SP	CC ON RD/SP INTO EOT	WR FAIL STOP BOT SIDE	CODE COMPATIBILITY	WR EOM IN EW AREA	MSB ←	SCSI ID	LSB →
16	*	*	*	*	*	*	*	*
17 SCSI C	-	-	-	-	LOOK-AHEAD READ TERMINATION ← consecutive file marks, see Table B.1(a) →			
18	*	*	*	*	*	*	*	*

Note 1: functions are as stated when the bit is set to '1'.

Note 2: '\*' means those bits are not specific to SCSI operation.

Note 3: 4-bit code compatibilities are listed in Table B.1(e).

TABLE B.1(b) SCSI OPTIONS, PROM 123996 revisions 02 & 03  
& PROM 124180 revision 01

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
13 MISC A	*	SCSI FITTED	*	SCSI OPTIONS FROM NVR	*	*	*	*
14 SCSI A	PARITY CHECKED	DISCONNECT ENABLED	ATTENTION REPORTING	RECOV'D ERR REPORTING	HIGH SPEED BURST MODE	CODE COMPATIBILITY	CODE COMPATIBILITY	CODE COMPATIBILITY
15 SCSI B	FM STATUS WR/RD/SP	CC ON RD/SP INTO EOT	WR FAIL STOP BOT SIDE	CODE COMPATIBILITY	WR EOM IN EW AREA	MSB ←	SCSI ID	LSB →
16	*	*	*	*	*	*	*	*
17 SCSI C	-	-	-	-	LOOK-AHEAD READ TERMINATION ← consecutive file marks, see Table B.1(a) →			
18	*	*	*	*	*	*	*	*
19 CUSTOMER OPT	-	-	-	-	-	FIXED MODE POWER-UP DEFAULT conditional, see Table B.1(e)		

Note 1: functions are as stated when the bit is set to '1'.

Note 2: '\*' means those bits are not specific to SCSI operation.

Note 3: 4-bit code compatibilities are listed in Table B.1(e).

TABLE B.1(c) SCSI OPTIONS, PROM 123996 revision 04



	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
13 MISC A	*	SCSI FITTED	*	SCSI OPTIONS FROM NVR	*	*	*	*
14 SCSI A	PARITY CHECKED	DISCONNECT ENABLED	ATTENTION REPORTING	RECOV'D ERR REPORTING	HIGH SPEED BURST MODE	CODE COMPATIBILITY	CODE COMPATIBILITY	CODE COMPATIBILITY
15 SCSI B	FM STATUS WR/RD/SP	CC ON RD/SP INTO EOT	WR FAIL STOP BOT SIDE	CODE COMPATIBILITY	WR EOM IN EW AREA	MSB ←	SCSI ID	LSB →
16	*	*	*	*	*	*	*	*
17 SCSI C	-	-	-	-	LOOK-AHEAD READ TERMINATION ← consecutive file marks, see Table B.1(a) →			
18	*	*	*	*	*	*	*	*
19 CUSTOMER OPT	-	-	-	-	-	FIXED MODE POWER-UP DEFAULT conditional, see Table B.1(e)		

Note 1: functions are as stated when the bit is set to '1'.

Note 2: '\*' means those bits are not specific to SCSI operation.

Note 3: 4-bit code compatibilities are listed in Table B.1(e).

TABLE B.1(d) SCSI OPTIONS, PROM 123996 revisions 05 & 06

Code Bit Settings				Application	Operational Notes																																				
B15 b4	B14 b2	B14 b1	B14 b0																																						
1	1	1	1	( 1) IBM 9348	Interfaces with RS/6000 systems																																				
1	1	1	0	( 2) STK std	If synchronous working is available, SDTR is initiated If a command is sent to a non-existent LUN, Check Condition will be sent with sense key 05 (Illegal Request) Unit Attention is set after power-up and after 9914 comes ready for the first time																																				
1	1	0	1	( 3) <i>M4 Data</i> std	As per <i>M4 Data's</i> SCSI User Manual																																				
1	0	1	0	( 6) <i>M4 Data</i> old std	As (3), except Inquiry data contains the on-board PROM part number																																				
0	1	1	1	( 9) HP 9000	Interfaces with the HP 9000-series																																				
0	1	1	0	(10) HP Mode A	As (2), except: - accepts all motion commands and holds Disconnects if LUN is rewinding ((2) sets CC/Not Ready) - Test Unit Ready returns Good Status immediately if LUN is online and rewinding - The HP Read Log command is enabled - Front panel selection of variable/fixed mode is enabled (via Config Byte 19) as follows:																																				
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1	0	0	Fixed Mode, 1K bytes																																						
1	0	1	Fixed Mode, 4K bytes																																						
1	1	0	Fixed Mode, 16K bytes																																						
1	1	1	Fixed Mode, 32K bytes																																						
0	0	1	1	(13) Kennedy	As (3), except Inquiry data contains Kennedy-style product information																																				
0	0	0	1	(15) HP Mode C	Interfaces with Sun workstations																																				
x	x	x	x	<i>reserved</i>	Use only if specifically informed																																				

Important: the IBM, HP, and Kennedy drives are not exactly emulated

TABLE B.1(e) SCSI 4-BIT CODE COMPATIBILITIES

# C.

## PCI Options

This appendix tabulates the Pertec Cache Interface (PCI) options. Detailed descriptions of the options (and of the operating modes) are set out in the PCI User Manual.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
13 MISC A	*	PERTEC CACHE FITTED	*	CACHE OPTIONS FROM NVR	*	*	*	*
14 CACHE A	LOWER HOST DATA RATES	LDG EDGE IGO SETS IFBY	PARITY NOT CHECKED	IEOT WHEN MARKER SEEN	RETRY COUNT		CACHE MODE CONTROL	
15 CACHE B		CODE COMPATIBILITY		ELECTRONIC RAMP DELAY		HOST DATA RATE		
16	*	*	*	*	*	*	*	*
17 CACHE C	-	-	-	-	← LOOK-AHEAD READ TERMINATION consecutive file marks, see next page →			
18	*	*	*	*	*	*	*	*

Note 1: functions are as stated when the bit is set to '1'.

Note 2: '\*' means those bits are not specific to cache operation.

TABLE C.1(a) PERTEC CACHE OPTIONS, PROM 123707 revision 04

Retry count:			Cache mode control:			Code compatibility:			
b3	b2		b1	b0		b6	b5		
0	0	0 write/ 4 read	0	0	Normal cache (2)	0	0	<i>M4 Data</i> std emulation	
0	1	16 write/ 4 read	0	1	Non-cache (1)	0	1	STK 2920 emulation	
1	0	32 write/ 8 read	1	0	<i>Reserved</i> (3)	1	0	QT 14	
1	1	48 write/12 read	1	1	Non-cache, long block (4)	1	1	9905 emulation	

Electronic ramp delay:			Host Data Rate (kB/s):				Look-Ahead Read termination:				
b4	b3		b2	b1	b0	Lo/Hi	b3	b2	b1	b0	
0	0	0 ms	0	0	0	10/ 278	0	0	0	0	255 file marks
0	1	2 ms	0	0	1	30/ 312	0	0	0	1	1 file mark
1	0	4 ms	0	1	0	50/ 357	0	0	1	0	2 file marks
1	1	8 ms read	0	1	1	72/ 416	.	.	.	.	and so on
		120 ms write	1	0	0	100/ 500	1	1	1	1	15 file marks
			1	0	1	120/ 625					
			1	1	0	156/ 833					
			1	1	1	193/1250					

TABLE C.1(b) PERTEC CACHE OPTIONS, ENCODING

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# D.

## Super SCSI Options

This appendix tabulates the Super SCSI options. Detailed descriptions of the options (and of the command set) are set out in the Super SCSI User Manual.

Note that this feature differs from the older 'standard' SCSI, which uses a different board and has a previous specification.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
13 MISC A	*	SUPER SCSI FITTED	*	S-SCSI OPT FROM NVR	*	*	*	*
14 SCSI A	SINGLE-ENDED ENABLED	DISCONNECT ENABLED	ATTENTION REPORTING	RECOV'D ERR REPORTING	FAST SCSI	CODE COMPATIBILITY	CODE COMPATIBILITY	CODE COMPATIBILITY
15 SCSI B	FM STATUS WR/RD/SP	CC ON RD/SP INTO EOT	WR FAIL STOP BOT SIDE	CODE COMPATIBILITY	WR EOM IN EW AREA <sup>#3</sup>	MSB ←	SCSI ID	LSB →
16	*	*	*	*	*	*	*	*
17 SCSI C	-	-	-	-	LOOK-AHEAD READ TERMINATION ← consecutive file marks, see Table B.1 (a) →			
18	*	*	*	*	*	*	*	*
19 CUSTOMER OPT	-	-	-	-	-	FIXED MODE POWER-UP DEFAULT conditional, see Table D.1(b)		

Note 1: functions are as stated when the bit is set to '1'.

Note 2: '\*' means those bits are not specific to Super SCSI operation.

Note 3: 4-bit code compatibilities are listed in Table D.1(b).

Note 4: if RS/6000 compatibility is set, B15 b3 = 0 enables synchronous data transfers.

TABLE D.1(a) SUPER SCSI OPTIONS, PROM 124610 revision 01



Code Bit Settings				Application	Operational Notes																																				
B15 b4	B14 b2	B14 b1	B14 b0																																						
1	1	1	1	( 1) IBM 9348	Interfaces with RS/6000 systems																																				
1	1	1	0	( 2) STK std	If synchronous working is available, SDTR is initiated If a command is sent to a non-existent LUN, Check Condition will be sent with sense key 05 (Illegal Request) Unit Attention is set after power-up and after 9914 comes ready for the first time																																				
1	1	0	1	( 3) M4 Data std	As per M4 Data's SCSI User Manual																																				
1	0	1	0	( 6) M4 Data old std	As (3), except Inquiry data contains the on-board PROM part number																																				
0	1	1	1	( 9) HP 9000	Interfaces with the HP 9000-series																																				
0	1	1	0	(10) HP Mode A	As (2), except: - accepts all motion commands and holds Disconnects if LUN is rewinding ((2) sets CC/Not Ready) - Test Unit Ready returns Good Status immediately if LUN is online and rewinding - The HP Read Log command is enabled - Front panel selection of variable/fixed mode is enabled (via Config Byte 19) as follows:																																				
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x	x	x	x	<i>reserved</i>	Use only if specifically informed																																				

Important: the IBM, HP, and Kennedy drives are not exactly emulated

TABLE D.1(b) SUPER SCSI 4-BIT CODE COMPATIBILITIES

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