4.3.8.1 VMS File Names and Syntax 581
4.3.9 Handling Special DEC or VMS Fonts 581
4.3.9.1 Preparing DEC Fonts 581
4.3.9.2 Preparing Other Special Fonts 582
4.3.10 DECnet Operation with Open Windows 582
4.3.11 Some typical problems on VMS 583
4.4 IBM RS6000 Systems 585
4.4.1 Overview 585
4.4.2 TFTP File Transfer Protocol 585
4.4.3 IBM RS6000 Fonts 586
4.4.4 RSH Permissions on the RS6000 586
4.4.5 Starting Xdm on the RS6000 586
Section 5.0 - HDS ViewStation Developer's Kit 587
5.1 HDS ViewStation Developer's Kit Overview 587
5.1.1 **HDS ViewStation Architecture 587**
5.1.2 Developer's Kit Contents 587
5.1.2.1 GNU Tools 588
5.1.2.2 HDS Libraries 588
Section 6.0 - HDS ViewStation Services 589
6.1 HDS ViewStation Warranty 589
6.2 HDS ViewStation Service 590
6.2.1 HDS ViewStation Upgrades 590
6.2.1.1 Memory Upgrades 590
6.2.2 HDSware Software Upgrades 591
6.2.2.1 HDSware Premium Software Service 591
INDEX 593

4.1.3 FTP File Transfer Protocol 561
  4.1.3.1 Anonymous FTP File Transfer 561
4.1.4 NFS File Transfer Protocol 562
4.1.5 Other Network Services 563
  4.1.5.1 BOOTP (Boot Protocol Daemon) 563
  4.1.5.2 RARP (Reverse Address Resolution Protocol) 563
4.1.6 Open Windows Applications 563
  4.1.6.1 Open Windows Environments 563
4.1.7 OLWM Window Manager 564

4.2 Hewlett Packard Systems 567

4.2.1 Preparing the HP700 567
  4.2.1.1 Load the HDSware Tape on the HP host 567
  4.2.1.2 Verify the startup method 567
  4.2.1.3 Verify the file access method 568
  4.2.1.4 TFTP - Trivial File Transfer Protocol 568
  4.2.1.5 TFTP in "Secure Mode" on HP Systems 569
  4.2.1.6 ViewStation File Path Specifications 570
  4.2.1.7 FTP - File Transfer Protocol 570
  4.2.1.8 Anonymous FTP File Transfer 570
  4.2.1.9 NFS - Network File System 571
4.2.2 Configure the User Account 571
  4.2.2.1 User's .vue Directory 571
4.2.3 vue.settings file 572
4.2.4 Optional Customization for the ViewStation 572
  4.2.4.1 vue.session file 573
4.2.5 Other important files in the .vue directory 573
  4.2.5.1 palette.vue 573
  4.2.5.2 vue.resources 574
  4.2.5.3 Creating a Common .vue Environment 574
4.2.6 Settings on the HDS ViewStation 574

4.3 DEC VMS Systems 575

4.3.1 Overview 575
4.3.2 DEC UCX Protocol 575
4.3.3 ViewStation Setup Mode Entries for VMS 576
4.3.4 NFS on VMS Systems 577
4.3.5 HDSware Installation for VMS Systems 577
4.3.6 Booting the ViewStation from a VMS Host 578
4.3.7 Automatic ViewStation Configuration 579
4.3.8 HDSware Tape Contents 579

3.3.6 Using the .xsession File 535
  3.3.6.1 Vendor Display Class String 537
  3.3.6.2 ViewStation .xsession File 537
3.4 X Resource Operations 539
3.4.1 X Resource Format 539
  3.4.1.1 X Resource Syntax 540
  3.4.1.2 Resource Classes and Resource Instances 540
  3.4.1.3 Class and Instance Hierarchy 540
  3.4.1.4 Resource Bindings 541
  3.4.1.5 Resource Precedence 541
  3.4.1.6 X Client - editres 541
  3.4.1.7 X Client - mre 541
3.4.2 X Resource Database 542
  3.4.2.1 The X Resource File 542
  3.4.2.2 Application Resource Files 544
  3.4.2.3 Run Command Files for Resources 544
  3.4.2.4 Server-related Resource Files 545
  3.4.2.5 Host-related Resource Files 545
  3.4.2.6 Resource Specification from the Command Line 545
  3.4.2.7 ViewStation Local Client Resources 545
3.4.3 Loading Resource Files with Xrdb 545
3.5 Network Printing Operations 547
3.5.1 The LPD Print Spooler for BSD Systems 547
  3.5.1.1 LPD Daemon 547
  3.5.1.2 Sample Input Filter File 548
  3.5.1.3 Spooler Shell Script 549
  3.5.1.4 Printcap File 551
  3.5.1.5 ViewStation Print Spooler Example 552
3.5.2 The LP Print Service for UNIX System V Printing 553
  3.5.2.1 Using LP Print Service with the ViewStation 553
  3.5.2.2 Sample Printer Model File 553
  3.5.2.3 Adding a ViewStation Printer to the LP Print Service 554
  3.5.2.4 HDS-Model File 555
Section 4.0 - Using the ViewStation on Selected Host Systems 559
4.1 Sun Workstation Configuration 559
4.1.1 Sun Network Services 559
4.1.2 TFTP File Transfer Protocol 560
  4.1.2.1 TFTP in Secure Mode 560
  4.1.2.2 Paths with Secure TFTP 561

3.1.3 TFTP 517
  3.1.3.1 Using TFTP 517
  3.1.3.2 Starting TFTP on your Host 517
  3.1.3.3 TFTP in Secure Mode 517
  3.1.3.4 TFTP in Secure Mode on Sun Systems 518
  3.1.3.5 TFTP on Hewlett Packard Systems 519
  3.1.3.6 TFTP File Transfer Protocol on IBM RS6000 Systems 521
3.1.4 FTP 521
  3.1.4.1 Anonymous FTP File Transfer 521

3.2 BOOTP Operations 523

3.2.1 Starting with BOOTP 523
  3.2.1.1 Ethernet Hardware Address 523
  3.2.1.2 Bootptab Command Fields 524
  3.2.1.3 Problems with BOOTP Starting 525
3.2.2 Setting Up BOOTP on your Host 525
  3.2.2.1 Installing BOOTP on your Host 526
  3.2.2.2 BOOTP Debugging 527
3.2.3 Sample bootptab File 527
  3.2.3.1 Password Security with BOOTP 528

3.3 XDMCP Operations 529

3.3.1 Starting Xdm on your Host 529
3.3.2 Xdm Configuration Files 530
  3.3.2.1 Xdm Authorize 530
  3.3.2.2 Xresources File 530
  3.3.2.3 Xservers File 530
  3.3.2.4 Xsetup File 531
  3.3.2.5 Xstartup File 531
  3.3.2.6 Xreset File 531
  3.3.2.7 xdm-errors File 531
  3.3.2.8 xdm-pid 531
  3.3.2.9 Xsession file 531
3.3.3 Xdm Versions 531
3.3.4 Using Xdm with your ViewStation 532
  3.3.4.1 Xdm Direct Access 532
  3.3.4.2 Xdm Indirect Access 532
  3.3.4.3 Xdm Broadcast Access 532
  3.3.4.4 Xdm Chooser 532
  3.3.4.5 ViewStation's Chooser Client 532
3.3.5 Using XDM on the ViewStation 533
  3.3.5.1 XDMCP Options Selection in Setup Mode 533

2.7.5.1 How does Video affect my network? 417
2.7.5.2 How large are digital video files in different formats? 418
2.7.5.3 What do I need for my in-house video training? 418
2.7.5.4 What are some other applications for netVideo ViewStations? 418
2.7.6 HDS Multimedia Client Manual Pages 419
2.7.6.1 HDS Audio Local Client Manual Page 419
2.7.6.2 HDS Play Audio Client Manual Page 423
2.7.6.3 HDS Au Audio Client Manual Page 425
2.7.6.4 NetAudio Audio Client Manual Page 427
2.7.6.5 HDS Conference Manual Page 430
2.7.6.6 HDS Movie Manual Page 436
2.7.6.7 HDS NetTV Simulcast Manual Page 439
2.7.6.8 HDS NetTV Viewer Manual Page 445
2.7.6.9 HDS Tuner Manual Page 448
2.7.6.10 HDS Video Manual Page 451
2.7.6.11 HDS Record Client Man Page 456

2.8 FVWM Virtual Window Manager 459

2.8.1 FVWM Manual Page 459
2.8.2 FvwmAudio Manual Page 490
2.8.3 FvwmAuto Manual Page 492
2.8.4 FvwmBacker Manual Page 493
2.8.5 FvwmBanner Manual Page 494
2.8.6 FvwmClean Manual Page 495
2.8.7 FvwmDebug Manual Page 496
2.8.8 Fvwm Goodstuff Manual Page 497
2.8.9 FvwmIconBox Manual Page 500
2.8.10 FvwmIdent Manual Page 505
2.8.11 FvwmPager Manual Page 506
2.8.12 FvwmScroll Manual Page 509
2.8.13 FvwmWinlist Manual Page 510

Section 3.0 - Network and Host System Operations 513

3.1 Network File Transfer Operations 513

3.1.1 ViewStation File Transfer Protocols 513
3.1.1.1 Selecting a File Transfer Protocol 513
3.1.2 NFS 514
3.1.2.1 For Sun OS 4.1.x and BSD type UNIX: 514
3.1.2.2 For Solaris 2.x and Sys V R4.x type UNIX: 514
3.1.2.3 Setting Up the ViewStation for NFS 515
3.1.2.4 Using NFS for ViewStation File Access 515

2.6.14 FDFORMAT Disk Format Utility 366
2.6.15 PEX 3D Server Extension 367
    2.6.15.1 Installation of the HDS PEX-3D Extension 367
    2.6.15.2 HDS PEX-3D Limitations 367
    2.6.15.3 HDS PEX-3D Functional Description 368
    2.6.15.4 HDS PEX-3D Implementation Dependent Constants 371
    2.6.15.5 HDS PEX-3D Lookup Tables 372
    2.6.15.6 HDS PEX-3D Lookup Table default predefined values 372
2.6.16 Xscope Manual Page 377
2.6.17 PING Manual Page 379
2.6.18 HDSshare Manual Page 381
    2.6.18.1 Using the HDSshare Client 381
2.6.19 Xpmroot Manual Page 382

2.7 HDS ViewStation Multimedia Operations 385

2.7.1 HDS ViewStation Audio Operation 385
    2.7.1.1 Audio Operation Hardware 385
    2.7.1.2 Audio Device Setting Menu in Setup Mode 385
    2.7.1.3 ViewStation Audio Client Overview 387
    2.7.1.4 HDSperx Audio Control client - hdsaudio 387
    2.7.1.5 Starting the HDS Audio Client 389
    2.7.1.6 HDSperx NetAudio compatible server - auhds 389
    2.7.1.7 HDSperx Audio File Playback program - hdsplay 390
    2.7.1.8 HDSperx Audio File Recording program - hdsrecord 390
    2.7.1.9 Using ViewStation Audio with Application Programs 390
    2.7.1.10 ViewStation Audio Specifications 391
2.7.2 HDS ViewStation Video Operations 392
    2.7.2.1 HDS Video Hardware Configuration 392
    2.7.2.2 ViewStation with HDS netVideo Hardware 392
    2.7.2.3 HDS netVideo (analog and digital video) Specifications 393
    2.7.2.4 HDS netVideo Playback (digital video) Specifications 393
2.7.3 HDSware netVideo Software 394
    2.7.3.1 Installing HDSware netVideo Software 394
2.7.4 HDS netVideo Clients 395
    2.7.4.1 Using the HDS Video Client 396
    2.7.4.2 Using the HDS Movie Client 401
    2.7.4.3 Using the HDS Conference Client 403
    2.7.4.4 Using the HDS Tuner Client 408
    2.7.4.5 HDS netTV Simulcast Client 410
    2.7.4.6 HDS netTV Viewer Client 413
2.7.5 Frequently Asked Questions: 417

2.5.5.1 Pointer Shapes 291
2.5.5.2 Mouse Buttons 291
2.5.5.3 Mouse Buttons and Modifier Keys 291
2.5.5.4 Selecting a Window with OLVWM 292
2.5.5.5 Window Decoration 292
2.5.5.6 Moving a Window 293
2.5.5.7 Resizing a Window 293
2.5.5.8 Iconifying and Deiconifying a Window 293
2.5.6 OLVWM Menu 293
2.5.7 Using HDSperx with OLVWM 294
2.5.8 Exiting OLVWM 295
2.5.9 Starting Local Processes from the Local OLVWM 295
2.5.10 Starting Remote Processes with Local OLVWM 295
2.5.11 Customizing OLVWM 295
2.5.12 OPEN LOOK Window Manager Menu 296
2.5.12.1 Starting Clients with OLWM 297
2.5.13 Using HDSperx Clients with OLWM 298
2.5.13.1 OLWM .openwin-menu Sample File 298
2.5.13.2 HDSperx Menu Contents 300
2.5.13.3 HDSperx Menu Handling 300
2.5.14 Window Manager Remote Starting Checklist 300
2.5.15 OLWM Version 1.0 Syntax Differences 304
2.5.16 HDS OLVWM Extensions 305
2.5.17 HDSrunwm Launcher Program 306

2.6 HDSperx Clients 309

2.6.1 HDSperx Manual Pages 309
2.6.2 HDScalc Manual Pages 311
2.6.3 HDS Chooser Client 319
2.6.4 HDSdclock Manual Page 321
2.6.5 HDSoclock Manual Page 326
2.6.6 HDSxclock Manual Page 328
2.6.7 HDSscreensaver Manual Page 331
2.6.8 HDStetris Manual Page 336
2.6.9 HDSview Manual Page 337
2.6.10 Waitforserver Manual Page 355
2.6.11 Xhost Manual Page 356
2.6.12 Xmodmap Manual Page 358
2.6.13 Xset Manual Page 363

2.3.3 Open Connect tn3270 Terminal Emulation 260
2.3.4 Tandem 6530 Terminal Emulation 260

2.4 Motif Window Manager 261

2.4.1 Starting Motif Window Manager 261
2.4.2 Starting Local MWM Remotely 262
2.4.3 MWM Operations 263
  2.4.3.1 Pointer Shapes 263
  2.4.3.2 Mouse Buttons 263
  2.4.3.3 Mouse Buttons and Modifier Keys 263
  2.4.3.4 Selecting a Window with MWM 264
  2.4.3.5 Window Decoration 264
  2.4.3.6 Moving a Window 265
  2.4.3.7 Resizing a Window 265
  2.4.3.8 Iconifying and Deiconifying a Window 265
  2.4.3.9 Maximizing a Window 265
  2.4.3.10 MWM Window Menu 265
2.4.4 Using the MWM Root Menu 266
2.4.5 Exiting MWM 267
2.4.6 Customizing the Motif Window Manager 267
  2.4.6.1 MWM Resource Files 268
2.4.7 Starting Local Processes from the Local MWM 268
2.4.8 Starting Remote Processes from the Local MWM 269
  2.4.8.1 MWM Menu with HDSperx 269
2.4.9 Editing the Root Menu Description 270
  2.4.9.1 Sample Customized Mwm Root Menu 271
  2.4.9.2 Starting Clients with Mwm 274
2.4.10 Motif Resource Editor 275
2.4.11 Local MWM Default Files 276
  2.4.11.1 MWM App-defaults File 276
  2.4.11.2 MWM .mwmrc File 277
2.4.12 Window Manager Remote Starting Checklist 280
2.4.13 Using HDSperx Clients with MWM 283
2.4.14 HDSrunwm Launcher Program 284

2.5 OPEN LOOK Virtual Window Manager 287

2.5.1 Starting OPEN LOOK Virtual Window Manager 288
2.5.2 Starting Local OLVWM Remotely 288
2.5.3 The OPEN LOOK Environment 289
2.5.4 OPEN LOOK Virtual Window Manager Operations 290
2.5.5 Using the OLVWM Window Manager 291

2.1.4.1 Format of Client Configuration Files 206
2.1.4.2 A clients.config Sample File 206
2.1.4.3 Pre-loading Motif Libraries 207
2.1.5 HDSperx Client Attributes 207
2.1.6 X11 Server Extensions 211
2.1.6.1 Downloadable X11 Server Extensions 211
2.1.6.2 Loading X11 Server Extensions 212
2.1.6.3 XTrap Extension 212
2.1.6.4 Multi-Buffering Extension 212
2.1.6.5 Shared Memory Extension 212
2.1.6.6 PEX-3D Extension 212
2.2 HDSterm Terminal Emulation Client 213
2.2.1 Using the HDSterm Client 213
2.2.1.1 HDSterm Window 214
2.2.1.2 Using the tty Telnet Client 214
2.2.2 HDSterm Functions 214
2.2.2.1 Commands Pull-down Menu 215
2.2.2.2 Customize Pull-down Menu 216
2.2.2.3 Serial Options Pull-down Menu 219
2.2.2.4 Help Pull-down Menu 219
2.2.3 HDSterm Operation 219
2.2.3.1 HDSterm Manual Starting 220
2.2.3.2 HDSterm rlogin Capability 220
2.2.3.3 Auto-Starting an Application in HDSterm 221
2.2.4 HDSterm Manual Page 226
2.2.5 HDSTerm Resource Files 237
2.2.5.1 HDSTerm Resources in HDS$$ROM 237
2.2.5.2 HDSTerm Resources in $HOME/.Xdefaults 239
2.2.6 HDSterm Command Sequences 239
2.2.6.1 HDSterm Supported Command Set: 239
2.2.7 HDSterm Print Commands 244
2.2.8 VT320 Keyboard Mapping 245
2.2.8.1 Using IBM 101+ or 102 keyboards: 245
2.2.8.2 Using DEC VT320 keyboards 246
2.2.9 HDSterm Key Translations 246
2.2.9.1 Sample Key Translations 247
2.3 HDS Local Terminal Emulation Clients 255
2.3.1 Using Local Clients 255
2.3.2 HDS3270 Terminal Emulation 255

1.11.2 ViewStation rhosts Security 189
  1.11.2.1 Setting Up an rhosts File on the ViewStation 189
  1.11.2.2 ViewStation Remote Access Reporting 189
1.11.3 Permission for Remote Shell Commands 190
  1.11.3.1 Using the /etc/hosts.equiv File 190
  1.11.3.2 Using the .rhosts File on the Host 190
1.11.4 Host Access Control Security 191
  1.11.4.1 Host Access Control from Setup Mode 191
  1.11.4.2 Using Magic Cookie Security 191
  1.11.4.3 Starting Magic Cookie Security in Xdm 191
  1.11.4.4 Magic Cookie Security on the ViewStation 192
  1.11.4.5 Problems with Magic Cookie Authentication 192
  1.11.4.6 Using the ViewStation's xhost Client 193
1.11.5 CMW Security 193
  1.11.5.1 CMW Security Features 193

1.12 ViewStation Floppy Drive Feature 195

1.12.1 Hardware configuration 195
1.12.2 Using the Floppy Drive with a Printer 196
1.12.3 Software configuration 196
1.12.4 Changing Floppy Disks 196
1.12.5 Floppy Disk Drive Access 196
1.12.6 Local Floppy Filesystem Access 197
1.12.7 Floppy Drive RCP (Remote Copy) Access 197
1.12.8 Floppy Drive NFS (Network File Service) Access 197
1.12.9 Floppy Drive File Ownership 198
1.12.10 Floppy Drive Formatting disks 198
1.12.11 Using the ViewStation's Floppy Disk with SoftWindows from Insignia Solutions 199
1.12.12 Using the ViewStation's Floppy Disk from WABI 2.0 200

Section 2.0 - HDS ViewStation Local Clients 203

2.1 HDS ViewStation Client Operations 203

2.1.1 Using the HDSperx Clients 203
2.1.2 HDSperx Clients 203
  2.1.2.1 HDSperx Clients Menu 204
  2.1.2.2 HDSperx Client List 205
2.1.3 HDSware Installation of HDSperx 205
  2.1.3.1 Using the HDSperx Clients 205
2.1.4 Customizing HDSperx Clients 206

1.9.5.2 bdfto960 Font Utility Program 167
1.9.5.3 hdsmkdir Font Utility Program 168
1.9.5.4 getbdf Font Utility Program 168
1.9.5.5 hdsfc960 Font Utility Program 168
1.9.5.6 Handling .bdf Fonts and Fonts in other Formats 168
1.9.6 Loading Fonts to the ViewStation 170
1.9.6.1 Setting the Fontpath 170
1.9.6.2 Verifying the Fontpath Setting 171
1.9.6.3 Making a fonts.dir File 172
1.9.6.4 Making a fonts.alias File 173

1.10 PC CardDevices 175

1.10.1 ViewStation PC Card Adapter Card 175
1.10.2 ViewStation FlashPROM 176
1.10.2.1 Loading New Server Code into flashPROM 176
1.10.3 ViewStation ROM cards 177
1.10.4 Hard Disk Drive Storage Devices 177
1.10.4.1 Adding a PC Card Hard Disk Drive 177
1.10.4.2 Using the Hard Disk Drive 178
1.10.4.3 Using the fdisk Command 178
1.10.4.4 Using the flash Command 179
1.10.4.5 The flash boot Command 179
1.10.4.6 The flash server Command 179
1.10.4.7 The flash files Command 179
1.10.5 Token Ring Interface Card 181
1.10.5.1 Token Ring Specifications 181
1.10.5.2 ViewStation Token Ring Controls 182
1.10.6 Multimedia Devices 183
1.10.6.1 Configuring the ViewStation for Multimedia 183
1.10.6.2 ViewStation Multimedia Audio Specifications 183
1.10.6.3 ViewStation Multimedia Audio Capabilities 184
1.10.7 Other PC Card Devices 184

1.11 HDS ViewStation Security Considerations 185

1.11.1 ViewStation Passwords 185
1.11.1.1 Changing the ViewStation Password 185
1.11.1.2 Setup Mode Password Protection 186
1.11.1.3 Console Window Password Protection 186
1.11.1.4 HDSperx Password Protection 186
1.11.1.5 Password Security 187
1.11.1.6 Passwords in Bootp 188
1.11.1.7 Password Encryption with hdscrypt 188

1.7.9 Remote Management of ViewStations 148
1.7.9.1 Changing ViewStation Settings 148
1.7.9.2 Changing the ViewStation Password 148
1.7.9.3 Changing Server Code Versions 148
1.7.9.4 Problem Diagnosis from a Remote Machine 148
1.8 Keyboards and their Operations 149
1.8.1 HDS ViewStation Keyboards 149
1.8.1.1 Keyboard Connections 150
1.8.2 Keystroke Functions on the ViewStation 150
1.8.2.1 Keyboard Cursor Mode 150
1.8.2.2 Setup Mode Keystrokes 150
1.8.2.3 Monitor Mode Keystrokes 151
1.8.2.4 HDSterm Environment Variable Keystrokes 151
1.8.3 Keyboard Operations 151
1.8.3.1 Keycode Modification Tables 152
1.8.3.2 Key Mappings 152
1.8.3.3 Modifier Keymappings 153
1.8.3.4 ViewStation Pointer Mappings 153
1.8.4 Xev Key Monitoring 154
1.8.5 Key Handling in a Client/Server Environment 154
1.8.5.1 Keymap Changes with Xmodmap 155
1.8.5.2 Keymap Changes with Event Translations 157
1.8.5.3 HDSterm Event Translations 159
1.8.5.4 HDSterm Keymap Groups 159
1.8.5.5 Customizing HDSterm Keymaps 160
1.8.5.6 Customizing Example 160
1.8.5.7 Special Motif Bindings for HDSterm Keys 162
1.9 Font Handling 163
1.9.1 Fonts in the X Window System 163
1.9.2 Automatic Fontpath Configuration 164
1.9.3 Font Server Operations 164
1.9.3.1 Putting the Font Server in the Font Path 164
1.9.3.2 Font Server Benefits 164
1.9.3.3 Using Alternate Font Servers 165
1.9.4 HDS ViewStation Font File Formats 165
1.9.4.1 ViewStation Compressed Font Files 165
1.9.4.2 Making Special .snf Font Files 165
1.9.4.3 Font File Formats - .bdf and .snf 166
1.9.5 Using HDS Font Utilities 166
1.9.5.1 HDS Font Utilities 166

1.5.6.12 Restore Settings from NVM 118

1.6 Starting the ViewStation 119

1.6.1 Starting from Local Storage 119

1.6.1.1 Starting from a ViewStation Hard Disk 119

1.6.2 Starting from Monitor Mode 120

1.6.2.1 Monitor Mode Key Mappings 120

1.6.2.2 Monitor Mode Screen 120

1.6.2.3 Monitor Mode Commands 121

1.6.2.4 Monitor Mode Sample Entries 122

1.6.2.5 Booting ViewStations with 4 MB Memory 123

1.6.2.6 Booting the ViewStation from a VMS Host 124

1.6.3 Starting with BOOTP 125

1.6.3.1 BOOTP Command Fields 125

1.6.3.2 Problems with BOOTP Starting 126

1.6.3.3 Sample bootptab File 127

1.6.4 Startup Considerations 128

1.6.4.1 Local storage Benefits 128

1.6.4.2 BOOTP Benefits 128

1.6.4.3 Monitor Mode Benefits 129

1.6.5 Determining the IP Address 129

1.6.5.1 Setup Mode IP Address Selection 129

1.6.5.2 IP Addressing with BOOTP 129

1.6.5.3 IP Addressing with RARP 129

1.6.5.4 Sun NIS IP Addressing 130

1.6.5.5 RARP Protocol Example 130

1.6.6 Network-based ViewStation Operation 131

1.7 Remote Configuration 133

1.7.1 Determining the IP Address 133

1.7.2 Loading the ViewStation's Server File 133

1.7.3 Loading the ViewStation's Configuration File 134

1.7.3.1 FXUtilities and HDSware Abbreviation 134

1.7.4 Configuration File Syntax 134

1.7.4.1 Generating an Individual Configuration File 143

1.7.5 Using Include Statements in a Configuration File 144

1.7.6 ViewStation Hard Disk Configuration File 146

1.7.6.1 Configuration File config.fx.dsk 146

1.7.6.2 Configuration File clients.config.dsk 147

1.7.7 Configuration File for 4 MB ViewStations 148

1.7.8 Remote Configuration Security Considerations 148

1.4.4.9 SLIP Protocol or CSLIP Protocol for Serial Communications 81
1.4.5 ViewStation IP Addresses and Route Table 82
1.4.5.1 PPP Configuration and Network Routes 82
1.4.5.2 Typical PPP Configurations 82
1.4.5.3 ViewStation Local Route Command 84
1.4.5.4 ViewStation Local Ping Command 84
1.5 Setup Mode 85
1.5.1 Entering Setup Mode 85
1.5.1.1 Setup Mode with Hidden Icon 85
1.5.1.2 Remote Setup Mode Operation 86
1.5.2 Setup Mode Operation 86
1.5.2.1 Quick Starting with Setup Mode 87
1.5.2.2 Setup Mode Editing 88
1.5.2.3 Setup Mode Editing Keys 88
1.5.2.4 File Names and Paths in Setup Mode 88
1.5.2.5 Setup Mode Password Protection 89
1.5.3 Remote Configuration of the ViewStation 89
1.5.4 Setup Mode Main Menu 90
1.5.4.1 Setup Mode Heading Bar 90
1.5.4.2 Setup Mode Selection Buttons 90
1.5.4.3 Setup Mode Function Buttons 91
1.5.5 Starting ViewStation Clients 93
1.5.5.1 Telnet Terminal Window Selection 93
1.5.5.2 Serial Terminal Window Selection 93
1.5.5.3 Console Window Selection 95
1.5.5.4 Available Memory Selection 96
1.5.5.5 Low Memory Warning Client 97
1.5.5.6 Motif Window Manager 97
1.5.5.7 OPEN LOOK Virtual Window Manager 97
1.5.6 Setup Options Selection 97
1.5.6.1 Communications Menu 98
1.5.6.2 Ethernet Communications Menu 99
1.5.6.3 Configure Serial 1 (2) Port Menu 99
1.5.6.4 Token Ring Communications Menu 99
1.5.6.5 XDMCP Options Selection 100
1.5.6.6 Remote Hosts Menu 102
1.5.6.7 Domain Name Servers Selection 105
1.5.6.8 User Preferences Selection 106
1.5.6.9 Startup Options Selection 114
1.5.6.10 Restart and Reset Menu Selection 116
1.5.6.11 Reset NVM to Factory Defaults Selection 117

1.3.6.2 Diskette handling (5.25" or 3.5"): 57
1.3.7 HDSware Utility Programs 58
1.3.7.1 Compiling the Utility Programs from Source Code 58
1.3.7.2 bdfto960 Font Utility Program 58
1.3.7.3 hdsmkdir Font Utility Program 59
1.3.7.4 hdsfc960 Font Conversion Utility 59
1.3.7.5 getbdf Font Conversion Utility 61
1.3.7.6 hdscrypt Encryption Utility Program 61
1.3.7.7 flashfilesys Utility Program 61
1.3.8 HDSware Contributed Programs 61
1.3.8.1 bootp 62
1.3.8.2 hdsrunwm Launcher Program 62
1.3.8.3 xscope Diagnostic Utility 62
1.3.8.4 xmkmf Utility Program 62
1.3.8.5 snftobdf Font Conversion Program 62
1.3.8.6 usepty Utility Program 62
1.3.8.7 xrsh Utility Program 62

1.4 Network Connections 63

1.4.1 Communications Menu 64
1.4.2 Ethernet Connections 65
1.4.2.1 Ethernet Communications Menu 66
1.4.2.2 Physical Connection to the Ethernet Network 67
1.4.2.3 Twisted-pair Ethernet with Link Integrity and SQE Settings 68
1.4.2.4 Selecting the Ethernet Physical Type 68
1.4.2.5 Logical Connection to the Ethernet 69
1.4.2.6 Network Addressing 70
1.4.2.7 IEEE 802.3 and "Ethernet" Networks 71
1.4.2.8 Use of Network Trailers 71
1.4.3 Token Ring Interface 71
1.4.3.1 Token Ring Communications Menu 72
1.4.3.2 Token Ring Specifications 73
1.4.3.3 ViewStation Token Ring Controls 73
1.4.4 ViewStation Serial Connection 74
1.4.4.1 ViewStation Serial Port Physical Connection 74
1.4.4.2 Serial Port Troubleshooting 74
1.4.4.3 ViewStation Serial Port Menu 74
1.4.4.4 PPP/SLIP Options Menu 76
1.4.4.5 PPP Protocol for Serial Communications 77
1.4.4.6 Direct Serial Connections 79
1.4.4.7 Serial Connection Example 80
1.4.4.8 PPP Connection Example 81

    - 1.2.1.5 Console Window Security 30
  - 1.2.2 Console Window Commands 31
    - 1.2.2.1 Summary of Console commands: 32
    - 1.2.2.2 Summary of privileged commands 34
    - 1.2.2.3 Privileged Commands in a Shell Script 35
  - 1.2.3 Console Window Messages 35
    - 1.2.3.1 ViewStation Error Message Reporting 35
  - 1.2.4 Printing from the Console Window 37
  - 1.2.5 ViewStation Internal File System Structure 38
    - 1.2.5.1 FXUtilities Abbreviation 38
    - 1.2.5.2 ViewStation Mount Points 38
    - 1.2.5.3 Local Mount Directory 39
    - 1.2.5.4 Remote Mount Directory 39
    - 1.2.5.5 Mount Directory Example 40
  - 1.2.6 Access to ViewStation Ports 41
    - 1.2.6.1 The opendev Command 41
    - 1.2.6.2 Remote Access to ViewStation Ports 41
    - 1.2.6.3 Usepty Script 42
    - 1.2.6.4 Implementing "opendev" in a C Program 42
  - 1.2.7 ViewStation Flash File System 43
    - 1.2.7.1 Operation with the flashPROM Board 43
    - 1.2.7.2 Operation with PCMCIA Devices 43
  - 1.2.8 ViewStation Startup Files 43
    - 1.2.8.1 Server-reset Command File 44
    - 1.2.8.2 Startup Command File 44
- **1.3 HDSware 47**
  - 1.3.1 HDSware Software Formats 47
    - 1.3.1.1 HDSware on an Internal Hard Disk Drive 48
    - 1.3.1.2 Premium Software Service and Software Upgrades 48
  - 1.3.2 HDSware CD-ROM Format 48
    - 1.3.2.1 HDSware CD-ROM File Naming 48
    - 1.3.2.2 Mounting the CD-ROM 48
    - 1.3.2.3 Loading files from the CD-ROM 49
    - 1.3.2.4 HDSware Installation Script 49
    - 1.3.2.5 HDSware CD-ROM Contents 50
  - 1.3.3 HDSware Tape Contents 52
  - 1.3.4 Automatic ViewStation Configuration 55
  - 1.3.5 HDSware Upgrades 55
  - 1.3.6 Loading the HDSware Tape Manually 56
    - 1.3.6.1 Cartridge tape handling 56

1.1.6.1 Selecting the Monitor Type 5
1.1.6.2 Changing ViewStation Monitors 6
1.1.7 ViewStation Physical Characteristics 7
1.1.7.1 ViewStation Base Unit 7
1.1.7.2 ViewStation Keyboards 7
1.1.7.3 ViewStation Pointing Devices 8
1.1.7.4 ViewStation Monitors 8
1.1.8 ViewStation Environmental Requirements: 8
1.1.8.1 Operation 8
1.1.8.2 Storage 8
1.1.9 ViewStation Controls and Indicators 8
1.1.10 ViewStation Connections 8
1.1.10.1 Mouse Connector 8
1.1.10.2 Keyboard Connector 9
1.1.10.3 Serial Port - RJ11 Connector 9
1.1.10.4 Parallel Port - DB25 Connector 10
1.1.10.5 Video Connector - DB15 high-density (VGA-type) 11
1.1.10.6 Twisted-Pair Ethernet - RJ45 Connector 11
1.1.10.7 ThinWire Ethernet - BNC Connector 12
1.1.10.8 ThickWire Ethernet - DB15 Connector 12
1.1.10.9 Serial Port - DB-25 Connector 13
1.1.10.10 Sun Keyboard Connector 13
1.1.10.11 Audio Ports - Input/Output Connections 13
1.1.10.12 PC CardPort 13
1.1.11 ViewStation Software 14
1.1.11.1 ViewStation Server Components 14
1.1.11.2 Setup Mode 14
1.1.11.3 Setup Mode Command Buttons 16
1.1.11.4 Network Services 16
1.1.11.5 Terminal Emulator 17
1.1.11.6 Font Loading 17
1.1.11.7 Server-Resident Fonts 17
1.1.12 HDS ViewStation Number Encoding 19
1.1.12.1 HDS ViewStation Serial Number 19
1.1.12.2 HDS ViewStation Part Number 19
1.2 HDS ViewStation Internal Architecture 27
1.2.1 ViewStation Console Shell Window 27
1.2.1.1 Access to the Console Window 28
1.2.1.2 Console Window as a Local Display 29
1.2.1.3 Console Window from a Remote Host 29
1.2.1.4 Diagnostic Messages from a Remote Terminal 30

Table of Contents

Front Matter and Copyrights iii
Table of Contents v
Preface xxiii

Section 1.0 - HDS ViewStation 1

1.1 HDS ViewStation Specifications 1

1.1.1 HDS ViewStation Overview 1
1.1.2 Hardware Specifications 1
1.1.2.1 ViewStation Base Unit 1
1.1.2.2 ViewStation Circuit Board 1
1.1.2.3 ViewStation Memory 1
1.1.2.4 ViewStation Bootprom 2
1.1.2.5 ViewStation Video Memory 2
1.1.2.6 ViewStation External Connections 2
1.1.2.7 ViewStation Optional Communications Board 2
1.1.2.8 ViewStation FlashPROM Board 2
1.1.2.9 ViewStation PC Card Board 3
1.1.2.10 ViewStation PC Card Devices 3
1.1.2.11 ViewStation Floppy Disk Drive 3
1.1.3 ViewStation Power Supply 3
1.1.4 ViewStation Keyboards 3
1.1.5 ViewStation Mouse and Pointing Devices 3
1.1.6 ViewStation Display Monitors 4