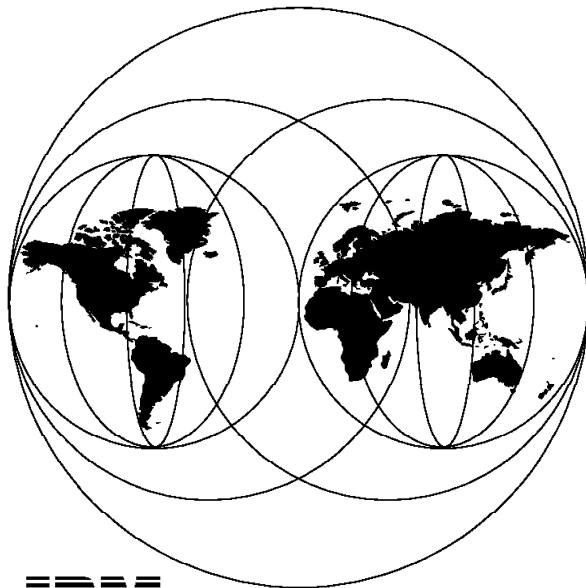


SG24-2587-00

International Technical Support Organization

Inside Client Access/400 Optimized for OS/2

October 1995



IBM

**International Technical Support Organization
Rochester Center**



SG24-2587-00

International Technical Support Organization

Inside Client Access/400 Optimized for OS/2

October 1995

Take Note!

Before using this information and the product it supports, be sure to read the general information under "Special Notices" on page xxi.

First Edition (October 1995)

This edition applies to Version 3 Release 1 of Client Access/400 Optimized for OS/2.

Order publications through your IBM representative or the IBM branch office serving your locality. Publications are not stocked at the address given below.

An ITSO Technical Bulletin Evaluation Form for reader's feedback appears facing Chapter 1. If the form has been removed, comments may be addressed to:

IBM Corporation, International Technical Support Organization
Dept. 977 Building 663-3
3605 Highway 52N
Rochester, Minnesota 55901-7829

When you send information to IBM, you grant IBM a non-exclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

© **Copyright International Business Machines Corporation 1995. All rights reserved.**
Note to U.S. Government Users — Documentation related to restricted rights — Use, duplication or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp.

Abstract

This document is unique in its detailed coverage of Client Access/400 Optimized for OS/2. It focuses on giving practical guidance for the installation, configuration and use of the client. It includes information on topics new to the Client Access/400 world such as TCP/IP and AnyNet concepts and configuration, and the new client management support that enables the AS/400 system to keep track of the PC hardware and software on each of the clients.

This document was written for Customers, Business Partners and IBM Systems Specialists who need an understanding of Client Access/400 Optimized for OS/2.

(381 pages)

Contents

Abstract	iii
Figures	xiii
Tables	xix
Special Notices	xxi
Preface	xxv
How This Document is Organized	xxv
Related Publications	xxix
International Technical Support Organization Publications	xxix
Acknowledgments	xxxii
Chapter 1. Overview	1
1.1 Client Access/400 Family	1
1.2 Client Access/400 Overview	2
1.2.1 OS/400 Server Functions	3
1.2.2 IFS Introduction	5
1.2.3 Compatibility with PC Support/400	9
1.2.4 Connectivity Options	10
1.2.5 Programming Interfaces	11
1.2.6 Choice of GUI 5250 Emulators	11
1.2.7 Print Services	12
1.2.8 Access to Data	14
1.2.9 Security Improvements	14
1.2.10 OS/400 Graphical Operations Support	15
1.3 Client Access/400 Optimized for OS/2 Introduction	15
1.3.1 Client Management	16
1.3.2 Terminal and Print Emulation	16
1.3.3 Network Print	17
1.3.4 Network Drives	17
1.3.5 Data Access facility	17
1.3.6 Products Registry	17
1.3.7 Application Programming Interfaces (API)	17
Chapter 2. Concepts	21
2.1 TCP/IP Concepts	21
2.1.1 TCP/IP Terminology	22

2.1.2 TCP/IP Support	25
2.2 AnyNet Concepts	25
2.2.1 APPC over TCP/IP	26
2.2.2 Sockets Over SNA	26
2.3 Simple Network Management Protocol (SNMP)	27
2.4 Desktop Management Interface (DMI)	27
Chapter 3. Migration	29
3.1 OS/2 PC Support/400 or Client Access/400 for OS/2	30
3.2 Communications Manager/2 Version 1.11 and Network Transport Services/2	31
3.3 Replacing Communications Manager/2	32
3.4 OS/2 LAN Requester 3.0 and NTS/2	32
3.5 OS/2 LAN Requester 4.0 and Multiprotocol Transport Services (MPTS)	32
3.6 Warp Connect	33
3.7 User Profile Management (UPM)	34
3.8 LAN Adapter Protocol Support and TCP/IP for OS/2	34
Chapter 4. Client Access/400 Optimized for OS/2 Installation	35
4.1 Installation Overview	35
4.1.1 Workstation Requirements	35
4.2 AS/400 Requirements	37
4.2.1 Planning Tasks	37
4.2.2 Choice of Installation Source	38
4.3 Installation Worksheets	43
4.3.1 SNA Worksheet	43
4.3.2 TCP/IP through LAN Installation Worksheet	47
4.4 SNA Installation	50
4.4.1 SNA Installation on the AS/400 System	50
4.4.2 PC Configuration	60
4.4.3 PC Installation - SNA	61
4.5 TCP/IP	79
4.5.1 AnyNet/400 Configuration	79
4.5.2 PC Configuration	95
4.5.3 PC Installation - TCP/IP	96
4.5.4 AnyNet Configuration	113
4.6 Installing Over Existing Communications Products	118
4.6.1 Communications Manager/2 Version 1.11 and Network Transport Services/2	118
4.6.2 Replacing Communications Manager/2 with Client Access/400 Communications	121
4.6.3 LAN Adapter Protocol Support and TCP/IP for OS/2	125

4.7	Creating Installation Diskettes	128
4.8	Installation Hints and Tips	130
4.9	CID Installation	131
Chapter 5. Configuration		135
5.1	Templates	138
5.1.1	Configuration Using Templates	139
5.2	Startup Configuration Group	140
5.3	Configuration Group	141
5.3.1	Configuration	141
5.3.2	Automatically Started Configuration Groups	141
5.3.3	Shared Configuration Groups	142
5.4	Connections	142
5.4.1	Add Direct	146
5.4.2	Add Indirect	148
5.4.3	Change/Remove	148
5.4.4	Connect/Disconnect	148
5.4.5	Previous Connections	149
5.4.6	SNA Configuration	149
5.5	Network Drives	150
5.5.1	Configuration	150
5.5.2	Products Registry - Network Drive	153
5.5.3	Assigning a Drive	155
5.5.4	Releasing a Drive	155
5.5.5	Command Line Interface	156
5.5.6	Text File Conversion	157
5.5.7	Potential Conflict Using Universal Naming Convention (UNC) Names	160
5.6	Network Printers	161
5.6.1	Configuration	161
5.6.2	Installing Printer Drivers	165
5.6.3	Assigning a Printer	165
5.6.4	Printer Driver Settings	167
5.6.5	The SCS driver	168
5.6.6	The AFP driver	173
5.6.7	Releasing a Printer	179
5.6.8	Command Line Interface	179
5.7	Products Registry	180
5.7.1	Starting Client Access/400 Products Registry	181
5.7.2	Selective Install/Removal	182
5.7.3	General Settings	185
5.7.4	General Settings for Different Components	192

5.7.5 Update	193
5.7.6 Other Applications	196
5.8 Emulation	196
5.8.1 RUMBA/400	196
5.8.2 PC5250	199
5.9 Automating Startup	201
5.9.1 LaunchPad	202
5.10 Modifying Startup	203
5.10.1 Starting Communications	204
5.10.2 Startup and Runtime Performance	205
5.10.3 Recreating Startup Command Files	207
5.11 CONFIG.SYS Recommendations	207
5.11.1 Restart Objects	207
5.11.2 Autostart Connections	207
5.11.3 Performance	208
5.12 Stopping Client Access/400 Optimized for OS/2	208
Chapter 6. Client Management	211
6.1 DMI Overview	211
6.1.1 DMI Application Programming Interfaces	212
6.2 Client Inventory	212
6.3 Client Service	212
6.3.1 Problem Records	213
6.4 SIA	214
6.5 Simple Network Management Protocol (SNMP)	214
6.6 User Interface	214
6.7 Managing Clients Today	215
6.8 AS/400 Client Asset Management	216
6.9 SNMP Client Management	217
6.10 Manageability Structure	217
6.11 CONFIG.SYS and CASERV.CMD	219
6.12 Configuration	220
6.12.1 SNMP Configuration	222
6.12.2 AS/400 System Setup	223
6.12.3 Check Client Service and Inventory	224
6.12.4 Remove a Client from the AS/400 Database	225
6.12.5 Client Inventory Database	225
6.13 Service	228
6.13.1 HISTORY.LOG	228
6.13.2 PROBLEM.LOG	229
6.13.3 Traces	230

Chapter 7. Accessing AS/400 Data	231
7.1 File Transfer Commands	231
7.2 RUMBA/400 File Transfer	231
7.2.1 Using RUMBA/400 File Transfer	233
7.3 RUMBA/400 Database Access	236
7.3.1 Installation	236
7.3.2 Connecting to a Data Source	236
7.3.3 Using the Query Builder	237
7.3.4 Database Access Notes	246
7.4 Open Database Connectivity	246
Chapter 8. Remote Commands	249
8.1 RUNRMTCMD Run Remote Command	249
8.2 Remote Command	253
8.3 Distributed Program Call	254
Chapter 9. Graphical Interfaces	255
9.1 Graphical Operations	255
9.2 System Object Access	258
9.3 Graphical Access for OS/400	259
Chapter 10. Emulators	263
10.1 RUMBA/400	263
10.1.1 Introduction	263
10.1.2 Enhancements in Version 3.0 Release 1.0	264
10.1.3 Included with Client Access/400	265
10.1.4 Color Screen Tool	265
10.1.5 Print Options	266
10.1.6 Application Print	267
10.1.7 Private Directories	271
10.1.8 Capture Host Screens	272
10.1.9 Tool Bar	273
10.2 Personal Communications/5250	278
10.2.1 Introduction	278
10.2.2 Tool Bar	279
10.3 DOS PC Support/400 Workstation Function (WSF)	281
10.4 Communications Manager/2 5250	281
10.5 Personal Communications for AS/400	281
10.6 PC5250 Console Feature	282
10.6.1 Configuration	282
10.7 Emulator Comparison Table	285

Chapter 11. Client Access/400 in Virtual DOS Machines	289
11.1 An Introduction to Virtual DOS Machines (VDMs)	289
11.1.1 Multiple Virtual DOS Machines	289
11.1.2 Memory Protection	290
11.1.3 Memory Management	290
11.1.4 Windowing Support	291
11.1.5 Application Support	291
11.1.6 Virtual Device Drivers	292
11.1.7 Memory Support in VDMs	293
11.1.8 DOS Settings	293
11.1.9 Microsoft Windows Applications in VDMs	294
11.2 Client Access/400 for Extended DOS in OS/2 VDMs	295
11.2.1 Client Access/400 Virtual Device Driver (VDD) Support	296
11.3 Virtual DOS Machine Configuration for Client Access/400	301
11.3.1 Client Access/400 Optimized for OS/2 Configuration	301
11.3.2 Client Access/400 for Extended DOS Configuration	303
11.3.3 Creating a Batch File for Client Access/400	305
11.3.4 Creating a VDM Icon on the OS/2 Desktop	306
11.3.5 Configuring a VDM for AS/400 Graphics	307
11.3.6 Network Drive / Shared Folder Considerations	309
11.3.7 Network Printer / Virtual Printer Considerations	310
11.3.8 Running Client Access/400 from Multiple VDMs	310
11.3.9 VDMSERV Parameters	311
11.4 Running Client Access/400 for Extended DOS Under WIN-OS/2	312
11.4.1 WIN-OS/2 Overview	313
11.4.2 Configuring Client Access/400 for Extended DOS for Microsoft Windows	315
11.4.3 General Rules	316
11.4.4 Creating a Batch File for Client Access/400	318
11.4.5 Creating a VDM Icon on the OS/2 Desktop	318
11.4.6 Using Your New Icon	319
11.4.7 Stopping Your New Icon	319
11.4.8 Client Access/400 for Windows 3.1 ODBC in a VDM	320
Chapter 12. Mixed Version Networks	323
12.1 Using Client Access/400 Optimized for OS/2 on Pre-V3R1 Systems	323
12.1.1 User ID and Password Verification to Pre-Version 3.0 Release 1.0 AS/400 Systems	324
Chapter 13. Performance Tuning OS/2 Warp	325
13.1 File Systems	326
13.1.1 FAT	327

13.1.2 HPFS	328
13.2 System Tuning CONFIG.SYS	329
13.3 Additional CONFIG.SYS Considerations	332
13.4 System Settings	333
13.5 Conclusion	334
Chapter 14. Hints and Tips	335
14.1 Consideration for LIBPATH	335
14.2 Recreate Icons	335
14.3 TCP/IP	335
14.4 OS/2 Window	336
14.5 Forward Slashes (/) Not Supported	336
14.6 Refreshing the Software Catalog	336
14.7 Error Messages	337
14.7.2 LAN Adapter Protocol Support	337
14.7.3 Error Defining Connection names running over TCP/IP	337
14.7.4 CWBUI0058 - Error getting a drive connection for the Find option	338
14.7.5 RUMBA/400	338
14.7.6 Client Access/400 Connections	339
14.7.7 CWB4004 - Security error occurred for system NETID.SYSNAME	339
14.7.8 Updating to V3R1M1	340
14.7.9 Using the Client with WARP Connect	340
14.7.10 README.CA4	340
Appendix A. Documentation	341
A.1 Introduction	341
A.2 Information	341
A.3 Error Messages	343
A.4 Publications	343
A.4.1 InfoSeeker	344
A.4.2 IBM Library Reader	344
Appendix B. Directory Structure	347
Appendix C. Configuration Files	349
C.1 Performance	349
C.2 TCP/IP	352
C.3 Communications Manager/2 1.11 and NTS/2	353
C.4 OS/2 LAN Requester 4.0 and MPTS	355
C.5 OS/2 LAN Requester 4.0 and MPTS, Communications Manager/2 1.11	355

Appendix D. CID CID Response File Example	357
Appendix E. Refresh, Availability	359
E.1 General Availability	359
E.2 Highlights	360
E.3 Function Availability Dates	361
E.4 Availability Dates by Detailed Function	362
List of Abbreviations	367
Index	369

Figures

1.	OS/2 Drives View of the IFS	8
2.	AS/400 Printing Illustration	13
3.	Example of the SNACKETS Mode Description	53
4.	Sockets over SNA	54
5.	Display of Network Attributes with an ALWANYNET Value of *YES	55
6.	The CFGIPS, Configure IP over SNA Panel	55
7.	Add IP over SNA Interface (ADDIPSIFC)	56
8.	Work with IP over SNA Interfaces	56
9.	Add IP Over SNA Location (ADDIPSLOC) Panel	57
10.	Work with IP over SNA Locations	58
11.	Display Line Description Panel	59
12.	Installation Options - Custom Installation Panel	62
13.	LAN Adapter - Setup Panel, Using an Ethernet Adapter With the Burned-in Address.	63
14.	TWINAX Adapter - Setup Panel	64
15.	AnyNet - Setup Panel, TWINAX	65
16.	Selective Install Panel	66
17.	Client Access/400 Install in Process Panel	67
18.	Installation Part 1 Complete - Panel	68
19.	Client Access/400 Installation - Part 2 Panel	69
20.	Client Access/400 Connection Setup - Add, LAN	70
21.	Client Access/400 LAN - Advanced Options	71
22.	Configure Sockets for SNA Gateway - Remote Nodes Panel	72
23.	Client Access/400 Installation - Part 2 Panel	74
24.	Client Access/400 AS/400 Connection Setup - Add	75
25.	Installation Part 2 Progress - Panel	77
26.	Emulation Session Setup	77
27.	Congratulations - Panel	78
28.	TCP/IP Configuration Example	81
29.	Create Token-Ring Line Description - System RCHAS040	82
30.	TCP/IP Configuration Menu	83
31.	TCP/IP Interface Definition - System RCHAS040	84
32.	TCP/IP Route Table Entries - System RCHAS040	85
33.	TCP/IP Host Table Entries - System RCHAS040	86
34.	Display of Network Attributes with ALWANYNET(*YES)	87
35.	Create Controller Description with LINKTYPE(*ANYNW)	88
36.	APPN Remote Location List Panel	91
37.	APPN Remote Location List Panel with Generic Name	92
38.	TCP/IP Host Table Entries	93

39.	Installation Options - Custom Installation Panel	97
40.	Communication Support Options - Panel	97
41.	LAN Adapter - Setup Panel	98
42.	TCP/IP and AnyNet - Setup Panel	100
43.	Selective Install Panel	101
44.	Client Access/400 Install in Process Panel	102
45.	Installation Part 1 Complete - Panel	102
46.	Client Access/400 Installation - Part 2 Panel	104
47.	Client Access/400 Communication Setup - Local Node	104
48.	Communication Setup - TCP/IP Network Panel	105
49.	Communication Setup - TCP/IP Routers Panel	107
50.	Communication Setup - Name Servers	107
51.	Communication Setup - Hosts Panel	108
52.	Installation Part 2 - Panel	109
53.	AS/400 Communication Setup - Panel	109
54.	Installation Part 2 Progress - Panel	110
55.	Emulation Session Setup	110
56.	Congratulations - Panel	111
57.	TCP/IP Matching Parameters Table	112
58.	Advance Configuration - Panel	113
59.	AnyNet: SNA over TCP/IP Tab	114
60.	AnyNet for OS/2 Configuration Page 1	115
61.	AnyNet for OS/2 Configuration Page 2	116
62.	AnyNet for OS/2 Configuration Page 3	117
63.	Communications Manager/2 Installation Panel	119
64.	Communications Support Options Panel	120
65.	Communications Components Panel	120
66.	Client Access/400 Communications Folder Contents	122
67.	AS/400 Connections Setup Panel	123
68.	AS/400 Communications Setup - Change Panel	123
69.	Client Access/400 Message Panel - Error codes	124
70.	Client Access/400 Advanced Options Panel	125
71.	TCP/IP and AnyNet Setup Panel	126
72.	TCP/IP Network Panel	126
73.	TCP/IP Routers Panel	127
74.	TCP/IP Name Servers Panel	127
75.	Create Install Diskettes Panel	128
76.	Create Install Diskette - Diskette Estimate Panel	129
77.	OS/2 Window, During Client Access/400 CID Installation	132
78.	AS/400 Workstation and Subfolders	136
79.	Client Access/400 and Subfolders	138
80.	Client Access/400 Templates Folder	139

81.	Client Access/400 Startup Configuration Folder	140
82.	Client Access/400 Connections SNA	143
83.	Client Access/400 Connections TCP/IP	144
84.	Client Access/400 Define Connection Names TCP/IP	145
85.	Client Access/400 TCP/IP Configuration	146
86.	Work with Line Description Query Status	147
87.	Client Access/400 SNA Configuration	149
88.	Network Drive Definition - Settings Notebook	151
89.	Client Access/400 Products Registry	153
90.	Network Drive - General Settings Notebook	154
91.	Client Access/400 Startup Configuration Folder	155
92.	OS/2 Drives Folder	155
93.	NET400 STATUS	157
94.	Network Drive - General Settings Notebook	158
95.	Enhanced Editor - Settings Notebook	159
96.	QSTRUPPGM.MBR	160
97.	Network Printer Definition - Settings Notebook	162
98.	Client Access/400 Startup Configuration Folder	165
99.	Network Printers Folder	166
100.	Network Printer Details View	166
101.	Printer Driver Panel	168
102.	IBM SCS Printer Driver: IBM 3812 Panel	169
103.	New Forms: IBM 3812 Panel	170
104.	Printer Job Properties: IBM 3812 Panel	171
105.	ASCII to EBCDIC Translation Table Path Panel	172
106.	IBM AFPDS Printer Driver: Generic Printer Panel	173
107.	IBM AFPDS New Forms Panel	174
108.	IBM AFPDS Printer Driver: Generic Printer Panel	175
109.	Change Unprintable Borders: Generic Printer Panel	178
110.	Network Printer Releasing	179
111.	NET400 Status	180
112.	Client Access/400 Products Registry Panel	181
113.	Selective Install Panel	183
114.	Installation Path Panel	184
115.	Selective Install Status Panel	184
116.	Client Access/400 General Settings Security Page	186
117.	Client Access/400 General Settings Language Page	187
118.	National Language - Advanced Options Page	188
119.	Client Access/400 General Settings Service Page 1	189
120.	Client Access/400 General Settings Transaction Program (TP) Page	191
121.	Client Access/400 General Settings TP - Add	192
122.	Update Settings Notebook	194

123.	Update Entry - Change Panel	194
124.	RUMBA/400 - Sample Panel	197
125.	RUMBA/400 Applications - Icon View	198
126.	RUMBA/400 Save Profile Panel	198
127.	Client Access/400 Templates Folder	200
128.	PC5250 Display Session - Settings Notebook	200
129.	LaunchPad	202
130.	OS/2 Warp DMI Browser	215
131.	Client Access/400 Manageability Structure	218
132.	Sample CASERV.CMD	221
133.	Sample CACOM.CMD	221
134.	HISTORY.LOG	229
135.	PROBLEM.LOG	229
136.	RUMBA/400 File Transfer Icon in Software Product Group	232
137.	RUMBA/400 AS/400 to PC Transfer	233
138.	RUMBA/400 File Transfer Save Profile - Panel	235
139.	RUMBA/400 Database Access Tool Bar Icons Description	236
140.	Query Builder - Library List	239
141.	Query Builder - Query Criteria	241
142.	Query Builder - Join Criteria	242
143.	Query Builder - Group Criteria	244
144.	Query Builder - Group Criteria	245
145.	Graphical Operations Main Group	256
146.	Graphical Operations Printer List	256
147.	Graphical Operations Printer List Details	257
148.	Graphical Operations Operator Work Area	257
149.	Network Printers	258
150.	Network Printer Details	259
151.	Graphical Access Main Menu	260
152.	Graphical Access Work with All Printers	261
153.	Graphical Access Work with Output Queues	261
154.	Graphical Access Create Network Server Description	262
155.	RUMBA/400 - Coloring Tool	265
156.	RUMBA/400 - Print Options Panel	266
157.	RUMBA/400 - Application Print Setup Panel	268
158.	RUMBA/400 - Application Print Setup Panel	270
159.	RUMBA/400 - Sample Application Print Output	271
160.	RUMBA/400 - 3-D Status Bar	276
161.	PC5250 - Tool Bar	279
162.	PC5250 Console Session - Settings Notebook	283
163.	PC5250 Twinaxial Attachment Display	283
164.	PC5250 SNA-over-Async Attachment Display	284

165.	PC5250 Twinaxial Attachment - AT-Bus Adapter Screen	284
166.	Client Access/400 VDD Architecture	299
167.	Selective Install - OS/2 Communications Options for DOS	302
168.	General Options for Client Access/400 for Extended DOS	304
169.	OS/2 Communications Options for DOS	305
170.	Example of Output from VDMSERV /D	312
171.	Configuring Client Access/400 for Extended DOS for Microsoft Windows	316
172.	Error Defining Connection Names Running Over TCP/IP	338
173.	WinPcs2 Error Panel	339
174.	Information Folder	342
175.	Sample CONFIG.SYS File Optimized for Performance 1/3	349
176.	Sample CONFIG.SYS File Optimized for Performance 2/3	350
177.	Sample CONFIG.SYS File Optimized for Performance 3/3	351
178.	Sample CONFIG.SYS for Client Access/400 over TCP/IP	352
179.	Sample CONFIG.SYS File	353
180.	Sample PRECOM.CMD File	354
181.	Sample CACOM.CMD File	354
182.	Sample CASERV.CMD File	354
183.	Sample CACOM.CMD File	355
184.	Sample CASERV.CMD File	355
185.	Sample PRECOM.CMD File	356
186.	Sample CACOM.CMD File	356
187.	Sample CASERV.CMD File	356
188.	CID response file example 1/2	357
189.	CID response file example 2/2	358

Tables

1.	Client Access/400 Optimized for OS/2 SNA Combined Worksheet	44
2.	Client Access/400 Optimized for OS/2 TCP/IP through LAN Installation Worksheet	47
3.	Comparison of Emulators	286
4.	Client Access/400 Optimized for OS/2 Directory Structure	347

Special Notices

This publication is intended to help Customers, Business Partners and IBM Systems Specialists understand the functions in Client Access/400 Optimized for OS/2. It provides advice and guidance on installation and configuration together with details of new functions and practical hints and tips. The information in this publication is not intended as the specification of any programming interfaces that are provided by Client Access/400 Optimized for OS/2. See the PUBLICATIONS section of the IBM Programming Announcement for Client Access/400 Optimized for OS/2 for more information about what publications are considered to be product documentation.

References in this publication to IBM products, programs or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent program that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program or service.

Information in this book was developed in conjunction with use of the equipment specified, and is limited in application to those specific hardware and software products and levels.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to the IBM Director of Licensing, IBM Corporation, 500 Columbus Avenue, Thornwood, NY 10594 USA.

The information contained in this document has not been submitted to any formal IBM test and is distributed AS IS. The information about non-IBM (VENDOR) products in this manual has been supplied by the vendor and IBM assumes no responsibility for its accuracy or completeness. The use of this information or the implementation of any of these techniques is a customer responsibility and depends on the customer's ability to evaluate and integrate them into the customer's operational environment. While each item may have been reviewed by IBM for accuracy in a specific situation, there is no guarantee that the same or similar results will be obtained elsewhere. Customers attempting to adapt these techniques to their own environments do so at their own risk.

Any performance data contained in this document was determined in a controlled environment, and therefore, the results that may be obtained in other operating environments may vary significantly. Users of this document should verify the applicable data for their specific environment.

The following document contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples contain the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

Reference to PTF numbers that have not been released through the normal distribution process does not imply general availability. The purpose of including these reference numbers is to alert IBM customers to specific information relative to the implementation of the PTF when it becomes available to each customer according to the normal IBM PTF distribution process.

The following terms are trademarks of the International Business Machines Corporation in the United States and/or other countries:

Advanced Function Printing	Advanced Peer-to-Peer Networking
AFP	AIX
AnyNet	Application System/400
APPN	AS/400
Client Series	Current
DATABASE 2	DATABASE 2 OS/400
DB2	DB2/2
DB2/400	Enterprise System/9000
ES/9000	FFST
FFST/2	First Failure Support Technology
First Failure Support Technology/2	IBM
ILE	Integrated Language Environment
Intelligent Printer Data Stream	IPDS
LAN Distance	MANAGEWARE
NetView	OfficeVision
OfficeVision/400	Operating System/2
Operating System/400	OS/2 32
OS/2	OS/400
Personal Computer AT	Personal Computer XT
Personal System/1	Personal System/2
Presentation Manager	PrintManager
Proprinter	PS/ValuePoint
PS/1	PS/2
PSF	RISC System/6000
RS/6000	S/370

S/390	SAA
Sysplex Timer	System/36
System/370	System/38
System/390	Systems Application Architecture
ThinkPad	Ultimedia
XGA	xHLLAPI
XT	3090
400	

The following terms are trademarks of other companies:

Windows is a trademark of Microsoft Corporation.

PC Direct is a trademark of Ziff Communications Company and is used by IBM Corporation under license.

UNIX is a registered trademark in the United States and other countries licensed exclusively through X/Open Company Limited.

DEC VT52, DEC VT100 and DEC VT220	Digital Equipment Corporation
EtherLink	3COM Corporation
PostScript	Adobe Systems, Inc.
1-2-3, Lotus, Freelance, Freelance	Lotus Development Corporation
Graphics	

Other trademarks are trademarks of their respective companies.

Preface

This document is unique in its detailed coverage of Client Access/400 Optimized for OS/2. It focuses on giving practical guidance for the installation, configuration and use of the client. It includes information on topics new to the Client Access/400 world such as TCP/IP and AnyNet concepts and configuration, and the new client management support that enables the AS/400 system to keep track of the PC hardware and software on each of the clients.

This document was written for Customers, Business Partners and IBM Systems Specialists who need an understanding of Client Access/400 Optimized for OS/2.

How This Document is Organized

The document is organized as follows:

- Chapter 1, "Overview."

This chapter introduces the Client Access/400 family of products, and in particular Client Access/400 Optimized for OS/2.

- Chapter 2, "Concepts."

This chapter introduces the new concepts used in Client Access/400 Optimized for OS/2. Some, such as TCP/IP and AnyNet, are large subjects in their own right, and in this publication we have tried to include sufficient detail from a Client Access/400 Optimized for OS/2 perspective.

The sections covered in this chapter are:

- 2.1, "TCP/IP Concepts"
- 2.2, "AnyNet Concepts"
- 2.3, "Simple Network Management Protocol (SNMP)"
- 2.4, "Desktop Management Interface (DMI)"

- Chapter 3, "Migration."

This chapter provides advice on installing Client Access/400 Optimized for OS/2 on PCs that already have communications products installed.

- Chapter 4, "Client Access/400 Optimized for OS/2 Installation."

This chapter describes the Client Access/400 Optimized for OS/2 installation process.

Client Access/400 Optimized for OS/2 integrates functions from a number of different PC products into one package. As a result, a large amount of code is needed during the installation process, and we recommend that wherever possible you avoid installing the client from diskettes. This chapter includes information on how to install from diskettes, CD-ROM, and from LAN servers including the AS/400 FSIOF.

- Chapter 5, "Configuration."

This chapter contains information on configuring the various parts of Client Access/400 Optimized for OS/2, and consists of the following sections:

- 5.1, "Templates."
- 5.2, "Startup Configuration Group."
- 5.3, "Configuration Group."
- 5.4, "Connections."
- 5.5, "Network Drives."
- 5.6, "Network Printers."
- 5.7, "Products Registry."
- 5.8, "Emulation."
- 5.9, "Automating Startup."
- 5.10, "Modifying Startup."
- 5.11, "CONFIG.SYS Recommendations."

- Chapter 6, "Client Management."

Client Management is provided through the Simple Network Management Protocol (SNMP) agent and System Information Agent (SIA) event reporting. Client Access/400 Optimized for OS/2 reports both the software that is installed on the PC, and software errors to the AS/400 system, making it an easier task to manage PC clients in the network.

This section explains client management concepts, and how Client Access/400 Optimized for OS/2 implements these concepts.

- Chapter 7, "Accessing AS/400 Data."

In this chapter, you can find how to access AS/400 data, and how to transfer data to and from the AS/400 system.

This chapter contains the following sections:

- 7.1, "File Transfer Commands"
- 7.2, "RUMBA/400 File Transfer"
- 7.3, "RUMBA/400 Database Access"
- 7.4, "Open Database Connectivity"

- Chapter 8, "Remote Commands." This section describes the various remote command functions that are provided as part of Client Access/400 Optimized for OS/2 and includes the following:

- 8.1, "RUNRMTCMD Run Remote Command"
- 8.2, "Remote Command"
- 8.3, "Distributed Program Call"

- Chapter 9, "Graphical Interfaces."

This chapter contains information on the various graphical interfaces that are available, and includes:

- 9.1, "Graphical Operations."
- 9.2, "System Object Access."
- 9.3, "Graphical Access for OS/400."

- Chapter 10, "Emulators."

This chapter looks at the emulators that are provided with Client Access/400 Optimized for OS/2 and also at those emulators that are available separately from Client Access/400.

- Chapter 11, "Client Access/400 in Virtual DOS Machines."

This chapter contains details of the support provided for Client Access/400 for Extended DOS in OS/2 Warp Virtual DOS Machines (VDMs). This support is basically the same as with Extended DOS PC Support/400 Version 2.0 Release 3.0 and OS/2 2.1. Refer to *Using V2R3 DOS and OS/2 PC Support/400 under OS/2 2.1, Including CM/400, CM/2 and RUMBA/400 for OS/2*, GG24-4070-01, for details. Parts of this document are based on that publication.

It contains the following sections:

- 11.1, "An Introduction to Virtual DOS Machines (VDMs)"
- 11.2, "Client Access/400 for Extended DOS in OS/2 VDMs"
- 11.3, "Virtual DOS Machine Configuration for Client Access/400"

11.4, "Running Client Access/400 for Extended DOS Under WIN-OS/2"

- Chapter 12, "Mixed Version Networks."

This section describes the issues involved when running Client Access/400 Optimized for OS/2 in a network consisting of AS/400 systems with different levels of OS/400.

- Chapter 13, "Performance Tuning OS/2 Warp."

This chapter contains information about performance tuning OS/2 WARP to get the best out of the PC hardware that you have. It gives advice on file systems, and CONFIG.SYS settings.

- Chapter 14, "Hints and Tips."

This section contains a selection of miscellaneous hints and tips that you may find useful.

- Appendix A, "Documentation."

This section contains information on where to find help and documentation on Client Access/400 Optimized for OS/2. It covers the following topics:

- A.1, "Introduction"
- A.2, "Information"
- A.3, "Error Messages"
- A.4, "Publications"

- Appendix B, "Directory Structure."

This section contains a table showing the directory structure used by Client Access/400 Optimized for OS/2.

- Appendix C, "Configuration Files."

This section contains sample configuration files used in various different types of installations.

- Appendix E, "Refresh, Availability"

This section summarizes the functions that are available in the refresh of Client Access/400 Optimized for OS/2. It also contains a table which summarizes the availability of each of the functions for all of the clients in the Client Access/400 family.

Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document.

- *PC Support/400: DOS Installation and Administration Guide*, SC41-0006
- *Client Access/400 for Windows 3.1 - Getting Started*, SC41-3530
- *Client Access/400 for Windows 3.1 API and Technical Reference*, SC41-3531
- *Client Access/400 RUMBA/400 User Guide*, SC41-3550
- *Client Access/400 RUMBA/400 Tools*, SC41-3551
- *Client Access/400 for Windows 3.1 PC5250 Setup (User's Guide)*, SC41-3552
- *Client Access/400 PC5250 Reference Guide*, SC41-3553
- *Client Access/400 PC5250 Programmer's Guide*, SC41-3554
- *DATABASE 2/400 SQL Reference*, SC41-3612
- *AS/400 Integrated File System Introduction*, SC41-3711
- *OS/400 Server Concepts and Administration*, SC41-3740
- *AS/400 Physical Planning Guide and Reference*, GA41-9571
- *ASCII Workstation Reference and Example*, SA41-9922
- *Microsoft ODBC Software Development Kit Programmer's Reference*
- *Windows Resource Kit for Microsoft Windows Operating System Version 3.1*
- *Microsoft ODBC 2.0 Programmer's Reference and SDK Guide*
- *Novell NetWare Workstation Basics and Installation*

International Technical Support Organization Publications

Below is a list of ITSO publications that are currently available which relate to the AS/400.

AS/400 redbooks are also available on CD-ROM, by adding feature code #8053 to your OS/400 software profile.

- *System/36 to AS/400 System Migration*, GG24-3249-01
- *System/36 to AS/400 Application Migration*, GG24-3250-01
- *AS/400: System/38 Application Migration to AS/400*, GG24-3251-00 (available on CD-ROM only)
- *AS/400 Communication Migration*, GG24-3253-00
- *AS/400 Office in a DIA/SNADS Network*, GG24-3268-00 (available on CD-ROM only)
- *Converting S/36 Environment Application to Native*, GG24-3304-01
- *AS/400 Communications Problem Determination*, GG24-3305-00

- *SQL/400: A Guide for Implementation OS/400 V2R2*, GG24-3321-03
- *AS/400 - S/370 Connectivity*, GG24-3336-00
- *AS/400, S/38 and PS/2 as T2.1 Nodes in a Subarea Network*, GG24-3420-00
- *Writing SAA Applications for AS/400*, GG24-3438-00
- *IBM AS/400 TCP/IP Operation and Configuration*, GG24-3442-02
- *IBM AS/400 in Large Networks: A Case Study*, GG24-3447-00
- *AS/400 Communications Definitions Examples*, GG24-3449-00
- *AS/400 Object Distribution Facility and SNA RSCS PROFS*, GG24-3479-00
- *IBM AS/400 ISDN Connectivity*, GG24-3517-00
- *OfficeVision/400 and AS/400 Query Applications in a Multilingual Environment*, GG24-3579-00
- *Managing Multiple AS/400s in a Peer Network*, GG24-3614-02
- *OfficeVision/400 in a DIA/SNADS Network*, GG24-3625-00
- *AS/400 Audit and Security Enhancements in OS/400*, GG24-3639-00
- *WAF/400 5363 Optical Subsystem Configuration and Installation*, GG24-3680-00
- *OfficeVision/400 Printing*, GG24-3697-00
- *AS/400 Printing II*, GG24-3704-00
- *AS/400 APPN with PS/2 APPN, 3174 APPN, 5394 and Subareas*, GG24-3717-00
- *AS/400 CPI Communications Selected Topics*, GG24-3722-00
- *AS/400 Performance Management V2R2*, GG24-3723-02
- *Multimedia Examples with the AS/400 Using AVC*, GG24-3743-00
- *Getting Started with AS/400 OSI*, GG24-3758-00
- *AS/400 Communication Definition Examples Volume 2*, GG24-3763-00
- *Installation Considerations for National Language*, GG24-3790-00
- *Artificial Intelligence and AS/400: Neural Networks and Knowledge Based Systems*, GG24-3793-00
- *Facsimile Support/400 Implementation*, GG24-3797-00
- *Application Development on the AS/400*, GG24-3806-00
- *PC Support/400 Asynchronous and SDLC Configuration (CD-ROM only) Examples*, GG24-3808-00
- *5494 & OS/2 ES: Connecting Remote User Groups*, GG24-3828-00
- *AS/400 Automation Using NetView and SNA MS Transport*, GG24-3841-00
- *DOS PCS/400 in OS/2 V2 Virtual DOS Machine*, GG24-3856-00
- *WAF/400 Administration and User Examples*, GG24-3866-00
- *OfficeVision/400 Application Enabler*, GG24-3868-00
- *Cooperative Processing and GUI in an AS/400 Environment*, GG24-3877-00
- *OfficeVision/400 Application Programming Interfaces V2R2*, GG24-3885-00
- *OfficeVision/400 Integration with CallPath/400 and Fax Support*, GG24-3896-00
- *AS/400 Performance Capacity Planning V2R2*, GG24-3908-00

- *AS/400 System Availability and Recovery for V2R2*, GG24-3912-00
- *AS/400 Network Routing Facility*, GG24-3918-00
- *AD/CYCLE Code/400, ADM/400 and ADS/400*, GG24-3928-00
- *OfficeVision/400 V2 Technical Tips and Techniques*, GG24-3937-00
- *CICS/400 Migration from Mainframe CICS*, GG24-4006-00
- *Using DOS PC Support/400 with Novell NetWare 3.11 and NetWare for SAA 1.3*, GG24-4013-00
- *Ultimedia Video Delivery System/400*, GG24-4020-00
- *AS/400 Client Series - Products and Positioning*, GG24-4027-01
- *IBM AS/400 Printing III*, GG24-4028-00
- *Performance Benchmarking for the AS/400*, GG24-4030-00
- *AS/400 and RISC System/6000 Connectivity*, GG24-4039-00
- *Using V2R3 DOS and OS/2 PC Support/400 under OS/2 2.1*, GG24-4070-01
- *Apple Macintosh and the AS/400*, GG24-4071-00
- *OfficeVision/400 Application Enabler Version 2 Release 3*, GG24-4072-00
- *The IBM AS/400 as a TCP/IP Network File Server*, GG24-4092-00
- *ENVY/400 Hints and Tips*, GG24-4094-00
- *Introduction to ENVY/400*, GG24-4126-00
- *Managing Operations on AS/400s with IBM SAA SystemView OMEGAMON Services/400*, GG24-4136-00
- *AS/400 Integrated Language Environment*, GG24-4148-00
- *CICS/400 V2R3 Task Book*, GG24-4182-00
- *AS/400 V2R3 Software Life Cycle Management with ADM/400*, GG24-4187-00
- *An Implementation Guide for AS/400 Security and Auditing including C2, Cryptography, Communications and PC Connectivity*, GG24-4200-00
- *IBM AS/400 APPN Problem Management*, GG24-4222-00
- *DB2/400 Advanced Database Functions*, GG24-4249-00
- *V2R3 PC Support/400 and Microsoft Windows 3.1 Advanced Topics*, GG24-4253-00
- *OfficeVision/400: Printer Setup in an OfficeVision Environment*, GG24-4283-00
- *AS/400 Client Series Handbook*, GG24-4285-00
- *Backup Recovery and Media Services/400 Implementation Tips and Techniques*, GG24-4300-00
- *Managing AS/400 with Operations Control Center/400*, GG24-4372-00
- *Implementing LANRES/400 with Novell NetWare*, GG24-4373-00
- *IBM Current-OV/400 Workgroup Program V1 R1 Modification 0 Refresh 1*, GG24-4377-00
- *LAN Server/400 A Guide to Using AS/400 as a File Server*, GG24-4378-00
- *Communications Definitions III*, GG24-4386-00
- *IBM AS/400 Printing IV*, GG24-4389-00

- *Client Access/400 API Planning Guide*, GG24-4422-00
- *AnyMail/400 Mail Server Framework Developer Guide*, GG24-4449-00
- *Implementing Hierarchical Storage on the AS/400*, GG24-4450-00

A complete list of International Technical Support Organization publications, with a brief description of each, may be found in:

To get a catalog of ITSO technical publications (known as “redbooks”), VNET users may type:

```
TOOLS SENDTO WTSCPOK TOOLS REDBOOKS GET REDBOOKS CATALOG
```

How to Order ITSO Redbooks

IBM employees in the USA may order ITSO books and CD-ROMs using PUBORDER. Customers in the USA may order by calling 1-800-879-2755 or by faxing 1-800-284-4721. Visa and Master Cards are accepted. Outside the USA, customers should contact their local IBM office.

Customers may order hardcopy ITSO books individually or in customized sets, called GBOFs, which relate to specific functions of interest. IBM employees and customers may also order ITSO books in on-line format on CD-ROM collections, which contain redbooks on a variety of products.

Acknowledgments

This project was designed and managed by:

Nick Hutt
International Technical Support Organization, Rochester Center

The authors of this document are:

Sally Moore
IBM United Kingdom

Jim Olliges
IBM Rochester

Ruben Perez Farfan
IBM Mexico

Morten Rasmussen
IBM Denmark

Christian Wassmer
IBM Switzerland

This publication is the result of a residency conducted at the International Technical Support Organization, Rochester Center.

Thanks to the following people for the invaluable advice and guidance provided in the production of this document:

Brian Smith
International Technical Support Organization, Rochester Center

Gary Mullen-Schultz
International Technical Support Organization, Rochester Center

Randy Baartman
IBM Rochester (SNMP/DMI)

Fiona Collins
IBM United Kingdom

Bob Dick
IBM Rochester

Joe DiCecco
IBM Rochester

Todd Johnson
IBM Rochester

Doug Beauchene
IBM Rochester

Lois Douglas
IBM Rochester (Editor)

Jim Kronk
IBM Raleigh

Ron Cadima
IBM Boca Raton, FL (WARP Performance)

Clark A. Scholten
IBM Rochester

Mark Vanderwiel
IBM Rochester

Chapter 1. Overview

This chapter introduces the Client Access/400 family of products, and in particular Client Access/400 Optimized for OS/2.

1.1 Client Access/400 Family

While the emphasis with Client Access/400 is on the new clients, it is essential that you understand the structure for the entire Client Access/400 product. The following categories represent the Client Access/400 family:

- Original Clients

These are the clients that remain primarily unchanged from their PC Support/400 predecessor in terms of function. The packaging approach did change so that rather than ordering multiple products and features to fulfil a specific requirement, Client Access/400 packages what used to be the different products and features together. The *original* clients are:

- Client Access/400 for DOS Extended
- Client Access/400 for DOS Base
- Client Access/400 for OS/2 1.3

If you are currently using PC Support/400 with Version 2.0 and you run the update program after installing Version 3.0 Release 1.0 on your AS/400 system, the clients are be automatically updated by the Client Access/400 migration program. If you are currently using Version 2.0 Release 3.0 OS/2 PC Support/400 you will be automatically updated to Version 3.0 Release 1.0 Client Access/400 for OS/2, *not* to the new Client Access/400 Optimized for OS/2 client.

Even though OS/2 1.3 is included in the product name, this client actually supports OS/2 at Version 1.3, OS/2 2.0 or later and OS/2 Warp.

- Client Access/400 for Windows 3.1 Client

The Client Access/400 for Windows 3.1 client is also known as an *enhanced original* client. While it is not a 32-bit client, since Microsoft Windows 3.1 is a 16-bit operating environment, much of the code has been rewritten to take advantage of Windows 386 Enhanced mode.

- Optimized Clients

The *optimized* clients are designed for advanced operating systems such as OS/2, AIX, UNIX, and Windows 95. Object oriented design creates a

portable code base and allows close integration with the client platform. The first of the optimized clients to ship was Client Access/400 Optimized for OS/2.

1.2 Client Access/400 Overview

While the AS/400 system provides a powerful platform for distributed client serving, the main objective of Client Access/400 is to provide desktop services for the personal workstation. In Version 3.0, Client Access/400 replaces PC Support/400.

Additional Client Access/400 products will support popular PC platforms such as AIX, UNIX, and Macintosh. Clients will be introduced for future Microsoft products including Windows95 on a “ship when ready” basis.

PC Support/400 contained both AS/400 server code and client code for each of the supported client environments (DOS, DOS Extended and OS/2), along with options for Single- Byte Character Sets (SBCS) and Double- Byte Character Sets (DBCS). RUMBA/400 and Communications Manager/400 for OS/2 were available as separate features.

In Version 3.0 Release 0.5, the server code was integrated into OS/400 and the client code was separated into different products for the various client environments. The features provided with PC Support/400 is commonly referred to as “original” support. There are *original* client products for DOS, DOS Extended, and OS/2 and there are *original* servers for those clients in OS/400.

The new support added in Version 3.0 Release 1.0, is referred to as *optimized* support.

The *original servers* have support for: file transfer, remote SQL, data queues, virtual print, license management, message function and shared folders. The new *optimized servers* have support for file serving (network drives), database, network print, central server function, data queues and security.

Client Access/400 Optimized for OS/2 takes full advantage of the optimized servers.

1.2.1 OS/400 Server Functions

OS/400 servers provide a way for personal computers to access and use AS/400 resources. With Version 3.0 Release 1.0 these have been separated and the server portions are now part of OS/400. This allows business partners and system administrators to know that users can access client functions from any AS/400 system in the network without having to worry if a license for Client Access/400 was acquired for that AS/400 or not.

This was also needed so that additional clients could be introduced at any time, also known as “ship when ready.”

A number of enhancements have been made to the server code, including:

- A new file server that replaces the shared folder servers.
- Improved performance for database access, including ODBC.
- A new network print server providing many new APIs for clients.
- A new data queue server.
- A remote command and program call server to provide the ability to issue commands and call programs on the AS/400 system and pass the results back to the client.
- A central server providing services such as license management and other client management functions.
- A user exit registration program that improves performance and granularity for user exit programs. If you utilize user exit programs with Version 2, you should review what modifications should be made for them to work with Version 3.

1.2.1.1 Subsystems Used for Server Jobs

The server jobs are configured to run in different subsystems on the AS/400 system, depending on their function. The following is a short description of the subsystems that are used for the server jobs.

1.2.1.2 QCMN

The QCMN subsystem supports all communications jobs. It contains attributes that allow all communication jobs to be accepted into this subsystem if there are no other subsystems defined that accept the jobs. All of the server jobs, *except* the file server and the database server, run in this subsystem if the default configuration is used.

1.2.1.3 QSERVER

The QSERVER subsystem is new for Version 3.0 Release 1.0. The file server (previously called the shared folders type 2 server) and the data base server must run in this subsystem. Open Database Connectivity (ODBC) jobs also run in this subsystem.

This subsystem contains a communications entry that causes all communications jobs that request to use the QSERVER mode to start in this subsystem. The database clients use this method to start the database server.

Note: If you are running Client Access/400 Optimized for OS/2 through an intermediate APPN node, such as an OS/2 gateway or another AS/400 system, you must define the QSERVER mode on the intermediate system.

The file server jobs also run in this subsystem, but their communications job requests are first be routed to the QCMN subsystem, and then moved to the QSERVER subsystem.

Prior to Version 3.0 Release 1.0, all shared folders type 2 jobs ran in a subsystem called QXFPCS. This subsystem is not used in Version 3.0 Release 1.0, and is replaced with the QSERVER subsystem.

Several of the OS/400 servers use prestart jobs in Version 3.0 Release 1.0 to improve startup performance. The database server, central server, remote command and program call server and network print server are configured to use prestart jobs. The prestarted jobs should be monitored to get best performance! This is very important in a client/server environment where the AS/400 system acts as a database server.

For more information on server functions please review *OS/400 Server Concepts and Administration*.

1.2.1.4 OS/400 Version 3.0 Release 1.0 Performance Improvements

Software performance gains have been achieved with a combination of improvements in system utilization and response time over OS/400 Version 2.0. Generally, the effect on an application ranges up to eight times improvement in system utilization and five times improvement in response time.

- OS/400 APPC communications programs have been streamlined so that performance gains are achieved when using the Client Access/400 APPC

communications protocol. Performance of OS/400 TCP/IP communications programs has also been enhanced.

- Enhancements to OS/400 database programs enable Client Access/400 SQL requests to run up to three times faster.
- Data stored in the "root" file subsystem of the new Integrated File System is accessed faster than data stored in QDLS library structure (shared folders).

1.2.1.5 Changes to Shared Folders Support

The shared folders file server has been rewritten to a new interface on the AS/400 system as part of the Open Systems Enablement support. Use of this interface enables the shared folders file server to:

- Work with the entire AS/400 namespace, including AS/400 objects.
- Interact with file systems other than QDLS ("old" shared folders).

The name has been changed from shared folders to network drives for the Client Access/400 Optimized for OS/2 client.

1.2.2 IFS Introduction

The Integrated File System is a part of OS/400 that supports stream input/output and storage management similar to personal computer and UNIX operating systems, while providing an integrating structure over all of the information stored in the AS/400 system.

The key features of the Integrated File System are the following:

- Support for storing information in stream files that can contain long continuous strings of data. These strings of data might be, for example, the text of a document or the picture elements in a picture. The stream file support is designed for efficient use in client/server applications.
- A hierarchical directory structure that allows objects to be organized like in a way similar to fruit on the branches of a tree. An object is accessed by specifying the path through the directories to the object.
- A common interface that allows users and applications to access not only the stream files but also database files, documents, and other objects stored in the AS/400 system.

With this support, the AS/400 system can support several different file systems with similar interfaces. A file system provides the support that allows users and applications to access specific segments of storage that are

organized as logical units. These logical units are files, directories, libraries and objects. The AS/400 file systems in Version 3.0 Release 1.0 are:

“root” The / file system. This file system is designed to take full advantage of the stream file support and hierarchical directory structure of the Integrated File System. It has the characteristics of the DOS and OS/2 file systems.

QOpenSys

The open systems file system. This file system is designed to be compatible with UNIX-based open system standards, such as POSIX and XPG. It takes advantage of the stream file and directory support provided by the Integrated File System in a similar way to the root file system. In addition, it supports case-sensitive object names.

QSYS.LIB The library file system. This file system supports the AS/400 library structure. It provides access to database files and all of the other AS/400 object types that are managed by the library support.

QDLS The document library services file system. This file system supports the folders structure. It provides access to documents and folders.

QLANSrv The LAN Server/400 file system. This file system provides access to the same directories and files that are accessed through the LAN Server/400 licensed program. It allows users of the OS/400 file server and AS/400 applications to use the same data as LAN Server/400 clients.

The IFS enhances the already extensive data management capabilities of OS/400 with additional capabilities to better support emerging and future forms of information processing, such as client/server, open systems and multimedia. Following are some of the benefits provided by the IFS:

- Provides fast access to AS/400 data, especially for applications using the Client Access/400 file server.
- Allows more efficient handling of the increasingly important types of stream data, such as images, audio, and video.
- Provides a file system and directory base for supporting UNIX-based open system standards, such as POSIX and XPG. This file and directory structure also provides a familiar environment for users of PC operating systems, such as DOS and OS/2.

- Allows file support with unique capabilities (such as record-oriented database files, UNIX-based stream files, and file serving) to be handled as separate file systems, while allowing them all to be managed through a common interface.
- Allows PC users to take better advantage of the desktop graphical user interface. For example, OS/2 users can use the OS/2 graphical tools to operate on AS/400 stream files and other objects in the same way they operate on files stored on their PCs.
- Provides continuity of object names and associated object information across national languages. This support ensures that individual characters remain the same when switching from the code page of one language to the code page of another language.

1.2.2.1 Why IFS is Important to Client Access/400 Users

The introduction of the Integrated File System in Version 3.0 Release 1.0 has some major consequences on the way that data is stored and retrieved on the AS/400 system.

The original Client Access/400 clients do not have access to the IFS; they are able to only access the QDLS, or shared folder branch of the system. The Client Access/400 Optimized for OS/2 and the Client Access/400 for Windows 3.1 clients are the first of the new clients that access the entire IFS. Users of Client Access/400 Optimized for OS/2 can graphically see the entire IFS using the OS/2 Drives icon as shown in Figure 1 on page 8.

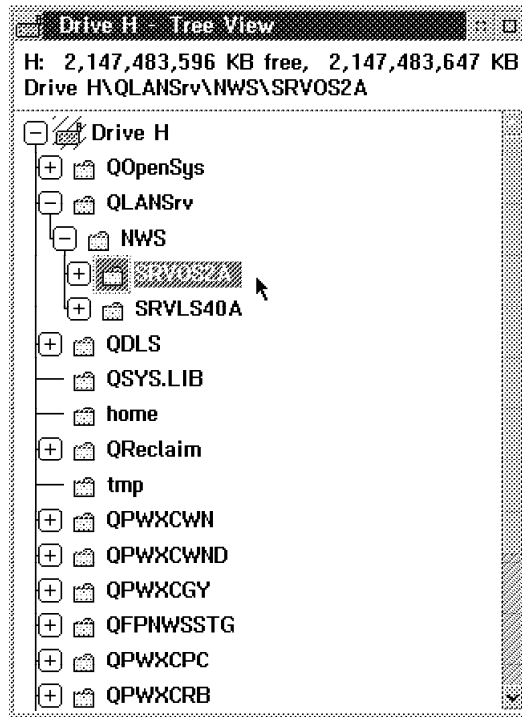


Figure 1. OS/2 Drives View of the IFS

In this figure you notice that QDLS, QLANSrv and QOpenSys are listed as directories on the root file system. When you display \QLANSrv\NWS shown in Figure 1 two servers are listed. One is an FSIOP in the AS/400 system and the other one is an OS/2 LAN Server that we are attached to via the IFS and LAN Server/400.

Warning!

We do not recommend accessing QSYS.LIB from the OS/2 Drives Icon or using the DIR command from an OS/2 command prompt. Currently, accessing the QSYS.LIB object causes a large list of all objects in library QSYS to be returned to the client. This can take in excess of 30 minutes to process and have an adverse effect on AS/400 resource utilization. A design change will be made in the future so that when QSYS.LIB is queried, only a list of product libraries is returned.

Note that the LAN requester function is not installed on this client; Client Access/400 Optimized for OS/2 network drives are used to access the remote OS/2 LAN Server resources.

The integration of Client Access/400 Optimized for OS/2 into the IFS provides some benefits, and also poses some difficulties. One major benefit is the ability to use Client Access/400 Optimized for OS/2, in conjunction with LAN Server/400, to access remote LAN functions.

Probably the main area of difficulty when using the IFS is when you have mixed clients, some with the ability to access the IFS and others that cannot. This can make it difficult to place data in a file system that provides maximum performance while still allowing for access by all clients. Fortunately, it is likely that this will be addressed in a future Client Access/400 for Extended DOS release.

Note: Methods used for save/restore are not the same for data in the IFS as they are for shared folders in QDLS, and save/restore should be reviewed in this light. For further information on the Integrated File System, review *IFS Introduction: SC41-3711*.

1.2.3 Compatibility with PC Support/400

Client Access/400 Optimized for OS/2 has preserved the OS/2 PC Support/400 16-bit API functions, but not the APIs themselves. If you have applications that make use of the OS/2 PC Support/400 APIs, you have to continue running the original client to support these applications. Running the original OS/2 client at the same time as Client Access/400 Optimized for OS/2 is possible (see 3.1, "OS/2 PC Support/400 or Client Access/400 for OS/2" on page 30 for details).

As with the Update function of PC Support/400, Client Access/400 software is distributed and maintained using AS/400 system management functions which provide software distribution and control, PTF distribution, and remote support. When new software is installed on an AS/400 system, Client Access/400 uses the update function to distribute the new software to Client Access/400 workstations on the network without end-user intervention. Client Access/400 Optimized for OS/2 uses a product registry format to provide enhanced maintenance support and serviceability.

1.2.4 Connectivity Options

Client Access/400 Optimized for OS/2 and Client Access/400 for Windows 3.1 use Multiprotocol Transport Networking (MPTN) architecture to communicate across both SNA and TCP/IP networks. APPC communications programs are included for all of the Client Access/400 family packages, and TCP/IP stacks are included for the OS/2 Optimized and Windows 3.1 clients.

Client workstations connected on token-ring or Ethernet LANs also need the IBM LAN programs that provide the device drivers and associated program interfaces. The following software is provided with the clients:

- IBM LAN Support Program for DOS and Windows operating systems
- IBM NTS/2 Program with LAPS (LAN Adapter and Protocol Support) for OS/2 operating systems
- IBM TCP/IP product subset is provided with the Client Access/400 Optimized for OS/2 and Windows 3.1 clients to allow connections over TCP/IP networks.

Note:

Telnet, FTP, NFS, SMTP, and LPR/LPD functions are not provided in the TCP/IP stacks that ship with the clients.

Client Access/400 supports a wide variety of connections to AS/400 systems, such as IBM token-ring, Ethernet, SDLC, asynchronous, Twinaxial, IBM Fiber Distributed Data Interface (FDDI), X.25, and ISDN. In addition, workstations are supported through remote gateways, such as IBM 5394/5494 Remote Controllers, and 8229 bridge.

The supported connectivities for the initial version of Client Access/400 Optimized for OS/2 are LAN (token ring and ethernet) and twinax. SDLC and async will be added in the refreshed version, and the other connectivities are available by using Communications Manager/2 1.11 in conjunction with Client Access/400 Optimized for OS/2.

1.2.4.1 Communications Console Feature

Client Access/400 now provides system console support using a personal computer serial connection to the AS/400 system. This eliminates the need for a non-programmable terminal (NPT) as the system console.

1.2.5 Programming Interfaces

Support for the following industry-standard interfaces is provided. These interfaces have been adopted by a wide range of IBM and non-IBM platforms.

- Common Programming Interface for Communications (CPI-C) is an adopted standard for developing Advanced Program-to-Program Communication (APPC) applications. CPI-C provides full-duplex conversation support. This is ideal for distributed applications such as desktop conferencing that require simultaneous peer communications. One of the main benefits of CPI-C is that it allows you to write APPC programs on a variety of platforms without having to learn a platform-specific interface.
- Sockets is an accepted interface standard for applications that use TCP/IP networks.
- Advanced Program-to-Program Communications (APPC) is a protocol used by Digital Equipment Corporation, Hewlett-Packard, Novell, Apple, AT&T, SUN Microsystems, UNIX, and Wang, as well as IBM.
- Enhanced Low-Level Application Programming Interface (EHLLAPI) is a programming interface for many 3270 and 5250 emulation products. EHLLAPI support is provided by the RUMBA/400 and Personal Communications/5250 emulators.
- Open Database Connectivity (ODBC) is a documented interface developed by Microsoft for accessing database information. ODBC driver interfaces are written by the database vendor to this standard. This allows developers to create applications for accessing database management systems (DBMS) without having to code for DBMS platform specific considerations. Through the use of ODBC driver interfaces, an application can manipulate data regardless of the source.

1.2.6 Choice of GUI 5250 Emulators

Client Access/400 provides two emulation products, RUMBA/400 and Personal Communications/5250 for both the Client Access/400 Optimized for OS/2 and Client Access/400 for Windows 3.1 clients. Both programs are native to the client platform and provide features such as multiple display and printer sessions, keyboard macro support, clipboard cut and paste, and so on. Rumba/400 is also available for the Client Access/400 for OS/2 1.3 client in a separate version.

Workstation Function (WSF) is provided with the original DOS clients, and it is possible to run the Extended DOS version of WSF in a DOS session under OS/2 together with Client Access/400 Optimized for OS/2. You may want to do this to allow AS/400 graphics to be displayed.

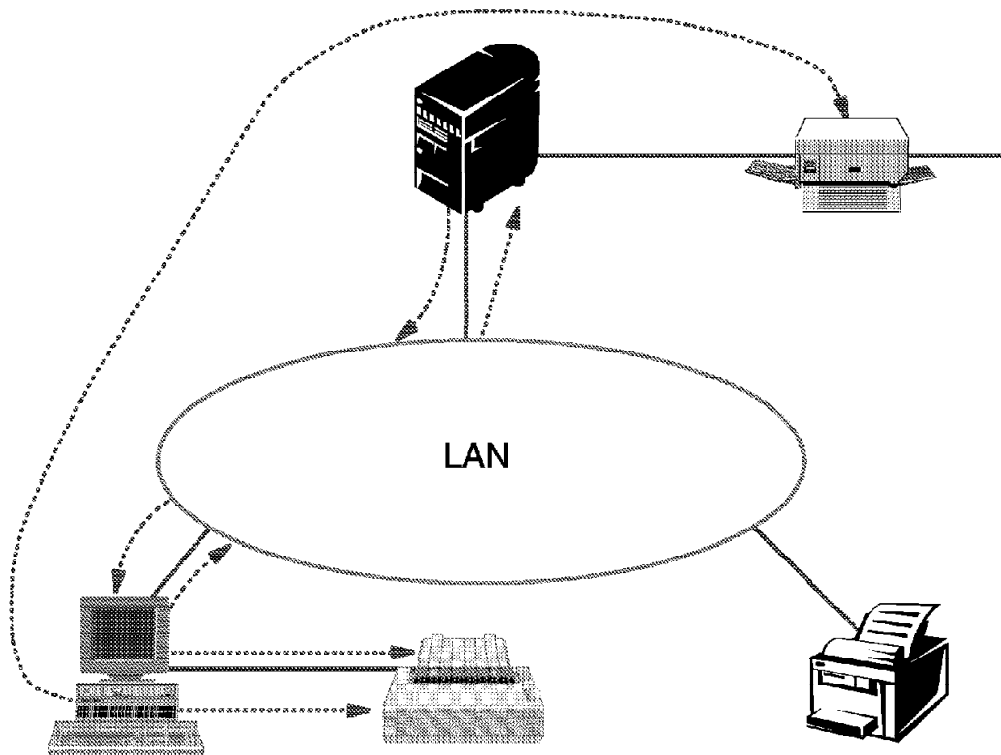
For information on using WSF Graphics support in a OS/2 VDM, review 11.3.5, “Configuring a VDM for AS/400 Graphics” on page 307.

For more information on the emulators provided, please review Chapter 10, “Emulators” on page 263.

1.2.7 Print Services

PC users can use any AS/400 host or Version 3.0 Release 1.0 PC printer defined as an AS/400 network printer. Version 3.0 Release 1.0 OS/400 also supports PC printers attached directly to token-ring and Ethernet LANs. This requires a LAN connection using a Marknet XLe or the Integrated Network Option (INO) available on certain printers. For more information about ASCII LAN-Attached printing, see *IBM AS/400 Printing IV*, GG24-4389.

- Through the use of Printer Emulation services, users can print AS/400 generated output on any PC attached printer in the network.
- Through the use of Network Print services, users can print PC generated output on any AS/400 printer in the network.
- The PC ASCII printer data stream can be routed transparently to the AS/400 system, and sent as a spooled file to any PC printer defined to the network.
- Through the use of a supplied driver, graphical output from a Windows or OS/2 application can be directed to an Advanced Function Printing (AFP) capable printer.



JOLL011.PRE-1

05/95

Figure 2. AS/400 Printing Illustration

- A subset of the IBM Advanced Function Printing (AFP) Workbench product will ship with the refresh versions of the Microsoft Windows and Client Access/400 Optimized for OS/2 clients. It allows you to view and manipulate documents residing on a PC or the AS/400 system. The AFP viewer provided with Client Access/400 supports AFP, SCS, and ASCII formats, and is available for an unlimited time. Some other functions are provided on a "try-and-buy" basis, and will be disabled for each individual client after 25 uses (printing for example).

1.2.8 Access to Data

The ability to retrieve information from the AS/400 system and other databases is provided through integrated support for Open Database Connectivity (ODBC), Database Access GUI and File Transfer. Additional information on these topics is found in Chapter 7, "Accessing AS/400 Data" on page 231.

In Version 3.0 Release 1.0, the OS/400 file serving capability is enhanced by the introduction of the Integrated File System (IFS) that allows libraries, objects, folders, documents, OS/2 and UNIX compatible byte stream files, and LAN Server/400 file system data to be accessed in a consistent manner. A separate subsystem can now be allocated specifically for file serving, and a set of commands are provided to make it easy to move PC data from the folders directory (that is, shared folders) to the "root" file system directory. The new file system provides increased performance over shared folders (QDLS) and provides a consistent interface for manipulating PC files. Client Access/400 for Windows 3.1 was the first client enabled to access the IFS. Client Access/400 Optimized for OS/2 also provides access to the IFS namespace.

1.2.9 Security Improvements

Some of the security enhancements provided with Client Access/400 are:

- Encryption - the log in password is now encrypted in the client communications data stream so it cannot be compromised in the network.
- Users can change expired passwords without having to start up 5250 emulation.
- System value QDSPSGNINF (display sign-on information) can be set to either display or suppress the time and date of the last sign-on.

Warning!

The password encryption only applies to the router password and not to the password entered on an AS/400 sign-on panel. For example, when you sign on to a RUMBA/400 or PC5250 session, the password is sent to the AS/400 system unencrypted. This can be avoided by configuring the emulator to bypass the Signon display.

For additional information about Version 3.0 Release 1.0 security enhancements, please review *Security - Reference: SC41-3302*.

1.2.10 OS/400 Graphical Operations Support

This function provides an iconic interface that allows users to handle some AS/400 tasks with icons instead of commands. Users are able to directly manipulate the icons with "point and click" or "drag and drop" actions, rather than by typing commands and command parameters to complete tasks. Graphical Operations is designed for the casual end-user, providing an alternative (Graphical User Interface) GUI front-end to systems functions.

OS/400 Graphical Operations supports management and use of these AS/400 functions:

- Printer output, output message, and printers
- Sending and receiving messages
- Jobs and job queues
- Messages, message queues, and job logs
- Signed on users
- Libraries and objects

1.3 Client Access/400 Optimized for OS/2 Introduction

Client Access/400 Optimized for OS/2 is the first 32-bit client in the Client Access/400 family. Developed using object-oriented programming principles, Client Access/400 Optimized for OS/2 provides automated installation, enhanced service functions, and improved configuration. Client Access/400 Optimized for OS/2 requires OS/2 2.11 or higher, OS/2 for Windows, or OS/2 Warp.

The initial version of Client Access/400 Optimized for OS/2 shipped on May 26, 1995. A refresh is planned for this client in September 1995. The refresh includes enhancements for ODBC level 2, NLV (language) support, AFP workbench subset and native asynchronous and SDLC connectivity among others.

This publication focuses on the Client Access/400 Optimized for OS/2 features available as of May 26, 1995. Ultimedia System Facilities are not covered in this publication.

Client Access/400 Optimized for OS/2 provides an integrated communications layer that allows connections over SNA and TCP/IP networks. IBM NTS/2, CM/2, and AnyNet products comprise this layer and allow protocol independence. Some of the functions provided are:

- Client Management

- Terminal and Printer Emulation
- Network Print services (Virtual Print)
- Network Drive services (Shared Folders)
- Data Access facility
- Product Registry (Application Update)
- Application Program Interfaces

1.3.1 Client Management

The integration of AnyNet/2 into Client Access/400 Optimized for OS/2 provides Simple Network Management Protocol (SNMP) support for managing client workstations. SNMP allows for installed product information and problem reports from the client workstation to be sent directly to the AS/400 system for analysis. The Desktop Management Interface (DMI) is also provided in Client Access/400 Optimized for OS/2. DMI provides tools that allow hardware and software vendors to enable their products to be managed in a heterogeneous environment. For more information, see 6.1, “DMI Overview” on page 211. System Information Agent (SIA), support gathers hardware and software information on the client, and uses SNMP trap support to forward that information to the AS/400 system. This information is stored in the AS/400 database, and can be queried using any database access tool, or with a SNMP manager such as Netview/6000.

1.3.2 Terminal and Print Emulation

Client Access/400 Optimized for OS/2 provides terminal emulation through a choice of emulators: RUMBA/400 or Personal Communications/5250. Client Access/400 Optimized for OS/2 can also be installed over an existing Communications Manager/2 configuration. If you do not install Communications Manager/400 provided with the product, then any existing 5250 display sessions will be available as well. For more information, see 10.1.1, “Introduction” on page 263.

Print emulation is provided by the RUMBA/400 and Personal Communications/5250 emulators. AS/400 output is directed to PC or LAN attached printers. Both emulators provide integrated support for a wide range of ASCII printers. You can also utilize OS/400 Host Print Transform to ensure output is printed the same regardless of the emulator used. For more information see, Chapter 10, “Emulators” on page 263.

1.3.3 Network Print

Network Print services replaces the Virtual Print function that was provided with PC Support/400. Through Network Print you can print PC documents on an AS/400 system printer or a PC printer defined as a system printer. Client Access/400 Optimized for OS/2 provides a template that allows a user to define a Network Printer quickly by using the OS/2 GUI interface. Additional information is found in 5.6.1, "Configuration" on page 161.

1.3.4 Network Drives

The Network Drives function is similar to Shared Folders function provided with PC Support/400. A user can assign network drives quickly by dragging the network drive template from the templates folder to the desktop. Client Access/400 Optimized for OS/2 network drives can be assigned to any part of the IFS namespace. This allows the user to view the entire file structure on the AS/400 system. For information regarding Network Drive definitions, see 5.5, "Network Drives" on page 150.

1.3.5 Data Access facility

A graphical interface is provided that allows a user to easily select and retrieve AS/400 database records. The process is simplified through the use of toolbar icons and pull-down menus. This allows a user to transfer information without having to know SQL command structure. See 7.3, "RUMBA/400 Database Access" on page 236 for details.

1.3.6 Products Registry

The products registry provides a central place for the selective installation and configuration of Client Access/400 Optimized for OS/2 including control over how the application update function runs. For more information about the product registry, see 5.7, "Products Registry" on page 180.

1.3.7 Application Programming Interfaces (API)

Client Access/400 Optimized for OS/2 is the first optimized client to provide a 32-bit interface for developing client/server applications while preserving 16-bit API functionality. Applications written to the old 16 bit APIs still require Client Access/400 for OS/2 to be running. Client Access/400 Optimized for OS/2 APIs are based on procedural calls that perform tasks by creating and manipulating objects. Some of the key features of Client Access/400 Optimized for OS/2 APIs are shown in the following list.

- Support is provided for industry standard APIs (Sockets, CPI-C, ODBC, and so on) as well as AS/400 specific APIs (Data Queues, EHLLAPI, Remote Command, and so on).
- A consistent format is provided for all Client Access/400 Optimized for OS/2 APIs that includes handles for parameter checking, descriptive function names, and constants for return codes.
- The Remote SQL API is enhanced to provide better performance and functionality, and is now called the Optimized SQL API.
- APIs have been added for National Language Support (NLV), ODBC, Mail Enablement, Security, License, and Client Management.

For additional information regarding Client Access/400 APIs, see *Client Access/400 API Planning Guide*, GG24-4422.

1.3.7.1 Advantages over PC Support/400 and Client Access/400 for OS/2

Client Access/400 Optimized for OS/2 provides some key enhancements over OS/2 PC Support/400. The major differences are highlighted in the following list:

- OS/2 PC Support/400 is a 16-bit application.
- Installation and configuration of separate products on each workstation is required to use OS/2 PC Support/400.
- OS/2 PC Support/400 provides many text based interfaces and are not fully integrated into the OS/2 workplace shell.
- OS/2 PC Support/400 does not provide advanced features such as client management.

Client Access/400 Optimized for OS/2 addresses all of these concerns. The graphical interface is designed specifically around the Workplace shell. This allows a user to perform tasks based on objects. An example is dragging a PC file onto an icon to produce output on an AS/400 printer.

The installation process provides seamless integration with the communications products that is loaded. You do not have to manually install any additional software products. In addition, Client Access/400 Optimized for OS/2 can be installed using CD-ROM, AS/400 FSIOP, LAN PC server, or with diskettes.

Note:

A user can select to use existing CM/2 and NTS/2 products on the client workstation during the installation process. You are not required to use the communications support that ships with Client Access/400 Optimized for OS/2

Client Access/400 Optimized for OS/2 provides a choice of 32-bit emulators: RUMBA/400 and Personal Communications/5250. A products registry is included that allows granular control and distribution of software and fixes.

1.3.7.2 Serviceability

Client Access/400 Optimized for OS/2 provides better serviceability through the use of a problem and history log for all software products. SNMP agents can be used to send problem reports to the AS/400 system for diagnosis. This simplifies the task of problem analysis and identification for technical support personnel. A Desktop Management Interface (DMI) API is provided to allow software and hardware vendors to build diagnostic support into their products.

Chapter 2. Concepts

This chapter introduces the new concepts used in Client Access/400 Optimized for OS/2. Some, such as TCP/IP and AnyNet, are large subjects in their own right, and in this publication we have tried to include sufficient detail from a Client Access/400 Optimized for OS/2 perspective.

The sections covered in this chapter are:

- 2.1, "TCP/IP Concepts"
- 2.2, "AnyNet Concepts" on page 25
- 2.3, "Simple Network Management Protocol (SNMP)" on page 27
- 2.4, "Desktop Management Interface (DMI)" on page 27.

2.1 TCP/IP Concepts

TCP/IP (*Transmission Control Protocol/Internet Protocol*) refers to a specific set of protocols that allow computers to share resources and exchange information in a network. Because TCP and IP are two of the best-known protocols in this set, the term TCP/IP has become the commonly used name for the whole family. Remember this when looking at the protocols and how they fit together.

Today, there are many networks including regional networks, local networks at universities and research institutions, and military networks. The term *Internet* applies to this entire set of networks. Because these networks are interconnected, information can be sent from one to another if security restrictions permit. This *Internet* is controlled by a central authority, which is responsible for assigning network addresses to new users and subnetworks. Many smaller private networks around the world use TCP/IP protocols, but they are not connected to the Internet; for example, organizations that have machines from several vendors and need to interconnect them. TCP/IP provides a good solution for these small networks.

Much of the information published about TCP/IP domain naming and addressing conventions is related to the Internet. These conventions are designed to give flexibility and control to this large interconnection of networks. If a proposed network is not a part of *Internet*, simpler conventions may meet the requirements of that network.

For more information, refer to *IBM AS/400 TCP/IP Configuration and Operation*, GG24-3442.

2.1.1 TCP/IP Terminology

The objective of this section is to provide an explanation for the terms commonly used in this book for TCP/IP networking.

Domain Can be a host or a set of hosts. In Internet, authority for assigning names and addresses is delegated to individual domains. Domains are organized hierarchically; each has authority for machines within the domain but does not have authority for machines in other domains.

Domain name

Is the name of a host in a network. The terms *host name* and *domain name* are often used interchangeably.

A domain name is a sequence of subnames separated by a delimited character. For example, *rchas040.rchland.ibm.com* is the name of a host in the lowest-level domain, which is a sub-domain of *rchland.ibm.com*, which is a sub-domain of *ibm.com*, which is a sub-domain of *com*.

Gateway Interconnects two or more networks in the TCP/IP environment. Gateways connect to other gateways by using a special gateway protocol (EGP and RIP). A gateway also performs the function of an IP router. Gateways can be used to interconnect networks using different network architectures, for example, TCP/IP to SNA.

Host A unique internal address and associated system name. The function of a host is to control all or part of a network and provide an access method to that network. The host name must meet one or more of the following criteria:

- Only uppercase characters A-Z, lowercase characters a-z, and numeric characters 0-9 are allowed for the first character of a host name.
- Only uppercase characters A-Z, lowercase characters a-z, numeric characters 0-9, and periods (.) are allowed for the last character of a host name.
- Blank cannot be embedded in host names.
- Only the special characters period (.), dash (-) and underscore(_) are allowed in host names.

- Parts of the host name separated by periods (.) cannot exceed 63 characters in length.
- A domain name cannot have two consecutive periods.
- Host names must be at least one character in length.
- Host names including all periods cannot be more than 255 characters.

Internet address

Also called IP Address. IP uses IP addresses to specify source and target hosts on the internet. The network address of the IP address is unique and is assigned by a central authority, the Network Information Center (NIC). They are 32-bit addresses, usually represented in dotted decimal form. For example:

9.5.69.245

There are two logical addresses in each IP address: a network address, representing the physical network within the internet, and a local address, specifying an individual host or gateway within that network.

IP address = <network address><host address>

The first bits of the IP address specify how the rest of the address should be separated in its network and host part. Four classes of IP addresses exist:

- Class A addresses provide for 128 (in fact 126) networks, each of which can have up to 2 to the power of 24 (16777219) hosts.
- Class B addresses allocate 14 bits for the physical networks and 16 bits for hosts in each of those networks.
- Class C addresses allocate 21 bits for the network ID and each can have up to 256 hosts.
- Class D addresses are reserved for multi-casting (a sort of broadcasting but in a limited area, and only to hosts having this class D address).

If your network is not part of the Internet world, you do not have to worry about this class standard, although we recommend that you do follow the conventions in case you need to link to the Internet in the future.

Name Server

Is a server application providing the translation between domain names and the internet address. Usually all name servers are arranged in a tree structure corresponding to the domain naming hierarchy. In each domain, one or more of the machines assumes this task.

Port

Identifies an interface between a higher-level protocol or application, and the TCP or UDP protocol. It is specified as a 16-bit number. Some protocols, such as FTP and SMTP, use the same port number in all TCP/IP implementations. Those assigned port numbers are called well-known ports.

Protocol

Is a format description of message formats and the rules that two or more machines must follow to exchange messages. Protocols determine the machine-to-machine interface at the lower-level (such as the order in which bits from a byte are sent) and at the highest level (such as file transfer programs).

Route

Is the path that network traffic follows from its source to its destination. In the TCP/IP network, each datagram is routed separately. The route of an IP datagram may include many gateways and many physical networks.

Router

Receives and forwards datagrams in a network; it could also provide the functions of a bridge. Normally, routers use functions in the Internet Protocol. The higher-level protocols are the same on both sides of a router.

Socket

Defines a TCP/IP application (process) in the Internet Protocol by the following pair of numbers:

- The Internet address of the host on which it runs.
- The port number through which it communicates with TCP/IP.

Subnet

Is one of the smaller, more manageable networks created when subnet addressing subdivides networks. Subnets are grouped by host addresses. For example, a typical Internet address may be:

<network address> <host address>

and after subnetting:

<network address> <subnet address> <host address>

Many large organizations divide their network number into subnets. This way, each institution that wants to connect to the network has only one entry to define. Each update of the

organization's network does not affect the definition in the other network.

Subnet mask

Defines the portion of the host address used for routing to specific subnets.

Subnet value

Defines which host or hosts are addressed within a subnet. This value is a subset of the subnet mask.

2.1.2 TCP/IP Support

Client Access/400 Optimized for OS/2 provides full functionality for TCP/IP. This means that users are able to gain access to an AS/400 system in either an SNA or TCP/IP network.

Through AnyNet, every Client Access/400 function can be used over TCP/IP. This is a major difference to current TCP/IP products that allow only TCP/IP functions like TELNET or FTP. These native TCP/IP functions are usually far behind Client Access/400. Client Access/400 Optimized for OS/2 provides only the part of AnyNet that is needed to run the Client Access/400 Optimized for OS/2 client over a TCP/IP network. The installation and configuration of TCP/IP and AnyNet is integrated into the Client Access/400 Optimized for OS/2 client.

The IBM TCP/IP for OS/2 Stack is included with the Client Access/400 Optimized for OS/2 product. It should be noted that, although the TCP/IP protocol stacks are provided, applications often associated with a TCP/IP product (FTP, TELNET, LPR/LPD, SMTP, PING, NETSTAT, NFS, etc.) are *not* included.

At the time this document was written, the only officially-supported stack was the IBM TCP/IP for OS/2 stack.

2.2 AnyNet Concepts

AnyNet comprises a family of software products designed to make it easier for customers to choose the applications that meets the needs of their business, regardless of what transport protocol is used in their local or wide area network. Members of the AnyNet family make it possible for these communications paths on various platforms:

- APPC over TCP/IP

- Sockets over SNA
- NETBIOS over SNA
- APPC over IPX
- Sockets over IPX

AnyNet is an implementation of the Multiprotocol Transport Networking (MPTN) architecture. MPTN enables application programs that were designed to operate over one transport protocol (such as SNA or TCP/IP) to operate over additional protocols.

The initial shipment of OS/400 Version 3 Release 1 provides support only for APPC over TCP/IP and Sockets over SNA. IBM intends to add APPC and Sockets over IPX into OS/400 in November 1995.

2.2.1 APPC over TCP/IP

Client Access/400 Optimized for OS/2 uses the APPC over TCP/IP function of AnyNet that enables APPC or CPI-C application programs to communicate over an TCP/IP network.

The advantage of this approach is that there were no architectural changes necessary in the design of Client Access/400 Optimized for OS/2 and the host part of Client Access/400. Client Access/400 still generally consists of APPC client/server applications.

2.2.2 Sockets Over SNA

"Sockets over SNA" allows C socket API applications to communicate over SNA networks. Applications using the sockets APIs can be added to an existing SNA network without adding a separate TCP/IP network. Sockets over SNA supports LU 6.2 full duplex conversations.

The Socket APIs in a TCP/IP environment are similar to the CPI-C APIs in an SNA environment. A C-socket API application on the client communicates with a C-socket API application on the server, but it is not possible for a C-socket API application in one place to communicate directly with a CPI-C application in another place.

For more information about AnyNet/400 Sockets over SNA, see *IBM AS/400 AnyNet Scenarios*, GG24-2431.

2.3 Simple Network Management Protocol (SNMP)

Simple Network Management Protocol uses the socket APIs. Client Access/400 Optimized for OS/2 includes an SNMP agent that is used to route problem information between the Client Access/400 workstation and the AS/400 system.

The Client Access/400 SNMP agent handles the encode/decode of the following Protocol Data Unit's (PDU):

- GET
- GETNEXT
- SET

and the supports notifications known as "TRAPs".

2.4 Desktop Management Interface (DMI)

The Desktop Management Interface is a technology that provides a facility for PC hardware and software vendors to make available basic product information. The DMI is being specified and developed by an industry consortium called the Desktop Management Task Force (DMTF). The objective of DMTF is to provide a definition for desktop workstation management. The result is a platform-independent set of APIs.

Client Access/400 uses the Desktop Management Interface mechanism to catch error situations and for maintaining an inventory of PC clients on the AS/400 system. Client Access/400 consolidates the error situation into a problem record. Again using the DMI, the DMI transforms the Client Access/400 problem record into a DMI event. The Client Access/400 SNMP agent converts the DMI event to an SNMP trap and sends it to AS/400 Management Services. The problem record is then added to the AS/400 problem log.

See Chapter 6, "Client Management" on page 211 for details about client management. It discusses client inventory as well as client service. Additional information is included in *Client Access/400 Optimized for OS/2 API and Technical Reference*, SC41-3511 and *SNMP Support*, SC41-4412.

Chapter 3. Migration

The Client Access/400 Optimized for OS/2 installation program provides logic for installation over existing compatible products. If a compatible product is already installed on your PC, the installation program checks the level of the product. If the level of the product is equal to or greater than the level required by Client Access/400 Optimized for OS/2, the installation program does not install over the existing product. If the level of the product is less than the level required by Client Access/400, the installation program will install over the existing product, except for Communications Manager/2, where you are given the choice. Product configuration values are preserved or migrated by the installation program unless otherwise noted.

If a compatible product is already installed on your PC and the installation program installs over the existing product, the path of the existing product is where the Client Access/400 installation program installs the new product.

This chapter covers those situations that may need consideration when planning to install Client Access/400 Optimized for OS/2, and includes:

- 3.1, "OS/2 PC Support/400 or Client Access/400 for OS/2" on page 30
- 3.2, "Communications Manager/2 Version 1.11 and Network Transport Services/2" on page 31
- 3.3, "Replacing Communications Manager/2" on page 32
- 3.4, "OS/2 LAN Requester 3.0 and NTS/2" on page 32
- 3.5, "OS/2 LAN Requester 4.0 and Multiprotocol Transport Services (MPTS)" on page 32
- 3.8, "LAN Adapter Protocol Support and TCP/IP for OS/2" on page 34.

See Chapter 12, "Mixed Version Networks" on page 323 for information on using Client Access/400 Optimized for OS/2 in a mixed network environment.

For more information on what happens during installation in these areas, please refer to 4.6, "Installing Over Existing Communications Products" on page 118.

3.1 OS/2 PC Support/400 or Client Access/400 for OS/2

If you install Client Access/400 Optimized for OS/2 over OS/2 PC Support/400 or Client Access/400 for OS/2, both clients will coexist.

Note

The path for Client Access/400 Optimized for OS/2 (C:CA0S2) must be specified before the path of the original client (C:PCS0S2) in the LIBPATH= statement in the CONFIG.SYS file.

Attention:

Do not use the PCSSTART.EXE command in STARTUP.CMD when using the two clients together. Instead, use STARTPCS.CMD. STARTPCS.CMD does not start communications (unlike PCSSTART.EXE), so put STARTCM in the STARTUP.CMD file to do this.

There is no migration tool to convert Client Access/400 for OS/2 configuration information for use with Client Access/400 Optimized for OS/2. For installation of Client Access/400 Optimized for OS/2 please see Chapter 4, "Client Access/400 Optimized for OS/2 Installation" on page 35 for more information.

After the installation of Client Access/400 Optimized for OS/2, the AS/400 Workstation icon is placed onto the OS/2 Desktop. You still have your Client Access/400 for OS/2 icon on the Desktop. Client Access/400 Optimized for OS/2 does not directly replace the original Client Access/400 for OS/2. You can still get a connection with Client Access/400 for OS/2, and use the shared folders, virtual print, and so on. However, if you have Client Access/400 for OS/2 RUMBA/400 installed, you cannot use this with either client. You must install and use the Client Access/400 Optimized for OS/2 RUMBA/400.

If you have applications that use the APIs from Client Access/400 for OS/2 or Client Access/400 for OS/2, you have to run both clients to provide the API support.

Do not use the original client's connection configuration program (PCSCMCFG.EXE - new in V3R0.5) to change your configuration after you have installed Client Access/400 Optimized for OS/2. If you use the original

connection configuration program, it erases the new configuration and rebuilds it with what was in your original client configuration file.

3.2 Communications Manager/2 Version 1.11 and Network Transport Services/2

If you have Communications Manager/2 configured so that you have 3270 and 5250 sessions, you should not install Client Access/400 Communications. Communications Manager/2 provides support for:

- 3270 and 5250 connection
- Connection network support
- Synchronous
- Asynchronous
- X.25
- ISDN

Client Access/400 Communications only provides APPC to the AS/400 system over LAN and twinax connections in the initial version, and does not provide 3270 connectivity.

To understand why you may want to install Client Access/400 Communications over Communications Manager/2, see 3.3, "Replacing Communications Manager/2" on page 32.

Note:

Client Access/400 Optimized for OS/2 data queues will *not* work with Communications Manager/2 Version 1.11. When you attempt to open the data queue, you receive a return code of CWB_COMM_VERSION_ERROR (4022). This is because data queues relies on CPI-C APIs that are not in Communications Manager/2 1.11, but are in the Client Access/400 Optimized for OS/2 communications subset.

Applications written to the data queues APIs will also fail. Examples include ManageWare/400 and Ultimedia Systems Facilities.

3.3 Replacing Communications Manager/2

If you have a lower-level version of Communications Manager/2 loaded on your machine, then you may want to upgrade it by replacing it with the communications support shipped with the Optimized OS/2 client.

Replacing Communications Manager/2 with the built in communications support ensures that you are using an integrated product. If there are any PTFs that are applied to your AS/400 system, having the full integrated product on your machine, makes sure that it is always up to date.

Configuration is made so much easier if you use the full integrated product. All of the configuration is done in one place. For further information, see Chapter 5, "Configuration" on page 135.

3.4 OS/2 LAN Requester 3.0 and NTS/2

No issues were found when using Client Access/400 Optimized for OS/2 with OS/2 LAN Requester Version 3 and NTS/2.

3.5 OS/2 LAN Requester 4.0 and Multiprotocol Transport Services (MPTS)

If you have OS/2 LAN Requester 4.0 and MPTS on your PC, and you want to install Client Access/400 Optimized for OS/2, then the Client Access/400 versions of Network Transport Services/2, AnyNet Sockets over SNA, SNMP and SIA will not be installed, and will not function. This means that the new client management functions that are included in Client Access/400 Optimized for OS/2 will not be available. See Chapter 6, "Client Management" on page 211 for details on these functions. If you require a TCP/IP protocol added to your stack, then you must configure your stack using MPTS. There is no interface for editing a HOSTS file provided with MPTS. The optimized client provides such an interface, but it is not installed if MPTS is already on the PC. If you need a HOSTS file, adhere to the following guidelines:

- The HOSTS file should be in the directory specified by the ETC environment variable (usually C:\MPTN\ETC).
- Edit the file using any ASCII editor, but *always leave a blank line at the end of the file.*
- The format of the HOSTS file is:

```
# comments
ip_address hostname alias1 alias2...aliasn # comments
```

- for example:

```
# This is my hosts file
129.5.24.1 host1
129.5.24.3 pc3 normasPC host3 # This is Norma's PC
```

You should do this before installing Client Access/400 on your machine.

If you install OS/2 LAN Requester 4.0 after Client Access/400, OS/2 LAN Requester will change two SET lines in the CONFIG.SYS file to the following:

```
SET LOCPATH=C:IBMLANXPG4LOCALE
SET LANG=ENUS437
```

If the locale files in C:IBMLANXPG4LOCALE are older than the ones in C:CAOS2, then the CONFIG.SYS SET lines should be changed to:

```
SET LOCPATH=C:CAOS2
SET LANG=EN_US
```

This prevents a TRAP error in the SETLOC.DLL file. However, Client Access/400 NTS/2, AnyNet Sockets over SNA, SNMP, and SIA will no longer function and should not be configured.

If the installation program detects that User Profile Management (UPM) is already installed, the Client Access/400 UPM is not installed.

3.6 Warp Connect

Warp Connect includes OS/2 LAN Requester 4.0 and MPTS, and the same limitations apply as described in 3.5, "OS/2 LAN Requester 4.0 and Multiprotocol Transport Services (MPTS)" on page 32, namely:

- All functions work running over TCP/IP.
- Client management functions do not work if the client is run over SNA. Other functions of the client work normally.

3.7 User Profile Management (UPM)

If you are not using Client Access/400 UPM and you have configured logon profiles for AS/400 nodes, the password is not updated automatically when you change passwords.

3.8 LAN Adapter Protocol Support and TCP/IP for OS/2

You may already have LAN Adapter Protocol Support and TCP/IP for OS/2 installed and running on your PC. Client Access/400 Optimized for OS/2 supports a TCP/IP network using AnyNet architecture.

In this case, Client Access/400 uses the LAPS and TCP/IP already installed and configured in your PC, and only adds Client Access/400 Communications and AnyNet/2 in order to have the complete support to run over a TCP/IP network.

Chapter 4. Client Access/400 Optimized for OS/2 Installation

This chapter describes the Client Access/400 Optimized for OS/2 installation process.

Client Access/400 Optimized for OS/2 integrates functions from a number of different PC products into one package. As a result, a large amount of code is needed during the installation process, and we recommend that wherever possible you avoid installing the client from diskettes. This chapter includes information on how to install from diskettes, CD-ROM, and from LAN servers including the AS/400 FSIOP.

4.1 Installation Overview

This overview section introduces you to the installation procedures on the AS/400 system and the workstation.

An installation consists of:

1. Installation planning
2. AS/400 installation tasks
3. Workstation installation tasks

4.1.1 Workstation Requirements

- The PC workstation must have the following specifications:
 - A 33MHz 80486 processor. A 66MHz 80486 processor is recommended.
 - A minimum of 12MB of memory (consider 16MB+).
 - 100MB of free hard disk space:
 - 64MB available for the Client Access/400 Optimized for OS/2 code (all options).
 - 24MB of temporary disk space is used during the installation.
- One of the following adapters must be installed to communicate with the AS/400 system:
 - In the TWINAX environment, the following TWINAX adapters can be used to connect to a TWINAX workstation controller:
 - IBM System 36/38 Workstation Emulator Adapter/A (Micro Channel)

- Enhanced 5250 Emulation Adapter (AT or XT) (not supported in DBCS environments)
- IBM 5250 Emulation Adapter /A (Micro Channel)
- IBM 5250 Emulation PCMCIA Adapter

IBM is supplying manufacturers of other twinaxial adapters with the relevant information for them to provide support to the new interface used by Client Access/400 Optimized for OS/2. Please contact the adapter manufacturers for details of support.

- In a LAN network, the following LAN adapters can be used to connect to the LAN:
 - IBM PC Network II and Baseband Adapters
 - IBM PC Network II/A and Baseband/A Adapters
 - IBM PS/2 Adapter for Ethernet Networks
 - IBM Token-Ring Network Adapters
 - IBM Token-Ring 16/4 II
 - IBM Token-Ring Bus Master
 - Standard Microsystems Ethercard Plus Adapters
 - Standard Microsystems Ethercard Plus Micro Channel Adapters
 - Ungermann-Bass NiUpc Adapters
 - Ungermann-Bass NiUps Adapters
 - 3Com 3C503 Etherlink II Adapter
 - 3Com 3C523 Etherlink MC Adapter
 - DCS IRMAtrac Token-Ring Adapter/Convertible
 - Other adapters can be used by specifying an adapter type of *other*, if you have the necessary OS/2 drivers. PCMCIA LAN Cards are supported in this way.

- Optional CD-ROM

To speed up the installation process, you can install from a CD-ROM. If a LAN Server is available, this speeds up the installation process still further.

- Client Access/400 Optimized for OS/2 requires one of the following OS/2 versions:
 - OS/2 WARP version 3.0
 - OS/2 version 2.11
 - WARP Connect
 - OS/2 version 2.11 for Windows

4.2 AS/400 Requirements

Client Access/400 Optimized for OS/2 requires OS/400 Version 3.0 Release 1.0 to be installed and the following program options must be installed:

- 5763 SS1 OS/400 Version 3.0 Release 1.0
- 5763 SS1 Host Servers
- 5763 XA1 Client Access/400 - Base
- 5763 XG1 Client Access/400 Optimized for OS/2
- 5763 XG1 Client Access/400 Optimized for OS/2

and the following options as required:

- 5763 XG1 Client Access/400 - RUMBA Optimized for OS/2
- 5763 XG1 Client Access/400 - PC5250 Optimized for OS/2
- 5763 XG1 Client Access/400 - GraphicOps for OS/2

Also ensure that the latest CUM PTF Package is installed.

4.2.1 Planning Tasks

The AS/400 administrator and the PC administrator may be the same person in many installations. Before starting the actual installation, the administrators should complete the following:

- Read *Client Access/400 Optimized for OS/2 Getting Started* and the *README.CA4* file (located in the QPWXGOS2 directory). The readme file contains important information that is not included in the product documentation or other on-line information. It contains details of the latest changes, hints and tips, restrictions, and so on.
- We recommend that you read Chapter 2, “Concepts” on page 21, Chapter 3, “Migration” on page 29 and this chapter in this redbook.
- While reading through either 4.4, “SNA Installation” on page 50 or 4.5, “TCP/IP” on page 79, fill in the Installation Worksheets shown in 4.3, “Installation Worksheets” on page 43.
- We recommend that you use a naming convention for your PCs when you complete the worksheets. This helps later in managing your network of PCs.

4.2.2 Choice of Installation Source

Client Access/400 Optimized for OS/2 is shipped on the tape media you normally use for the license code installation process together with a CD-ROM and PC diskettes, depending on the details of your order.

During installation on the AS/400 system, the Client Access/400 Optimized for OS/2 code is copied to the following IFS *root* directories:

- QPWXGOS2 - Base Client Access/400 Optimized for OS/2
- QPWXGPC - Personal Communications/5250
- QPWXGRB - RUMBA/400
- QPWXGGY - OS/400 Graphical Operations

To get access to these directories, an initial Client Access/400 Optimized for OS/2 workstation must be installed using the CD or the diskette media. If you already have installed a Client Access/400 for Windows 3.1 workstation, you can use this as an alternative way of accessing the root directories.

4.2.2.1 Updating the Installation Source

PTF updates to Client Access/400 result in updates to the code in the IFS root directories. We recommend that you create a new copy of the installation diskettes as soon as the first workstation has been installed with Client Access/400 Optimized for OS/2. Also, if you are going to use a LAN server for your Client Access/400 installations, you should include an update of the Client Access/400 code on the LAN server as a task in your PTF installation process.

By updating the installation code, the PTFs are included at installation time, and the updates do not have to be applied to each workstation separately by the update function.

4.2.2.2 Installing From PC Diskettes

When shipped on 1.44MB diskettes, the code for Client Access/400 Optimized for OS/2 can be contained on about 27 diskettes.

Because of the time taken to install from diskettes, you might want to consider the alternatives mentioned in the following section for your installation process.

For instructions on how to create extra sets of installation diskettes, see 4.7, "Creating Installation Diskettes" on page 128.

4.2.2.3 Installing From CD

In environments where a LAN server is not available, we recommend that Client Access/400 Optimized for OS/2 be installed from CD-ROM wherever possible to reduce the installation time. You should be aware however, that since the CD-ROM cannot be updated, you have to rely on the update function of Client Access/400 Optimized for OS/2 to distribute PTF changes to the PCs. This may be particularly relevant if your PC is using a slow communications link to the AS/400 system.

To make a CD-ROM the default source for *selective install*, you do the following:

1. Add the line SET CAINSTALL_SOURCE=d:\path\ to your CONFIG.SYS, where d: is your CD-ROM drive, and path is the path to the QPWXGxxx directories. Note that the trailing back-slash is required.
2. Shut down your PC.
3. Insert the program disc and turn on the CD-ROM.
4. Restart your PC.

4.2.2.4 AS/400 Running LAN Server/400

If you want to install Client Access/400 Optimized for OS/2 on LAN attached PCs without using diskettes or CD-ROM, you can copy the Client Access/400 Optimized for OS/2 code to an AS/400 FSIOP and do the installation from there.

1. Determine which alias name on the AS/400 system refers to a network server storage space with sufficient free space.
 - Use the command **WRKNWSSTG** to display the disk space available for each configured drive letter.
 - Use the command **WRKNWSALS** to find the alias that refers to the storage space that you want to use.

You need approximately 71MB to store all the option of the Client Access/400 Optimized for OS/2. In the examples shown in this section, the alias name is CA.

2. If you have a PC workstation that already has Client Access/400 Optimized for OS/2 installed or a Client Access/400 for Windows 3.1 workstation, you can assign a drive to the root directory on the AS/400 system and copy the directories:
 - QPWXGOS2 - Base Client Access/400 Optimized for OS/2
 - QPWXGPC - Personal Communications/5250 (if required)
 - QPWXGRB - RUMBA/400 (if required)
 - QPWXGGY - OS/400 Graphical Operations (if required)using the following commands from a OS/2 command line.

In this example, the Z: drive is assigned to the AS/400 system:

```
MD Z:\QLANSrv\CA\QPWXGOS2
MD Z:\QLANSrv\CA\QPWXGPC
MD Z:\QLANSrv\CA\QPWXGRB
MD Z:\QLANSrv\CA\QPWXGGY
XCOPY Z:\QPWXGOS2\*.* Z:\QLANSrv\CA\QPWXGOS2 /S
XCOPY Z:\QPWXGPC\*.* Z:\QLANSrv\CA\QPWXGPC /S
XCOPY Z:\QPWXGRB\*.* Z:\QLANSrv\CA\QPWXGRB /S
XCOPY Z:\QPWXGGY\*.* Z:\QLANSrv\CA\QPWXGGY /S
```

If you have LAN Requestor installed on your PC, then using a drive assigned to the FSIOP using LAN Requestor for the target drive enables the copy to be completed faster.

3. If you do not have a PC workstation with Client Access/400, you must copy the following directories and their contents from the AS/400 system to the LAN Server/400 file system QLANSrv. This takes some time to complete.
 - QPWXGOS2 - Base Client Access/400 Optimized for OS/2
 - QPWXGPC - Personal Communications/5250 (if required)
 - QPWXGRB - RUMBA/400 (if required)
 - QPWXGGY - OS/400 Graphical Operations

You can use the following AS/400 commands to complete this copy where xxxx is the language code (2924 for U.S. English). These commands take a significant time to run, and we recommend submitting them to batch during off-peak hours.

```
MD DIR(' \QLANSrv\CA\QPWXGOS2')
MD DIR(' \QLANSrv\CA\QPWXGOS2\DBCS')
MD DIR(' \QLANSrv\CA\QPWXGOS2\SBCS')
MD DIR(' \QLANSrv\CA\QPWXGOS2\ANYNET2')
MD DIR(' \QLANSrv\CA\QPWXGOS2\COMM_MGR')
MD DIR(' \QLANSrv\CA\QPWXGOS2\NTS2')
MD DIR(' \QLANSrv\CA\QPWXGOS2\NTS2\LANLK')
MD DIR(' \QLANSrv\CA\QPWXGOS2\NTS2\IBMCOM')
MD DIR(' \QLANSrv\CA\QPWXGOS2\NTS2\IBMCOM\DLL')
MD DIR(' \QLANSrv\CA\QPWXGOS2\NTS2\IBMCOM\MACS')
MD DIR(' \QLANSrv\CA\QPWXGOS2\NTS2\IBMCOM\PROTOCOL')
MD DIR(' \QLANSrv\CA\QPWXGOS2\TCP/IP')
MD DIR(' \QLANSrv\CA\QPWXGOS2\UPM')
MD DIR(' \QLANSrv\CA\QPWXGOS2\MRIxxxx')
MD DIR(' \QLANSrv\CA\QPWXGOS2\MRIxxxx\DBCS')
MD DIR(' \QLANSrv\CA\QPWXGOS2\MRIxxxx\SBCS')
MD DIR(' \QLANSrv\CA\QPWXGPC')
MD DIR(' \QLANSrv\CA\QPWXGPC\PDFPDT')
```

```

MD DIR(' \QLANSrv\CA\QPWXGPC\MRIxxxx' )
MD DIR(' \QLANSrv\CA\QPWXGRB' )
MD DIR(' \QLANSrv\CA\QPWXGRB\CHARSETS' )
MD DIR(' \QLANSrv\CA\QPWXGRB\KBDINFO' )
MD DIR(' \QLANSrv\CA\QPWXGRB\MACRO' )
MD DIR(' \QLANSrv\CA\QPWXGRB\MRIxxxx' )
MD DIR(' \QLANSrv\CA\QPWXGGY' )
MD DIR(' \QLANSrv\CA\QPWXGGY\QSTART' )
MD DIR(' \QLANSrv\CA\QPWXGGY\MRIxxxx' )

CPY OBJ(' \QPWXGOS2\*' ) TODIR(' \QLANSrv\CA\QPWXGOS2' )
CPY OBJ(' \QPWXGOS2\DBCS\*' ) TODIR(' \QLANSrv\CA\QPWXGOS2\DBCS' )
CPY OBJ(' \QPWXGOS2\SBCS\*' ) TODIR(' \QLANSrv\CA\QPWXGOS2\SBCS' )
CPY OBJ(' \QPWXGOS2\ANYNET2\*' ) TODIR(' \QLANSrv\CA\QPWXGOS2\ANYNET2' )
CPY OBJ(' \QPWXGOS2\COM_MGR\*' ) TODIR(' \QLANSrv\CA\QPWXGOS2\COM_MGR' )
CPY OBJ(' \QPWXGOS2\NTS2\*' ) TODIR(' \QLANSrv\CA\QPWXGOS2\NTS2' )
CPY OBJ(' \QPWXGOS2\NTS2\IBMCOM\*' )
      TODIR(' \QLANSrv\CA\QPWXGOS2\NTS2\IBMCOM' )
CPY OBJ(' \QPWXGOS2\NTS2\IBMCOM\DLL\*' )
      TODIR(' \QLANSrv\CA\QPWXGOS2\NTS2\IBMCOM\DLL' )
CPY OBJ(' \QPWXGOS2\NTS2\IBMCOM\MACS\*' )
      TODIR(' \QLANSrv\CA\QPWXGOS2\NTS2\IBMCOM\MACS' )
CPY OBJ(' \QPWXGOS2\NTS2\IBMCOM\PROTOCOL\*' )
      TODIR(' \QLANSrv\CA\QPWXGOS2\NTS2\IBMCOM\PROTOCOL' )
CPY OBJ(' \QPWXGOS2\TCPIP\*' ) TODIR(' \QLANSrv\CA\QPWXGOS2\TCPIP' )
CPY OBJ(' \QPWXGOS2\UPM\*' ) TODIR(' \QLANSrv\CA\QPWXGOS2\UPM' )
CPY OBJ(' \QPWXGOS2\MRIxxxx\*' ) TODIR(' \QLANSrv\CA\QPWXGOS2\MRIxxxx' )
CPY OBJ(' \QPWXGOS2\MRIxxxx\DBSC\*' )
      TODIR(' \QLANSrv\CA\QPWXGOS2\MRIxxxx\DBCS' )
CPY OBJ(' \QPWXGOS2\MRIxxxx\SBCS\*' )
      TODIR(' \QLANSrv\CA\QPWXGOS2\MRIxxxx\SBCS' )
CPY OBJ(' \QPWXGPC\*' ) TODIR(' \QLANSrv\CA\QPWXGPC' )
CPY OBJ(' \QPWXGPC\PDFPDT\*' ) TODIR(' \QLANSrv\CA\QPWXGPC\PDFPDT' )
CPY OBJ(' \QPWXGPC\MRIxxxx\*' ) TODIR(' \QLANSrv\CA\QPWXGPC\MRIxxxx' )
CPY OBJ(' \QPWXGRB\*' ) TODIR(' \QLANSrv\QPWXGRB' )
CPY OBJ(' \QPWXGRB\CHARSETS\*' ) TODIR(' \QLANSrv\CA\QPWXGRB\CHARSETS' )
CPY OBJ(' \QPWXGRB\KBDINFO\*' ) TODIR(' \QLANSrv\CA\QPWXGRB\KBDINFO' )
CPY OBJ(' \QPWXGRB\MACRO\*' ) TODIR(' \QLANSrv\CA\QPWXGRB\MACRO' )
CPY OBJ(' \QPWXGRB\MRIxxxx\*' ) TODIR(' \QLANSrv\CA\QPWXGRB\MRIxxxx' )
CPY OBJ(' \QPWXGGY\*' ) TODIR(' \QLANSrv\CA\QPWXGGY' )
CPY OBJ(' \QPWXGGY\PDFPDT\*' ) TODIR(' \QLANSrv\CA\QPWXGGY\QSTART' )
CPY OBJ(' \QPWXGGY\MRIxxxx\*' ) TODIR(' \QLANSrv\CA\QPWXGGY\MRIxxxx' )

```

where xxxx is the language code (such as 2924 for U.S. English). Through a PC LAN requester, it is now possible to get access to the INSTALL.EXE located in \QLANSrv\CA\QPWXGOS2.

We recommend that you only allow users to have read access to these directories in QLANSrv.

To make the default source for *selective install* be the LAN Server/400, you must do the following:

1. Add the line SET CAINSTALL_SOURCE=d:\ to your CONFIG.SYS, where d: is the LAN Server/400 drive that contains the QPWXGxxx directories. Note that the trailing back-slash is required.
2. Shut down your PC.
3. Restart your PC.
4. Start the LAN requestor.

4.2.2.5 Installing From A PC LAN Server

If you have a PC workstation that already has Client Access/400 Optimized for OS/2 installed or a Client Access/400 for Windows 3.1 workstation, you can assign a drive to the root directory on the AS/400 system and copy the directories:

- QPWXGOS2 - Base Client Access/400 Optimized for OS/2
- QPWXGPC - Personal Communications/5250 (if required)
- QPWXGRB - RUMBA/400 (if required)
- QPWXGGY - OS/400 Graphical Operations (if required)

using the following commands from a OS/2 command line.

In this example, the Z: drive is assigned to the AS/400 system:

```
MD Z:\QLANSrv\CA\QPWXGOS2
MD Z:\QLANSrv\CA\QPWXGPC
MD Z:\QLANSrv\CA\QPWXGRB
MD Z:\QLANSrv\CA\QPWXGGY
XCOPY Z:\QPWXGOS2\*.* Z:\QLANSrv\CA\QPWXGOS2 /S
XCOPY Z:\QPWXGPC\*.* Z:\QLANSrv\CA\QPWXGPC /S
XCOPY Z:\QPWXGRB\*.* Z:\QLANSrv\CA\QPWXGRB /S
XCOPY Z:\QPWXGGY\*.* Z:\QLANSrv\CA\QPWXGGY /S
```

If you have LAN Requestor installed on your PC, then using a drive assigned to the FSIOP using LAN Requestor for the target drive enables the copy to be completed faster.

We recommend that you only allow users to have read access to these directories in QLANSrv.

To make the default source for *selective install* be the LAN Server/400, you must do the following:

1. Add the line SET CAINSTALL_SOURCE=d:\ to your CONFIG.SYS, where d: is the LAN Server/400 drive that contains the QPWXGxxx directories. Note that the trailing back-slash is required.
2. Shut down your PC.
3. Restart your PC.
4. Start the LAN requestor.

4.2.2.6 CID Installation

Client Access/400 Optimized for OS/2 allows the use of CID response files for the first part of the installation process. See 4.9, "CID Installation" on page 131 for details.

4.3 Installation Worksheets

This section contains the worksheets that we recommend you complete before you start the installation process for Client Access/400 Optimized for OS/2.

4.3.1 SNA Worksheet

Table 1 on page 44 is the worksheet that you can fill in while you read the instructions on how to install in an SNA environment in 4.4, "SNA Installation" on page 50.

The purpose of the left most column, **Ref.#**, in the worksheet is to provide a tool for you to use during the planning process. The matching parameters table map can be somewhat complicated to use. Using the Ref.#, you are able to match the parameters. When you find a value for one parameter in the AS/400 section of the worksheet, you can fill in the matching parameter in the PC section of the worksheet.

Not all parameters have a one-to-one relationship. **Matching parameters** are without parentheses, such as 1. For **Equivalent parameters**, use the description of the parameter for information on how to match them. Equivalent parameters do have parentheses such as (1).

<i>Table 1 (Page 1 of 3). Client Access/400 Optimized for OS/2 SNA Combined Worksheet</i>					
Ref #	Parameter	AS/400 Parameters	CA/400 Parameters	Our Example	Your Information
AS/400 Network Attributes					
1	Local control point name	LCLCPNAME	System name	RCHAS040	
2	Local network ID	LCLNETID	AS/400 network ID	ITSCNET	
3	Node type	NODETYPE	Node type		
4	Allow AnyNet support	ALWANYNET	AnyNet Support		
Add IP over SNA Interface ADDIPSIFC					
5	Internet address	INTNETADR	System to notify	10.10.10.10	
Add IP over SNA Location ADDIPSLOC					
5	Remote destination	RMTDEST	System to notify	10.10.10.10	
2	Remote network id.	RMTNETID	SNA network name	ITSCNET	
1	Location template	LOCTPL	LU Template	RCHAS040	
6	Remote destination, PC	RMTDEST	Local IP Addr. for SNA	10.9.11.124(t) 10.9.11.12(l)	
(7)	Subnet mask	SUBNETMASK			
9	Remote network identifier, PC	RMTNETID	SNA network ID	ITSCNET	
10	Location template	LOCTPL	LU Template	D911P124(t) D911PC12(l)	
Connection A) through LAN					
8	LAN remote adapter address	ADPTADR	LAN adapter address	400009110112	
9	Remote network	RMTNETID	Local node Network ID	ITSCNET	
10	Remote control point name	RMTCPNAME	PC location name	D911P124(t) D911PC12(l)	

<i>Table 1 (Page 2 of 3). Client Access/400 Optimized for OS/2 SNA Combined Worksheet</i>					
Ref #	Parameter	AS/400 Parameters	CA/400 Parameters	Our Example	Your Information
Connection B) through Local Workstation Controller					
(12)	Device model	MOD	(Adapter type)	2 (S/36,38)	
11	Switch setting	SWTSET	Workstation address	4	
Connection C) through Remote Workstation Controller					
(12)	Device model	MOD	(Adapter type)	2 (S/36,38)	
(11)	Port number			2	
(11)	Switch setting	SWTSET	Workstation address	4	
(11)	Local location address	LOCADR		12	
PC Workstation Installation Part 1					
8	LAN remote adapter address	ADPTADR	LAN adapter address	400009110112	
11	Switch setting	SWTSET (local)	Workstation address	4	
(12)	Adapter type	(MOD AT=1/MC=2)	Adapter type	S/36,38	
4	Enable AnyNet		Enable AnyNet	*yes	
6	Local IP address for SNA	RMTDEST	Local IP address for SNA	10.9.11.124(t) 10.9.11.124(l)	
(7)	Subnet mask		Address mask	255.255.255.255	255.255.255.255
10	Location template	LOCTPL	LU Template	D911P124(t) D911PC12(l)	
9	SNA network ID	RMTNETID	Local node network ID	ITSCNET	
PC Workstation Installation Part 2					
9	Local network ID	RMTNETID	Local network ID	ITSCNET	
10	PC location name	RMTCPNAME	PC location name	D911P124(t) D911PC12(l)	

<i>Table 1 (Page 3 of 3). Client Access/400 Optimized for OS/2 SNA Combined Worksheet</i>					
Ref #	Parameter	AS/400 Parameters	CA/400 Parameters	Our Example	Your Information
5	System to notify	LOCTPL	System to notify	10.10.10.10	
2	AS/400 network ID	LCLNETID	Connection network ID	ITSCNET	
1	System name	LCLCPNAME	Connection system	RCHAS040	
3	Node type	NODETYPE	Node type	Network Node	
13	LAN adapter address	ADPTADR	Connection address	400000000040	
5	IP network address	RMTDEST	System to notify	10.10.10.10	
(7)	Address mask		Address mask	255.255.255.255	255.255.255.255
1	LU template	LOCTPL	LU template	RHCAS040	
2	SNA network name	LCLNETID	SNA network name	ITSCNET	

4.3.2 TCP/IP through LAN Installation Worksheet

<i>Table 2 (Page 1 of 2). Client Access/400 Optimized for OS/2 TCP/IP through LAN Installation Worksheet</i>					
Ref #	Description	AS/400 Parameters	CA/400 Parameters	Our Example	Your Information
AS/400 System					
1	Line description	LIND		TRLIN041	
2	Resource name	RSRCNAME		LIN041	
3	Local adapter address	ADPTADR		400000000040	
4	IP address of AS/400 system	INTNETADR	Host IP address	9.5.69.253	
5	Subnet mask	SUBNETMASK		255.255.255.192	
6	Routing information	RTEDEST		9.5.69.193	
7	Host name of AS/400 system	HOSTNAME	TCP/IP Host name	RCHAS040	
8	Domain name of the AS/400 system			RCHLAND.IBM.COM	
9	Local Network ID	LCLNETID	AS/400 Network ID	ITSCNET	
10	Controller description	CTLD		ANYNWWS01	
11	Remote Network	RMTNETID	Network ID	ITSCNET	
12	Remote Location	RMTLOCNAME	PC location name	PCTCP01	
13	Local Location Name	LCLLOCNAME	AS/400 System	RCHAS040	
14	Control Point Network ID	CPNETID	Network ID	ITSCNET	
15	SNA domain name suffix	SNA domain name suffix	SNA domain name suffix	SNA.IBM.COM	

<i>Table 2 (Page 2 of 2). Client Access/400 Optimized for OS/2 TCP/IP through LAN Installation Worksheet</i>					
Ref #	Description	AS/400 Parameters	CA/400 Parameters	Our Example	Your Information
PC Workstation					
16	Adapter address of workstation		Adapter address	400000000010	
17	Host name of PC workstation	HOSTNAME	Local TCP/IP Host name	PCTCP01	
18	Domain name		Domain name	RCHLAND.IBM.COM	
19	IP address	Host IP address	IP address	9.5.69.245	
20	Subnet mask		Subnet mask	255.255.255.192	
21	Broadcast address		Broadcast address	255.255.255.0	
22	Routing information		Router address	9.5.69.193	
23	Name servers		Name servers	9.5.100.76	
24	TCP/IP Hosts name of AS/400	HOSTNAME	TCP/IP host name	RCHAS040.ITSCNET. SNA.IBM.COM	

Table notes:

1. This is the Name of the LAN line. If the line is already created, you can find the name by typing it on the command line of the AS/400 WRKCFGSTS *LIN. If is not created, you can choose a name for it. The name must begin with an alphabetical character followed by alphanumeric characters.
2. This is the Name of the LAN adapter port. You can find this information by typing it on the command line of the AS/400 WRKHDWRSC *CMN and look for the LAN adapter port, for example, Token Ring Port.
3. This is the AS/400 LAN adapter address. You can type a 12-number address of your choice; valid values are hexadecimal from 400000000000 to 7FFFFFFFFFFF. Or you can leave the default *ADPT which takes the burn-in address of the adapter.
4. This is the Internet Protocol address for the AS/400 system. See 2.1, "TCP/IP Concepts" on page 21 for more information about TCP/IP

parameters. If your AS/400 system is already configured for TCP/IP, you can find this parameter in option 1 of the Configure TCP/IP menu on the AS/400 system.

5. This is the Subnet mask of the subnetwork where the AS/400 system is attached to.

6. This is the IP address of the router that helps us to connect to other networks. If your PC workstation that you want to connect to resides in other networks, you need this information; otherwise leave it blank.

7. This is the host name of the AS/400 system. This name could be different from the system Name, but is strongly recommended to use the same name for both. If your AS/400 system is already configured for TCP/IP, you can find this parameter in option 10 of the Configure TCP/IP menu on the AS/400 system beside the IP address of the system.

8. This is the domain name of the network your AS/400 system belongs to. This is a TCP/IP parameter.

9. This is the network name where the AS/400 system belongs to. You can find this value by typing the command DSPNETA on the AS/400 system.

10. This is the name of the AS/400 controller created for the PC workstation.

11. This is the name of the network where the PC workstation belongs. In our example, the PC workstation and the AS/400 system belong to the same network.

12. This is the PC LU name; this is an SNA parameter. It could be different from the PC Host name but we strongly recommend using the same name for both.

13. This is the name of the AS/400 system. You can find this name by typing the command DSPNETA on the AS/400 system.

14. This is the name of the network the PC workstation belongs to; it has to match reference # 10.

15. The SNA domain name suffix is needed for the AnyNet communication. This parameter has to match the same parameter on the PC.

16. You can use the default address (burnt-in address) for this parameter, or override it with your own administration address. If you do not know which address your adapter is using, run the LAPS program and check for the current configuration.

17. This is the TCP/IP host name of the PC workstation.

18. This is the domain name of the network your PC workstation belongs to.

19. This is the Internet Protocol address for the PC workstation.

20. This is the Subnet mask of the PC workstation subnetwork.

21. If you are not sure of the broadcast address, ask your network administrator or leave the default.
22. This is the IP address of the router that helps us to connect to other networks. If the AS/400 system you want to connect to resides in another network, you need this information; otherwise leave it blank.
23. This is the system that resolves domain names to IP address. If you are not sure of this information, ask your network administrator.
24. This is the host name of the AS/400 system you want to connect to. This name must contain the SNA domain suffix as shown in the example.

4.4 SNA Installation

This section describes the installation of Client Access/400 Optimized for OS/2 in an SNA environment. Both LAN and Twinaxial connections are described.

As you complete the steps described here, complete the worksheets in 4.3.1, “SNA Worksheet” on page 43.

When you have completed the installation on the PC, you set up the Client Access/400 Optimized for OS/2 environment using the information found in Chapter 5, “Configuration” on page 135.

4.4.1 SNA Installation on the AS/400 System

This section describes the specific tasks that are needed to enable SNA connections from Client Access/400 Optimized for OS/2 PCs. It does not include the following tasks that should be completed first:

- Installation of AS/400 licensed program products (including Client Access/400 Optimized for OS/2). Remember to install both 5763-XG1 (base) and any options that are needed (for example, option 1 is RUMBA/400, option 2 is PC5250 and option 3 is Graphical Operations).
- Installation of the latest cumulative PTF package.
- Configuration of communications lines and remote workstation controllers.

The following sections guide you through the following steps on the AS/400 system:

1. Add users to the AS/400 system directory.
2. Verify AS/400 network attributes.
3. Verify AS/400 modes.

4. Configure for problem and inventory management through AnyNet.
5. Configure for LAN connection.
6. Configure for Twinaxial connection.

4.4.1.1 Add Users to the System Directory

Any user that needs access to folders in the QDLS file system must be enrolled in the system directory. Use **WRKDIRE** to display and add users to the directory.

4.4.1.2 Network Attributes

To get the information you need, you can display the network attributes with the following command:

```
DSPNETA
```

If you want to print the information, then use the following command:

```
DSPNETA OUTPUT(*PRINT)
```

The printout is listed in the output queue as QPDSPNET.

Current system name

This is the system name you see when you sign on to the system and in many menus. This network attribute is *not used* by Client Access/400.

Local control point name

The local control point name is the name for the AS/400 system that is used during the initialization of APPC connections, or "binds". This is the SNA AS/400 system name you specify during Client Access/400 installation.

The AS/400 keyword is *LCLCPNAME* and the Client Access/400 parameter is *system name*. The matching ref. id in the worksheet is # 1.

Default local location

Not used by Client Access/400.

Local network ID

The local network ID is the name of the network that the AS/400 system is a part of. In many AS/400 installations, the default local network ID, APPN is used. If you are connecting to other networks, we recommend that you use a unique network ID instead of APPN.

The network that the PC is in may be different from the AS/400 network and have a different name.

The AS/400 keyword is *LCLNETID*, and the Client Access/400 parameter is *AS/400 network ID*. The matching ref. id is # 2.

DDM request access and Client request access

If you have set PCSACC or DDMACC to *REJECT, this has no effect on Client Access/400 Optimized for OS/2 functions with the exception of the file transfer function. In this case, the file transfer function is disabled.

The AS/400 keywords are *DDMACC* and *PCSACC*. Matching other parameters is not required.

Node type

Depending on the role of your AS/400 system in the network, it is defined as either a NETNODE or an ENDNODE.

The AS/400 keyword is *NODETYPE*, and the Client Access/400 parameter is *Node type*. The matching ref. id is # 3.

Allow ANYNET support

When used in a Client Access/400 Optimized for OS/2 SNA environment, specifying *YES for this network attribute enables the client management functions of Client Access/400 Optimized for OS/2. See "The ALWANYNET Network Attribute" on page 54 for details. Using ALWANYNET *YES causes any sockets applications running natively over TCP/IP to run slower.

The AS/400 keyword is *ALWANYNET*, and the Client Access/400 parameter is *AnyNet Setup*. The matching ref. id in the worksheet is # 4.

4.4.1.3 MODE

Client Access/400 Optimized for OS/2 uses modes that include BLANK QPCSUPP, QSERVER, and SNACKETS. You can use the *WRKMODD* command to display the current settings of these modes. If you do not have the SNACKETS mode present on your system, you can order it as PTF number SF22357, or you can enter **CRTMODD** and fill in the values shown in Figure 3 on page 53.


```

                                Create Mode Description (CRTMODD)

Type choices, press Enter.

Mode description . . . . . MODD          SNACKETS
Maximum sessions . . . . . MAXSSN       > 64
Maximum conversations . . . . . MAXCNV   > 64
Locally controlled sessions . . . . . LCLCTLSSN > 2
Pre-established sessions . . . . . PREESTSSN > 0
Maximum inbound pacing value . . . . . MAXINPAC > *CALC
Inbound pacing value . . . . . INPACING   > 7
Outbound pacing value . . . . . OUTPACING > 7
Maximum length of request unit . . . . . MAXLENRU > *CALC
Data compression . . . . . DTACPR       > *NETATR
Inbound data compression . . . . . INDTACPR > *RLE
Outbound data compression . . . . . OUTDTACPR > *RLE
Class-of-service . . . . . COS          > #INTER
Authority . . . . . AUT                 *LIBCRTAUT
Text 'description' . . . . . TEXT       > 'AnyNet Sockets over SNA mode'

```

Figure 3. Example of the SNACKETS Mode Description

If you are going to have many connections, you may have to adjust these values. *AS/400 APPN Support*, SC41-3407, contains more details on modes.

4.4.1.4 Sockets Over SNA Setup

In Client Access/400 Optimized for OS/2, the DMI problem and inventory management function uses SNMP to route information to the AS/400 management system. Since SNMP uses sockets APIs, you must configure *Sockets over SNA* in order to use the inventory and problem management functions.

Figure 4 on page 54 shows how AnyNet allows the DMI SNMP agent at the PC workstation to route client management information through the TCP/IP sockets interface through AnyNet over an SNA network.

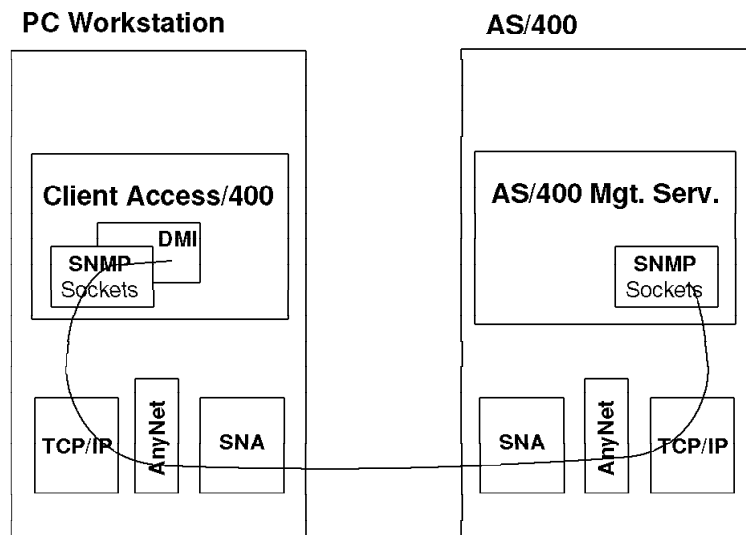


Figure 4. Sockets over SNA

For more information, see the "AnyNet/400 Sockets over SNA" chapter in the redbook *IBM AS/400 AnyNet Scenarios*, GG24-2531.

In Chapter 6, "Client Management" on page 211 and in *Client Access/400 Optimized for OS/2 API and Technical Reference*, SC41-3511, you can find more information on the client management functions. See 2.1, "TCP/IP Concepts" on page 21 for more information about TCP/IP parameters.

The ALWANYNET Network Attribute: To allow Sockets over SNA support to run on your system, you must change the ALWANYNET network attribute to *YES. If you need to display the current setting, use the **DSPNETA** command. Roll down three pages and you see the *Display Network Attributes* panel shown in Figure 5 on page 55.

```

                                Display Network Attributes
                                System:  RCHAS040
Maximum hop count . . . . . : 16
DDM request access . . . . . : *OBJAUT
Client request access . . . . . : *OBJAUT
Default ISDN network type . . . . . :
Default ISDN connection list . . . . . : QDCCNNLANY
Allow ANYNET support . . . . . : *YES
Network Server Domain . . . . . : ITSCDOM1

                                Bottom

Press Enter to continue.

F3=Exit  F12=Cancel

```

Figure 5. Display of Network Attributes with an ALWANYNET Value of *YES

Allow AnyNet support

The AS/400 keyword is *ALWANYNET*, and the Client Access/400 parameter is *AnyNet Setup*. The matching ref. id in the worksheet is # 4.

Add IP Over SNA Interface: To configure IP over SNA, enter **CFGIPS** on an AS/400 command line and you see the panel shown in Figure 6.

```

CFGIPS                Configure IP over SNA
                                System:  RCHAS040
Select one of the following:

    1. Work with IP over SNA interfaces
    2. Work with IP over SNA routes
    3. Work with IP over SNA locations
    4. Work with IP over SNA type of service

    20. Convert IP address into location name
    21. Convert location name into IP address

Selection or command
====> 1

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel

```

Figure 6. The CFGIPS, Configure IP over SNA Panel

Select **1** and then **1** again, and the *Add IP over SNA Interface* panel is displayed as shown in Figure 7 on page 56.

An interface is an Internet protocol address by which this local host is known on the SNA transport. IP over SNA interfaces are logical interfaces. They are not physical interfaces and they are not associated with any line description or network interface.

```

Add IP over SNA Interface (ADDIPSIFC)

Type choices, press Enter.

Internet address . . . . . INTNETADR      '10.10.10.10'
Subnet mask . . . . . SUBNETMASK         255.255.255.0
  
```

Figure 7. Add IP over SNA Interface (ADDIPSIFC)

Internet address

This *logical* IP address is the one that the AS/400 system uses for sockets over SNA. If you are using TCP/IP connections from your AS/400 system, you must ensure that the IP address used for IP over SNA is different from the IP address that is used by TCP/IP.

The AS/400 keyword is *INTNETADR*, and the Client Access/400 parameter is *System to notify*. The matching ref. id in the worksheet is # 5.

Subnet mask

The AS/400 keyword is *SUBNETMASK*. If you are using TCP/IP connections from your AS/400 system, you must ensure that a different subnetwork is used for IP over SNA from the one used by TCP/IP.

The panel in Figure 8 shows an example.

```

Work with IP over SNA Interfaces
System: RCHAS040

Type options, press Enter.
 1=Add  2=Change  4=Remove  9=Start  10=End

Opt      Internet      Subnet      Interface
Address  Mask              Status

_        10.10.10.10    255.255.255.0  Active
  
```

Figure 8. Work with IP over SNA Interfaces

After the SNA location is created, the interface becomes active. If you want to delete the location entry, use option 10 to stop the interface; then use option 4 to delete.

Add IP Over SNA Location

Select option 3, and then option 1 from the CFGIPS menu, and the *Add IP over SNA Location* panel is displayed.

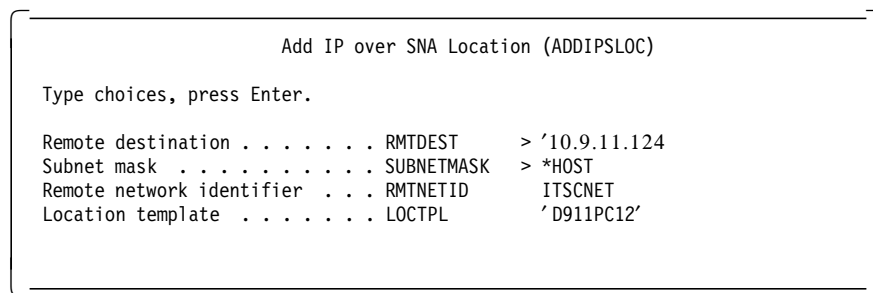


Figure 9. Add IP Over SNA Location (ADDIPSLOC) Panel

On the Add IP over SNA locations panel shown in Figure 9, enter your values for:

Remote destination

This is the IP address used for sockets over SNA by the PC.

The AS/400 keyword is *RMTDST*, and the Client Access/400 parameter is *Local IP address for SNA*. The matching ref. id in the worksheet is # 6.

Subnet mask

You must use **HOST*. The matching ref. id is # (7).

Remote network identifier

Here you must specify the value for the PC local network ID. In most networks, the PC is part of the AS/400 network, and the network ID would, therefore, be the same as the AS/400 network ID. The AS/400 keyword is *RMTNETID*, and the Client Access/400 parameter is *SNA network ID*. The matching ref. id is # 2.

Location template

In the configuration used here, the location template and the PC location name are the same. A more complicated use of IP may result in this configuration being different. Enter the value for your PC location name *RMTCPNAME*.

The AS/400 keyword is *RMTCPNAME* and the Client Access/400 parameter is *LU template*. The matching ref. id in the worksheet is # **10**.

Figure 10 shows an example of the completed *Work with IP over SNA Locations* panel.

Work with IP over SNA Locations				
Type options, press Enter. 1=Add 2=Change 4=Remove				System: RCHAS040
Opt	Remote Destination	Subnet Mask	Remote Network ID	Location Template
-	10.9.11.124	*HOST	ITSCNET	D911P124
-	10.9.11.12	*HOST	ITSCNET	D911PC12
-	10.10.10.10	*HOST	ITSCNET	RCHAS040
-	10.10.10.45	*HOST	ITSCNET	TCPRUBEN
-	10.10.10.46	*HOST	ITSCNET	SNAMRAS
-	10.10.10.47	*HOST	ITSCNET	EMUSALLY
-	10.10.10.48	*HOST	ITSCNET	DMICWAS

Figure 10. *Work with IP over SNA Locations*

Ensure that you have an entry for the AS/400 system as well as for any PCs using the Client Access/400 Optimized for OS/2 client management functions by using the following values:

Remote destination

Use the Internet address (*INTNETADR*) that you specified in “Add IP Over SNA Interface” on page 55.

The AS/400 keyword is *RMTDST*, and the Client Access/400 parameter is *System to notify*. The matching ref. id in the worksheet is # **5**.

Subnet mask

Use **HOST*.

Remote network identifier

Even though the AS/400 keyword is *RMTNETID*, you must use the value for AS/400 local network ID *LCLNETID*.

The AS/400 keyword *here* is *RMTNETID*, and the Client Access/400 parameter is *SNA network name*. The matching ref. id is # **2**.

Location template

Enter the value for your local control point name *LCLCPNAME*.

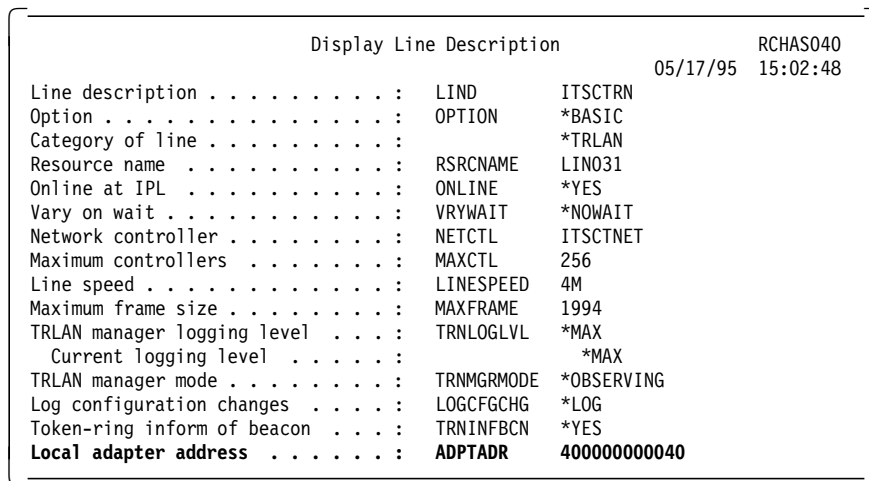
The AS/400 keyword is *LOCTPL* and the Client Access/400 parameter is *system name*. The matching ref. id in the worksheet is # 1.

4.4.1.5 AS/400 Controller And Device Parameters

Connection through LAN: To find the value for the AS/400 local adapter address enter the following command where *lanline* is the name of your line description (if you are not sure of the name of the line, you can use the command WRKLIND to help).

DSPLIND LIND(*lanline*)

Figure 11 shows an example of the output from this command.



Display Line Description		RCHAS040
Line description	LIND	ITSCTRN
Option	OPTION	*BASIC
Category of line		*TRLAN
Resource name	RSRCNAME	LIN031
Online at IPL	ONLINE	*YES
Vary on wait	VRYWAIT	*NOWAIT
Network controller	NETCTL	ITSCTNET
Maximum controllers	MAXCTL	256
Line speed	LINESPEED	4M
Maximum frame size	MAXFRAME	1994
TRLAN manager logging level	TRNLOGLVL	*MAX
Current logging level		*MAX
TRLAN manager mode	TRNMGRMODE	*OBSERVING
Log configuration changes	LOGCFGCHG	*LOG
Token-ring inform of beacon	TRNINFCN	*YES
Local adapter address	ADPTADR	40000000040

Figure 11. Display Line Description Panel

Local adapter address

This is the AS/400 LAN adapter address. The AS/400 keyword is *ADPTADR*, and the Client Access/400 parameter is *connection address*. The matching ref. id in the worksheet is # 13.

4.4.2 PC Configuration

Before you start the installation process on the PC, there are some adjustments that you need to make to CONFIG.SYS. These adjustments are described in the following sections.

4.4.2.1 RESTARTOBJECTS

We recommend that you add a restart objects statement or change the existing restart objects statement in CONFIG.SYS to:

```
SET RESTARTOBJECTS=STARTUPFOLDERONLY
```

Doing this tells OS/2 to start only the objects in the OS/2 Startup Folder when the Workplace Shell is started, thereby keeping applications that need Client Access/400 functions from starting before Client Access/400 is started.

4.4.2.2 The CONNECTIONS option of SET AUTOSTART

The CONNECTIONS option of AUTOSTART is not supported. **Remove** the CONNECTIONS statement from the following line:

```
SET AUTOSTART=PROGRAMS,TASKLIST,FOLDERS,CONNECTIONS,LAUNCHPAD
```

Having CONNECTIONS on the OS/2 SET AUTOSTART statement tells OS/2 to reconnect remote drive and printer connections that were active when OS/2 shut down. Client Access/400 connections cannot be restarted at the time OS/2 connects these drives and printers.

After Client Access/400 Optimized for OS/2 installation, you can use Client Access/400s startup configuration folder to automatically start network drives and printers. You can automatically start Client Access/400 by dragging a shadow of the Start Client Access/400 icon to OS/2's startup folder. See 5.2, "Startup Configuration Group" on page 140 for details.

4.4.2.3 Performance Adjustments to CONFIG.SYS

In Chapter 13, "Performance Tuning OS/2 Warp" on page 325, you can find information on how to optimize the settings in CONFIG.SYS.

4.4.2.4 Backing up CONFIG.SYS

In case you need to uninstall Client Access/400 Optimized for OS/2, make a backup copy of CONFIG.SYS before you start the installation process.

4.4.3 PC Installation - SNA

Before starting the installation process, be sure you have reviewed the information contained in the earlier parts of this chapter.

The installation procedure on the workstation is divided into two parts:

4.4.3.1, "PC Installation - SNA, Part 1," where you do not need a connection to the AS/400 system unless you are going to install using LAN Server/400. During part one, all of the code necessary to make a Client Access/400 connection to the AS/400 system is installed on the PC.

4.4.3.2, "PC Installation - SNA, Part 2" on page 68, where you define and set up the connection to the AS/400 system, selectively install other components of the client, and run the update function from the AS/400 system.

4.4.3.1 PC Installation - SNA, Part 1

1. Prepare the PC for installation by following the steps in 4.4.2, "PC Configuration" on page 60.
2. The installation program, INSTALL.EXE, is located on the first installation diskette, or in the QPWXGOS2 directory on the drive you are going to install from (see 4.2.2, "Choice of Installation Source" on page 38 for details). Enter the following command at an OS/2 prompt:

```
A:\INSTALL
```

for diskette installation, or if you are installing from other than diskettes:

```
d:\path\QPWXGOS2\INSTALL
```

where d:\path represents the drive and path that contains the QPWXGxxx directories.

3. On the *Client Access Part 1* panel, select **Install**.
4. If you have Communications Manager/2 and NTS/2 already installed on your PC, please see 4.6.1, "Communications Manager/2 Version 1.11 and Network Transport Services/2" on page 118 before continuing with your installation of Client Access/400.
5. Select **Custom** for the type of installation followed by **OK** to continue.
6. In the panel shown in Figure 12 on page 62, you can change the installation location *Drive* and *Path* and the installation temporary storage *Drive*. The default location is C:\CAOS2\. In this example we install on the D: drive.

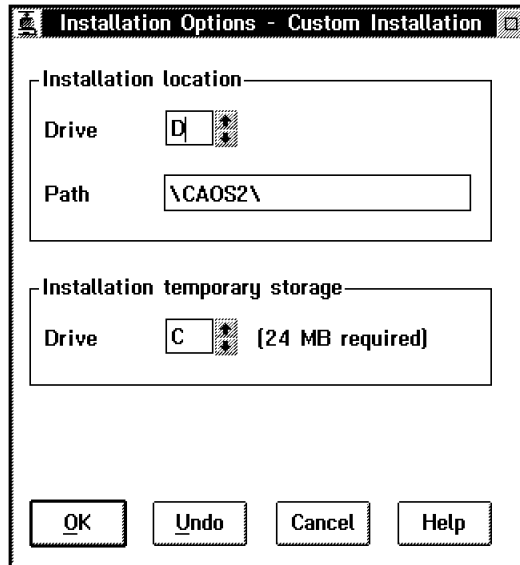


Figure 12. Installation Options - Custom Installation Panel

The installation temporary drive storage is used by the installation program to store programs and files during the installation process. The space needed is approximately 24MB when all options are installed. The space is freed when the installation is completed.

Select **OK**.

7. On the *Communications Support Options* panel, use the pull-down buttons to select either the LAN or the TWINAX connection:

Network type: **SNA**

Connection type: **LAN** or **TWINAX**

Select **OK**.

8. To continue the TWINAX installation, skip to step 10 on page 64.
9. In the panel shown in Figure 13 on page 63, you must enter the LAN adapter information:

Use the pull-down button to select the **LAN adapter Type** installed in your PC.

Attention

If you are connected on token ring, make sure that you select the appropriate adapter from the list instead of just taking the default "IBM Token Ring Network Adapters" entry.

If you have an adapter installed that is not on the list, and already have LAN Adapter Protocol Support installed on the PC, choose **Other** from the list. A panel is displayed that tells you to configure the adapter using the LAPS configuration program at the end of installation part 1. For those adapters that are included on the list, Client Access/400 Optimized for OS/2 automatically installs and configures LAPS with the appropriate information. If you do not have LAPS already installed, and you are installing the V3R1M0 version of the client, you *must* first choose an adapter from the list, and then reconfigure LAPS to replace the adapter with the correct one following part 1 of the installation process.

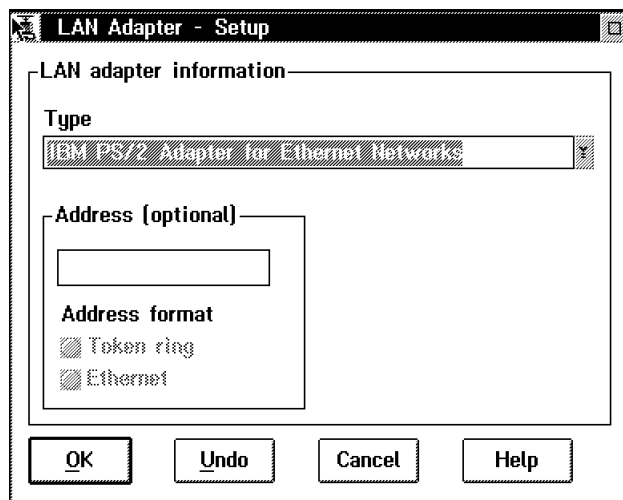


Figure 13. LAN Adapter - Setup Panel, Using an Ethernet Adapter With the Burned-in Address.

In the **Address (optional)** box, you can enter a LAN adapter address for your LAN adapter. All LAN adapters cards have a burnt-in or encoded address that is used as the default when connecting to networks. The installation program uses this encoded address as the default unless you want to override the address.

LAN adapter address

This is the LAN address of the PC workstation. The AS/400 keyword is *ADPTADR*, and the Client Access/400 parameter is *LAN adapter address*. The matching ref. id in the worksheet is # 8.

When you type a LAN address in the Address field, use the Address format radio buttons to indicate the address format: Token-Ring or Ethernet. To continue, select **OK** and skip to step 11.

10. On the *Twinaxial Adapter - Setup panel*, enter the workstation address and select the adapter type as shown in Figure 14 and select **OK**.

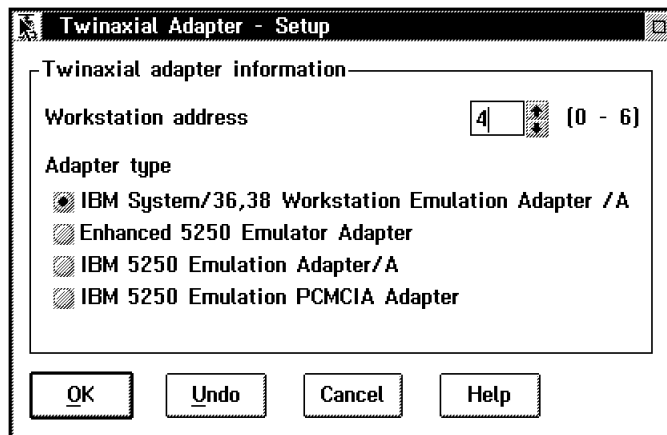


Figure 14. TWINAX Adapter - Setup Panel

Workstation address

This address is set to a value between 0 and 6 for locally attached PCs. The matching ref. id in the Installation Worksheet is 11.

11. The *Communications Components* panel lists the components that are installed on your workstation during part 1 of the installation process:
 - NTS/2 (when LAN)
 - Communications Manager
 - User Profile Management
 - AnyNet: Sockets over SNA
 - Systems Management
 - System Information Agent
 - Desktop Management Interface

It is possible to change the drive where some of the components are installed by selecting **Installation Path**.

If you want to check the disk space, choose **Check disk space**, and you are able to find out the required disk space for each of the components.

To continue, select **OK** from the *Communications Components* panel.

12. If you want to use the client management support described in Chapter 6, "Client Management" on page 211, select **Enable TCP/IP (Sockets) applications to run** on the panel shown in Figure 15.

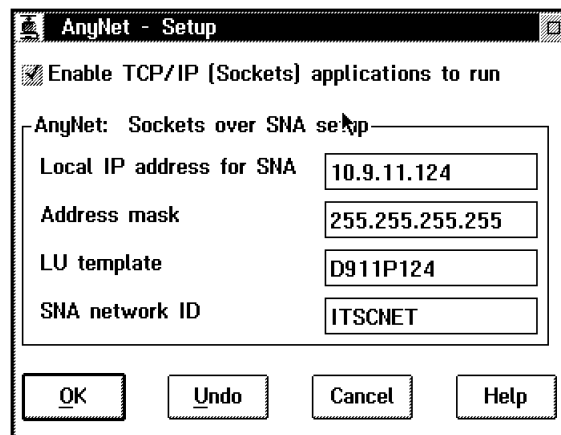


Figure 15. AnyNet - Setup Panel, TWINAX

Fill in your values:

Local IP address for SNA

The PC uses this *logical* address as the IP address for sockets over SNA.

The AS/400 remote destination keyword is *RMTDST*. The matching ref. id in the worksheet is # **6**.

Address mask

This must be 255.255.255.255.

LU template

For this AnyNet *local* node definition, this is the PC location name. The AS/400 location template keyword is *RMTCPNAME*. The matching ref. id in the worksheet is # **10**.

SNA Network ID

Here you must specify the value for the PC local network ID.
The AS/400 remote network identifier keyword is *RMTNETID*.
The matching ref. id is # **9**.

13. On the *Selective Install* panel, you can choose the functions that are installed during part 2 of the installation program. If you want to change the installation drive for the PC5250 or RUMBA/400 component, select the corresponding **Installation path** button.

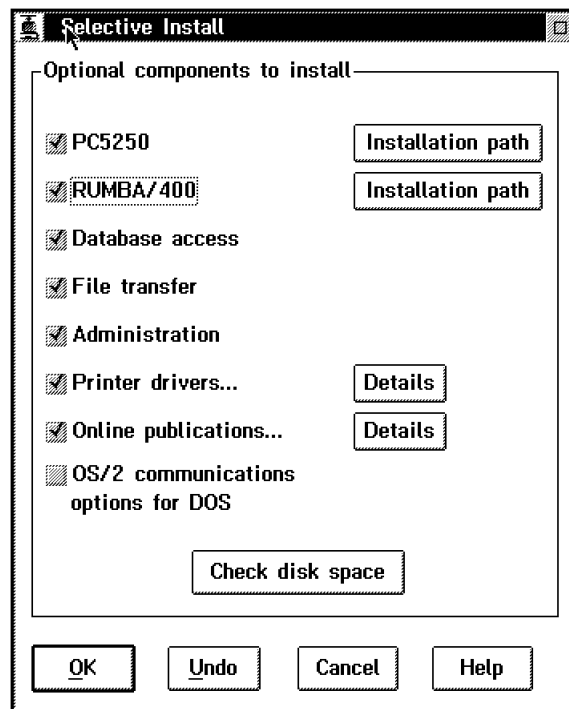


Figure 16. *Selective Install Panel*

14. If you want to change which printer drivers or on-line publications you are going to install, select the appropriate **Details** button. On the *Printer Drivers - Details* panel, select or deselect:

- OS/2 AFP printer driver
- OS/2 SCS printer driver
- Windows AFP printer driver

Make your choices and then select **OK**.

On the *On-line Publications - Details* panel, select or deselect:

- Command and message references
- Communication books

Make your choices and select **OK**.

15. The *Check disk space* button allows you to review the disk space required for each of the components that are to be installed.
16. To continue, select **OK** from the *Selective Install* panel.
17. Select **Yes** on the *Begin Client Access/400 Installation?* panel to continue, or select **No** to go back and make corrections. When you select **Yes**, you see the *Client Access/400 - Install in Progress* panel shown in Figure 17. The Install in progress panel details the files that are being copied on your PC, and gives an indication of the time remaining to install each component.

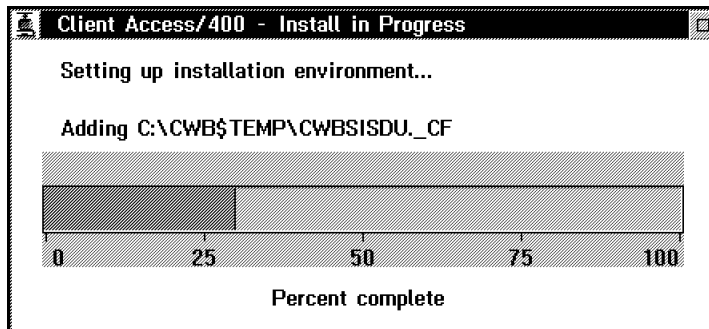


Figure 17. *Client Access/400 Install in Process Panel*

If you are installing from diskettes, you are prompted to insert diskettes when needed.

18. Select **Close** from the panel shown in Figure 18 on page 68 to complete part 1 of the installation on the PC.

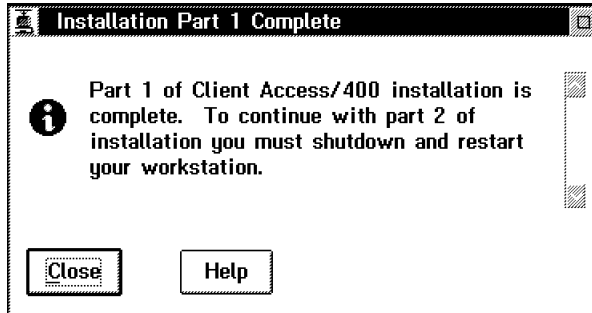


Figure 18. Installation Part 1 Complete - Panel

Note:

If you are going to install Part 2 using an alternative source to diskettes or the AS/400 system, such as CD-ROM or a LAN server, you must ensure that you have the line SET CAINSTALL_SOURCE=d:\path\ in CONFIG.SYS, where d:\path\ is the path containing the QPWGxxx directories (see 4.2.2, "Choice of Installation Source" on page 38 for details).

19. Shut down and restart the PC.



4.4.3.2 PC Installation - SNA, Part 2

Note

If you chose **Other** from the list in step on page 36, and have not yet configured 802.2 for your adapter, you must do so at this point by entering LAPS at an OS/2 command prompt.

When you restart the PC following part 1 of the installation program, you see

the  AS/400 Workstation icon on the OS/2 desktop.

1. Double-click on the **AS/400 Workstation** icon 
2. Select the **Client Access/400 Install part 2**  icon to start part 2 of the installation.

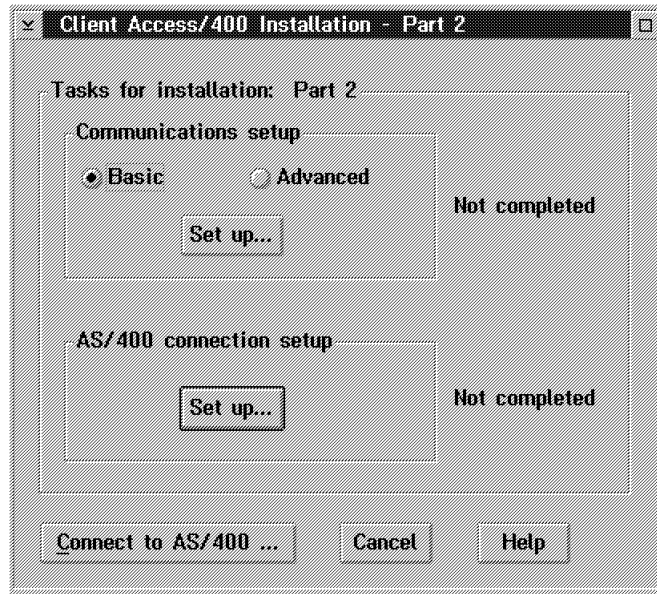


Figure 19. Client Access/400 Installation - Part 2 Panel

3. In the first panel shown in Figure 19, you can choose between a basic or advanced installation.

The option for *basic* installation only prompts for SNA configuration information and for the AS/400 system that you want to use with SNMP. The advanced installation option prompts you for additional parameters to configure the AnyNet Sockets over SNA support used by the Client Access/400 Optimized for OS/2 client management functions.

Choose **Advanced** and select **Set up...** from the *Communication Setup* box, and a notebook similar to the one shown in Figure 20 on page 70 is displayed.

Note: This example is for a twinaxial connection; the LAN version would simply have a LAN page in place of the twinaxial page. The LAN page enables you to go into the LAN Adapter and Protocol Support (LAPS) configuration program to alter settings for the LAN adapter. To move between pages in the notebook, use the left and right arrows on the bottom right corner of the notebook. You can also use the tabs to move between pages.

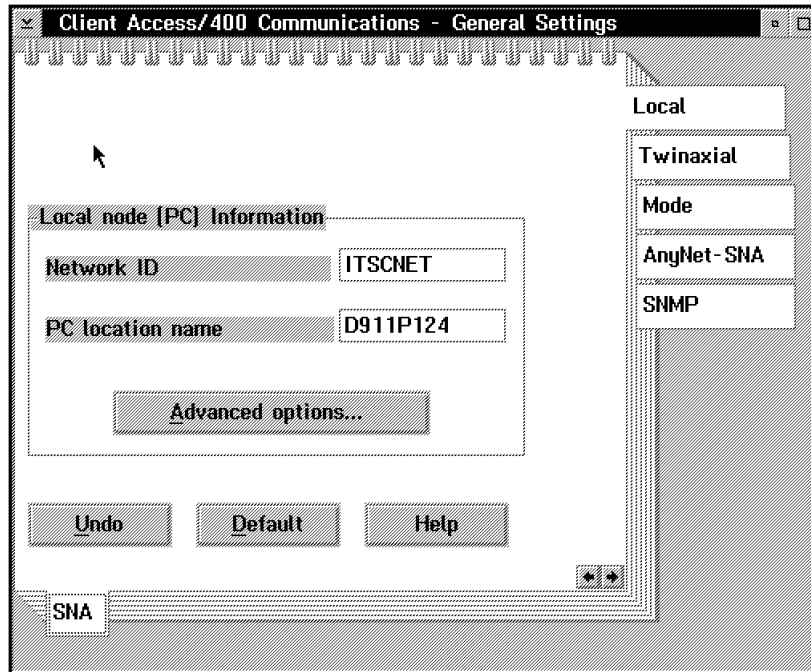


Figure 20. Client Access/400 Connection Setup - Add, LAN

4. On the *Local* page, fill in the *Local node (PC) Information* with the Network ID and PC location name:

Network ID

This is the name of the network that the PC belongs to. In the example, the PC workstation and the AS/400 system belong to the same network. The AS/400 remote network identifier keyword is *RMTNETID*. The matching ref. id in the worksheet is # **9**.

PC Location name

This is the name of the PC workstation. The AS/400 remote control point name keyword is *RMTCPNAME*. The matching ref. id in the worksheet is # **10**.

Having completed the local node information, select **Advanced options....**

5. On the Local Node - Advanced options, you are able to change the local node alias, the exchange ID (local node ID), and the maximum compression level. In this example, we use the default values. Select **OK** and click on the **Right arrow button** to get to the LAN adapter setup

page. This is where you can go into the LAPS configuration program. The **Advanced options...** button takes you to the panel shown in Figure 21 on page 71.

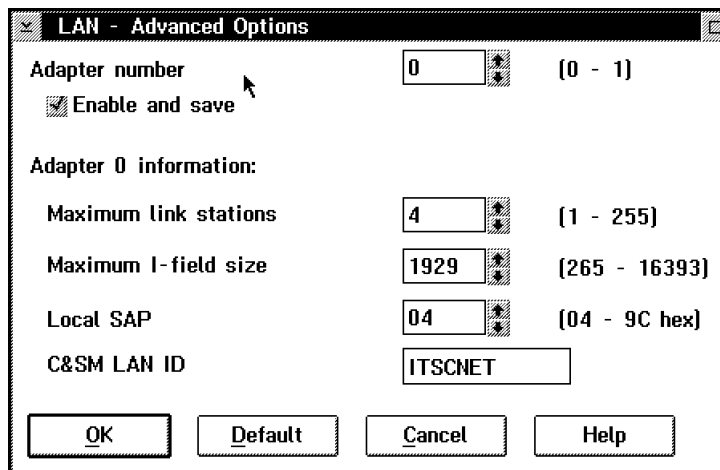


Figure 21. Client Access/400 LAN - Advanced Options

6. Select **OK**.
7. Click on the **Right arrow button** to get to the mode page. Notice the default mode is *BLANK*. You do not need to configure any mode unless you have specific applications that require other mode definitions.
8. If you do not want to enable the Client Access/400 Optimized for OS/2 client management support described in Chapter 6, "Client Management" on page 211, then skip to step 13 on page 75.
9. Click on the **Right arrow button** to get to the AnyNet: Sockets over SNA setup page, and select **Advanced options....**
10. Now you have the AnyNet for OS/2 Configuration notebook displayed. This notebook has five *Configure Sockets for SNA Gateway* pages that you can select using the arrow buttons:
 1. The local node information.
 2. The remote node information.
 3. Start options, maximum number of sessions.
 4. Start options, data buffer size.
 5. Mode definitions, the SNACKETS mode.

You must configure pages 1 and 2 for the local and remote node information if you want to enable Client Access/400 Optimized for OS/2

client management support. The defaults on pages 3, 4, and 5 are suitable for most installations.

11. The local node information is already completed with the details that you entered in the AnyNet - Setup Panel in Figure 15 on page 65. If you did not enter any information, enter it now in order to enable Sockets over SNA.
12. Use the **right arrow button** to get to the remote nodes (page 2) shown in Figure 22, and fill in your values for the AS/400 system:

The screenshot shows a window titled "AnyNet for OS/2 Configuration" with a sub-panel "Configure Sockets over SNA Gateway - Remote Nodes". The sub-panel has a tab labeled "Soc/SNA". Inside, there is a section "Address 1 of 1" containing four input fields: "IP Network ID" with the value "10.10.10.10", "Address Mask" with "255.255.255.255", "LU Template" with "RCHAS040", and "SNA Network Name" with "ITSCNET". Below these fields are three buttons: "New", "Previous", and "Delete". At the bottom of the sub-panel are buttons for "Undo", "Help", "Save", and "Page 2 of 5". Below the sub-panel is a text prompt "Enter the network name for your SNA network." with a right arrow button. At the very bottom is a navigation bar with three tabs: "Local node", "Remote nodes", and "Start options".

Figure 22. Configure Sockets for SNA Gateway - Remote Nodes Panel

IP Network ID

The PC workstation uses this *logical* location for the socket over SNA. You must use the Internet Address (*INTNETADR*) that you specified in the IP over SNA interface definition in "Add IP Over SNA Interface" on page 55.

The AS/400 remote destination keyword is *RMTDST*, and it also matches the Client Access/400 parameter which is *System to notify*. The matching ref. id in the worksheet is # 5.

Address mask

This must be 255.255.255.255.

LU Template

The name of the AS/400 system. Enter the value for the AS/400 local control point name.

The AS/400 location template keyword is *LOCTPL* and the Client Access/400 parameter is *system name*. The matching ref. id in the worksheet is # **1**.

SNA network Name

You must use the value for AS/400 local network ID here.

The AS/400 keyword *here* is *LCLNETID*. The matching ref. id is # **2**.

- a. Select **Save** to save your AnyNet configuration, and use the **right arrow button** to get to the final page in the Client Access/400 Communications - General Settings notebook.
- b. On the Setup - SNMP panel (Figure 23 on page 74), you can add additional information to be used in your inventory and problem management through SNMP.

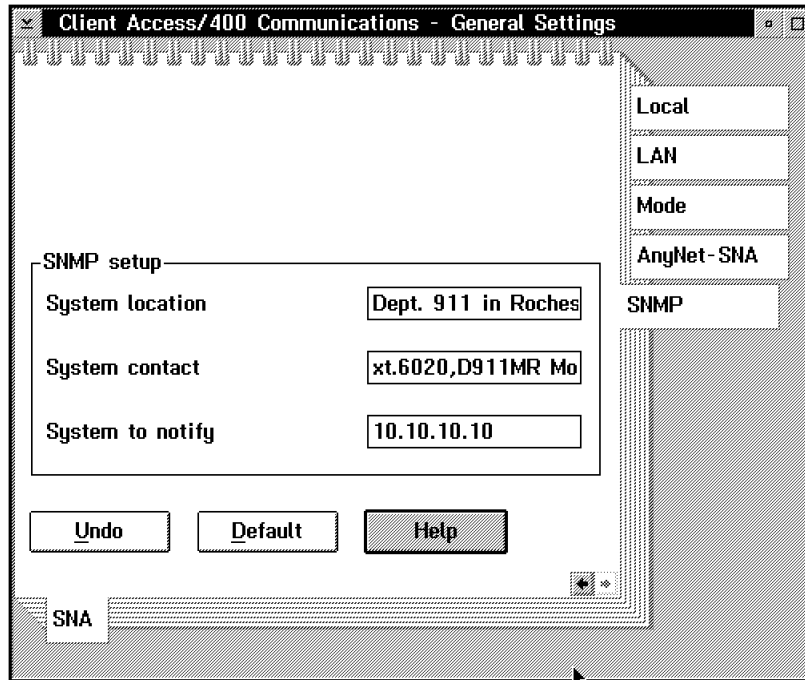


Figure 23. Client Access/400 Installation - Part 2 Panel

Fill in your values for:

System location

This field is optional and would typically contain an office or building number, but can contain what information you want.

System contact

This field is optional, but would typically contain information about who should be notified in the event of a problem.

System to notify

This is the AS/400 system IP address that is used for sockets over SNA. You must use the Internet Address you specified for the IP over SNA interface definition in “Add IP Over SNA Interface” on page 55.

The AS/400 remote destination keyword is *RMTDST*, and it also matches the Client Access/400 parameter *IP Network ID*. The matching ref. id in the worksheet is # 5.

13. Close the notebook by double-clicking the mouse on the top left corner of the notebook, and select **Save** to confirm the save of your communication settings.
14. When the *Client Access/400 Installation - Part 2* panel is displayed again, the communication setup task is labeled as completed. Select **Set up** from the *AS/400 connection setup* box, and the panel shown in Figure 24 is displayed. If you already have CM/2 installed and configured to connect to AS/400 systems, a panel listing those links is displayed instead so that you are able to select the connection from the panel without having to reconfigure the links.

Note

If your AS/400 line description is enabled to allow LAN query, you can select the **Find** button, and then select the AS/400 system from the resulting list. This saves having to complete the information in this section. To enable LAN query, enter GO PCSTSK on an AS/400 panel, and select option 23 from the menu.

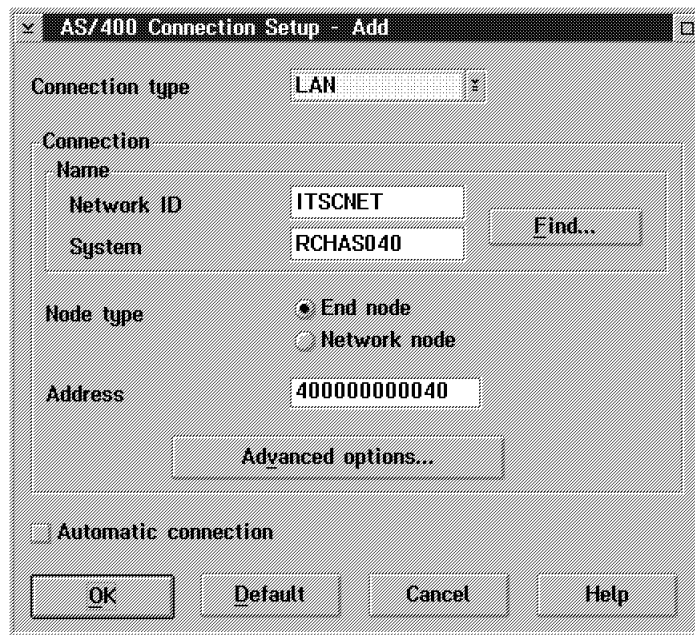


Figure 24. Client Access/400 AS/400 Connection Setup - Add

Network ID

The AS/400 local network ID keyword is *LCLNETID*, and the Client Access/400 parameter is *AS/400 network ID*. The matching ref. id in the worksheet is # **2**.

System This is the SNA AS/400 system name you are going to connect to.

The AS/400 local control point name keyword is *LCLCPNAME*. The matching ref. id in the worksheet is # **1**.

Node type

Depending on your network, your AS/400 system is defined as either a NETNODE or a ENDNODE.

The AS/400 node type keyword is *NODETYPE*, and the Client Access/400 parameter is *Node type*. The matching ref. ID is # **3**.

Address This is the LAN adapter address of the AS/400 system.

The AS/400 node type keyword is *ADPTADR*, and the Client Access/400 parameter is *Address*. The matching ref. ID is # **13**.

Automatic connection

The option is not normally needed. It tells the communications manager to activate the link when communications are started. If, for any reason the link fails, then the communications manager is unable to retry. Without the box checked, the link is established when a Client Access/400 function requires it, and the communications manager is able to retry the link later in the event of a failure.

15. Choose the **Automatic connection** button and select **OK**.
16. Notice that AS/400 communication setup is marked as completed.
You are now going to connect to the AS/400 system, so the physical connection must be in place, and any line or controller descriptions varied on for the AS/400 system.
17. Select the **Connect to AS/400 ...** button, and the panel shown in Figure 25 on page 77 is displayed.

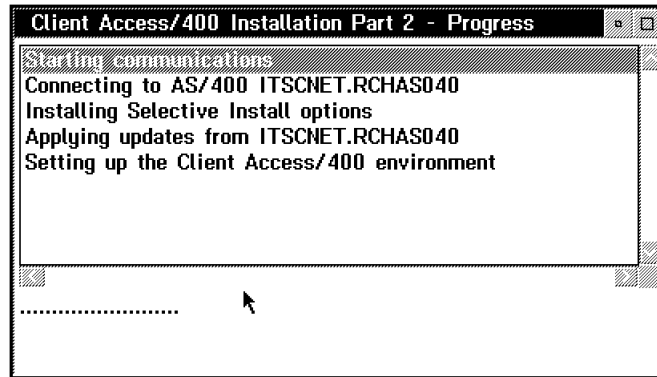


Figure 25. Installation Part 2 Progress - Panel

18. After communications has been started, a connection is made to the AS/400 system, and the AS/400 Logon panel is displayed. Enter the user ID and password, and select **OK**.

The panel shown in Figure 25 keeps you informed of the status of the installation.

19. The options that you chose to install during part 1 of the installation in step 13 on page 66 are now installed and the update function is run from the AS/400 system. If you chose to install RUMBA/400 or PC/5250 during part 1 of the installation, the panel shown in Figure 26 is displayed.

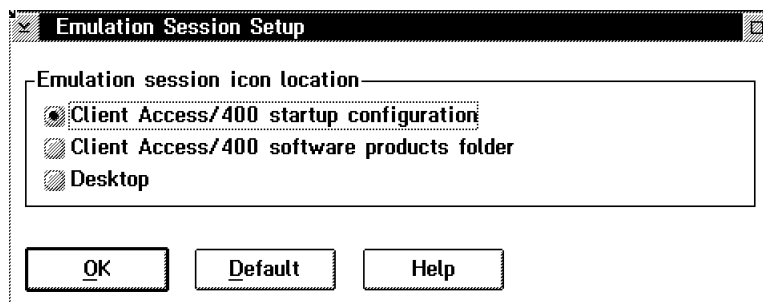


Figure 26. Emulation Session Setup

20. Choose the location of the emulation session icon from the panel. If you choose **Client Access/400 startup configuration**, the emulation session icon is placed in the Client Access/400 startup configuration folder, which causes the emulator to start when Client Access/400 is started.

Select **OK** to continue.

21. After a successful installation, you see the *Installation Part 2 Complete* panel shown in Figure 27 on page 78.

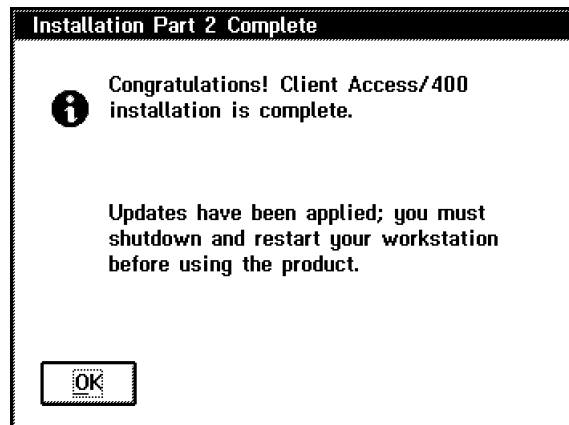


Figure 27. Congratulations - Panel

Select **OK**.

22. Shut down the PC using OS/2 shutdown. If you have installed the sockets over SNA support for the client management function of Client Access/400 Optimized for OS/2, you are asked to confirm that you want to end a program called *SNACKETS.EXE*. Just select **OK** to continue with the shutdown.
23. When you restart the PC, the second pass of the update function is started automatically to copy files from a temporary directory on the PC into the correct component directories.
24. When the update has finished, use OS/2 shutdown to shut down the PC workstation.

To continue

This completes the initial installation of Client Access/400 Optimized for OS/2 on the PC. For information on further configuration, refer to Chapter 5, "Configuration" on page 135.

4.5 TCP/IP

With the TCP/IP support (via AnyNet) Client Access/400 Optimized for OS/2 is able to participate in a non-SNA networks. Client Access/400 is an APPC application that has AnyNet/2 functions built in. This allows Client Access/400 Optimized for OS/2 APPC functions to run over TCP/IP networks.

Note:

Make sure that you have followed the steps to complete the appropriate installation worksheet before you start the installation. The worksheet and instructions on completing it can be found in 4.3.2, "TCP/IP through LAN Installation Worksheet" on page 47.

Client Access/400 Optimized for OS/2 supports TCP/IP over both token ring and Ethernet networks.

This section is divided into the following sections:

- 4.5.1, "AnyNet/400 Configuration." 4.5.2, "PC Configuration" on page 95.
- 4.5.3, "PC Installation - TCP/IP" on page 96.

For information about TCP/IP concepts, refer to 2.1, "TCP/IP Concepts" on page 21.

4.5.1 AnyNet/400 Configuration

The following OS/400 configuration steps are required:

- 4.5.1.1, " Establish a TCP/IP Configuration between the Systems" on page 80.
- 4.5.1.2, "Change the Network Attribute ALWANYNET to *YES" on page 87.
- 4.5.1.3, "Create an APPC controller with LINKTYPE(*ANYNW)" on page 88.
- 4.5.1.4, "Add an Entry to the APPN Remote Location List" on page 90.
- 4.5.1.5, "Map the APPC LU Name to an Internet Address" on page 93.

Note

The User ID, under which the APPC over TCP/IP configuration is created, must have sufficient authority to access the relevant commands. Some of the commands require the user ID to have the IOSYSCFG authority. The examples shown here were created using a profile with QSECOFR authority.

4.5.1.1 Establish a TCP/IP Configuration between the Systems

A prerequisite for APPC over TCP/IP is a TCP/IP configuration between the systems. In this step we show the basic steps to establishing a TCP/IP configuration between two systems. If your system already has a TCP/IP configuration to the remote system with which you want to communicate with APPC over TCP/IP, then you can skip this step and proceed to step 4.5.1.2, “Change the Network Attribute ALWANYNET to *YES” on page 87.

The examples in the following panels are based on the TCP/IP configuration for the AS/400 system called RCHAS040 shown in Figure 28 on page 81. You can also use the matching parameters table in Figure 57 on page 112 for guidance.

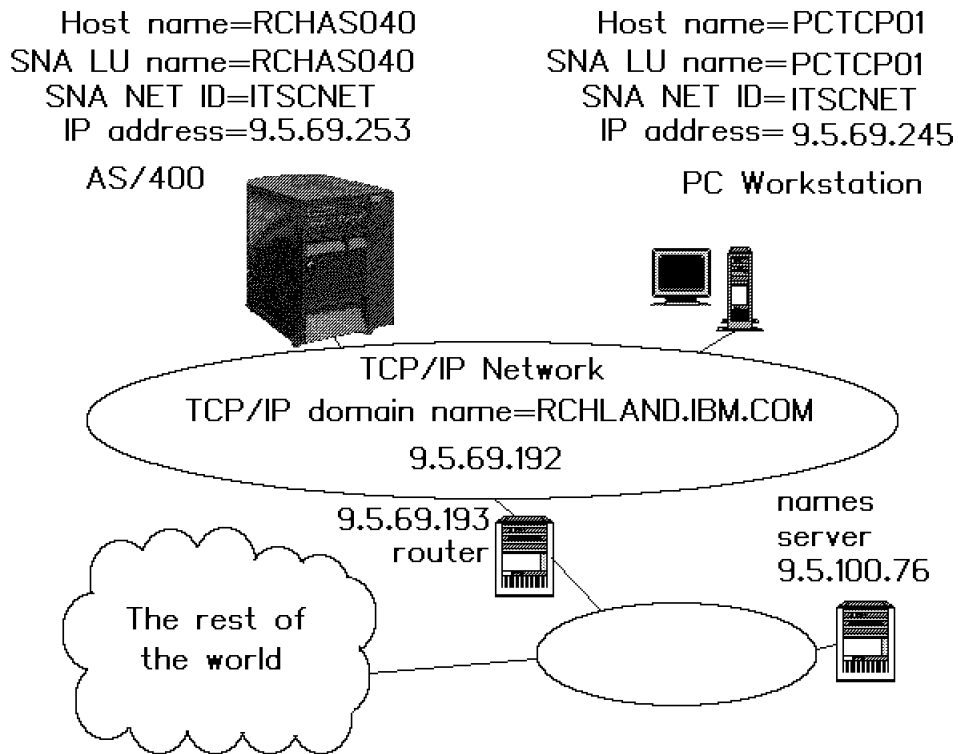


Figure 28. TCP/IP Configuration Example

The following panels show the configuration panels for a token-ring configuration. If you require help in establishing TCP/IP parameters, refer to the manual *AS/400 TCP/IP Configuration and Reference*, SC41-3420.

The AS/400 line description defines the physical interface to the network. If an appropriate line description does not already exist (they can be shared), you need to create one.

- Here we use the CRTLINTRN command to create a token-ring line description as shown in

```

                                Create Line Desc (Token-Ring) (CRTLINTRN)

Type choices, press Enter.

Line description . . . . . > TRLIN041 (1)  Name
Resource name . . . . . > LIN041 (2)      Name, *NWID, *NWS
Online at IPL . . . . . *YES              *YES, *NO
Vary on wait . . . . . *NOWAIT           *NOWAIT, 15-180 (1 second)
Maximum controllers . . . . . 40          1-256
Line speed . . . . . 4M                  4M, 16M, *NWI
Maximum frame size . . . . . 1994        265-16393, 265, 521, 1033...
Local adapter address . . . . . > 400000000040 (3) 400000000000-7FFFFFFF...
Exchange identifier . . . . . *SYSGEN     05600000-056FFFFF, *SYSGEN
SSAP list:
  Source service access point . *SYSGEN   02-FE, *SYSGEN
  SSAP maximum frame . . . . . *MAXFRAME, 265-16393
  SSAP type . . . . . *CALC, *NONSNA, *SNA, *HPR
    + for more values
Text 'description' . . . . . > '4M Token Ring line description for LIN041'

                                Bottom
F3=Exit  F4=Prompt  F5=Refresh  F10=Additional parameters  F12=Cancel
F13=How to use this display  F24=More keys

```

Figure 29. Create Token-Ring Line Description - System RCHAS040

- In the parameter *Line description*, enter the name of your choice for the line. The name must start with an alphabetic character followed by alphanumeric characters. This is ref # 1 on your worksheet.
- In the parameter *Resource name*, enter the name of the LAN adapter port. This is ref. # 2 on the worksheet.

Hint

Press F11 to display the keywords for each parameter. This helps you match them with the worksheet. You can use this function for most AS/400 commands.

- Enter the local adapter address of your LAN adapter. This is ref. # 3 on your worksheet.

For a TCP/IP configuration, there is no need to create controller and device descriptions. These descriptions are automatically created when TCP/IP first uses the token-ring line.

TCP/IP Interface

The TCP/IP interface defines this AS/400 system on the TCP/IP network.

- Enter the CFGTCP command to access the *Configure TCP/IP* panel shown in Figure 30.
- Take option 1 to work with TCP/IP interfaces, and the panel shown in Figure 31 on page 84 is displayed.

```
CFGTCP                Configure TCP/IP                System:  RCHAS040
Select one of the following:
    1. Work with TCP/IP interfaces
    2. Work with TCP/IP routes
    3. Change TCP/IP attributes
    4. Work with TCP/IP port restrictions
    5. Work with TCP/IP remote system information

    10. Work with TCP/IP host table entries
    11. Merge TCP/IP host table
    12. Change local domain and host names
    13. Change remote name server

    20. Configure TCP/IP applications
    21. Configure related tables

Selection or command
====> 1
-----
F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel
```

Figure 30. TCP/IP Configuration Menu

- If a TCP/IP interface does not already exist, add an entry using the internet address (ref # 4) allocated to this system, and the subnet mask (ref # 5) for the subnet in which the system resides.

```

Work with TCP/IP Interfaces
System: RCHAS040
Type options, press Enter.
1=Add 2=Change 4=Remove 5=Display 9=Start 10=End

Internet      Subnet      Line      Line
Opt Address      Mask      Description Type
_ (4) 9.5.69.253 (5) 255.255.255.192 (1) TRLIN041 *TRLAN
_ 127.0.0.1 255.0.0.0 *LOOPBACK *NONE

Bottom
F3=Exit F5=Refresh F6=Print list F10=Work with IP over SNA interfaces
F11=Display interface status F12=Cancel F17=Top F18=Bottom

```

Figure 31. TCP/IP Interface Definition - System RCHAS040

Besides allowing you to add, change and remove TCP/IP interfaces, this panel also allows you to start and end these interfaces.

TCP/IP Route

If the route to the remote host, in this case the PC workstation, is through a gateway, or the remote host resides in a different network or subnetwork to the local host, it is necessary to use option 2 from the Configure TCP/IP panel to configure a route. In our example, we do not need a router or gateway to access the PC workstation. In cases where a router needs to be defined, as previously described, the definition can be done in the panel shown in Figure 32 on page 85.

Work with TCP/IP Routes					System: RCHAS040
Type options, press Enter.					
1=Add 2=Change 4=Remove 5=Display					
Opt	Route Destination	Subnet Mask	Type of Service	Next Hop	
	*DFTRROUTE	*NONE	*NORMAL	(6)	9.5.69.193
F3=Exit F5=Refresh F6=Print list F12=Cancel F17=Top F18=Bottom					

Figure 32. TCP/IP Route Table Entries - System RCHAS040

TCP/IP Host table

The local host table on the AS/400 system contains a list of the internet addresses and associated host names for this network.

- To access the AS/400 host table, enter the CFGTCP command and take option 10 (Work with TCP/IP Host Table Entries). The panel shown in Figure 33 on page 86 is displayed.

```

Work with TCP/IP Host Table Entries
System: RCHAS040
Type options, press Enter.
1=Add 2=Change 4=Remove 5=Display 7=Rename

  Internet      Host
Opt  Address      Name
--(4) 9.5.69.253 (7) RCHAS040
      RCHAS040.RCHLAND.IBM.COM
      (7) + (8)

_(22) 9.5.69.245 (16) PCTCP01
      PCTCP01.RCHLAND.IBM.COM
      (17) + (18)

F3=Exit F5=Refresh F6=Print list F12=Cancel F17=Position to

```

Figure 33. TCP/IP Host Table Entries - System RCHAS040

Unless you are planning to use a name server, add an entry for the local system and the remote system (the PC workstation) where TCP/IP is to be used:

Internet Address (Internet protocol address) of your AS/400 system and your PC workstation, Ref. # 4 and 19 respectively.

Host Name Add host names for both the PC and AS/400 system.

In the preceding example, we added the name of the AS/400 host (RCHAS040) and the PC host (PCTCP01). Notice that we added the short name (PCTCP01 and RCHAS040) and the long name using the domain name of the network it belongs to (RCHAS040.RCHLAND.IBM.COM and PCTCP01.RCHLAND.IBM.COM). Either of these names (the short or the long) can be used to access a host through TCP/IP.

For more information about host names, see 2.1, "TCP/IP Concepts" on page 21.

Note:

You need a host table entry for the PC workstation that only has applications that do an allocate out of the AS/400 system. A good example for that is the RUNRMTCMD (see 8.1, "RUNRMTCMD Run Remote Command" on page 249) and the data queues function that use full duplex simulation, and therefore initiate outbound conversations from the AS/400 system to the PC. Even if you do not use RUNRMTCMD or data queues, at this point we recommend that you enter your PC into the host table because there is no performance degradation and it makes the configuration complete for possible future use.

4.5.1.2 Change the Network Attribute ALWANYNET to *YES

Now we start the AnyNet specific configuration steps. First we must change the ALWANYNET network attribute to *YES. Changing this attribute allows both APPC over TCP/IP and Sockets over SNA support to run on your system. The default for this value when V3R1 is initially installed is *NO.

- Use the DSPNETA command to see what the value is set to. If it is set to *NO, use the command:
CHGNETA ALWANYNET(*YES)
- After changing this attribute, you can verify the change by entering the DSPNETA command. Page down three pages and the resulting display is shown in Figure 34.

```
Display Network Attributes
System: RCHAS040
Maximum hop count . . . . . : 16
DDM request access . . . . . : *OBJAUT
Client request access . . . . . : *OBJAUT
Default ISDN network type . . . . . :
Default ISDN connection list . . . . . : QDCCNNLANY
Network Server Domain . . . . . : ITSCDOM1

Bottom

Press Enter to continue.

F3=Exit F12=Cancel
```

Figure 34. Display of Network Attributes with ALWANYNET(*YES)

Changing the ALWANYNET network attribute to *YES results in the APPC over TCP/IP job (QAPPCTCP) being started in the QSYSWRK subsystem.

4.5.1.3 Create an APPC controller with LINKTYPE(*ANYNW)

The APPC controller description defines the remote system. A new LINKTYPE has been added to the APPC controller description for APPC over TCP/IP. With APPC over TCP/IP, the APPC controller is no longer directly attached to a line description.

- Use the CRTCTLAPPC (Create APPC Controller Description) command to create an APPC controller with INKTYPE(*ANYNW) as shown in Figure 35.

```

                                Create Ctl Desc (APPC) (CRTCTLAPPC)

Type choices, press Enter.

Controller description . . . . . > ANYNWS01 (10)  Name
Link type . . . . . > *ANYNW                      *ANYNW, *FAX, *FR, *IDLC...
Online at IPL . . . . . *YES                       *YES, *NO
Remote network identifier . . . ITSCNET (11)      Name, *NETATR, *NONE, *ANY
Remote control point . . . . . > ANYPCTCP        Name, *ANY
User-defined 1 . . . . . *LIND                     0-255, *LIND
User-defined 2 . . . . . *LIND                     0-255, *LIND
User-defined 3 . . . . . *LIND                     0-255, *LIND
Text 'description' . . . . . > 'PC Workstation via AnyNet/400'

                                                                Bottom
F3=Exit  F4=Prompt  F5=Refresh  F10=Additional parameters  F12=Cancel
F13=How to use this display  F24=More keys

```

Figure 35. Create Controller Description with LINKTYPE(*ANYNW)

The Remote network identifier should match the local network identifier on the remote system. *NETATR indicates that the value in the network attributes should be used, that the local system and remote system have the same network ID.

The Remote control point name is not used externally to the AS/400 system, and only has to match the value in the APPN remote location list described in 4.5.1.4, “Add an Entry to the APPN Remote Location List” on page 90. This means that you do not need an APPC controller for each PC that you attach to the AS/400 system through TCP/IP. One controller can be shared by up to 254 PCs.

APPC Device Description and Mode Description

The APPC device description is automatically created when the controller created in 4.5.1.3, "Create an APPC controller with LINKTYPE(*ANYNW)" on page 88 is activated.

APPC over TCP/IP uses mode descriptions in the same way that APPC over SNA does.

Note: It is not possible to map an APPC mode to an IP type of service.

Additional Technical Information for APPC Controller: The following technical information describes the differences from the SNA world:

- The name of the *ANYNW controller and the remote control point name have no relationship to the name of the PC coming in.
- Each *ANYNW controller can handle up to 254 PCs at a time, and since the PCs may have different Control Point names and LU names, again, there is no relationship.
- The remote control point name in the *ANYNW controller is only used internally to the AS/400 system, as you see later when we add an entry to the configuration list.
- When the bind comes in for a PC through AnyNet, the code on the AS/400 system looks at the NETID.LUNAME part of the domain name of the PC. If there is a device already created with the NETID.LUNAME on any *ANYNW controller, and it is varied on, this device is used.
- If no match for the NETID.LUNAME is found on the *ANYNW controllers, the controller with the least number of devices attached is used to attach the newly created device.
- An *ANYNW controller must be varied on for APPC over TCP/IP to function.
- The device description that is created for your PC on the AS/400 system remains in status Active even if you disconnect your PC from the AS/400 system.

Note

In most cases, you only need to create one *ANYNW controller since you can have up to 254 PCs coming through that controller. If you have several *ANYNW controllers, there is no way to predict under which controller the device corresponding for your PC will appear, unless you manually create the device description associated with that PC.

4.5.1.4 Add an Entry to the APPN Remote Location List

For functions that are initiated from the AS/400 system, such as RUNRMTCMD and data queues, the AS/400 system requires an APPN remote location list entry for each remote system where APPC over TCP/IP is used. APPC over TCP/IP communications needs the information in the APPN remote location list to determine which controller description to use when it activates the session.

To update the APPN remote location list, use the following command:

```
CHGCFGL *APPNRMT
```

The resulting display is in Figure 36 on page 91.

```

Change Configuration List                                RCHAS040
                                                         11/10/94 10:47:23
Configuration list . . : QAPPNRMT
Configuration list type : *APPNRMT
Text . . . . . :

Type changes, press Enter.

-----APPN Remote Locations-----
Remote   Remote   Local   Remote   Control   Location   Secure
Location ID   Location Point   Net ID   Password   Loc
PCTCP01 ITSCNET RCHAS040 ANYPCTCP ITSCNET _____ *NO
(12)      (11)      (13)      (14)
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
More...
F3=Exit  F11=Display session information  F12=Cancel  F17=Top  F18=Bottom

```

Figure 36. APPN Remote Location List Panel

AS/400 APPN requires that all remote location names be unique. Thus, it cannot have the same remote location name and remote network ID in both its SNA network and its TCP/IP network.

- The Remote Location name should match the local location (LU) name at the remote system.
- The Local Location name should match the remote location (LU) name at the remote system.
- The Remote Network ID and Control Point Net ID should match the remote network identifier in the APPC controller with a LINKTYPE(*ANYNW).
- The Remote Control Point name should match the remote control name in the APPC controller with a LINKTYPE(*ANYNW). *NETATR indicates that the value in the network attributes should be used.

Any entry added to the APPN remote location list results in an entry in the local APPN topology database. However, the APPC over TCP/IP entries is not propagated to other systems in the APPN network; the entry is used as an end node, only information on attached network nodes is propagated. No

topology updates flow as a result of adding the APPC over TCP/IP entries. In addition to being used locally, the APPC over TCP/IP entries allows this system to respond to APPN search requests received for these LU names. It is this function that allows the AS/400 system to act as a bridge.

Additional Technical Information for the APPN Remote Location List

- Similar to what we have said about host tables entries, a configuration list entry is only necessary if your application does an allocate out of the AS/400 system. We recommend that you include the necessary entries in this list in order to have your AnyNet configuration complete and ready for possible future use.
- You need to be able to attach an APPC controller to a PC LU name. Therefore, if your PCs have similar LU names, you can use generic entries in the configuration list as shown in Figure 37.

```

Change Configuration List                                RCHAS040
                                                         11/10/94 10:47:23
Configuration list . . : QAPPNRMT
Configuration list type : *APPNRMT
Text . . . . . :

Type changes, press Enter.

-----APPN Remote Locations-----
Remote   Remote   Local   Remote   Control   Location   Secure
Location Network Local   Control   Point     Net ID     Password   Loc
ID       ID       Location Point     Net ID     Password   Password   Loc
PCTCP* ITSCNET RCHAS040 ANYPCTCP ITSCNET _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
_____ *NETATR *NETATR _____ *NETATR _____ *NO
More...
F3=Exit  F11=Display session information  F12=Cancel  F17=Top  F18=Bottom

```

Figure 37. APPN Remote Location List Panel with Generic Name

- It is possible that an incoming conversation (such as Client Access/400) produces a device description on one *ANYNW controller, while an outgoing conversation to the same PC (such as data queues) produces a

device on another controller as specified in the configuration list. This means that there may be two device descriptions for the same PC!

Hint

To keep the administration as simple as possible, try to create only the necessary number of APPC controllers of type *ANYNW. Remember, each controller can support up to 254 PCs.

4.5.1.5 Map the APPC LU Name to an Internet Address

The TCP/IP host table provides the mapping between host names and internet addresses. This mapping is required for functions that are initiated by the AS/400 system, such as RUNRMTCMD or data queues.

Enter the CFGTCP command to access the *Configure TCP/IP* panel, and take option 10 to work with the TCP/IP host table as shown in Figure 38.

```
Work with TCP/IP Host Table Entries                               System: RCHAS040
Type options, press Enter.
 1=Add  2=Change  4=Remove  5=Display  7=Rename

  Internet      Host
  Opt  Address   Name
  ---  -
  -    9.5.69.253 RCHAS040
      RCHAS040.RCHLAND.IBM.COM
  -    9.5.69.245 PCTCP01
      PCTCP01.RCHLAND.IBM.COM
      PCTCP01.ITSCNET.SNA.IBM.COM
      (12) + (11) + (15)

F3=Exit  F5=Refresh  F6=Print list  F12=Cancel  F17=Position to
```

Figure 38. TCP/IP Host Table Entries

For APPC over TCP/IP, the host name entries are made up as follows:

- **PCTCP01** - remote SNA location (LU) name (Ref # 12 on your worksheet).
- **ITSCNET** - remote SNA network ID (Ref # 11 on your worksheet).
- **SNA.IBM.COM** - SNA Domain Name Suffix (Ref # 15 on your worksheet).

Add an entry for each remote system where APPC over TCP/IP is used. The remote SNA location names and SNA network IDs should be as specified in the APPN remote location list.

Note: Host Name and SNA Location Name

The host name (PCTCP01) could be different from the SNA location name (ITSCNET.PCTCP01) but we recommend that you use the same name for both.

Note

A PTF is now available to allow the AS/400 system to use an SNA domain name suffix other than SNA.IBM.COM. The PTF is shipped in two parts: MF08352 and SF21042. The PTF was not used in the writing of this redbook.

To change the SNA Domain Name Suffix on the PC, refer to Figure 60 on page 115.

When communicating between systems using APPC over TCP/IP, both systems must use the same SNA Domain Name Suffix.

This host table is used by native TCP/IP and APPC over TCP/IP. The entries *without* the extension SNA.IBM.COM are for native TCP/IP.

Note

The AS/400 TCP/IP Host Table allows a maximum of four host names to be entered against a single host internet address. This may become a restriction when using AnyNet/400 APPC over TCP/IP. One possible alternative is to use a name server rather than the AS/400 host table.

With all of the configuration steps completed, you are now ready to use the APPC over TCP/IP support of AnyNet/400 in order use Client Access/400. The next steps show how to configure Client Access/400 Optimized for OS/2 on the PC.

4.5.2 PC Configuration

Before you start the installation process on the PC, there are some adjustments that you need to make to CONFIG.SYS. These adjustments are described in the following sections.

4.5.2.1 RESTARTOBJECTS

We recommend that you add a restart objects statement or change the existing restart objects statement in CONFIG.SYS to:

```
SET RESTARTOBJECTS=STARTUPFOLDERONLY
```

Doing this tells OS/2 to start only the objects in the OS/2 Startup Folder when the Workplace Shell is started, thereby keeping applications that need Client Access/400 functions from starting before Client Access/400 is started.

4.5.2.2 The CONNECTIONS option of SET AUTOSTART

The CONNECTIONS option of AUTOSTART is not supported. Remove the CONNECTIONS statement from the following line:

```
SET AUTOSTART=PROGRAMS,TASKLIST,FOLDERS,CONNECTIONS,LAUNCHPAD
```

Having CONNECTIONS on the OS/2 SET AUTOSTART statement tells OS/2 to reconnect remote drive and printer connections that were active when OS/2 shut down. Client Access/400 connections cannot be restarted at the time OS/2 connects these drives and printers.

After Client Access/400 Optimized for OS/2 installation, you can use Client Access/400s startup configuration folder to automatically start network drives and printers. You can automatically start Client Access/400 by dragging a shadow of the Client Access/400 startup icon to the OS/2 startup folder. See 5.2, "Startup Configuration Group" on page 140 for details.

4.5.2.3 Performance Adjustments to CONFIG.SYS

In Chapter 13, "Performance Tuning OS/2 Warp" on page 325, you can find information on how to optimize the settings in CONFIG.SYS.

4.5.2.4 Backing up CONFIG.SYS

In case you need to uninstall Client Access/400 Optimized for OS/2, make a backup copy of CONFIG.SYS before you start the installation process.

4.5.3 PC Installation - TCP/IP

This installation procedure on the PC is divided into two parts:

4.5.3.1, "PC Installation - TCP/IP, Part 1."

4.5.3.2, "PC Installation - TCP/IP, Part 2" on page 103.

4.5.3.1 PC Installation - TCP/IP, Part 1

1. Prepare the PC for installation by following the steps in 4.5.2, "PC Configuration" on page 95.
2. The installation program, `INSTALL.EXE`, is located on the first installation diskette, or in the `QPWYGOS2` directory on the drive you are going to install from (see 4.2.2, "Choice of Installation Source" on page 38 for details). Enter the following command at an OS/2 prompt:
`A:\INSTALL`
for diskette installation, or if you are installing from other than diskettes:
`d:\path\QPWYGOS2\INSTALL`
where `d:\path` represents the drive and path that contains the `QPWYGxxx` directories.
3. On the *Client Access Part 1* panel, select **Install**.
4. If you have Communications Manager/2 and NTS/2 already installed on your PC, please see 4.6.1, "Communications Manager/2 Version 1.11 and Network Transport Services/2" on page 118 before continuing with your installation of Client Access/400.
5. Select **Custom** for the type of installation followed by **OK** to continue.
6. On the panel shown in Figure 39 on page 97, you can change the installation location *Drive* and *Path* and the installation temporary storage *Drive*. The default location is `C:\CAOS2\` even if you are starting OS/2 from the D: drive. In this example, we install on the D: drive.

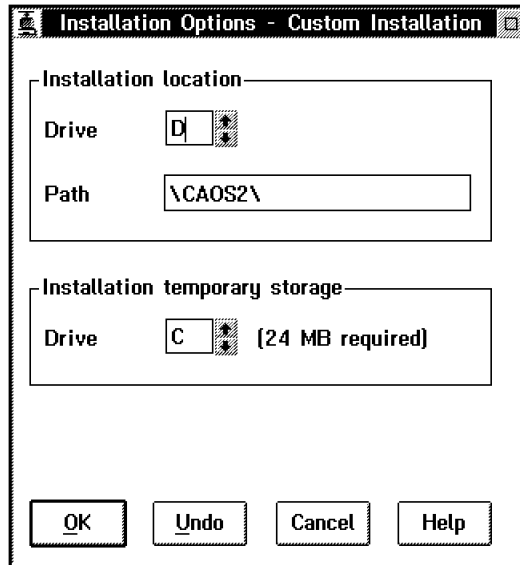


Figure 39. Installation Options - Custom Installation Panel

The Installation temporary drive storage is used by the installation program to store programs and files during the installation process. The space needed is approximately 24MB when all options are installed. The space is freed when the installation is completed.

Select **OK**.

7. On the *Communications Support Options* panel shown in Figure 40, choose **TCP/IP** for the Network type parameter, and then choose **OK**.

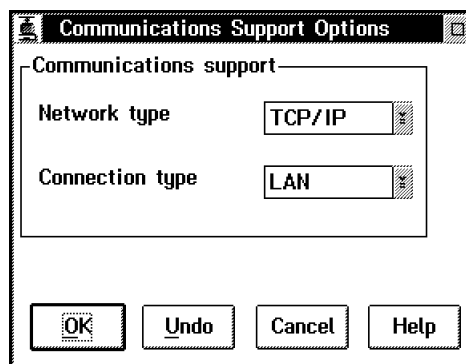


Figure 40. Communication Support Options - Panel

8. On the next panel shown in Figure 41 on page 98, enter the LAN adapter information. Use the pull-down button to select the LAN adapter type installed in your PC.

Attention

If you are connected on token ring, make sure that you select the appropriate adapter from the list instead of just taking the default "IBM Token Ring Network Adapters" entry.

If you have an adapter installed that is not on the list, and already have LAN Adapter Protocol Support installed on the PC, choose **Other** from the list. A panel is displayed that tells you to configure the adapter using the LAPS configuration program at the end of installation part 1. For those adapters that are included on the list, Client Access/400 Optimized for OS/2 automatically installs and configures LAPS with the appropriate information. If you do not have LAPS already installed, and you are installing the V3R1M0 version of the client, you *must* first choose an adapter from the list, and then reconfigure LAPS to replace the adapter with the correct one following part 1 of the installation process.

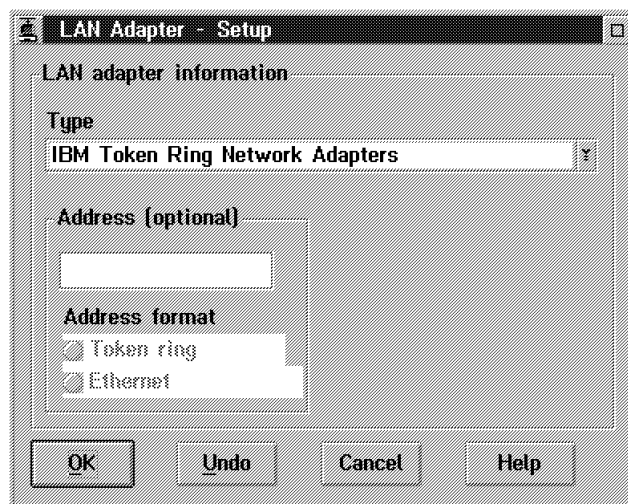


Figure 41. LAN Adapter - Setup Panel

Address (optional)

All LAN adapters cards have a burnt-in or encoded address that is used as the default when connecting to networks. The

installation program uses this encoded address as the default unless you choose to override the address. To override the address in the LAN adapter card, enter a 12-digit hexadecimal number to use as the LAN address for the personal computer. Use the following ranges for the LAN adapter address:

- IBM Token Ring Network format
Use range 400000000000 - 7FFFFFFFFFFFFF.
- IEEE standard notation, Ethernet address format
Use range 020000000000 - FFFFFFFFFFFFFF.

The address you use must be unique on the local area network.

Address format

Defines the address format of the LAN destination address at the workstation. Select the address format from the radio buttons. The two address formats are Token Ring or Ethernet. The default is Token Ring.

9. Select **OK** to continue.
10. The *Communications Components* panel lists the components that are installed on your workstation during part 1 of the installation process:
 - NTS/2 (when LAN)
 - Communications Manager
 - User Profile Management
 - AnyNet: Sockets over SNA
 - Systems Management
 - System Information Agent
 - Desktop Management Interface

It is possible to change the drive where some of the components are installed by selecting **Installation Path**.

Selecting **Check disk space** displays the required disk space for each of the components.

11. To continue, select **OK** from the *Communications Components* panel, and the panel shown in Figure 42 on page 100 is displayed. You need to consult your worksheet in order to complete this panel.
 - Local TCP Host name, Ref # 17 on your worksheet.
 - Domain name, Ref # 18 on your worksheet.

- SNA domain name suffix, Ref # 15 on your worksheet.

Important: SNA Domain Suffix

The default value for the SNA Domain Suffix is SNA.IBM.COM. We recommend that you do not change this value. This value, (15), must be the same as the value that is defined on the AS/400 system for the APPC applications that communicate with the AS/400 system.

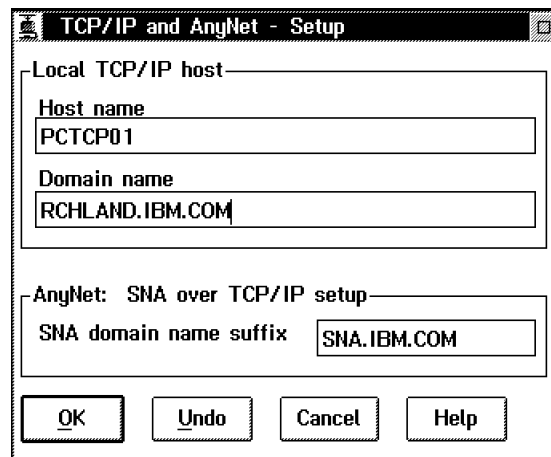


Figure 42. TCP/IP and AnyNet - Setup Panel

12. If you have TCP/IP already installed on your machine, please see 4.6.3, “LAN Adapter Protocol Support and TCP/IP for OS/2” on page 125.
13. On the *Selective Install* panel shown in Figure 43 on page 101, you can choose the functions that are installed during part 2 of the installation program. If you want to change the installation drive for the PC5250 or RUMBA/400 component, select the corresponding **Installation path** button.

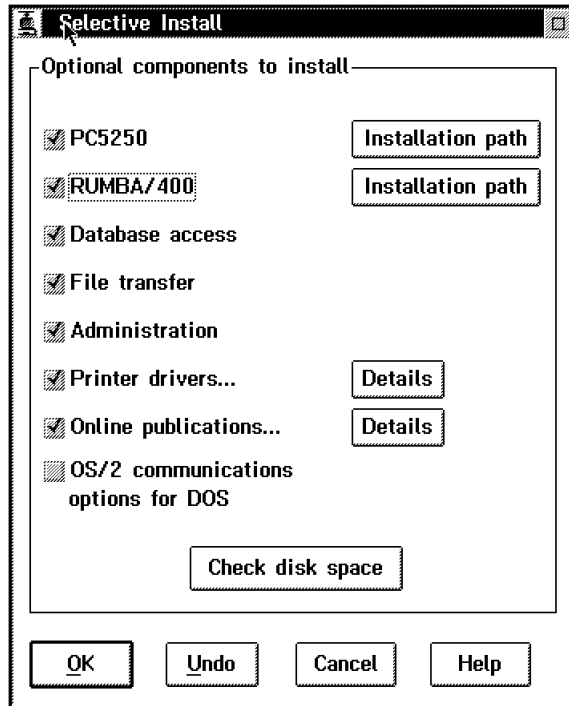


Figure 43. Selective Install Panel

14. If you want to change which printer drivers or on-line publications you are going to install, select the appropriate **Details** button. On the *Printer Drivers - Details* panel, select or deselect:

- OS/2 AFP printer driver
- OS/2 SCS printer driver
- Windows AFP printer driver

Make your choices and then select **OK**.

On the *On-line Publications - Details* panel, select or deselect:

- Command and message references
- Communication books

Make your choices and select **OK**.

15. The *Check disk space* button allows you to review the disk space required for each of the components that are to be installed.

16. To continue, select **OK** from the *Selective Install* panel.

17. Select **Yes** on the *Begin Client Access/400 Installation?* panel to continue, or select **No** to go back and make corrections. When you select **Yes**, you see the *Client Access/400 - Install in Progress* panel shown in Figure 44 on page 102. This panel details the files that are being copied on your PC, and gives an indication of the time remaining to install each component.

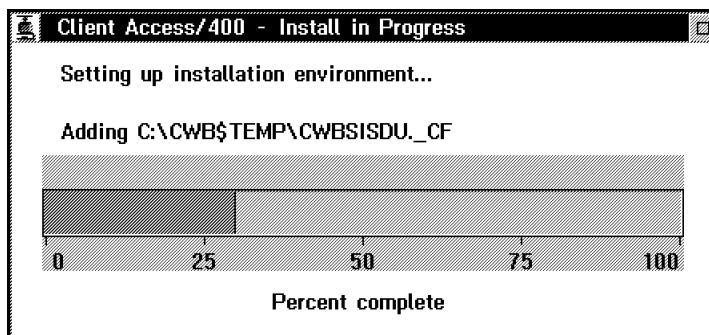


Figure 44. *Client Access/400 Install in Process Panel*

If you are installing from diskettes, you are prompted to insert diskettes when needed.

18. Select **Close** from the panel shown in Figure 45 to complete part 1 of the installation on the PC.

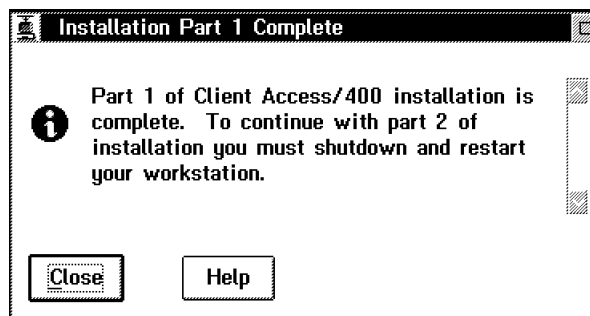


Figure 45. *Installation Part 1 Complete - Panel*


Note:

If you are going to install Part 2 using an alternative source to diskettes or the AS/400 system, such as CD-ROM or a LAN server, you must ensure that you have the line SET CAINSTALL_SOURCE=d:\path\ in CONFIG.SYS, where d:\path\ is the path containing the QPWXGxxx directories (see 4.2.2, "Choice of Installation Source" on page 38 for details).

19. Shut down and restart the PC.

4.5.3.2 PC Installation - TCP/IP, Part 2

When you restart the PC following part 1 of the installation program, you see



the  AS/400 Workstation icon on the OS/2 desktop.

Note

If you chose **Other** from the list in step on page 36, and have not yet configured 802.2 for your adapter, you must do so at this point, by entering the

LAPS

command at an OS/2 command prompt.

1. Double-click on the **AS/400 Workstation** icon  .
2. Select the **Client Access/400 Install part 2**  icon to start part 2 of the installation.

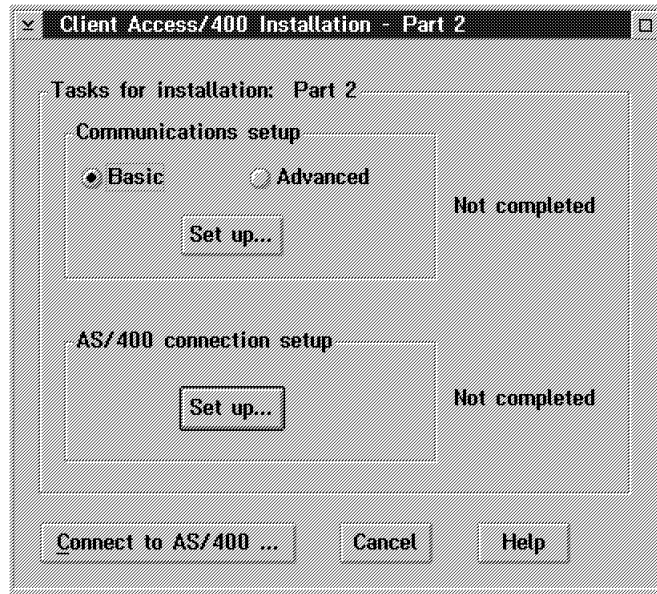


Figure 46. Client Access/400 Installation - Part 2 Panel

3. On the first panel shown in Figure 46, you can choose between basic or advanced communications setup.

The option for *basic* setup allows all but the most detailed parameters to be configured, and that is the method that we use here. If you are experienced in detailed AnyNet configuration, you can refer to 4.5.4, “AnyNet Configuration” on page 113.

4. Choose **Basic** and select **Set up...** from the *Communication Setup* box, and the panel shown in Figure 47 is displayed.

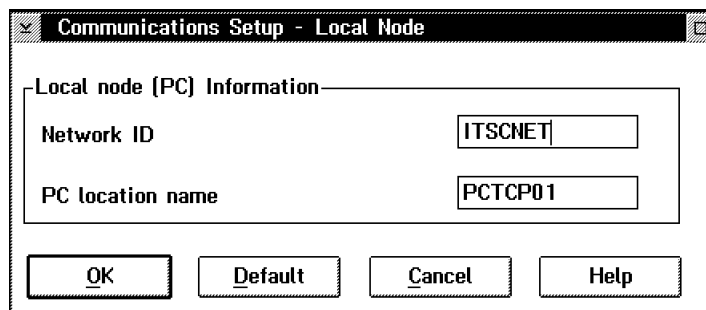


Figure 47. Client Access/400 Communication Setup - Local Node

5. Use your worksheet to complete the information:
 - Enter the Network ID information, Ref. # 11 on your worksheet.
If your workstation and the AS/400 system belong to a specific network, enter the name of the network in this parameter. The default is APPN.
 - Enter your PC Location Name, Ref # 12 on your worksheet.
 - Choose **OK** to continue.
6. The next panel is the *Communication Setup - SNMP* panel. If you want to enable the client management support, you must select **Enable SNMP system and problem management**, and supply the IP address of the AS/400 system as the system to notify (Ref # 4 on your worksheet). You can also fill in information for the system location (a building or office number, for example), and the system contact (the administrator or owner of the machine, for example).
7. Select **OK** and the *Communication Setup - TCP/IP Network* panel shown in Figure 48 is displayed.

Note: If you already have TCP/IP installed on your PC, this information is already completed for you.

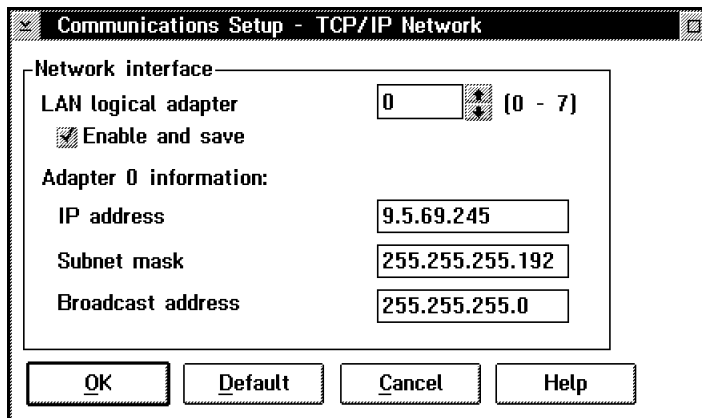


Figure 48. Communication Setup - TCP/IP Network Panel

Consult your worksheet in order to complete this panel.

Adapter number

Select the LAN logical adapter number. If you only have one LAN adapter in your PC, the adapter number is 0.

IP Address

Internet protocol address of your PC. This is Ref # **19** on your worksheet.

Subnet mask

This field specifies how much of the local address portion of the internet address (IP address) to reserve for a subnetwork address. In our example, the subnet mask is 255.255.255.192. Please refer to TCP/IP Concepts 2.1, "TCP/IP Concepts" on page 21 for more information. Leaving this field blank means that you are not using a subnetwork.

If you are not sure what to use for your subnet mask, contact your network administrator. This is Ref. # **20** on your worksheet.

Broadcast address

This field defaults to 255.255.255.0. If you want to receive simultaneous transmission of data packets, enter the broadcast address using the same format as in the IP address.

Be sure that the broadcast address is correct. An incorrect broadcast address creates extra traffic on the network, which can cause network performance problems.

If you are not sure of the broadcast address ask your network administrator or leave the default. This is Ref. # **21** on the worksheet.

8. Choose **OK**, and the *TCP/IP Routers* panel shown in Figure 49 on page 107 is displayed. If the TCP/IP network where your PC is attached is connected to other networks through routers or gateways, you must configure the routing information in order to be able to communicate with TCP/IP hosts in the other networks. If your network is not connected to other TCP/IP networks, you can leave this parameter blank.

You can add the routing information by choosing one of the **Insert** buttons. If you are not sure of this parameter ask your network administrator. This is Ref # **22** on your worksheet.

Choose **OK** to continue.

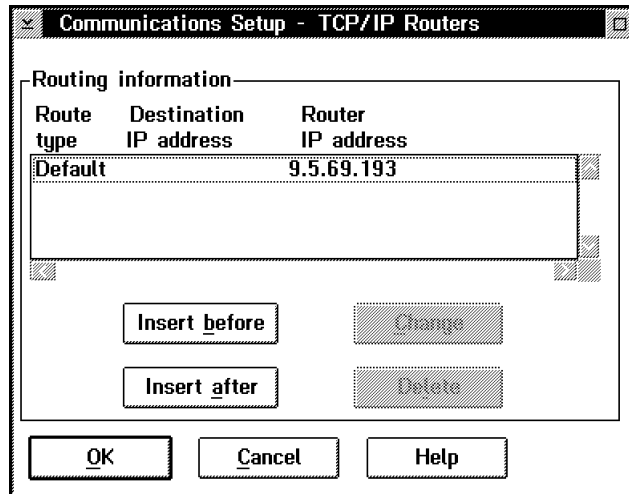


Figure 49. Communication Setup - TCP/IP Routers Panel

9. You are then prompted with the *TCP/IP Name Servers* panel shown in Figure 50. By choosing **Add**, insert the IP address of the name servers in your network that resolve domain names to IP addresses. If you are not sure of this information ask your network administrator. This is Ref # **23** on your worksheet.

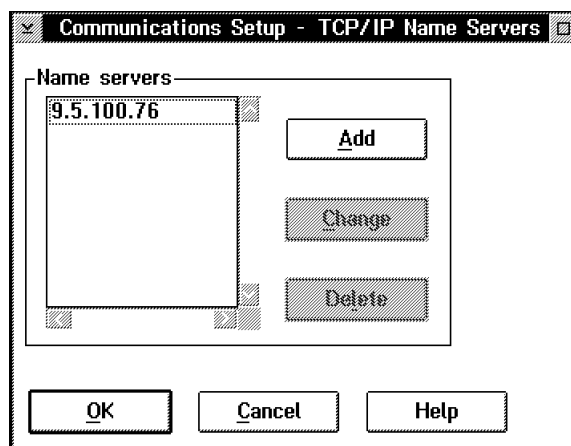


Figure 50. Communication Setup - Name Servers

10. Choose **OK** to continue and the *TCP/IP Hosts* panel is displayed as shown in Figure 51 on page 108.

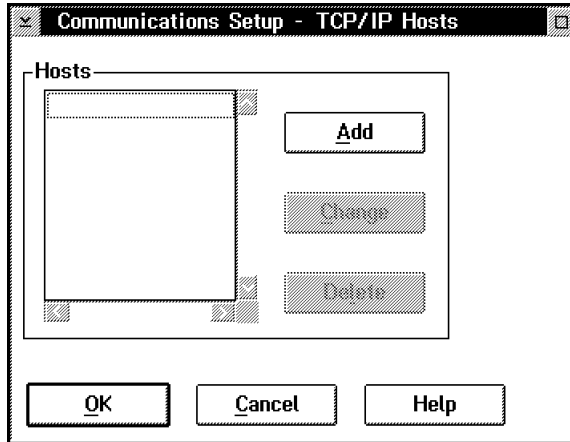


Figure 51. Communication Setup - Hosts Panel

Select **Add**, and complete the following information:

Host name

Enter the complete host name of the AS/400 system including the SNA domain suffix. This is ref # **24** on your worksheet.

Host IP address

Enter the IP address of the AS/400 system. This is Ref # **4** on your worksheet.

Alias

The alias allows you to enter a short form of the name for the AS/400 system. This can be the same as the normal AS/400 system name, for example.

Note:

An alias name is required for some functions when running over TCP/IP (RUMBA/400 display and printer emulation, Database Access GUI and file transfer for example).

11. Choose **Add** and the *TCP/IP Hosts* panel shown in Figure 51. is re-displayed.
12. Select **OK** to return to the *Client Access/400 Installation - Part 2* panel, shown in Figure 52 on page 109. Notice that this time the communication setup task is labeled as completed. Now you have to complete the AS/400 connection setup task.

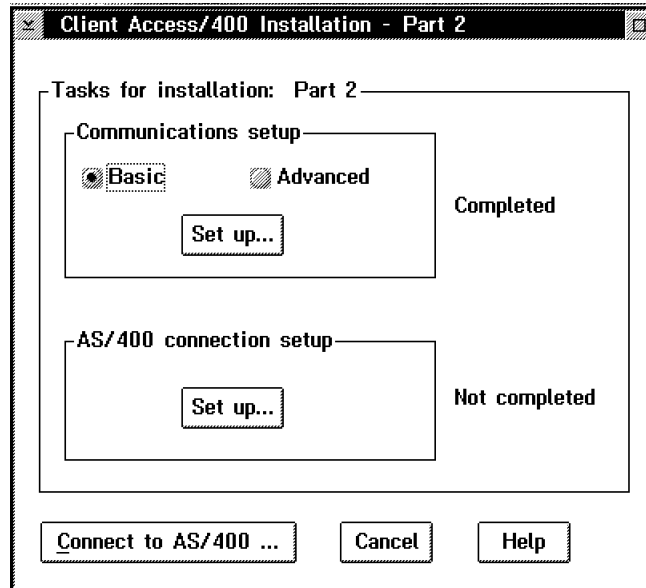


Figure 52. Installation Part 2 - Panel

13. In the AS/400 connection setup box, select **Set up** and the AS/400 Connection Setup panel shown in Figure 53 is displayed.

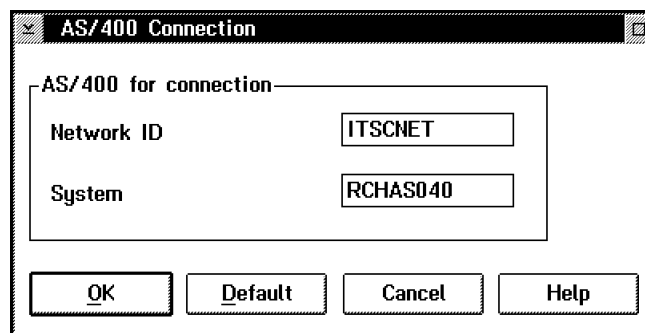


Figure 53. AS/400 Communication Setup - Panel

14. Enter the AS/400 **Network ID**. This is Ref # **9** on your worksheet (the default is APPN).
15. Enter the **system** name of the AS/400 system that you want to connect to. This is Ref. # **13** on your worksheet.
16. Choose **OK** to return to the *Client Access/400 Installation - Part 2* panel.

Both setup tasks on the communication setup panel are now marked as completed.

17. Select the **Connect to AS/400 ...** button, and the panel shown in Figure 54 is displayed.

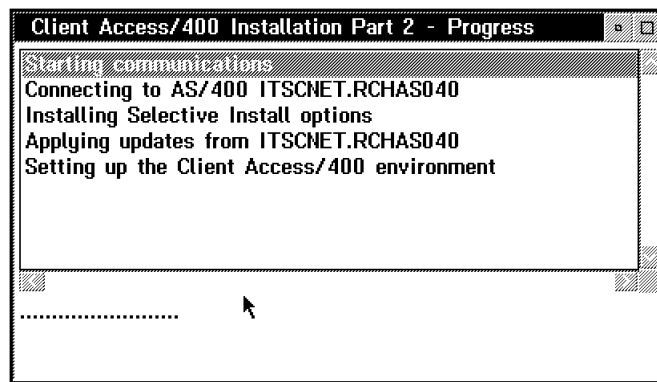


Figure 54. Installation Part 2 Progress - Panel

18. After communications has been started, a connection is made to the AS/400 system, and the AS/400 Logon panel is displayed. Enter the user ID and password, and select **OK**.

The panel shown in Figure 54 keeps you informed of the status of the installation.

19. The options that you chose to install during part 1 of the installation in step 13 on page 100 are now installed and the update function is run from the AS/400 system. If you chose to install RUMBA/400 or PC/5250 during part 1 of the installation, the panel shown in Figure 55 is displayed.

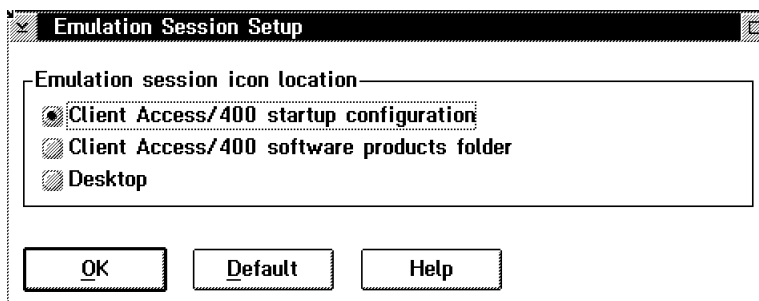


Figure 55. Emulation Session Setup

20. Choose the location of the emulation session icon from the panel. If you choose **Client Access/400 startup configuration**, the emulation session icon is placed in the Client Access/400 startup configuration folder, which causes the emulator to start when Client Access/400 is started.

Select **OK** to continue.

21. After a successful installation, you see the *Installation Part 2 Complete* panel shown in Figure 56.

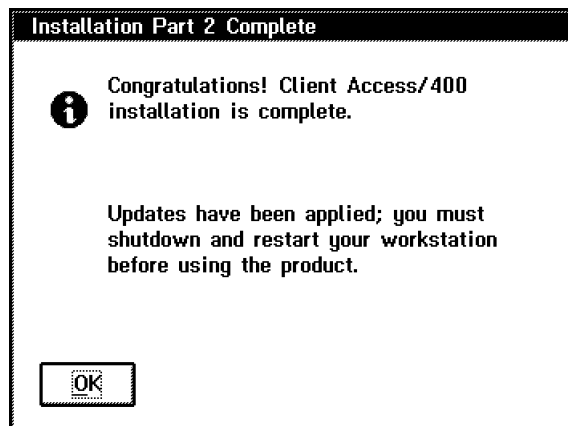


Figure 56. Congratulations - Panel

Select **OK**.

22. Shut down the PC using OS/2 shutdown.
23. When you restart the PC, the second pass of the update function is started automatically to copy files from a temporary directory on the PC into the correct component directories.
24. When the update has finished, use OS/2 shutdown to shut down the PC workstation.

To Continue

This completes the initial installation of Client Access/400 Optimized for OS/2 on the PC. For information on further configuration, refer to Chapter 5, "Configuration" on page 135.

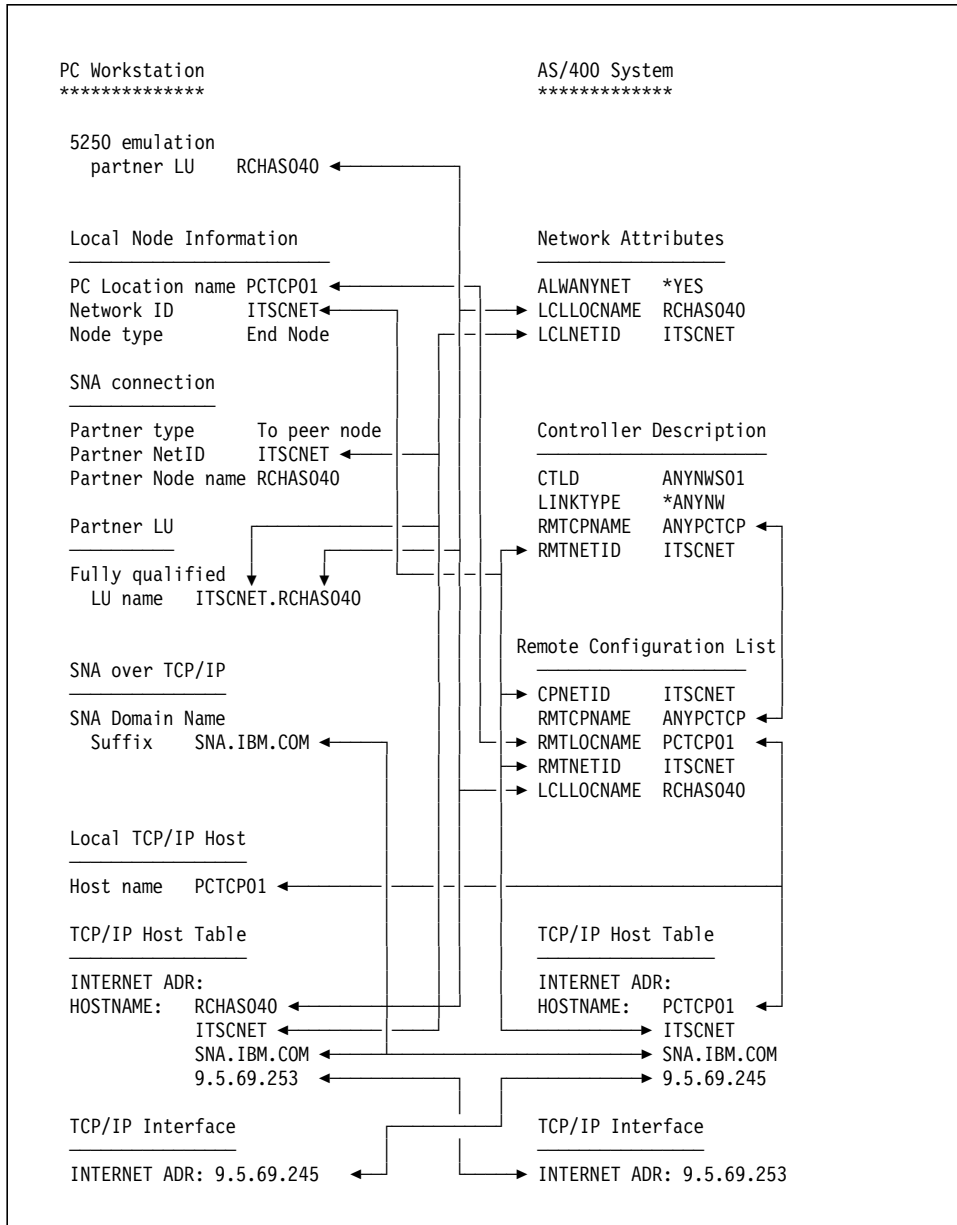


Figure 57. TCP/IP Matching Parameters Table

4.5.4 AnyNet Configuration

If you chose the **Advanced** option in step 3 on page 104, the notebook shown in Figure 58 is displayed.

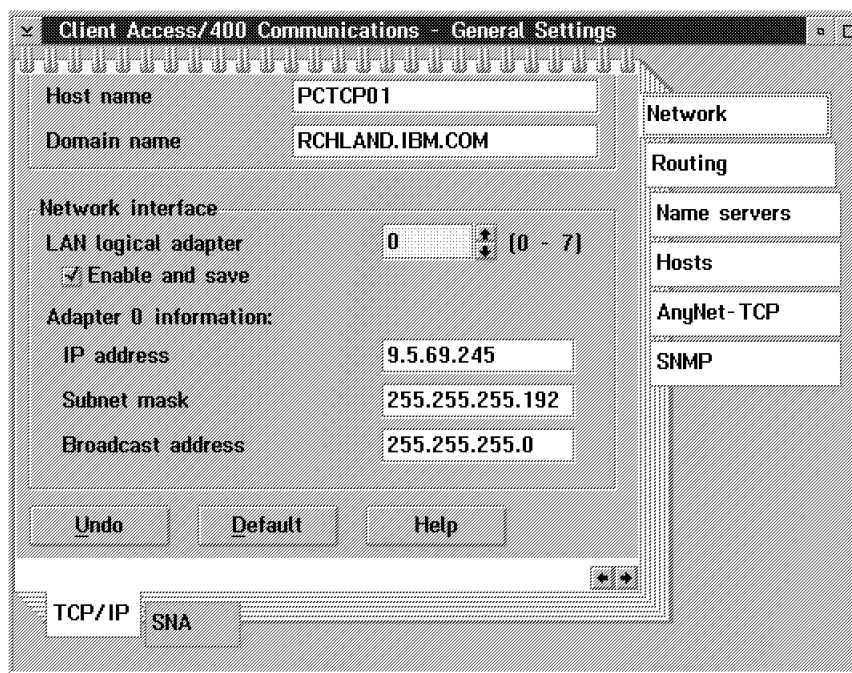


Figure 58. Advance Configuration - Panel

In order to fill the information for the first four pages of the notebook, start at step 4 on page 104. The panels displayed if you use the basic setup option are similar to the pages in this notebook:

- The *Network* page contains a combination of the information in the panels shown in Figure 47 on page 104 and Figure 48 on page 105.
- The *Routing* page contains the same information as the panel shown in Figure 49 on page 107.
- The *Name servers* page contains the same information as the panel shown in Figure 50 on page 107.
- The *Hosts* page contains the same information as the panel shown in Figure 51 on page 108 and the panel when **Add** is chosen.

When you have completed the first four tabs, come back to this point.

Attention

The values in the panels shown in this section should only be changed by someone who has a good knowledge of AnyNet configuration. For most situations, the defaults can be used.

The **AnyNet-TCP** page shown in Figure 59 allows you alter the SNA over TCP/IP settings.

Choose the **AnyNet-TCP** tab.

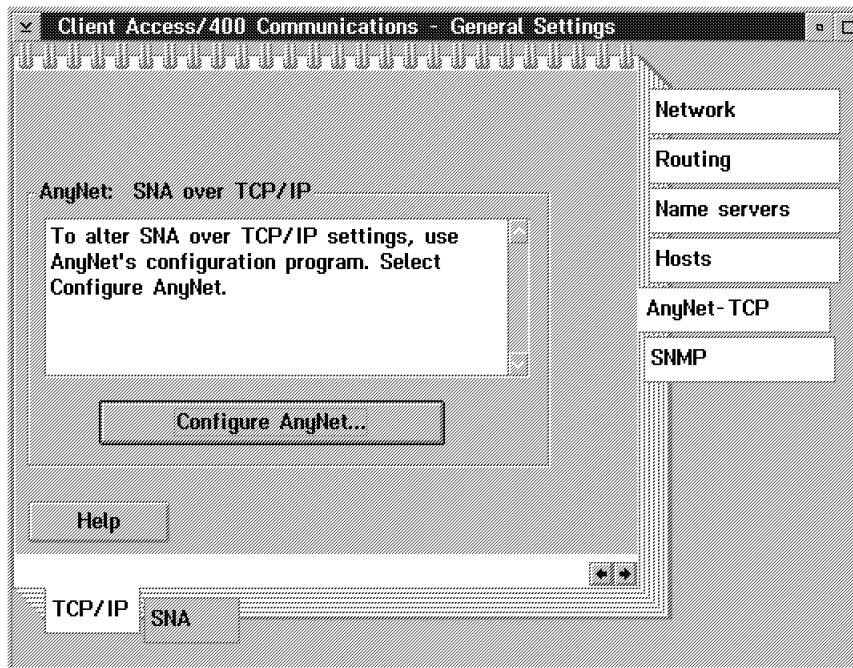


Figure 59. AnyNet: SNA over TCP/IP Tab

Select the **Configure AnyNet** button, and the panel shown in Figure 60 on page 115 is displayed.

This section is divided into three pages:

Page One: On this first page shown in Figure 60 on page 115, you see a field that defines the SNA domain name suffix.

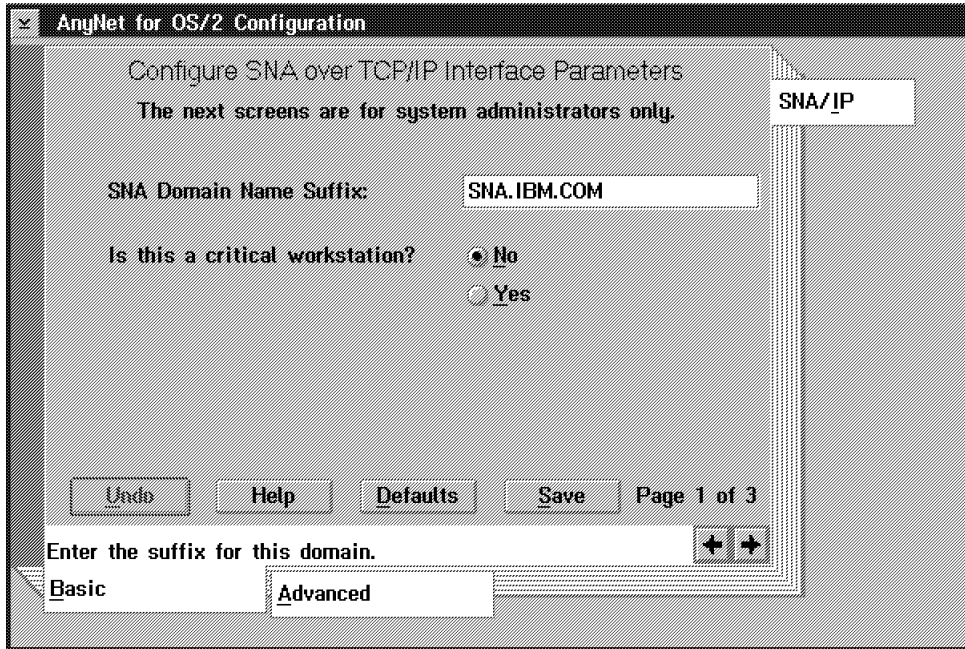


Figure 60. AnyNet for OS/2 Configuration Page 1

SNA over TCP/IP uses a fully-qualified host name in the form:
 luname.netid.snasuffix where:

- luname** is the SNA LU name
- netid** is the SNA network ID (netid)
- snasuffix** is the SNA domain name suffix.

Note

We recommend that you use the default name for the SNA domain name suffix.

This field sets the SNASUFFIX environment variable in your CONFIG.SYS file.

Page Two: The Well-Known Port for MPTN parameter enables you to define an alternative value for the well-known port used by SNA over TCP/IP on OS/2 (Figure 61 on page 116).

Note

We recommend that you use the default value for well-known port.

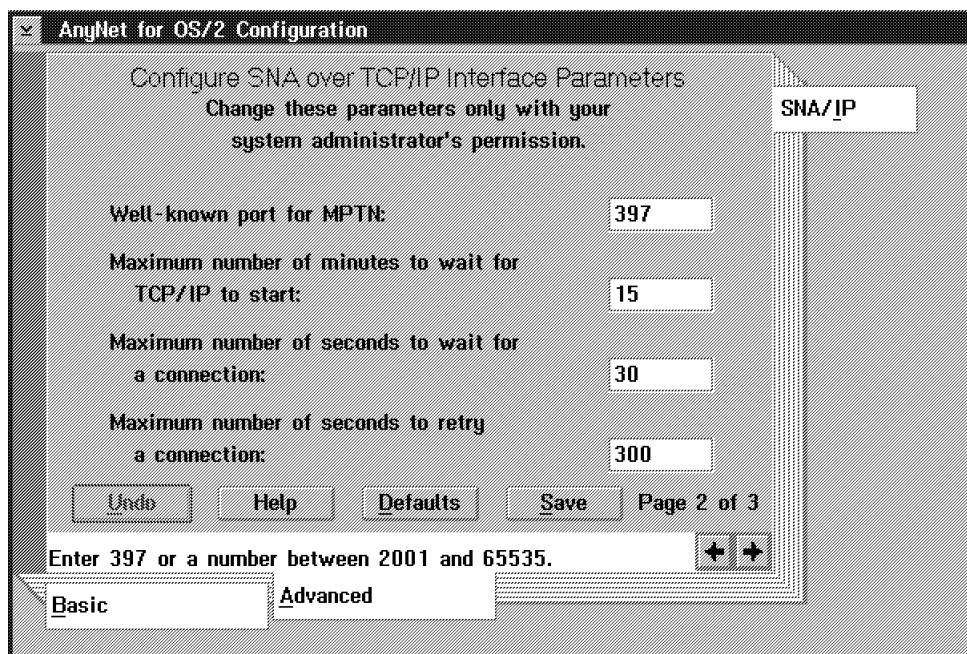


Figure 61. AnyNet for OS/2 Configuration Page 2

You may need to override the well-known port value when establishing test environments; however, we recommend that you use the standard well-known port (397) for normal operations.

If you do change the value on one node, that node is unable to set up connections to, or receive connections from, any other SNA over TCP/IP node in the network that has not also had this variable changed to the same value. For two nodes to communicate, their well-known port values must be the same.

This field sets the MPTN_WELL_KNOWN_PORT environment variable in your CONFIG.SYS file.

Page Three: This field sets the maximum time, in seconds, that SNA over TCP/IP retries an unacknowledged out-of-band (OOB) datagram (Figure 62 on page 117).

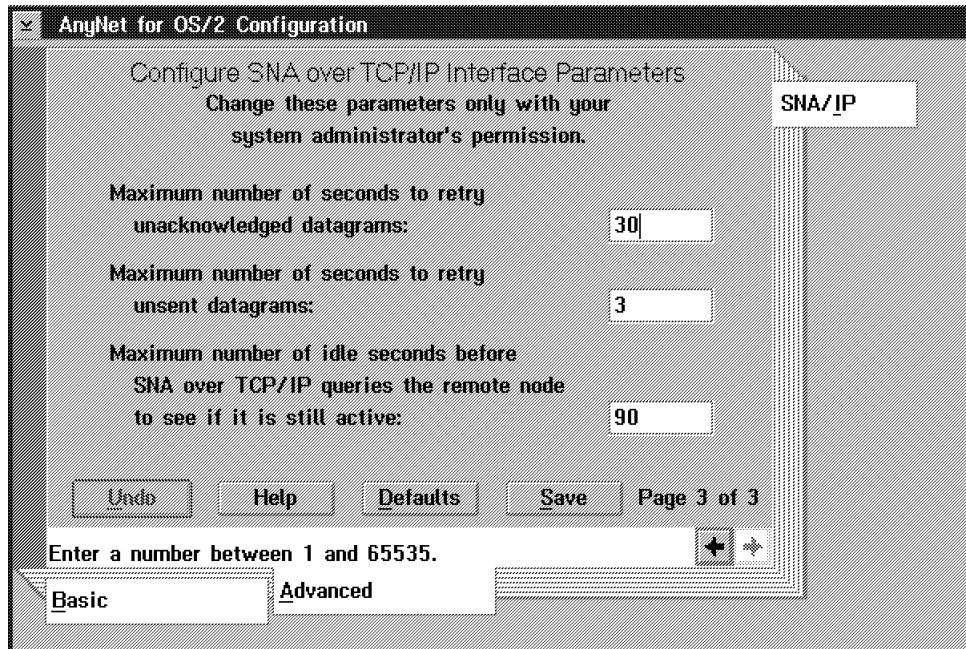


Figure 62. AnyNet for OS/2 Configuration Page 3

When expedited data is sent, this value can be used to set timer intervals that help improve the delivery of expedited data in congested situations. In SNA, some control messages (for example, messages requesting the right to send data or messages taking down a session) are sent as expedited data. Expedited data is not subject to congestion control and can move ahead of non-expedited data. To assure delivery, SNA over TCP/IP might send expedited data as normal data and as an out-of-band datagram.

Change this field only if you are experienced in tuning performance.

This field sets the UNACKED_DG_RETRY_SECS environment variable in your CONFIG.SYS file.

Choose **Save** to save your changes. When you complete all of the information required in this section, double-click on the upper left corner of the *Client Access/400 Communications - General Settings* panel shown in Figure 58 on page 113.

Select **Save** to save your changes and you are back to the *Client Access/400 Installation - Part 2* panel (Figure 52 on page 109).

To continue with the installation, go to step 13 on page 109.

4.6 Installing Over Existing Communications Products

This section describes the installation process that is used when you already have communications products installed on the PC, and consists of: 4.6.1, “Communications Manager/2 Version 1.11 and Network Transport Services/2,” 4.6.2, “Replacing Communications Manager/2 with Client Access/400 Communications” on page 121, and 4.6.3, “LAN Adapter Protocol Support and TCP/IP for OS/2” on page 125.

For details on deciding what approach to take in this situation, refer to Chapter 3, “Migration” on page 29.

4.6.1 Communications Manager/2 Version 1.11 and Network Transport Services/2

You may already have Communications Manager/2 and Network Transport Services/2 installed on your PC. Client Access/400 Optimized for OS/2 is an integrated product and includes a subset of Communications Manager/2. During the installation of Client Access/400 on a PC that has Communications Manager/2 installed, you see the panel shown in Figure 63 on page 119.

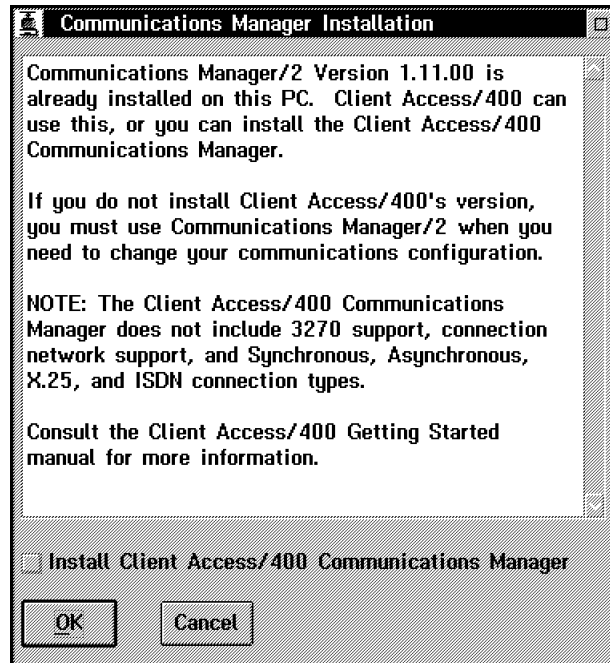


Figure 63. Communications Manager/2 Installation Panel

If you want to continue to use Communications Manager/2 rather than overwrite it with the communications support provided by Client Access/400 Optimized for OS/2, then make sure that the check box at the bottom of this panel is *not* selected. The default is to install the Client Access/400 Optimized for OS/2 version of communications manager.

If you want to install Client Access/400 Communications over Communications Manager/2, then please see 4.6.2, “Replacing Communications Manager/2 with Client Access/400 Communications” on page 121.

In our example, the check box was not selected, as we chose to use Communications Manager/2, which was already installed. Select **OK** from the panel shown in Figure 63, and then choose *Express* or *Custom* from the next panel. In our example, we chose custom setup. The panel shown in Figure 64 on page 120 is then displayed.

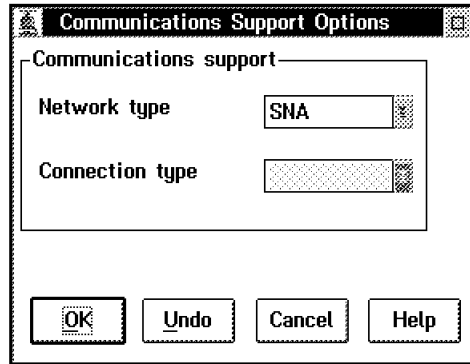


Figure 64. Communications Support Options Panel

From this panel, you are able to choose whether you have SNA or TCP/IP for your network type, but you are unable to choose the connection type. This is because Communications Manager/2 is already installed and the connection type has been set up within Communications Manager/2.

After choosing your network type, select **OK** to continue.

Client Access/400 now shows you what other communications components are going to be installed in the panel shown in Figure 65.

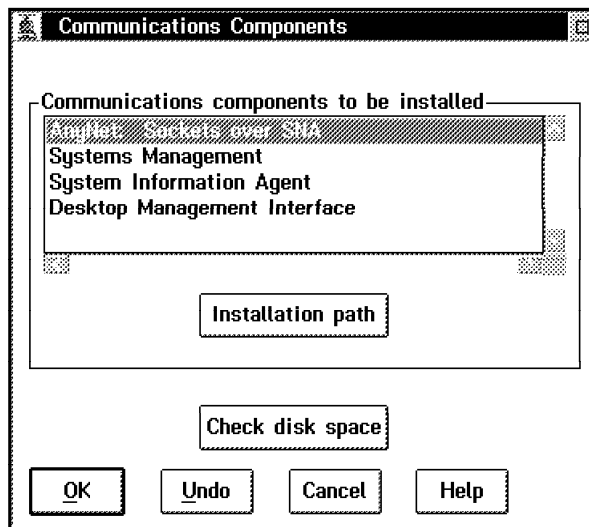


Figure 65. Communications Components Panel

As Communications Manager/2 is already installed, it is not listed.

This panel allows you to check the installation path for each communications component and the amount of disk space that is required for the installation. You are unable to select or deselect communications components to be installed. Select **OK** to continue Part 1 of the Installation.

4.6.2 Replacing Communications Manager/2 with Client Access/400 Communications

When installing Client Access/400 Optimized for OS/2, you have the option to install the communications support included with the client over Communications Manager/2. To do this, you select the check box at the bottom of the Communications Manager Installation panel (see Figure 63 on page 119). You then continue with the rest of Client Access/400 installation.

At the end of Part 1 of the installation, you notice that the Communications Manager/2 folder icon on your desktop changed from a patterned icon to a blank yellow icon, as did the FFST/2 icon. Figure 66 on page 122 shows you the contents of the *Communications Manager* folder provided with Client Access/400 Optimized for OS/2.

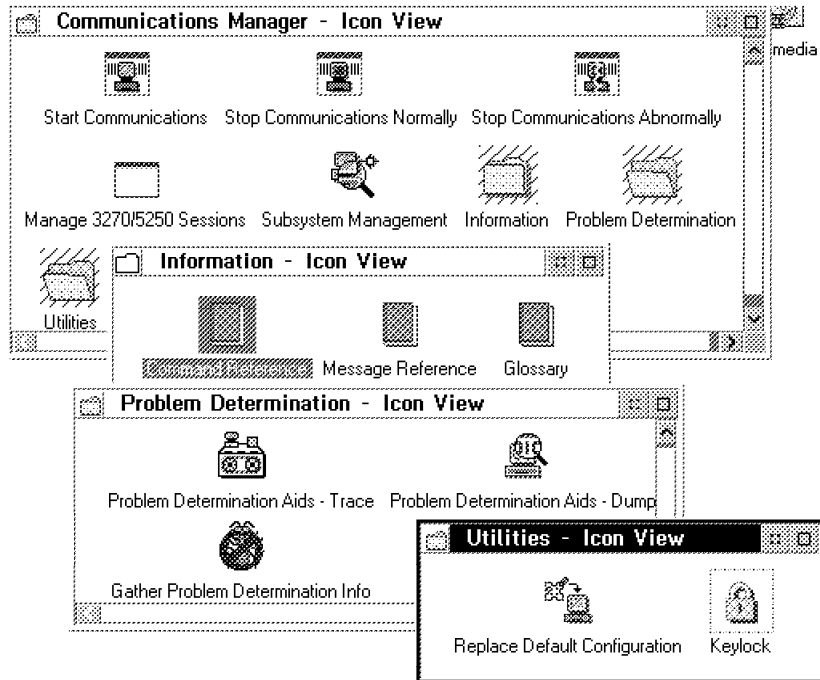


Figure 66. Client Access/400 Communications Folder Contents

During Part 2 of the installation, you notice that the configuration information for the AS/400 system is already entered for you if it was defined in your Communications Manager/2 configuration before you started the installation. An example *Connections Setup* panel is shown in Figure 67 on page 123 (the Add and Change buttons are not present if CM/2 is already installed and is being retained).

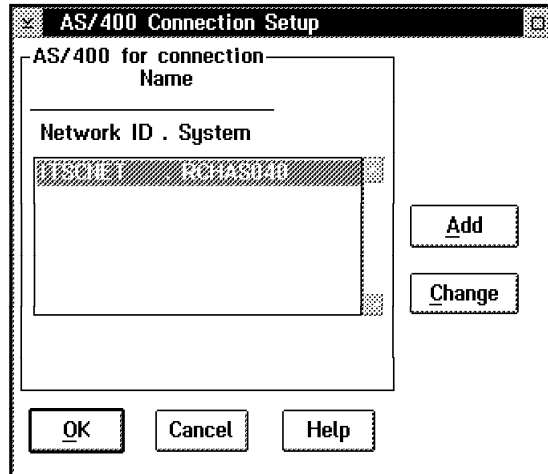


Figure 67. AS/400 Connections Setup Panel

Selecting *Change* from this panel displays a second panel with the configuration information already completed as shown in Figure 68.

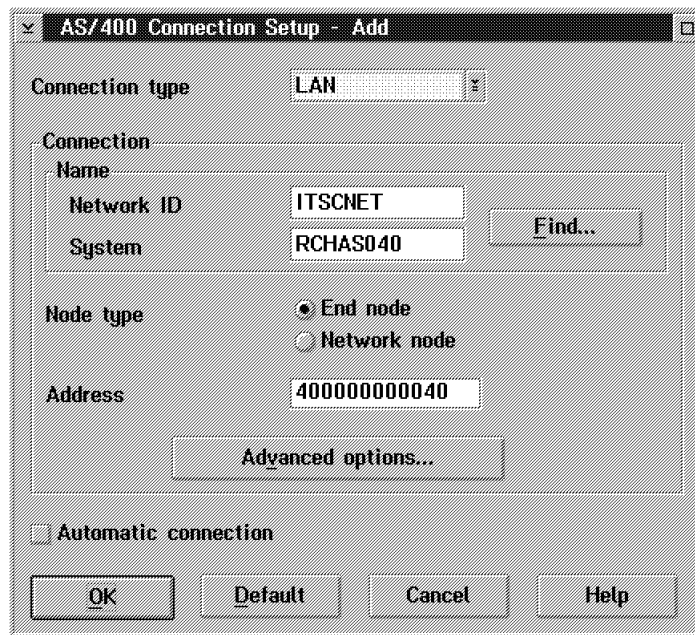


Figure 68. AS/400 Communications Setup - Change Panel

Select **OK** or **Cancel** to return to the Connection Setup panel, and then **OK** from there.

After clicking on the **Connect to AS/400 button**, you may receive the error messages shown in Figure 69.

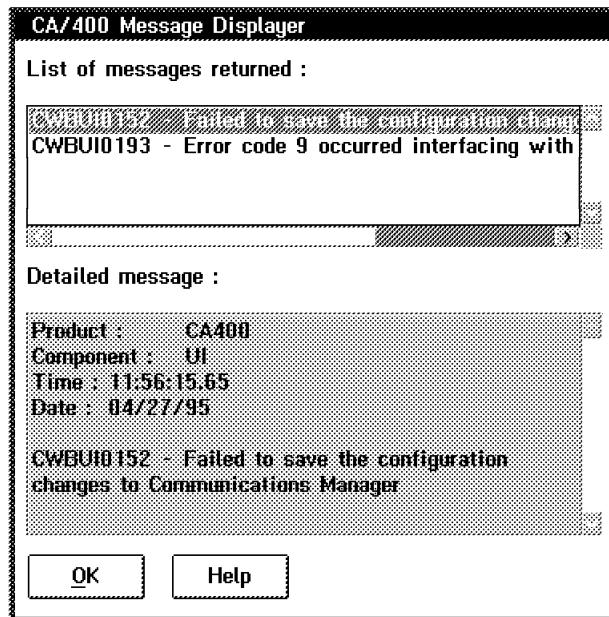


Figure 69. Client Access/400 Message Panel - Error codes

If this is the case, then you need to go back to the *AS/400 Connection setup* panel shown in Figure 68 on page 123, and click on the **Advanced options..** button. The *LAN Connection - Advanced Options* panel is displayed as shown in Figure 70 on page 125.

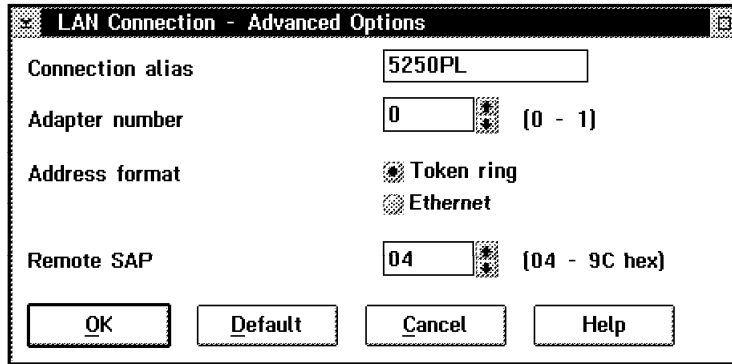


Figure 70. Client Access/400 Advanced Options Panel

The **Connection alias** box contains a name (for example, 5250PLU). To correct the previous errors, you need to change this so that it is different from what is already in there. In our example, we have changed it to 5250PL. Click on **OK** and save your changes. Then retry to connect to the AS/400 system.

4.6.3 LAN Adapter Protocol Support and TCP/IP for OS/2

If you have TCP/IP already installed on your PC, the configuration information is filled in on some Client Access/400 Optimized for OS/2 installation panels.

These are the panels you find already filled in:

1. In the *TCP/IP and AnyNet - Setup* panel shown in Figure 71 on page 126, the TCP/IP local host name information is already filled in.

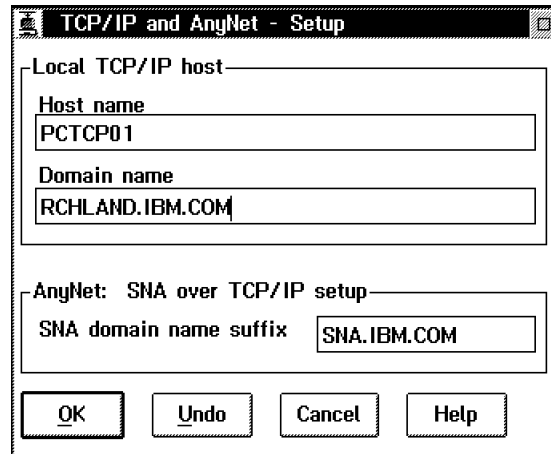


Figure 71. TCP/IP and AnyNet Setup Panel

2. The *TCP/IP Network* panel shown in Figure 72 is already completed with the IP addressing information.

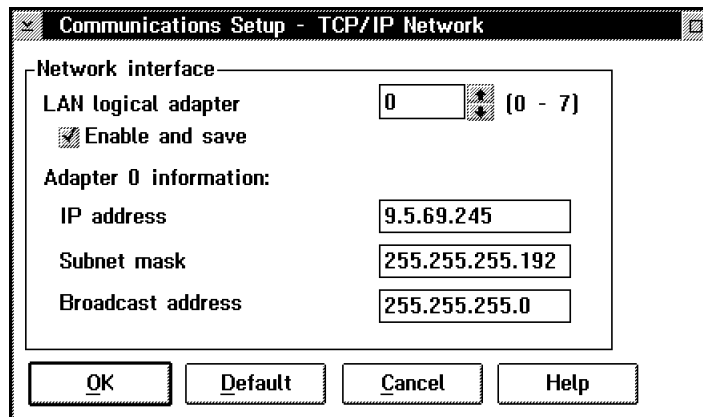


Figure 72. TCP/IP Network Panel

3. If you have routing information in your original TCP/IP configuration, this information is completed in the *Communications Setup - TCP/IP Routers* panel shown in Figure 73 on page 127.

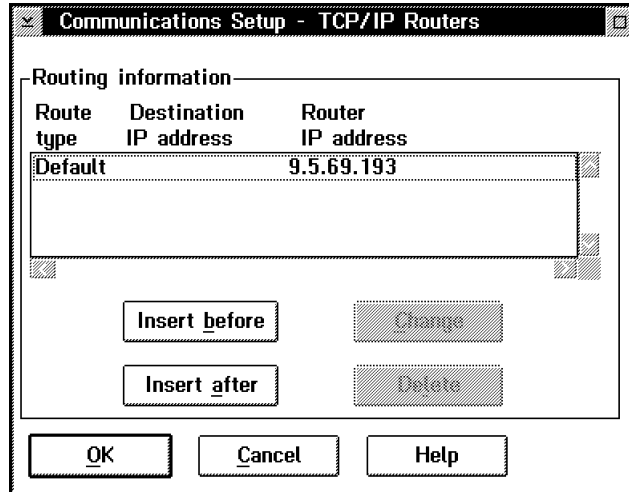


Figure 73. TCP/IP Routers Panel

4. If you have name servers information in your original TCP/IP configuration, the panel shown in Figure 74 is already filled in with this information.

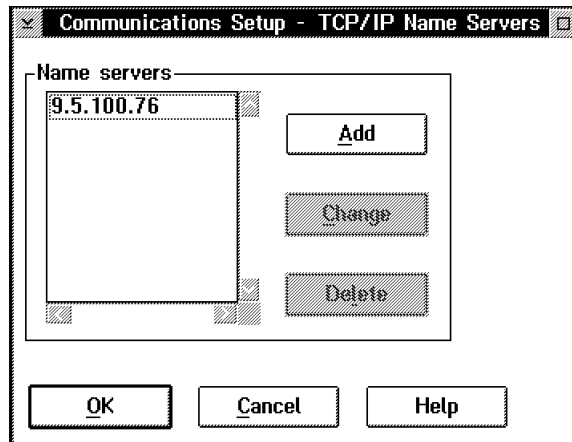


Figure 74. TCP/IP Name Servers Panel

4.7 Creating Installation Diskettes

We recommend that you create a new copy of the installation diskettes as soon as one workstation has been installed with Client Access/400 Optimized for OS/2 so that PTFs are included. Installation diskettes creating using the method described here contain either SBCS or DBCS code, and not both. This is determined by the version of OS/2 running on the PC being used to create the diskettes.

This ability to create installation diskettes is not included with the base support for the client. To install this support, you must selectively install the Administration component. See 5.7.2, "Selective Install/Removal" on page 182 for details.

1. Select the **AS/400 Workstation** icon and then the **Software Products** icon.
2. Select the **Client Access/400** icon.
3. Double-click on the **Create Install Diskettes** icon.

You are then presented with the *Create Install Diskettes* panel shown in Figure 75.

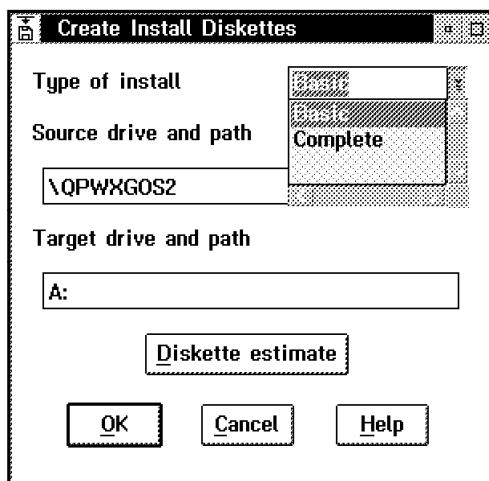


Figure 75. Create Install Diskettes Panel

4. For the *Type of Install*, you may either have *Basic* or *Complete*.

The *Basic* option allows you to create diskettes similar to those diskettes shipped with the client. These diskettes contain the necessary functions to enable a connection to the root directories on the AS/400 system.

These rest of the code is then downloaded from the AS/400 root directories.

The *Complete* option allows you to create diskettes that contain all of the base functions of Client Access/400. These diskettes do not include optional features such as RUMBA/400, PC5250, Graphical Operations, and Ultimedia Systems Facilities.

5. The *Source drive and path* field allows you to select where the code of Client Access/400 is going to come from to create the diskettes. The default is **QPWXGOS2** on the AS/400 system.
6. The *Target drive and path* field allows you to specify where the install diskettes are to be created. The default is **A:**. If the target is not a diskette drive, the type of install must be set to Complete.
7. Select the **Diskette estimate** button to find out how many diskettes it will take to create copies. This varies depending on whether you choose a basic or complete set of diskettes, and also on what type and capacity the diskettes are (see Figure 76).

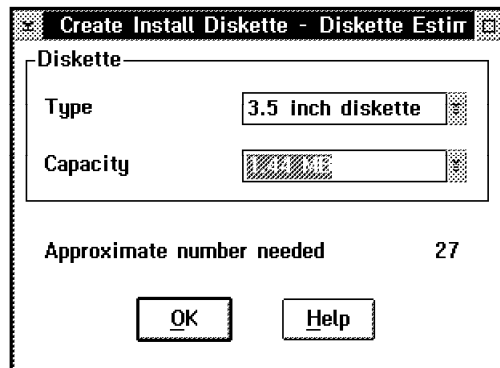


Figure 76. Create Install Diskette - Diskette Estimate Panel

In our example, we have chosen a basic type of install, using 3.5 inch diskettes with a capacity of 1.44MB.

You can change the type of diskettes to 5.25 inch, and the capacity to either 720KB, 1.44MB, or 2.88MB.

8. Once you have found out how many diskettes are required, you can format the number of diskettes required using a command line in another OS/2 window. Return here when ready and select **OK**, and then **OK** to create the diskettes.

4.8 Installation Hints and Tips

To do a normal install or removal of components after the initial Client Access/400 product is installed, refer to 5.7.2, "Selective Install/Removal" on page 182. When using this function, you may encounter the following situations.

4.8.1.1 Communication Manager Failure

If you are reinstalling Client Access/400 and choose to install or reinstall Client Access/400 Communications Manager, a Workplace Shell problem might occur.

To prevent this problem, do the following:

1. Remove d:CMLIBDLL from the LIBPATH in the CONFIG.SYS file. This disables Communications Manager until after you reinstall.
2. Restart the PC workstation.
3. Start the Client Access/400 installation program.

4.8.1.2 Reinstalling Client Access/400 PC5250

When you install PC5250 to a system where PC5250 is already installed, you must first remove PC5250 by using the Client Access/400 Selective Install (see 5.7.2, "Selective Install/Removal" on page 182).

Selectively removing PC5250 may fail with one of several symptoms including access violations. The d:CAOS2CAINSTL1.LOG file may contain a reference to an OS/2 memory problem. If you encounter this problem, restart your Workstation and try again.

4.8.1.3 Twinaxial Console restriction

PC5250 Twinaxial Console session does not work at the same time as Client Access/400 Communications Manager twinaxial connection because both device drivers try to use the same adapter. You must remove Client Access/400 Communications Manager twinaxial connection if you want to use PC5250 as a twinaxial console.

4.9 CID Installation

Configuration, installation, and distribution (CID) allows installation and configuration on PC workstations from source code residing on a server, eliminating the need for someone sitting next to the PC workstation inserting diskettes and answering the installation prompts. You can install from a LAN sever, or you can prepare the response file before doing the installation from a CD-ROM or PC diskettes.

Note:

CID installation is only possible for part 1 of the PC installation. The configuration information that you are prompted for during part 2 cannot be predefined in a response file.

Before you start the installation on the PC workstation, you must do the initial tasks described in either 4.5.2, "PC Configuration" on page 95 or 4.5.2, "PC Configuration" on page 95.

1. First you must create a response file in ASCII format with a name such as `pname.RSP` containing the CID keywords. If you have already installed Client Access/400 Optimized for OS/2 on a PC, you can modify the `d:\OS2\INSTALL\CAINSTALL.LOG` file to create a response file. Otherwise, you have to create one from scratch. In either case, you need to refer to *Client Access/400 Optimized for OS/2 API and Technical Reference*, SC41-3511, for a description of the response file format, and the details for each of the keywords and the options to specify.

By placing the response file in the `d:\OS2\INSTALL` folder, you minimize the risk of deleting the file by mistake.

2. Enter the `INSTALL` command at an OS/2 prompt, adding the option `/R` followed by the *path* and *name* of the response file. For example:

```
d:\QPWYGOS2\INSTALL.EXE /R:d:\OS2\INSTALL\PCNAME.RSP
```

where `d:\QPWYGOS2` is the directory containing the Client Access/400 Optimized for OS/2 code.

3. While the files are installed on the PC, the messages in Figure 77 on page 132 are shown.

```
Client Access/400
Optimized for Operating System/2
Client Access/400 Installation - Part 1
(C) Copyright IBM Corp. 1984, 1994. All rights reserved.

Files needed by the installation program are being
temporarily copied to the d:- drive.

Once the files are copied, the installation
program will start.

When installation completes, these temporary files
will be removed.

.....
```

Figure 77. OS/2 Window, During Client Access/400 CID Installation

When all the files are installed, you return to the OS/2 command prompt.

4. If you are going to install Part 2 using an alternative source like CD-ROM or LAN Server/400, you must now add the line SET CAINSTALL_SOURCE=d:\ to your CONFIG.SYS, where d: is the drive letter where the QPWXGxxx directories are located.
5. Use the OS/2 shutdown function to shut down the PC.
6. Restart the PC.
7. In Client Access/400 installation part 2, you must provide the configuration information manually. These tasks are described in 4.4.3.2, "PC Installation - SNA, Part 2" on page 68 and in 4.5.3.2, "PC Installation - TCP/IP, Part 2" on page 103.

Other Client Access/400 response files: During installation the following response files are created.

- d:\CAOS2\CACID.RSP
- d:\CMLIB\CA400.RSP
- d:\OS2\INSTALL\USER.RSP
- d:\CMLIB\UPGRADE.RSP
- d:\CMLIB\REINSTL.RSP
- d:\CMLIB\PRIME.RSP
- d:\OS2\INSTALL\SAMPLE.RSP
- d:\OS2\UNINSTAL.RSP

Corrections


The following are corrections to *Client Access/400 Optimized for OS/2 API and Technical Reference*, SC41-3511.

In Chapter 18 under CACOMPONENT - Communications Manager, under TWINAX_DLC, the table incorrectly states the values for *ADAPTER_TYPE*. The correct information is: **1=WEA/A, 2=E5250, 3=5250/A, 4=5250 PMCIA.**

In Chapter 18 under CACOMPONENT - TCP/IP, the table incorrectly states that the *HOSTNAME* keyword is not a required keyword in the TCP/IP response file. This *is* a required keyword.

Chapter 5. Configuration

Following the installation of Client Access/400 Optimized for OS/2, the only

icon added to your desktop is the *AS/400 Workstation* icon  (unless you have a PC5250 or RUMBA/400 session placed on the desktop). This is the main folder for everything that is related to the AS/400 system. As you can see in Figure 78 on page 136, it contains three icons:



Software Products

This is the starting point for most functions. It contains a folder called *Client Access/400* and a *Software Catalog* folder. The Software Catalog folder contains optional products such as Graphical Operations, Ultimea System Facilities and Graphical Access for OS/400. In addition the products from Wall Data are shown in the Software Products folder; RUMBA/400 Applications folder (terminal and printer emulation), Database Access and File Transfer. Every product or product component is listed in the Client Access/400 Products Registry.



Network Printers

This is the place to keep all of your network printers. You can compare it to the OS/2 drives folder where all your local and network drives are shown. OS/2 does not provide a place for printers and therefore Client Access/400 Optimized for OS/2 does. See 5.6, "Network Printers" on page 161 for details.



Client Access/400 Connections

Selecting this icon displays a list of AS/400 systems that you have previously connected to, and the status of the connections. If you are using the Communications Manager that comes with Client Access/400 Optimized for OS/2, or running a TCP/IP configuration, you can also configure communications from this panel. See 5.4, "Connections" on page 142 for details.

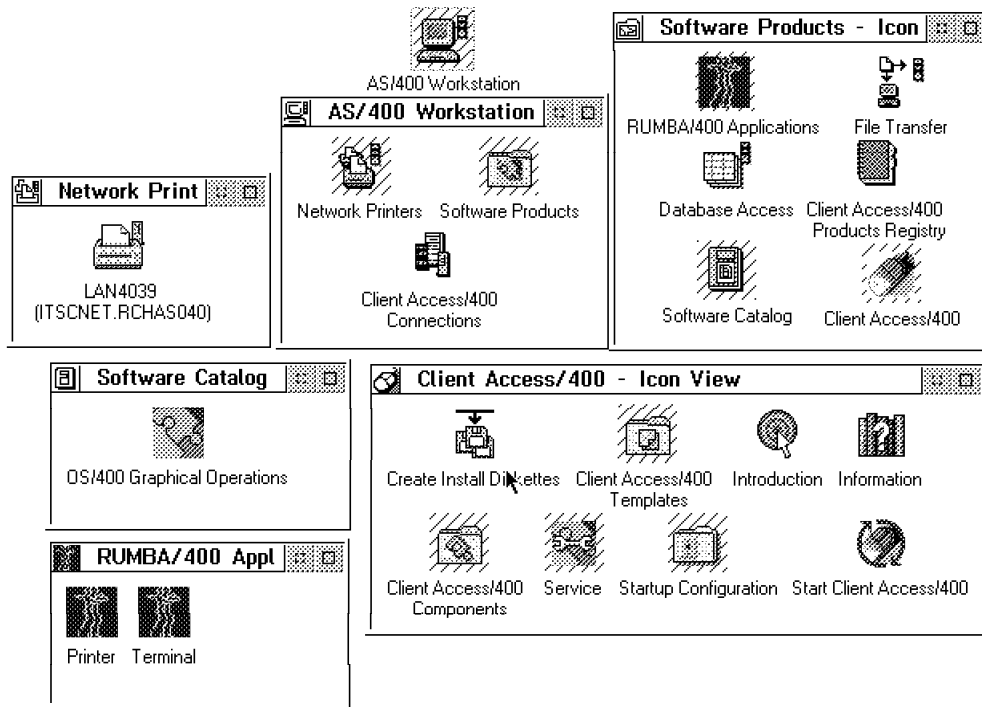



Figure 78. AS/400 Workstation and Subfolders

The **Client Access/400** folder  provides access to the following folders and functions (as shown in Figure 79 on page 138):

 **Introduction**

The introduction provides on-line help about how to carry out specific tasks such as defining network printer, or using the problem log. Refer to A.1, "Introduction" on page 341 for details.

 **Information**

This is the folder that contains the Client Access/400 documentation. It contains the manuals, command references and message references for the different product components of Client Access/400 Optimized for OS/2. It also contains a readme file that contains the latest hints and tips

that may not be in the normal manuals. Refer to A.2, "Information" on page 341 for details.



Start Client Access/400

This is the icon used to start Client Access/400 Optimized for OS/2. You can put this icon into the OS/2 Startup folder if you want the client started automatically, or onto the LaunchPad or desktop for better accessibility. Refer to 5.9, "Automating Startup" on page 201 for details.



Startup Configuration

This is the folder that contains the configuration objects which are started every time Client Access/400 starts. For example, it could contain objects representing network drives, printers, or emulation sessions. Refer to 5.2, "Startup Configuration Group" on page 140 for details.



Client Access/400 Templates

This is the folder that contains the templates for Client Access/400. A template is an object that you can use as a model to create additional objects. For example, you can drag and drop the network drive template to the desktop to define a drive on the AS/400 system. Refer to 5.1, "Templates" on page 138 for details.



Service

The service folder contains the problem and history logs, and if active, the traces. Refer to 6.13, "Service" on page 228 for details.



Create Install Diskettes

This option allows you to create installation diskettes. If you are using diskettes for installation, we recommended that you create a new set after installing PTFs. Refer to 4.7, "Creating Installation Diskettes" on page 128 for details.



Client Access/400 Components

This folder contains the subfolders for Client Access/400 components including Communications Manager and First Failure Support Technology/2 (FFST/2).

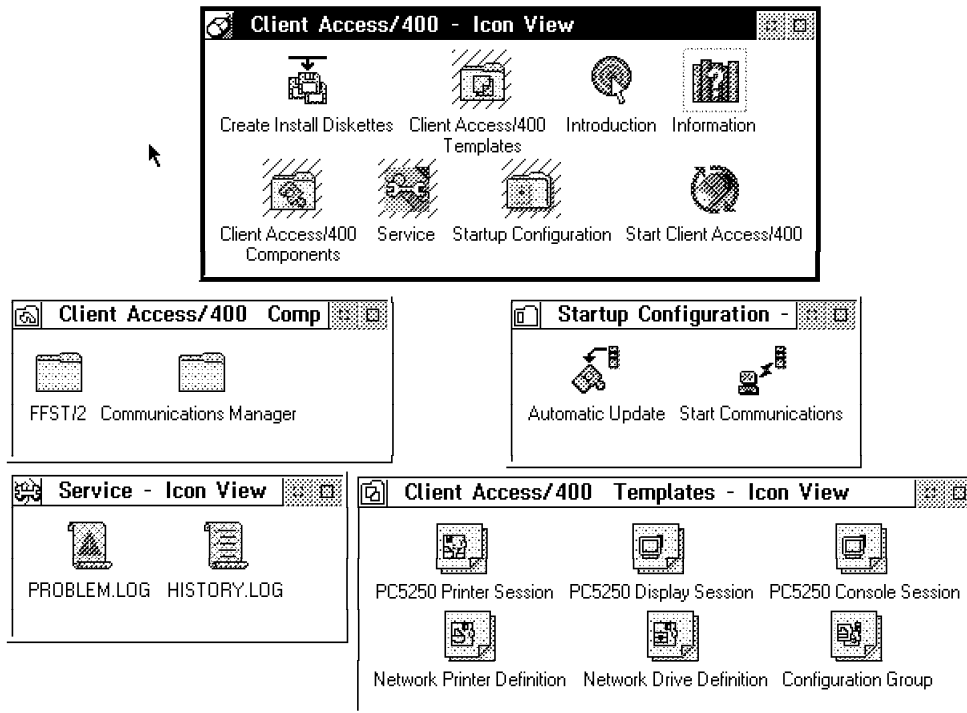


Figure 79. Client Access/400 and Subfolders

5.1 Templates

A template is an object that you can use as a model to create additional objects. When you drag a template, you create a copy of the original object as though you were peeling one of the objects off a stack. The new object has the same settings and contents as the original template in the stack.

Figure 80 on page 139 shows the six templates provided with Client Access/400 Optimized for OS/2.

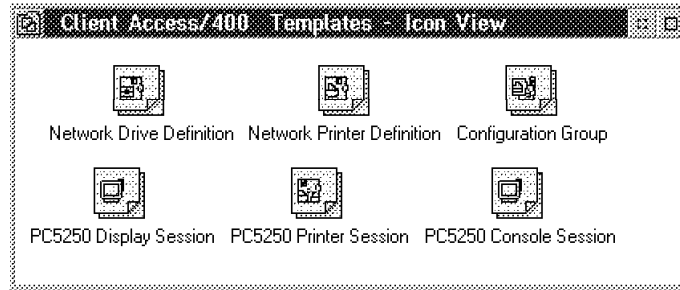



Figure 80. Client Access/400 Templates Folder

Note that unlike Personal Communications/5250, RUMBA/400 is not configured using templates.

These templates were written with true object oriented-programming techniques using System Object Model. Every object contains all of the necessary configuration information so there are no additional definition or configuration files. The advantage of this is the ability to exchange objects between systems. An administrator can define a network drive object on one system and transfer it to another.

Templates provide a much more integrated approach to configuring Client Access/400 objects than was possible using PC Support/400 or Client Access/400 for OS/2. In that environment, you had to go through different text based menus to define shared folders or virtual printers.

5.1.1 Configuration Using Templates


The Client Access/400 Templates folder  is found in the Client Access/400 folder which is part of the Software Products folder in the AS/400 Workstation folder. You can also open the standard OS/2 Templates folder. This is where the original Client Access/400 templates folder is. The templates folder in the Client Access/400 folder is a shadow of this one.

When you drag a template icon to the desktop or to the folder of your choice, a settings notebook is shown. This is the place where you specify all of the necessary configuration parameters for the object. You can leaf through the notebook by clicking on the arrow button at the bottom right-hand corner, or you can click on the tabs listed on the right-hand side.

Refer to the following places for a detailed description of the configuration for each template:

- Network Drive Definition: 5.5, “Network Drives” on page 150
- Network Printer Definition: 5.6, “Network Printers” on page 161
- Configuration Group: 5.3, “Configuration Group” on page 141
- PC5250 Display Session: 5.8.2, “PC5250” on page 199
- PC5250 Printer Session: 5.8.2, “PC5250” on page 199
- PC5250 Console Session: 10.6, “PC5250 Console Feature” on page 282

5.2 Startup Configuration Group

The contents of the Startup Configuration group  are automatically started when Client Access/400 is started.

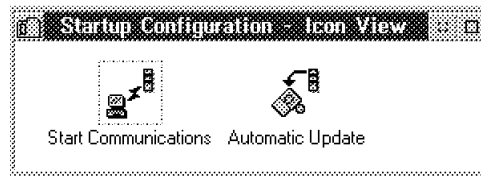


Figure 81. Client Access/400 Startup Configuration Folder

By default, the group will contain icons to start communications and run the update function. If you have configured a RUMBA/400 or PC5250 session, you may also have specified these to be in the startup configuration group.

The group can be compared to the OS/2 Startup folder which starts every time you boot OS/2. See 5.9, “Automating Startup” on page 201 for information on how to automatically start Client Access/400 during system startup.

Note: If you want to start RUMBA/400 and Personal Communications/5250 on the same PC, you have to be careful about the start sequence. RUMBA/400 has to be started before Personal Communications/5250. Start your RUMBA/400 sessions in the Startup Configuration and the Personal Communications/5250 sessions in a Configuration Group.

5.3 Configuration Group

The Configuration Group  is a folder similar to the Startup Configuration folder except that it is not automatically started when Client Access/400 is started (unless it is placed in the Startup Configuration folder), and cannot contain the Start Communications icon.

Use the Configuration Group folder:

- As a place to keep configuration objects that you do not want to start every time Client Access/400 starts, but you do want started together.
- To manage other user's configurations by using a shared configuration group. See 5.3.3, "Shared Configuration Groups" on page 142 for details.

5.3.1 Configuration

The Client Access/400 Templates folder is found in the Client Access/400 folder, which is part of the Software Products folder in the AS/400 Workstation folder.

You can also open the standard OS/2 Templates folder, which is where the original Client Access/400 templates folder is found. The templates folder in the Client Access/400 folder is a shadow of this one.

Drag the **Configuration Group** icon to the desktop or to the folder of your choice (for example, the Startup Configuration folder). Notice that a settings notebook is not displayed for the configuration group template. See 5.3.2, "Automatically Started Configuration Groups" for details on how to change the settings. You can now use the Configuration Group as a container for your objects.

5.3.2 Automatically Started Configuration Groups

A Configuration Group can be started either by a right-hand mouse button click on the icon followed by selecting **Open** and **Connection** from the menu, or through a double click on the Configuration Group icon.

The latter needs a change in the settings for this Configuration Group:

1. Use the right-hand mouse button, and select **Settings** from the menu to display the settings notebook.

2. Go to the **Menu** page.
3. Select **Open** from the Available menus and select **Settings**.
4. Change the Default action from **Icon view** to **Connection**.


You can now start everything within the Configuration Group with just a double click on the Configuration Group icon.

5.3.3 Shared Configuration Groups

1. Put the Configuration Group that you want to share on a common disk (network drive) so that all users can access.
2. Shadow the shared Configuration Group into each user's Startup Configuration folder, by right-clicking on the icon and selecting **Create shadow** from the menu.
3. Now you can make changes to the shared Configuration Group on the common disk and all of the users will start up using the changed configuration.

5.4 Connections

Connections allows you to start and stop connections, and to add new or change existing connections. This is very easy compared to the offerings we had with OS/2 PC Support/400, Communications Manager/400, and Communications Manager/2. It is assumed you are connected through SNA and you are using the built in Communications Manager in this section. Differences between TCP/IP and SNA configuration are mentioned. When

you start *Client Access/400 Connections*  from the *AS/400 Workstation* group, the panel in Figure 82 on page 143 is displayed.

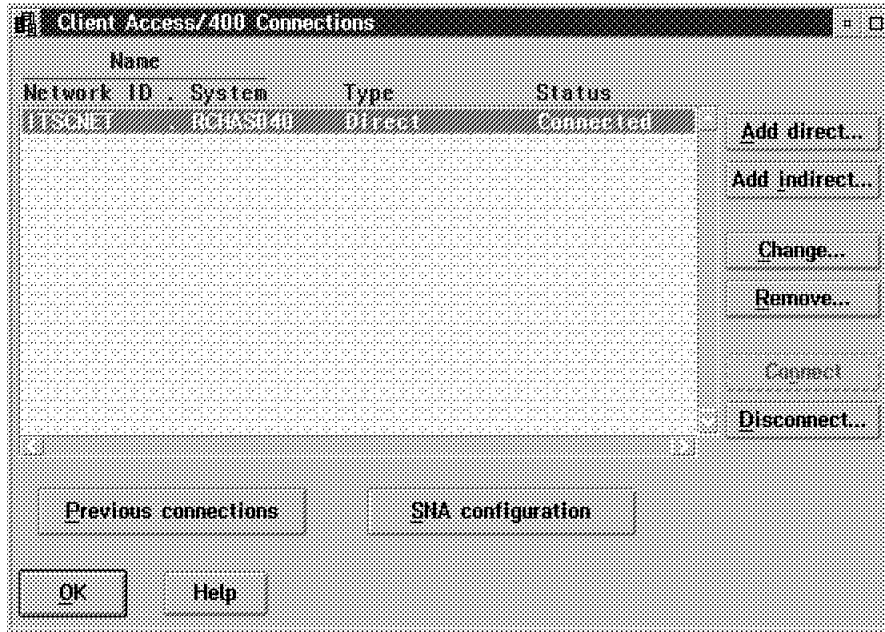


Figure 82. Client Access/400 Connections SNA

This panel shows the current connections that are configured, including type and status (only if you are using the communications manager shipped with the client).

Note: If you use this panel to reconfigure any connections, your changes will only be saved when you click on **OK**. Closing the window does not save your changes!

Hint for SNA

Change the SWTDSC parameter in your controller description on the AS/400 system from *YES to *NO. Otherwise your connection is terminated if there is no activity.

If you are using Communications Manager/2, you do not see the two columns Type and Status, and the only option you have is to remove a connection. You have to use Communications Manager/2 CMSETUP to add or change connections.

If your protocol is TCP/IP, you see the panel in Figure 83 on page 144.

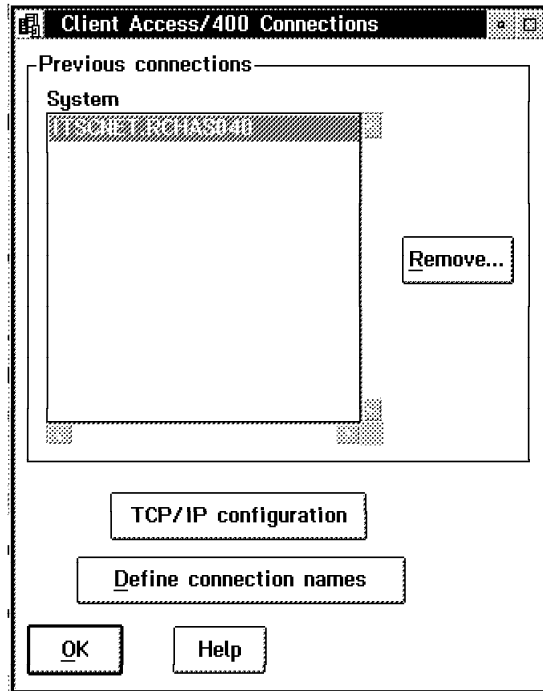


Figure 83. Client Access/400 Connections TCP/IP

You have only the option to remove a connection. To add or change connections, you can take the TCP/IP configuration option, (see Figure 85 on page 146), and you can define connection names (aliases). See Figure 84 on page 145.

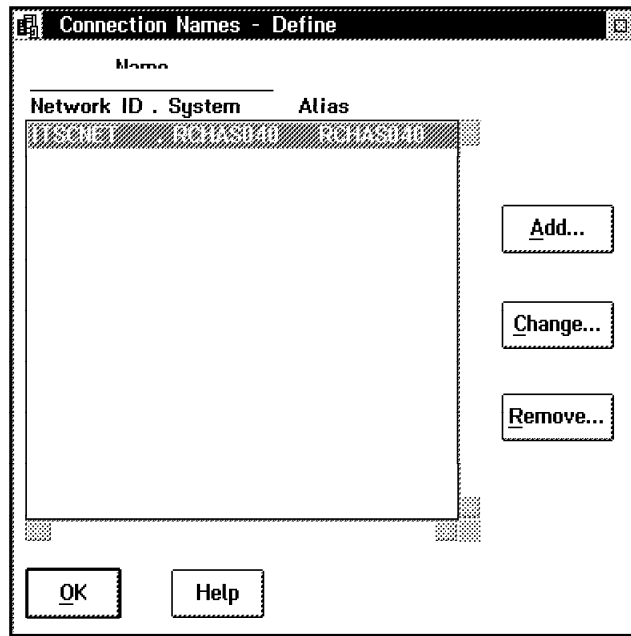


Figure 84. Client Access/400 Define Connection Names TCP/IP

Define Connection Names is the place to define an alias for your TCP/IP connection.

Note:

An alias name is required for some functions when running over TCP/IP (RUMBA/400 display and printer emulation, Database Access GUI and file transfer for example).

Select the TCP/IP configuration push button to start the Client Access/400 Communications Setup notebook. The panel in Figure 85 on page 146 is displayed.

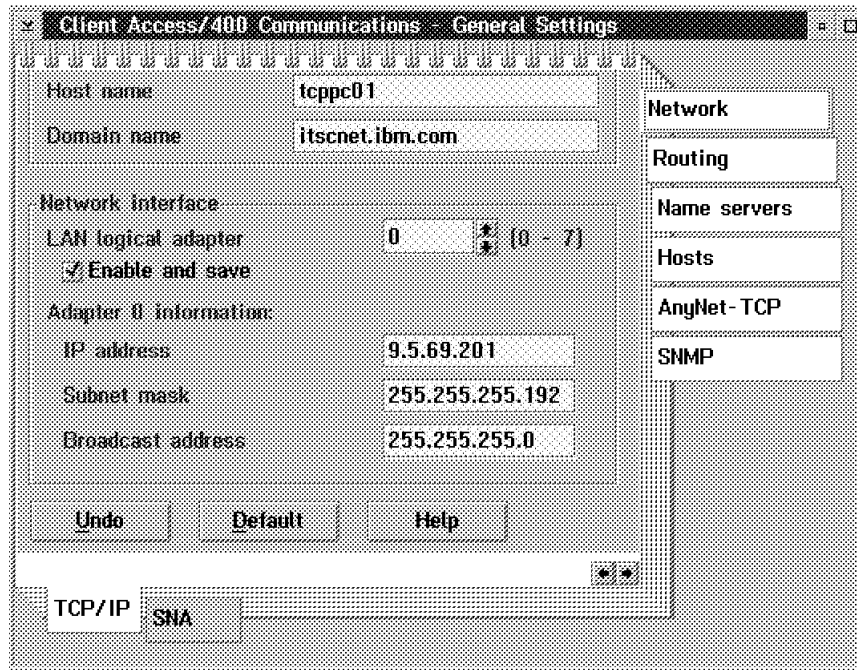


Figure 85. Client Access/400 TCP/IP Configuration

The same configuration information can be specified during installation. Refer to 4.5, “TCP/IP” on page 79 for details about the parameters. Use this notebook if you need to change anything from the values used during the installation process.

This notebook is also displayed if you are connected over TCP/IP and you choose the general settings for any communications component in the products registry. See 5.7, “Products Registry” on page 180 for details.

5.4.1 Add Direct

You can use this option if you need to add a connection to an AS/400 system where there is no APPN network node between your PC and the AS/400 system. For example, you may have an AS/400 system on the same token-ring as your PC (you might also be connected over LAN bridges or routers).

Connection type

You cannot change the connection type without reinstalling Client Access/400 Optimized for OS/2.

Find Select this push button to locate an AS/400 system on a LAN. Make sure your line description is enabled for the LAN query. You can check this from a terminal by entering GO PCSTSK and selecting Work with line description query status from the menu. Figure 86 on page 147 shows the panel that is displayed. To enable the query, you have to vary off your line.

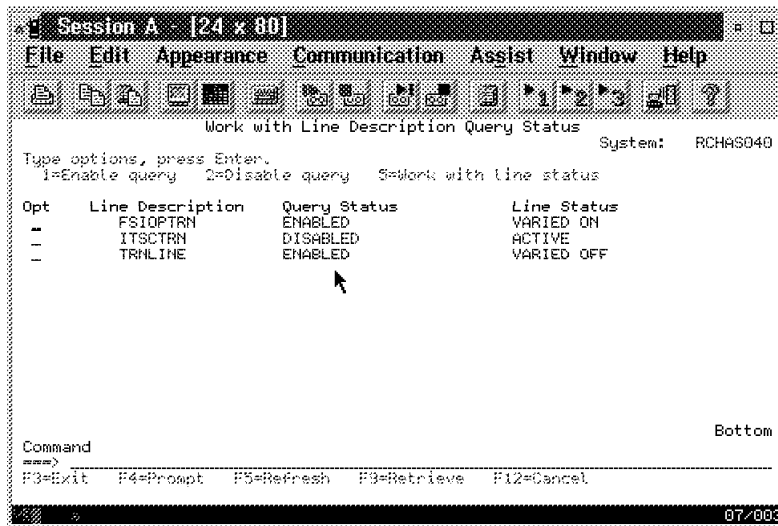


Figure 86. Work with Line Description Query Status

Network ID

Select the network ID of your system you want to connect to. If you are choosing a system from the query result, you do not have to worry about this parameter.

System

Select the system you want to connect to. If you are choosing a system from the query result, you do not have to worry about this parameter.

Mode type

Choose the mode type of your system. You can find this parameter in the network attributes (DSPNETA, parameter MODETYPE) of your system you want to connect to. If you are choosing a system from the query result, you do not have to worry about this parameter.

Address In LAN environments, this is the token-ring or Ethernet adapter number of your AS/400 system. You can find this number in your line description (ADPTADR). Again, if you are choosing a system from the query result, you do not have to worry about this parameter.

Advanced options

Use advanced options if you have one of the following:

- Alias other than system name
- Multiple adapters
- Ethernet connections
- Use of SAPs other than 04

Automatic connection

If you check this box, every time Client Access/400 is started, this connection is started as well.

5.4.2 Add Indirect

You have an indirect connection if there is an APPN network node between your PC and the AS/400 system that you want to add a connection for. For example if you are connected to one AS/400 system through token-ring and this AS/400 system is connected to a new AS/400 system through an SDLC communications line. The AS/400 system in the middle has to be a network node.

5.4.3 Change/Remove

This is to change or remove an existing connection.

If you change the system name, then you must also ensure that the alias on the advanced settings page is correct.

5.4.4 Connect/Disconnect

If you did not choose automatic connection, this is the place where you can start and stop your connection.

5.4.5 Previous Connections

This shows you a list of systems that have been successfully connected to in the past. This list is displayed if you ask to see a list of systems when configuring Client Access/400 functions. You can remove old systems from the list that are not used any more by using the Remove pushbutton.

5.4.6 SNA Configuration

Select the SNA configuration push button to start the Client Access/400 Communications Setup notebook. The panel in Figure 87 is displayed.

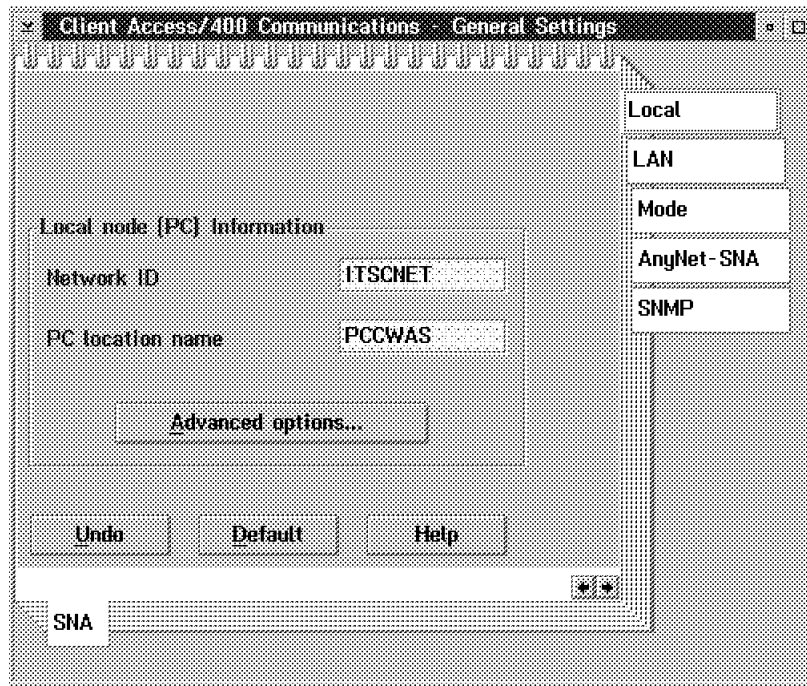


Figure 87. Client Access/400 SNA Configuration

The same configuration information is defined during installation. Refer to 4.4, "SNA Installation" on page 50 for details about the parameters. Use this notebook if you need to change any of the original parameters entered during the installation process.

The same notebook is displayed if you are connected over SNA and you choose the general settings for any communications component in the products registry. See 5.7, "Products Registry" on page 180 for details.

5.5 Network Drives

The Network drives function of Client Access/400 Optimized for OS/2 can be compared to shared folders in PC Support/400 or Client Access/400 for OS/2. The difference between PC Support/400 or Client Access/400 for OS/2 shared folders and the new network drives of the Client Access/400 Optimized for OS/2 client is the ability to access the entire Integrated File System. The IFS root directories also offer improved performance when compared to shared folders.


The advantage of this is that you can access every file system on the AS/400 system. For example, you can still access the old shared folders in QDLS where you can share data with OfficeVision/400, but you can also access QLANSrv which is used by File Server Input/Output Processor and LAN Server/400, and QSYS that contains the normal AS/400 database files.

Refer to 1.2.2, "IFS Introduction" on page 5 for an overview of the Integrated File System

Another significant difference from previous products is in the configuration of the network drives. While you had to go through text based menus in the past, there is now an OS/2 template that is used to create network drives. A template is an object that you can use as a model to create additional objects of the same type. These templates were written with true object oriented programming techniques using the System Object Model. Every object contains all of the necessary configuration information, and there are no additional definition or configuration files. The advantage of this is the ability to exchange objects between systems. An administrator can define a network drive object on one system and transfer it to another.

5.5.1 Configuration

The Client Access/400 Templates folder is found in the OS/2 Templates folder. A shadow of this folder exists in the Client Access/400 folder which is part of the Software Products folder in the AS/400 Workstation folder.

Drag the **Network Drive Definition** template  to the desktop or to the folder of your choice. The Network Drive Definition - Settings notebook is displayed (see Figure 88 on page 151). This is where you configure the network drive definition. You can leaf through the notebook by clicking on the arrow button at the bottom right-hand corner, or you can click on the tabs listed on the right-hand side.

Hint

A sub-topic can have more than one page of settings (for example, File). Do not forget these pages if you are clicking through the tabs instead of the arrow button!

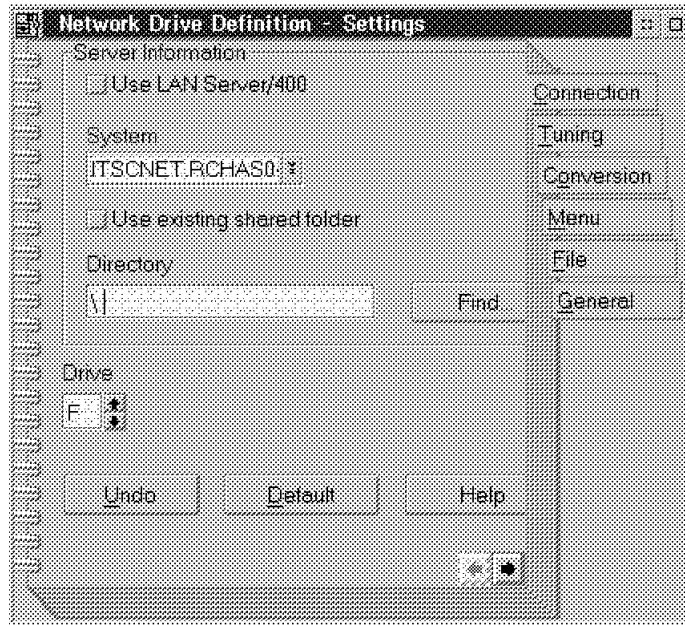


Figure 88. Network Drive Definition - Settings Notebook

5.5.1.1 Network Drive Definition - Settings

Connection page

Use LAN Server/400

Use this check box if you want to assign a drive using OS/2 LAN Requester. The drive can be assigned to an AS/400 FSIOP running LAN Server/400, or to an OS/2 LAN Server and provides you with high-performance PC file serving.

System Select the AS/400 system to that you want to assign the drive.

Use existing shared folder

Select this check box if you want to restrict the drive to accessing data in the shared folders file system QDLS. Marking this check

box has the same effect as prefixing the directory name with QDLS. You might use this option if you want to share data with OfficeVision/400 or with the Client Access/400 Original Clients that do not have access to the IFS.

Directory / Alias

Indicate the directory name. The default name is the AS/400 root directory. Select the Find push button to display the list of available directories.

If you checked the Use LAN Server/400 box, you have to indicate the alias of your resource.

Drive Assign a drive letter.

Hint:

Make sure that your drive letter is unique. If you have a drive letter already assigned to one AS/400 system, and specify the same drive letter for a network drive on a different AS/400 system, only one of the drives will be available.

Tuning page

Enhance performance for

List here the directories you use most frequently. When a file is opened or when the attributes of a file or directory are retrieved, every directory in the path is checked to make sure it exists, and to make sure the user is authorized to use the directory. This may take a considerable amount of time, especially if many subdirectories are involved. These checks can be eliminated if you specify the directories you use most often. When the drive is assigned, the existence and authority are checked, rather than every time the path is used.

Conversion page

Allow text file conversion

Text file conversion enables the automatic conversion of data in the file from EBCDIC to ASCII when an EBCDIC file is accessed by the PC. This needs additional configuration in the Client Access/400 Products Registry for the Network Drives. See 5.5.2, "Products Registry - Network Drive" on page 153 and 5.5.6, "Text File Conversion" on page 157 or more information.

General page

Title Assign a meaningful name to your icon. The default is Drive n (NETID.SYSNAME).

5.5.2 Products Registry - Network Drive

The Products Registry is used to selectively install or remove components of Client Access/400 Optimized for OS/2. In addition, you can define general and update settings for most of the components.

The Client Access/400 Products Registry is found in the Client Access/400 folder which is part of the Software Products folder in the AS/400 Workstation folder. An example is shown in Figure 89.

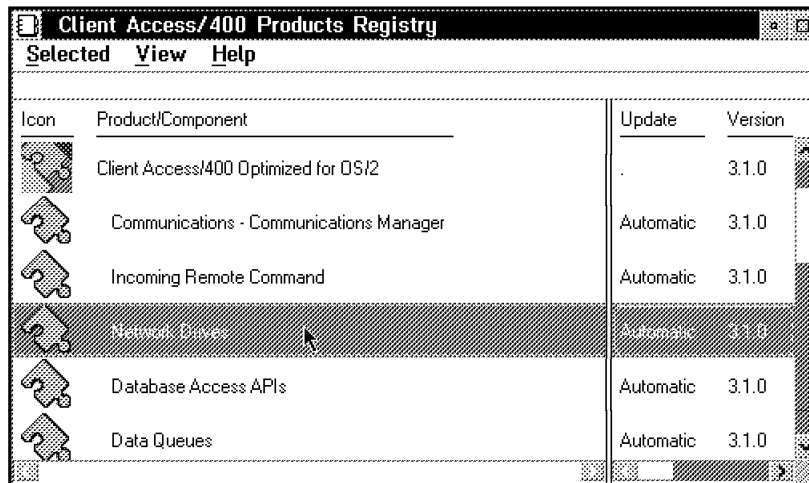


Figure 89. Client Access/400 Products Registry

To change the general settings for network drives (for example to allow automatic conversion of data from EBCDIC to ASCII), click the right mouse button on the Network Drives component, and select **Open** followed by **General settings** from the menu. The notebook shown in Figure 90 on page 154 is displayed.

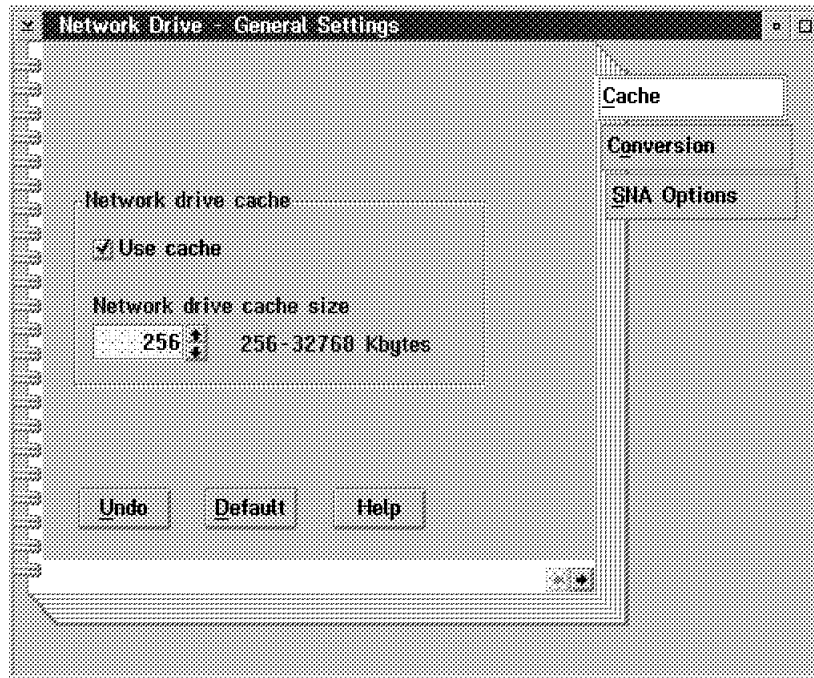


Figure 90. Network Drive - General Settings Notebook

5.5.2.1 Network Drive - General Settings

Cache page

Use Cache

Select this check box if you want to use the network drive data cache. Data caching improves performance through data read-ahead and write-behind.

Network drive cache size

Use this entry field to indicate the network drive data cache size. The default and minimum size is 256KB if caching is enabled.

Conversion page


Extension This is used to define the file extension or extensions of files that are to be automatically translated from EBCDIC to ASCII when accessed through a network drive that is configured for text file conversion. See 5.5.6, "Text File Conversion" on page 157 for more information about text conversion.

SNA Options page

Mode name

The default mode description is QPCSUPP.

5.5.3 Assigning a Drive

To assign a drive, just double click on the drive icon  .

If you want to automatically assign a drive every time you start Client Access/400, put your icon (or a shadow of it) into the Startup Configuration folder of Client Access/400 as shown in Figure 91.

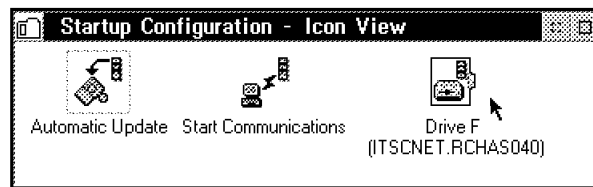


Figure 91. Client Access/400 Startup Configuration Folder

Your assigned drive appears in the standard OS/2 Drives folder as shown in Figure 92.

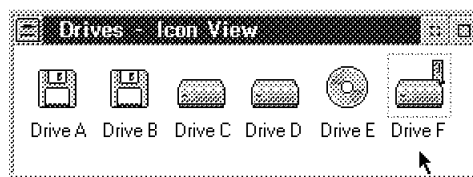


Figure 92. OS/2 Drives Folder

It is also possible to assign and release network drives using a command line interface. See 5.5.5, "Command Line Interface" on page 156 for details.

5.5.4 Releasing a Drive

To release a drive, click with the right mouse button on the drive icon and select **Disconnect** from the menu, followed **Disconnect** from the confirmation panel.

You cannot disconnect a drive that is using OS/2 LAN Requestor in this way. To release a LAN Requestor drive, the LAN Requestor interface must be used (for example, the NET command).

It is also possible to assign and release network drives using a command line interface. See 5.5.5, "Command Line Interface" for details.

5.5.5 Command Line Interface

The NET400 command provides a command line interface to work with network resources. The format is:

Command / Function Meaning

NET400 assign

Start using a system resource.

NET400 release

Stop using a system resource.

NET400 status

Display active system resources.

NET400 function /?

Detailed help for the function.

For example, use the following command to assign directory QDLS to drive K:

```
NET400 ASSIGN K: QDLS
```

To show the status, type:

```
NET400 STATUS
```

The information shown in Figure 93 on page 157 is displayed.


```
[D:\]NET400 Status

Client Access/400
Optimized for Operating System/2
Network Utility/400
(C) Copyright IBM Corp. 1994, 1994. All rights reserved
Version 3 Release 1 Level 0

Network Drive Status

Drive   Status Name      Assignment
-----
K       ITSCNET.RCHAS040  QDLS

No LPTs are assigned
```

Figure 93. NET400 STATUS

To release the same drive, use:

NET400 RELEASE K:

Note: This tool shows you only the Client Access/400 drives and not the drives assigned using LAN Server/400. Use NET USE to see the status of your LAN Server/400 drives.

For additional information, see the on-line Client Access/400 Command Reference.

5.5.6 Text File Conversion

Text file conversion enables the automatic conversion of data from EBCDIC to ASCII when accessed by the PC. This slows down performance a great deal, so do not do it for every network drive.

Let's assume you are a programmer and you want to develop a cooperative application in C. Your source physical file members on the AS/400 system are in the Integrated File System directory \QSYS.LIB\QGPL.LIB\QCLSRC.FILE*.MBR. If you have configured your network drive to allow text file conversion and defined the file extension MBR to be converted, then you can share this source member with your PC without having to worry about data conversion.

5.5.6.1 Example

1. Define the file extension MBR in Products Registry (settings for Network Drive, Conversion page) as shown in Figure 94. See 5.5.2, "Products Registry - Network Drive" on page 153 for details on how to get to the Products Registry.

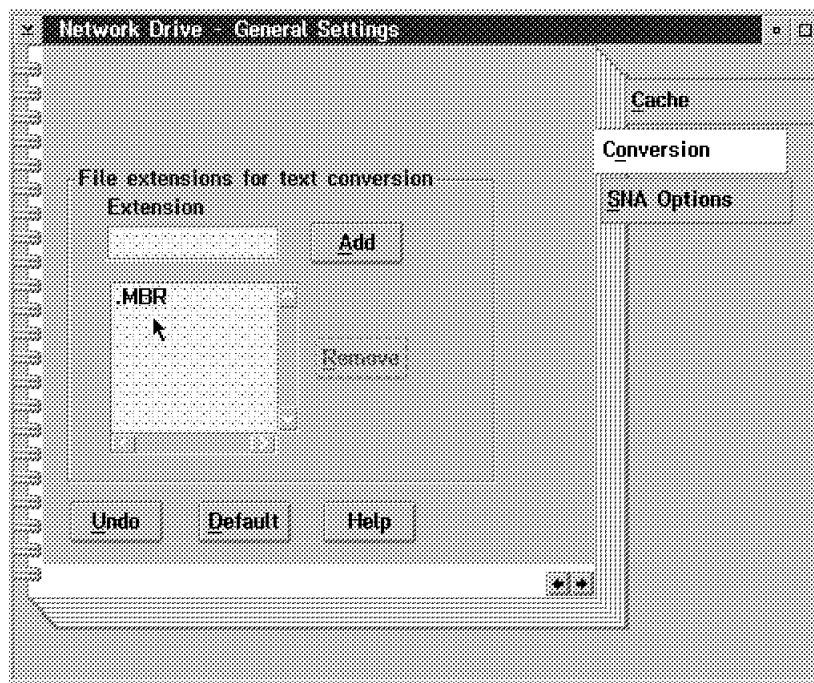


Figure 94. Network Drive - General Settings Notebook

2. Define a network drive with text file conversion enabled. Set the directory to:
`\QSYS.LIB\QGPL.LIB\QCLSRC.FILE`
See 5.5.1, "Configuration" on page 150 for details.
3. Start the network drive.
4. Retrieve the source of the system startup program using the following Client Access/400 command from an OS/2 window:
`RMTCMD RTVCLSRC PGM(QSYS/QSTRUP) SRCFILE(QGPL/QCLSRC) SRCMBR(QSTRUPPGM)`
5. Assign the extension MBR to your editor of choice, for example the OS/2 Enhanced Editor (OS/2 System, Productivity, Enhanced Editor, Settings,

Association page, write *.MBR in the New name box and click on Add) as shown in Figure 95 on page 159.

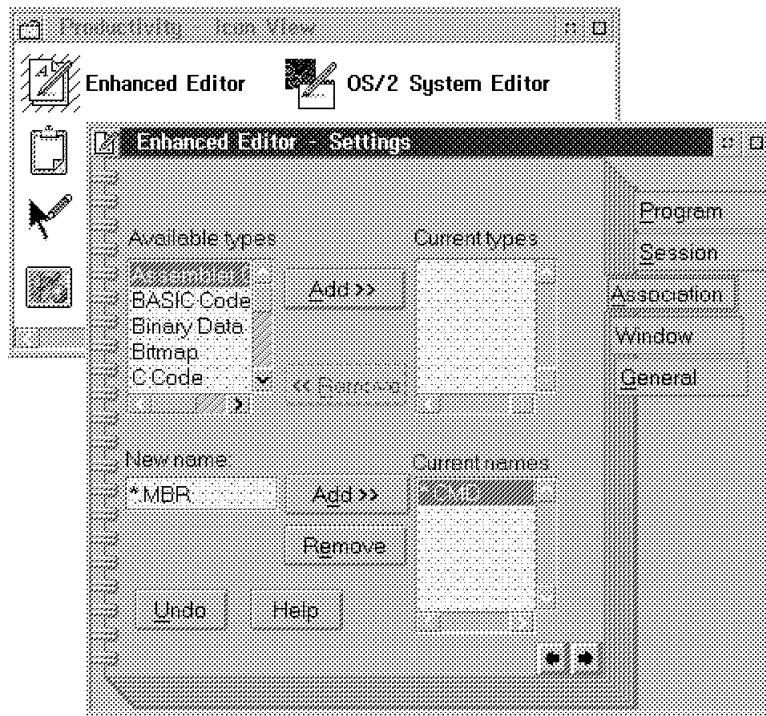


Figure 95. Enhanced Editor - Settings Notebook

6. Open the OS/2 drives folder and open your new network drive. Now you can see all of your CL source member files on the AS/400 system. Double click on the QSTRUPPGM.MBR file and you can edit your CL program from the PC. This is shown in Figure 96 on page 160.

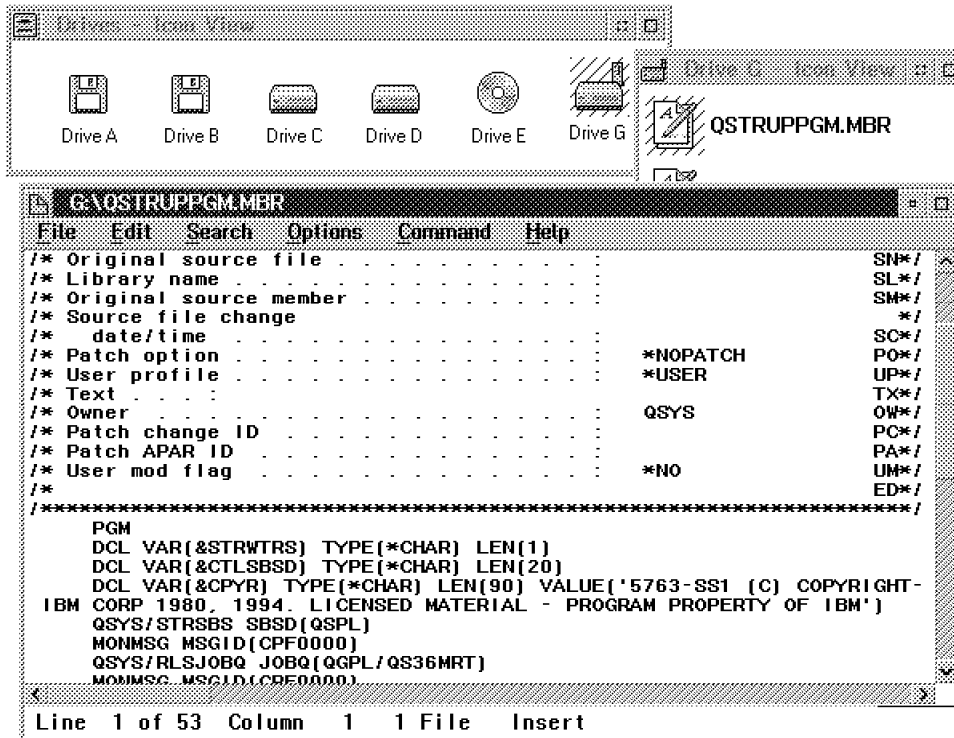


Figure 96. QSTRUPPGM.MBR

Note: Use a non-proportional font (for example system monospaced).

5.5.7 Potential Conflict Using Universal Naming Convention (UNC) Names

The Client Access/400 Network Drives function supports UNC names. A UNC name has the format \\server\path\path\name and can be used instead of a drive-based name (d:\path\path\name). If a personal computer (PC) has multiple clients, a name conflict occurs if servers have the same name. If there is a name conflict, the first network file system driver (FSD) specified in CONFIG.SYS (with the IFS=statement) gains control when a UNC name is used. For example, suppose a PC runs both a PC LAN Client and Client Access/400 client. Also suppose the PC connects to an AS/400 system called "SERVER1", and to a LAN server called "SERVER1". The first FSD loaded in CONFIG.SYS carries out UNC requests for SERVER1. Drive related requests are not affected.

To fix this problem, do one of the following:

- Order the FSDs in CONFIG.SYS such that the one you want to handle UNC names is loaded first.
- Do not use servers with the same names.
- Do not use UNC name based requests.

5.6 Network Printers


Network printers can be compared to virtual printers from PC Support/400 or Client Access/400 for OS/2. They give you access to AS/400 printers from the PC, or to PC printers that emulate AS/400 printers.

One difference between PC Support/400 or Client Access/400 for OS/2 virtual print and the new network printers of the Client Access/400 Optimized for OS/2 client is the ability to automatically detect the data stream. The advantage of this is that you no longer have to worry about data stream conversion from ASCII to SCS, ASCII to AFPDS, or ASCII to ASCII for example.

Another difference from previous products is in the area of configuration of network printers. Whereas Client Access/400 for OS/2 and PC Support/400 involved using text- based interfaces for configuration of virtual printing, Client Access/400 Optimized for OS/2 uses an OS/2 template. A template is an object that you can use as a model to create additional objects. These templates were written with true object oriented-programming techniques using System Object Model. Every object contains all of the necessary configuration information, and there are no additional definition or configuration files. The advantage of that is the ability to exchange objects between systems. An administrator can define a network printer object on one system and transfer it to another.

5.6.1 Configuration

The Client Access/400 Templates folder is found in the Client Access/400 folder which is part of the Software Products folder in the AS/400 Workstation folder.

Drag the **Network Printer Definition** template  to the desktop or to the folder of your choice. The Network Printer Definition - Settings notebook in Figure 97 on page 162 is shown. This is where you configure all of the

appropriate parameters for the network printer. You can leaf through the notebook by clicking on the arrow button at the bottom right-hand corner, or you can click on the tabs listed on the right-hand side.

Hint

A sub-topic can have more than one page of settings (for example, File). Do not forget these pages if you are clicking through the tabs instead of the arrow button!

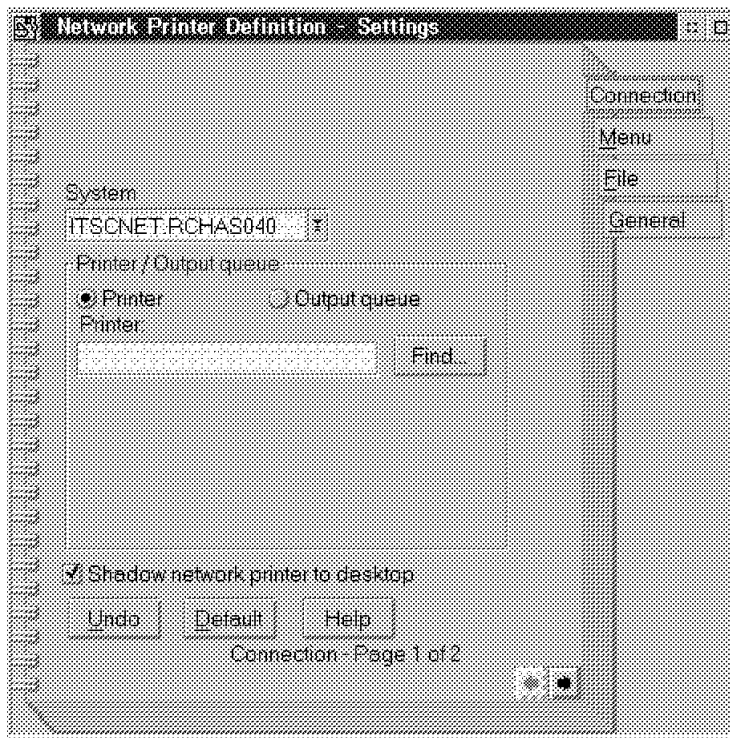


Figure 97. Network Printer Definition - Settings Notebook

5.6.1.1 Network Printer Definition - Settings

Connection page 1 of 2

System	Select the AS/400 system where you want to access a printer.
Printer / Output queue	Select these radio buttons to display the Printer or the Output queue entry fields where you can select which printer or which output queue you want to use. Choosing an output queue makes sense if your output queue is not assigned to a printer, otherwise select a printer (and the associated output queue is automatically selected).
Printer	Indicate the printer name you want to use. Your print jobs are placed on the AS/400 output queue associated with this printer. If you specify an output queue name, this printer name is ignored. Select the Find push button to display the list of available printers.
Output queue	Indicate the output queue name. Your print jobs are placed on this output queue. Select the Find push button to display the list of available output queues.
Library	Select a radio button to indicate whether you want to specify a name for the library that you want to use, the library list, or the current library.
Shadow network printer to desktop	Use this check box to indicate whether you want a shadow of your AS/400 network printer on the OS/2 desktop. Selecting this check box places an icon of the printer object on your desktop that is the default. Your desktop can have more than one printer icon each representing a different printer or the same printer with different settings.

Connection page 2 of 2

Type of data

Select the data type you want to use. You have the following choices:

Auto-select: The Network Print function automatically determines the type of data to use. This is a new function and we recommend that you use it.

AFPDS: If your PC program is supplying advanced function printing data stream (AFPDS) data.

SCS: If your PC program is supplying data that is already SCS. This is not common.

User ASCII: If your PC is supplying ASCII data (normal case) and you want the data to print on an ASCII printer that is connected to the host system (for example an emulated printer attached to a PC or terminal or a direct LAN attached ASCII printer).

Use printer file: If you want the value for the data type to be taken from a printer file.

Printer file

Indicate the printer file name. If you do not specify a printer file, QPNPSPRTF in library QSYS is used.

Library

Select a radio button to indicate whether you want to specify a name for the library you want to use or the library list or the current library.

Assign to port

Use this entry field to indicate which port to assign this printer. None and LPT1 through LPT9 are the ports you can assign. To change this value, select the down arrow to display a list of valid choices and select one.

General page

Title

Assign a meaningful name to your icon. The default is nnnnnnnn (NETID.SYSNAME) where nnnnnnnn is the name of your printer.


5.6.2 Installing Printer Drivers

The Products Registry is used to selectively install or remove product components. In addition, you can define general and update settings for most of the components.

The Client Access/400 Products Registry is found in the Client Access/400 folder which is part of the Software Products folder in the AS/400 Workstation folder.

Click the right mouse button on the Client Access/400 Optimized for OS/2 entry in the Products Registry and select **Selective install**. From the Selective Install panel, choose **Printer drivers**. Select the **Devices** push button for the OS/2 AFP and SCS printer driver. Select every printer device you have installed on your AS/400 system to make sure you have the right printer driver available.

5.6.3 Assigning a Printer

To assign a printer, just double click on the printer definition icon  .

It is also possible to assign network printers using a command line interface. See 5.6.8, "Command Line Interface" on page 179 for details.

You can also assign your printer by clicking the right mouse button on the printer icon in your Network Printers folder and selecting **Assign port**.

If you want to automatically assign a printer every time you start Client Access/400 put your icon (or a shadow of it) into the Startup Configuration folder of Client Access/400 as shown in Figure 98.

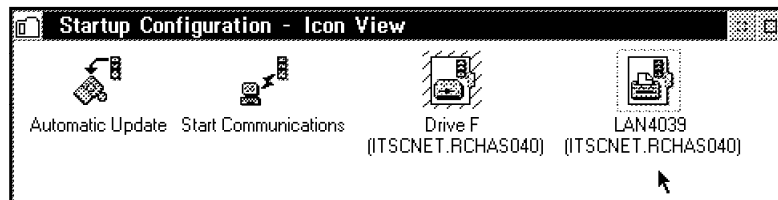


Figure 98. Client Access/400 Startup Configuration Folder

Your assigned printer appears in the Network Printers folder (see Figure 99 on page 166), which is a subfolder of the AS/400 Workstation folder.

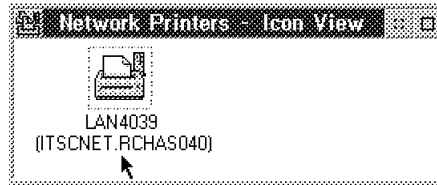


Figure 99. Network Printers Folder

Clicking on the network printer icon in the Network Printers folder with the right mouse button displays a menu that includes the following:

- Settings
- Change status: Hold and release
- Delete all jobs
- Set default
- Assign and unassign a port

A double click on the network printer session icon opens the Details view (see Figure 100) and shows the printer jobs in this output queue.

Icon	File	File number	Status	User	Copies	Pages
	QSYSPRT	1	Waiting to print	CWAS	1	1
	QPNPSPRTF	2	Waiting to print	CWAS	1	-1
	QPNPSPRTF	3	Waiting to print	CWAS	1	-1
	QPNPSPRTF	4	Waiting to print	CWAS	1	-1
	QPNPSPRTF	5	Waiting to print	CWAS	1	-1
	QSYSPRT	1	Waiting to print	CWAS	1	1
	QPJOBLOG	1	Held	CWAS	1	2
	QPNPSPRTF	1	Held	MRAS	1	-1

Figure 100. Network Printer Details View

5.6.4 Printer Driver Settings

1. Start the printer by double clicking the mouse on the icon.
If you created a shadow of the icon it is on the desktop. If you did not create a shadow, use the original printer icon in the Client Access/400 Network Printers folder.
2. Select the printer icon using the right mouse button to get the selections pull-down panel. To configure the printer driver select **Settings**.
3. On the Settings notebook select the **Queue options** tab.
4. Select the job dialog before print check box to specify job properties on a per-job basis instead of using the default job properties you set up for the printer object. Whenever you select Print from the pop-up menu of an object, a window appears from which you can set up the job properties for that particular print job.
5. Now on the Settings notebook select the **Printer driver** tab.
6. On the printer driver panel you will see the different printer drivers installed on your system as shown in Figure 101 on page 168.

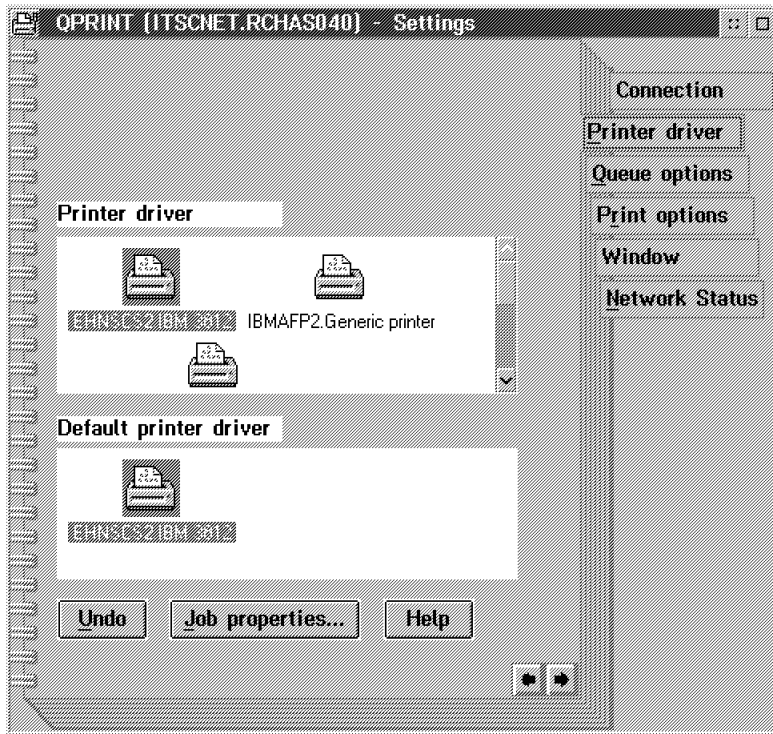


Figure 101. Printer Driver Panel

7. If no Client Access/400 printer drivers are present use the selective install function in the products registry. In 5.7.2, "Selective Install/Removal" on page 182 you can see how to install an AS/400 printer driver.

For details on how to configure the *IBMAFP2 Generic Printer* refer to 5.6.6, "The AFP driver" on page 173.

5.6.5 The SCS driver

Double click on the **EHNSCS2.IBM 3812** icon and you will get the IBM SCS Printer Driver: IBM 3812 panel (Figure 102 on page 169).

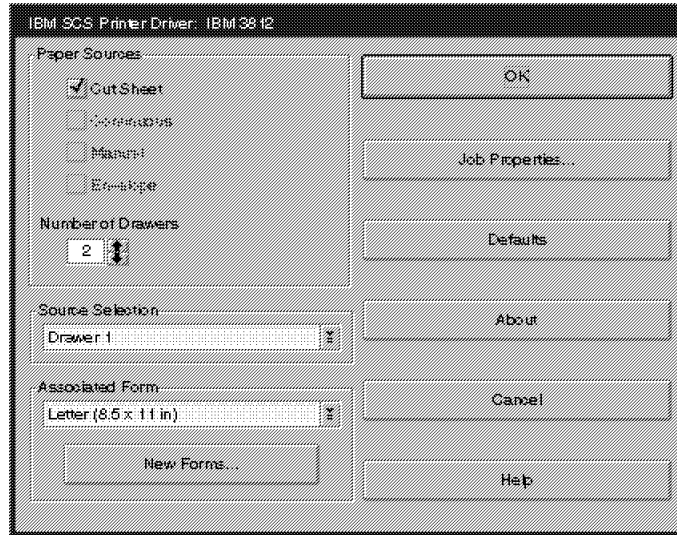


Figure 102. IBM SCS Printer Driver: IBM 3812 Panel

Use the **Defaults** button to reset any changes you make. **Cancel** will reset your changes and close the panel.

1. The first option is the paper source. Use the paper sources panel to specify the default paper source. All text will be printed on paper from this source unless you choose a different source using the *Paper Source and Form* list in the Job Properties dialog box. Select the check box for the printer type you are going to use:
 - Cut sheet paper
 - Continuous forms
 - Manual feed
 - Envelope feed

When you select a cut sheet printer you can specify the number of drawers using the spin button or you can type in the value.

2. On the source selection option use the pull-down button to select the drawer you want to use. You can also change this in the Job Properties dialog panel *Paper Source and Form* list option.
3. Use the Associated Form pull-down button to select a form appropriate to our print job.
4. Select the **New Forms** push button to add a new form.

- a. In the New form name panel (Figure 103 on page 170) type the name of the new form you are going to use
- b. If you select **Add Form** a form will be created. If you are going to change some of the values from the template you use, type a name but *do not* select **Add form** now.
- c. The Template Form allows you to select a default size for the custom form by selecting a predefined form size.

Use the pull-down button to select a form appropriate to the print job.

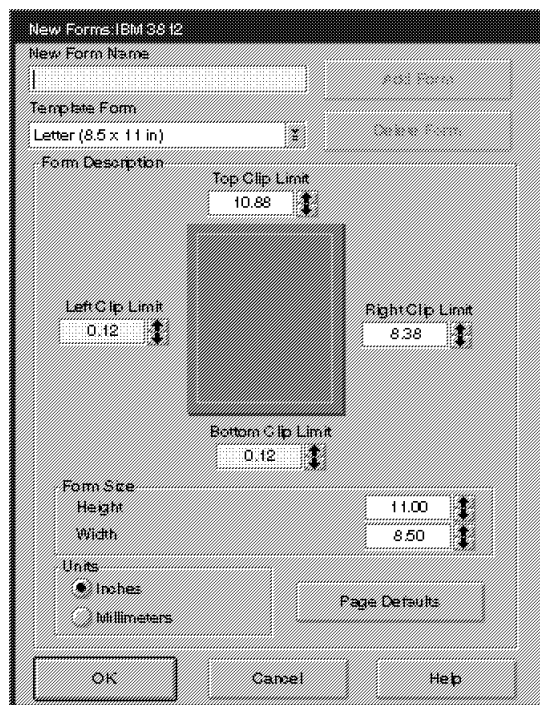


Figure 103. New Forms: IBM 3812 Panel

- d. If you want to delete a form you must *first* use the pull-down button to select and high-light the form you want to delete, and *then* select **Delete Form**.
- e. In the Form description/Margin you can use the spin buttons or type the values to specify the clip borders for the form. The clip border value is measured from the left edge of the paper. The application

- will not print to the left of this border. You can not set this value within the current left unprintable border.
- f. If you want to change the form size use the spin buttons to find the size, just type the values you want to use for *Height* and *Width*.
 - g. Use the radio buttons to select *millimeters* or *inches* for the measurement unit.
 - h. When you are finished with the new form setup select **OK** to save the settings.
5. Select the **Job Properties** push button and you will get the Print Job Properties: IBM 3812 panel (Figure 104).

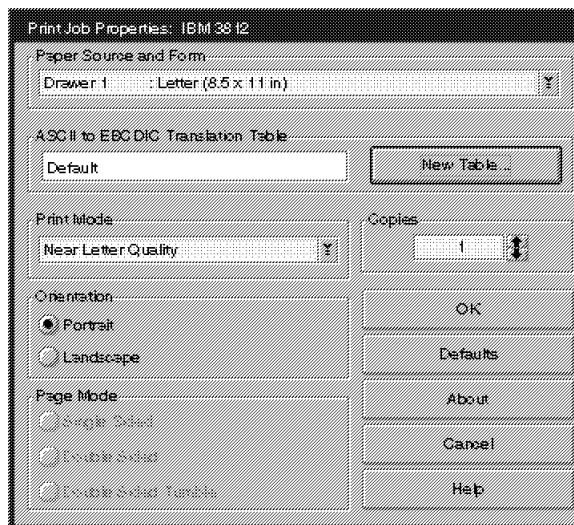


Figure 104. Printer Job Properties: IBM 3812 Panel

The job properties push button is also located on the printer settings notepad.

When you are finished the print job properties setup select **OK** to save the settings.

- a. The Paper Source and Form panel shows the available source and form connections.
Use the pull-down button to select the connection you want to use.
- b. If you have another ASCII to EBCDIC translation table you want to use select the **New table** push button and fill in the name of your

table in the ASCII to EBCDIC translation table path panel shown in Figure 105 on page 172.

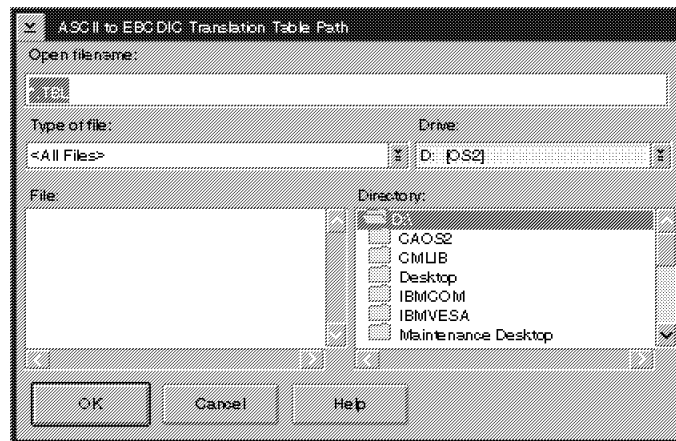


Figure 105. ASCII to EBCDIC Translation Table Path Panel

The translation table that you will use depends on the character code page that is currently in use on your personal computer and the code page in use on the AS/400. The default translation table used by the driver is the same as that used by Client Access/400 search panel.

- c. Select **OK** to return to the Print Job Properties: IBM 3812 panel.
 - d. Use the pull-down button to display the printer modes available for your printer.

Most SCS printers support two modes, Data Processing (or Draft) and Word Processing (or Near Letter Quality, NLQ). Select the printer mode you want to use.
 - e. Use the radio buttons to indicate the orientation of your output.
 - f. The page mode option allows you to specify simplex or duplex printing. The default is simplex. Note that most SCS printers do not support duplex printing. If your printer does not support duplex printing, this control will be disabled. The generic printer driver uses simplex mode.
 - g. Use the spin button or just type the number of copies.
 - h. Select **OK** to end the job properties setup.
6. When you are finished with the SCS printer driver setup use **OK** to save your configuration.

To close the Settings notebook select the pull-down button in the upper left corner, and select **Close**.

5.6.6 The AFP driver

Double click on the **IBMAFP2.Generic Printer** icon and you will get the IBM AFPDS Printer Driver: Generic printer panel shown in Figure 106.

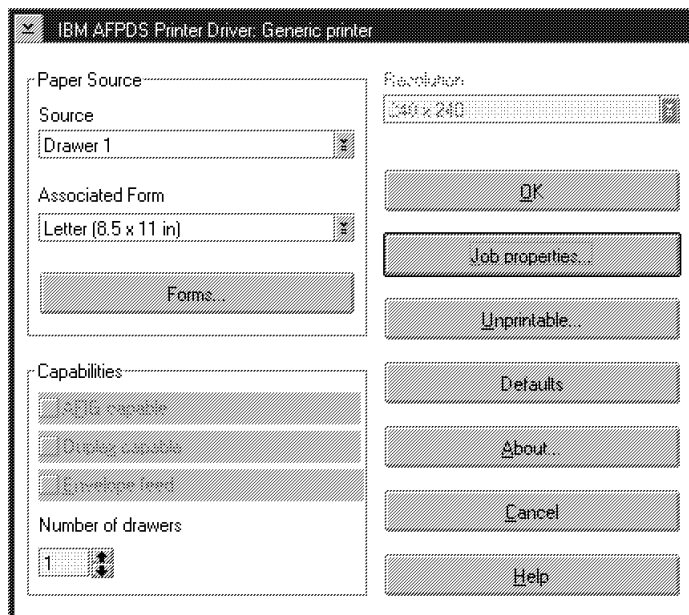


Figure 106. IBM AFPDS Printer Driver: Generic Printer Panel

1. Under Paper Source use the pull-down buttons to select the drawer and associated form you are going to use.
2. Select **New forms...** to add new forms. Selecting this push button displays the New Forms dialog shown in Figure 107 on page 174 which allows you to define custom form names and sizes. The IBM AFPDS Windows Printer Driver is only able to define one custom, user defined, form.

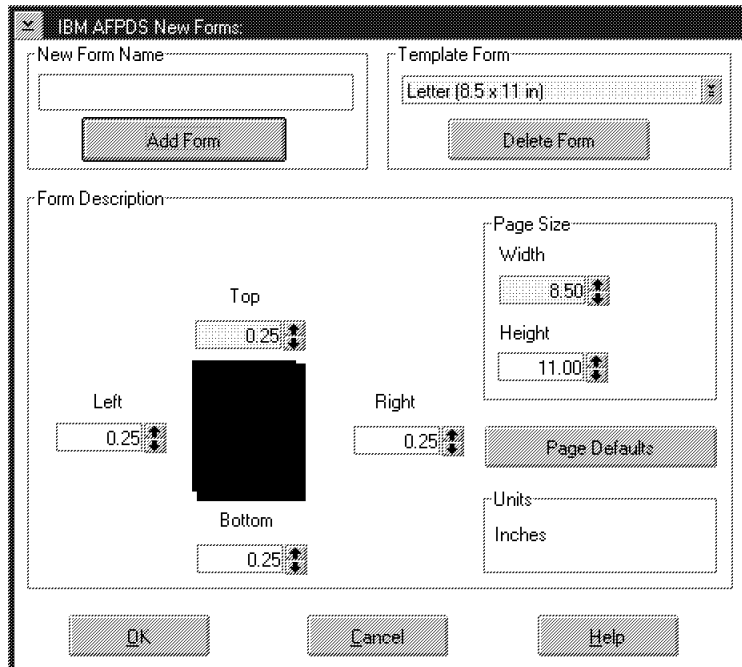


Figure 107. IBM AFPDS New Forms Panel

- a. If you select **Add Form** a form will be created. If you are going to change some of the values from the template you use, type a name but *do not* select the **Add form** now.
- b. The template form allows you to select a default size for the custom form by selecting a predefined form size.
- c. Use the pull-down button to select a form appropriate to the print job.
- d. If you want to delete a form *first* use the pull-down button to select and highlight the form you want to delete and *then* select **Delete Form**.
- e. In the form description/margins option the margins define the area on the form on which the printer cannot or should not print. This area varies from printer to printer.

Margins are similar to what you would expect from an application, although it will not affect any margin settings in the application. It only defines the unprintable area of the form, shown as the distance from the corresponding edge of the page. The default is set for the

printer chosen, equivalent to the unprintable borders of the printer. If needed you can adjust the borders.

- f. When you are finished the new forms setup select **OK** to return to get the IBM AFPDS Printer Driver: Generic printer panel (Figure 106 on page 173).
3. In the capabilities option you can use the spin button to select or just type the number of drawers. In the generic printer setup the default of one is used.
4. Use the spin button to select the resolution on the printer. In generic printer setup the field is disabled.
5. Now select the **Job Properties** push button and you will get the IBM AFPDS Printer Driver: Generic printer panel shown in Figure 108.

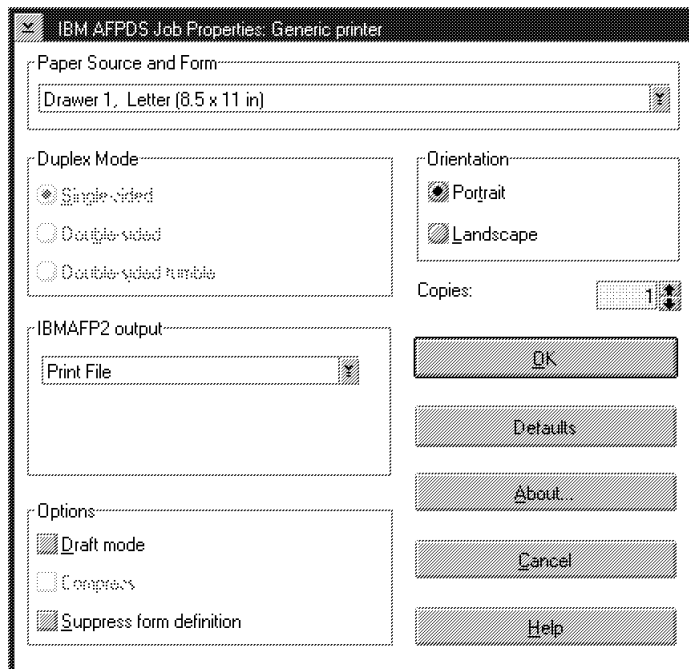


Figure 108. IBM AFPDS Printer Driver: Generic Printer Panel

The job properties push button is also located on the printer settings notepad.

- a. The paper source and form panel shows the available source and form connections. Use the pull-down button to select the connection you want to use.
- b. Use the radio buttons to select how the job can be printed: simplex, duplex, or duplex tumble. The generic printer driver uses single sided mode.
 - Simplex, single-sided specifies that data is printed on one side of the page only.
 - Duplex, double-sided specifies that data is printed on both sides of the page from top to bottom on the front side and top to bottom on the back side.
 - Tumble, double-sided tumble specifies that the data is printed on both sides of the page from top to bottom on the front side and bottom to top on the back side.
- c. If the *Duplex capable* option is not selected these radio buttons will be disabled.
- d. The IBMAFP2 output option specifies whether the output is a print file, page segment, overlay, or for a third-party product. Select print file if you want to produce a file that can be directly printed. Select page segment or overlay to produce an object that can be included in an AFP document. The dimensions of the page segment or overlay are controlled by changing the unprintable border, or by defining a custom form in the New Forms dialog box. Creating a custom form is the recommended method. Select the third-party product if you have an external product installed, such as Facsimile Support/400, that is designed to interface with this driver through the APIs.

Print File An entire document that can be directly printed on an AFP capable printer.

Overlay A predefined page or part of a page that is stored as a resource. Overlays are often used as electronic forms.

Page Segment

A portion of a page, containing data objects, stored as a resource. It can be included in a page or overlay.

To define a page segment size that is different from one of the default form sizes, create a custom form size using the New Forms dialog box.

Third party product

If a third-party product is installed, such as Facsimile Support/400, there will be additional selections in the IBMAFP Driver Output section in the Job Properties dialog box.

If the product is selected as the IBMAFP Output type, a button may be enabled below the output list box. This button provides an interface into the product. Use this to configure the product for any job specific information.

The purpose of this is to allow third-party products to collect data on the PC, include it in the data stream, and receive the data and the spool file on the AS/400 system.

- e. The draft mode option allows you to specify whether or not you want the printout in draft mode.
 - f. The suppress form definition indicates whether or not a form definition should be created within the data stream. In general, this should not be selected. A form definition is an AFP resource object that defines such characteristics as duplexing mode and source drawer selection. Suppressing the form definition will cause these functions to be lost, and can result in incorrectly positioned output.
 - g. Use the radio buttons to indicate the orientation of your output.
 - h. Use the spin button or just type the number of copies.
 - i. Select **OK** to return to the IBM AFPDS Printer Driver: Generic printer panel.
6. You can use the Change Unprintable Boarder Generic Printer panel (Figure 109 on page 178) to set the unprintable border for the printer selected.

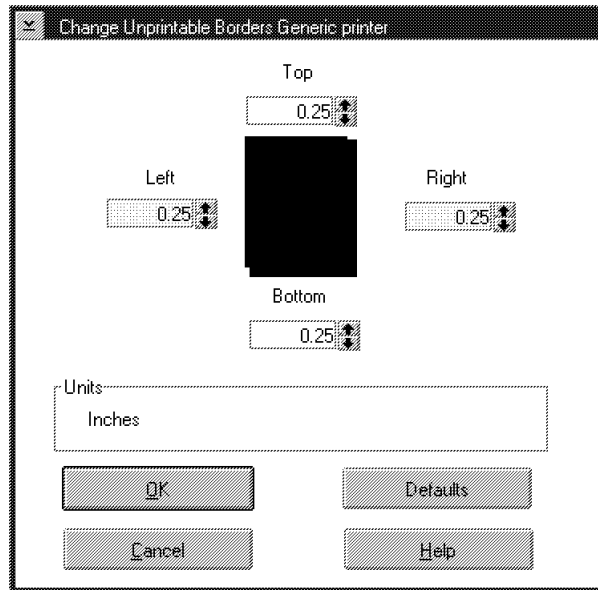


Figure 109. Change Unprintable Borders: Generic Printer Panel

- a. The unprintable border defines the area of the physical page on which the printer cannot print. This area varies from printer to printer. See in your printer documentation for specific information. The *IBM AS/400 Printing IV*, GG24-4389, has more general information on how to use printer borders.
 - b. Use the spin buttons or type the values you need to use for your printer.
 - c. When you are finished with the boarder setup select **OK** to save the settings.
7. When you are finished with the AFP printer driver setup use **OK** to save your configuration.

To close the Settings notebook select the pull-down button in the upper left hand corner, and select **Close**.

5.6.7 Releasing a Printer

To release a printer, click with the right mouse button on the printer icon in your Network Printers folder and select **Unassign port** as shown in Figure 110.

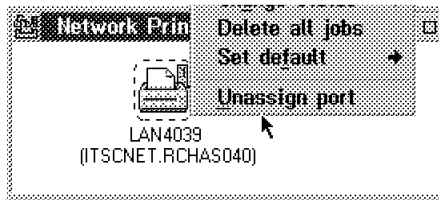


Figure 110. Network Printer Releasing

You can also release network printers using a command line interface. See 5.6.8, “Command Line Interface” for details.

5.6.8 Command Line Interface

The NET400 command provides a command line interface to work with network resources. The format is:

Command / Function	Meaning
NET400 assign	Start using a system resource
NET400 release	Stop using a system resource
NET400 status	Display active system resources
NET400 function /?	Detailed help for the function

For example, use the following command to assign printer LAN4039 to LPT1:

```
NET400 ASSIGN LPT1 /N=LAN4039
```

To show the status type:

```
NET400 STATUS
```

The information shown in Figure 111 on page 180 is displayed:

```
[D:\]NET400 STATUS

Client Access/400
Optimized for Operating System/2
Network Utility/400
(C) Copyright IBM Corp. 1994, 1994. All rights reserved
Version 3 Release 1 Level 0

No drives assigned

Network Printer Status

Device      :LPT1
System      :ITSCNET.RCHAS040
Output Queue :QUSRSYS/LAN4039
Printer File :
Data Type   :*AUTO
```

Figure 111. NET400 Status

To release the same printer port, type:

```
NET400 RELEASE LPT1
```

Note: This only shows you Client Access/400 network printers. Printers assigned with OS/2 LAN Server do not appear in the list. Use NET USE to see the status of your LAN Server printers.

For additional information, see the on-line Client Access/400 Command Reference.


5.7 Products Registry

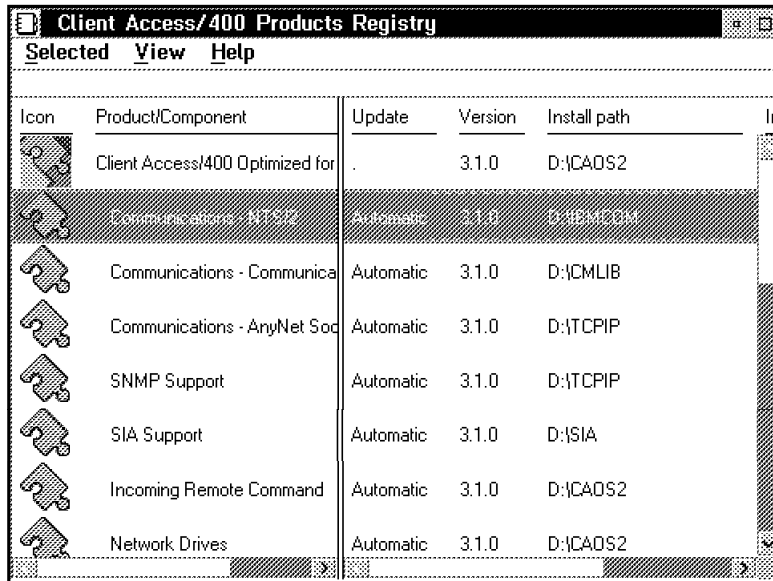
The Products Registry enables you to see a list of installed Client Access/400 Optimized for OS/2 components, and provides a central place for selective install and removal, update and altering of component general settings. For example, communications configuration can be performed from the registry via the general settings for the communications components.

5.7.1 Starting Client Access/400 Products Registry

To see a list of the products installed by Client Access/400,

1. Select the **AS/400 Workstation** icon.
2. Select the **Software Products** icon.
3. In the Software Products folder, there is an icon representing **Client**

Access/400 Products Registry  . Double click on this icon and a panel similar to the one shown in Figure 112 is displayed.











Icon	Product/Component	Update	Version	Install path	In
	Client Access/400 Optimized for	.	3.1.0	D:\CAOS2	
	Communications - NT S2	Automatic	3.1.0	D:\IBM\COM	
	Communications - Communica	Automatic	3.1.0	D:\CMLIB	
	Communications - AnyNet Soc	Automatic	3.1.0	D:\TCPIP	
	SNMP Support	Automatic	3.1.0	D:\TCPIP	
	SIA Support	Automatic	3.1.0	D:\SIA	
	Incoming Remote Command	Automatic	3.1.0	D:\CAOS2	
	Network Drives	Automatic	3.1.0	D:\CAOS2	

Figure 112. Client Access/400 Products Registry Panel

This panel shows you a complete list of the Client Access/400 components that are currently installed on your PC. After the product is installed onto the PC, it is registered onto the AS/400 system. This registration allows you to easily manage the products and components. Other than telling you what product is installed, this panel also shows the following:

- Update
- Version
- Install path
- Install date

- Install time

The update function can be automatic or manual. This means the type of update method, whether you allow the AS/400 system to update the product automatically when new code is loaded, or you prefer to update the product at a later date, and therefore manually update the product. You may want to select to update the product manually if you do not want some of your applications or components to be automatically updated by the managing AS/400 system when Client Access/400 starts.

The install path is where the product is held on the PC.

Notice how Client Access/400 Optimized for OS/2 is listed as the main product and the other components following it are indented. This is to show that all the products listed are part of the integrated client.

If you have Communications Manager/2 and NTS/2 already loaded on your PC, then these products are not listed in the Client Access/400 products registry.

The following parts of the optimized client do not show as components in the Registry (they are included in the Software Catalog instead):

- Graphical Access for OS/400
- Graphical Operations
- Ultimedia Systems Facilities

5.7.2 Selective Install/Removal

Selective install allows you to install additional components of Client Access/400 or to remove them. To do this, you must highlight the Client Access/400 Optimized for OS/2 product, and then either click on **Selected** from the menu bar and then **Selective install**, or place the mouse arrow on the Client Access/400 Optimized for OS/2 line and click on the right hand button of the mouse, and then select **Selective install**. Either way, you will go to the Selective Install panel as shown in Figure 113 on page 183. You can only do selective install when the Client Access/400 Optimized for OS/2 product is highlighted. This is because you are installing or removing components of this product.

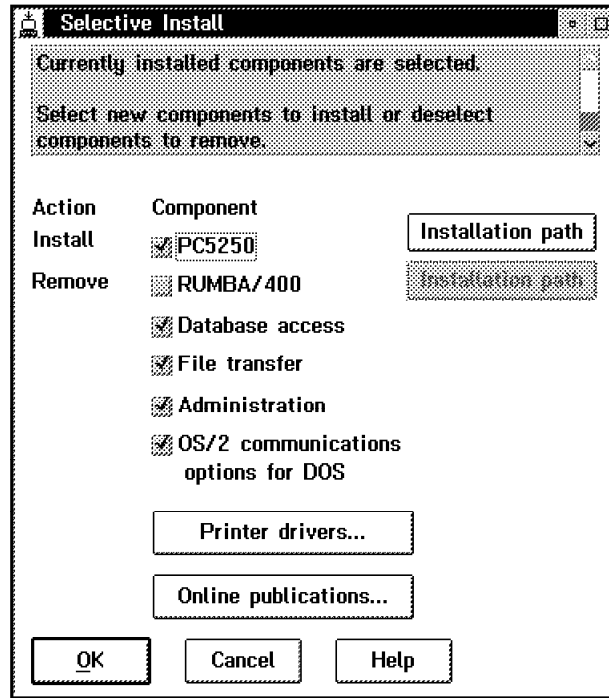


Figure 113. Selective Install Panel

At the Selective Install panel, a list of the products that you can install or remove is shown. You check or uncheck the appropriate box to either install or remove each of the components. In Figure 113, we have checked the PC5250 check box to install the product, and we have unchecked the RUMBA/400 check box to remove the product. For the PC5250 product you have the option to change the installation path. To do this, click on the **Installation path** button, which is alongside PC5250 check box, and the panel shown in Figure 114 on page 184 is displayed.

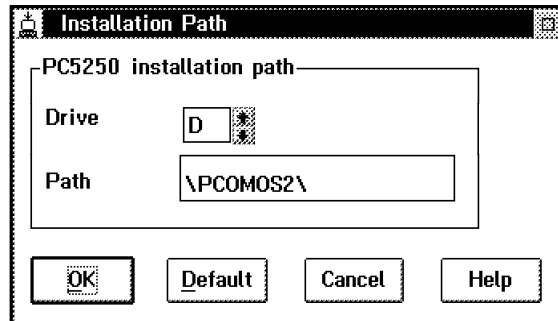


Figure 114. Installation Path Panel

If you want to, change the drive and path of where PC5250 is to be installed, and click on **OK** to return to the Selective install panel.

Once you have selected which components of Client Access/400 you want to install or remove, select **OK** from the Selective Install panel. You then see the Selective Install Status panel as shown in Figure 115.

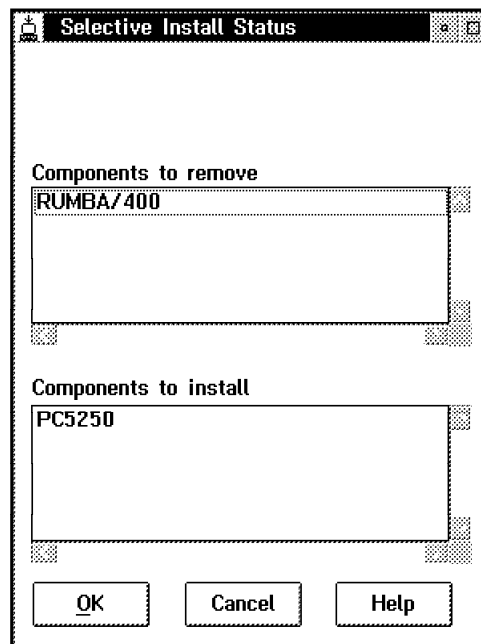


Figure 115. Selective Install Status Panel

This panel shows you which components you have selected to install and remove. Select **OK** and Client Access/400 then installs and removes the components selected.

The system then tells you when this process is finished, together with whether you need to restart the PC to complete the installation.

There are two other buttons on the Selective install panel: Printer drivers and On-line publications.

Selecting the Printer drivers button shows you three types of printer driver that are automatically installed with Client Access/400. These are OS/2 AFP, OS/2 SCS, and Windows AFP drivers. If you select the *Devices* buttons next to the printer drivers that are listed, you will see a list of support devices for a specific printer driver. You need to select additional printer devices if you want them to be included on your workstation.

It is the default for Client Access/400 to install all the publications available. If you want to remove these components, then select the **On-line publications** button, and then uncheck the relevant check boxes. These on-line publications are held in the Information folder.

5.7.3 General Settings

General settings is an option where you can change some of the settings for the whole of Client Access/400. For example:

- AS/400 passwords
- National language defaults
- Managing system
- Size of logs
- Transaction programs

Security: You can use this page (Figure 116 on page 186) to change User ID and password security attributes.

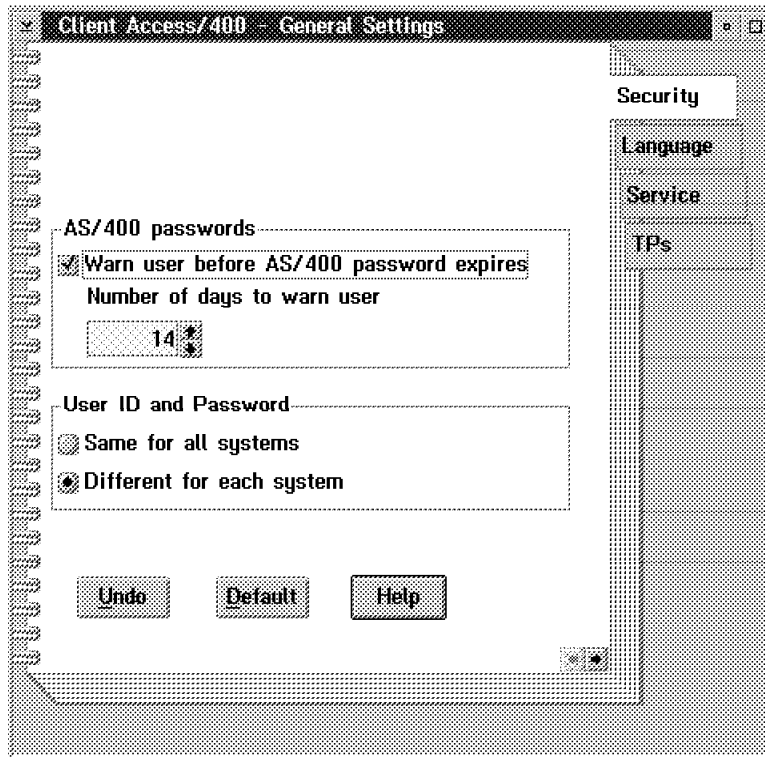


Figure 116. Client Access/400 General Settings Security Page

Warn user before AS/400 password expires

This enables you to indicate whether you want advance notice of when your Client Access/400 password is going to expire. If this box is checked, then you can select the number of days you want the user to be notified before the password expires.

Same for all systems and Different for each system

This enables you to have a choice of whether you use the same User ID and password for all systems, or whether you have different User IDs and passwords for different systems.

Language: The language page (Figure 117 on page 187) enables you to select the national language that you want to use.

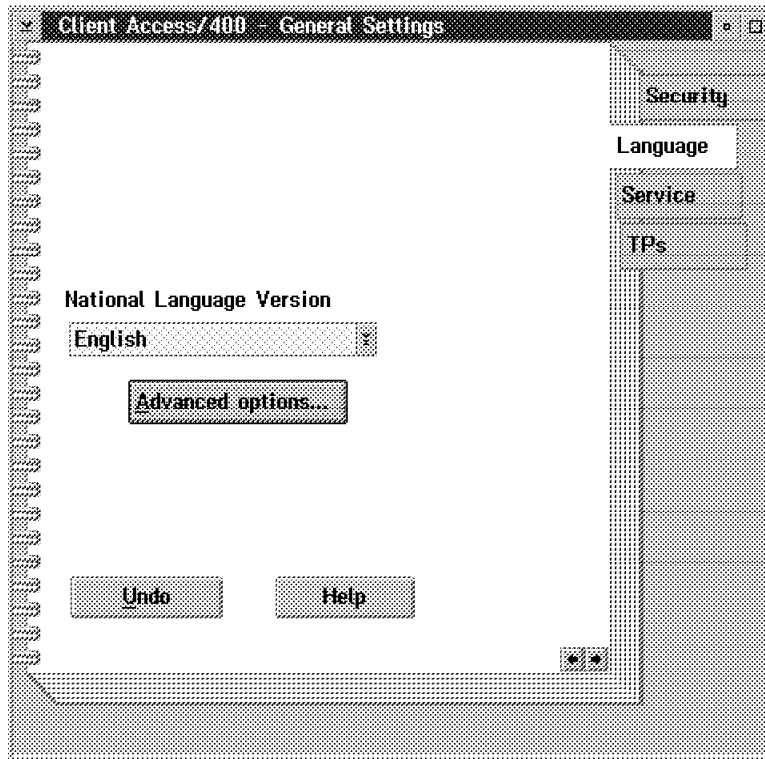


Figure 117. Client Access/400 General Settings Language Page

When this redbook was written, English was the only language available.

National language versions are available in the V3R1M1 1995 refresh to this product. To use multiple national language versions on your PC, you have to install a secondary language on the AS/400 system.

Even without full national language support in the initial shipment of the product, you can still select the **Advanced options** button where you can change the language for specific settings as shown in Figure 118 on page 188.

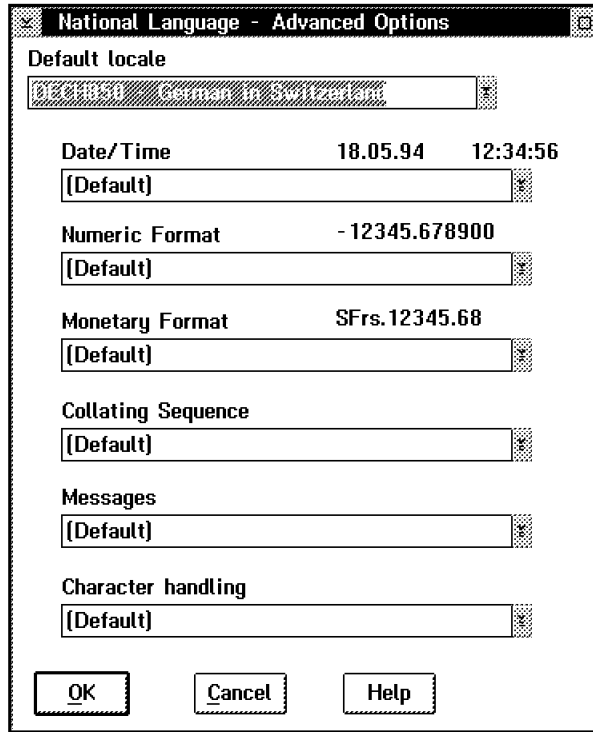


Figure 118. National Language - Advanced Options Page

Default locale

In Figure 118, we have chosen German in Switzerland as the language for the Default locale. This then changes all of the other options. You can change each option individually. For example, if you only need the monetary format to be different, you can select the language just for that value, without affecting any of the others.

Date/Time, Numeric Format and Monetary Format

The examples shown change to show the various formats that are available for these three values.

Collating sequence

This is the way that lists are sorted.

Messages

This field sets the rules for governing affirmative and negative responses.

Character handling

This field governs the ruling for:

- The interpretation of sequences of bytes of text data characters.
- The classification of characters, for example, alphabetical or numerical.
- The behavior of character classes.

Once you have chosen your language for the Advanced options, select **OK**.

Service: The service part of this notebook has five pages to it. The first page shows you the managing system setting and the default path for the service files (Figure 119).

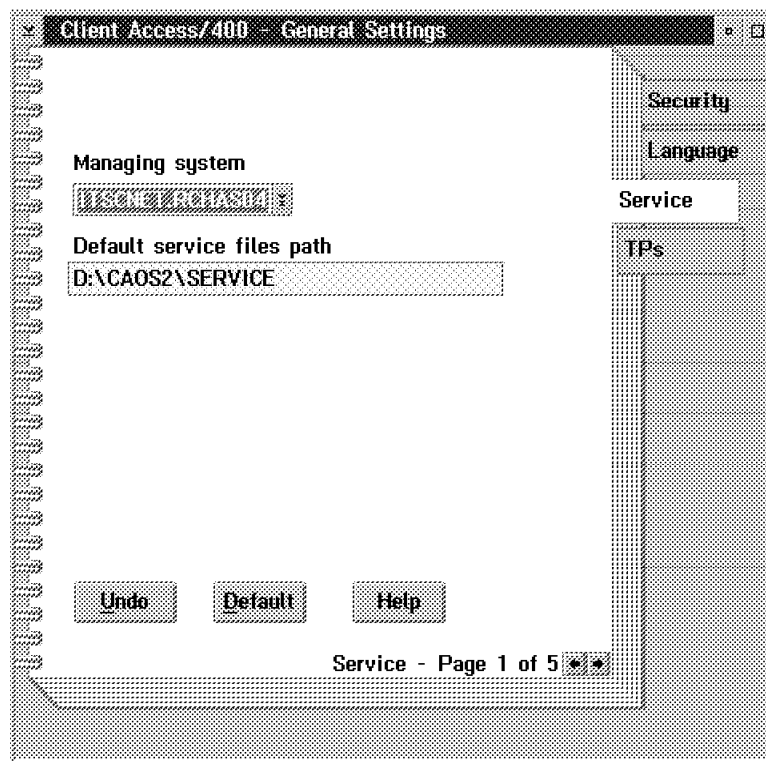


Figure 119. Client Access/400 General Settings Service Page 1

The managing system value determines:

- The AS/400 system that software updates come from (that is, the source for the Update function).

- The contents of the software catalog
- The AS/400 system that new components are selectively installed from. The value is originally set to the system named during part two of the installation process.

Before Client Access/400 Optimized for OS/2, if you were connected to two AS/400 systems, the updates would come from both systems, which could cause some confusion as to what level of code your PC was at. With Client Access/400 Optimized for OS/2 you only update from one AS/400, which is determined using the Managing system box.

Once this is set, it does not automatically change. You have to do this manually here. If you change this value, make sure that you select a system that is using the same or a later level of code. Otherwise your PC could be down-leveled when an update occurs.

The default path for the services files is the directory where the history logs and problem logs are held. Trace files are also held here.

The second page allows you to determine the maximum size of the history log. The Wrap check box allows you to select whether the most recent message replaces the oldest message. The default is Yes (checked).

The third page of the Service page allows you to determine the maximum size of the problem log.

Page four of the Service page shows the settings of the trace file. In addition to path, maximum size, and the wrap settings, you are also able to set the default size of the buffer file.

The Time period enables you to choose how long, in milliseconds, before the trace data is written to the file. You are also able to set how many entries are to be in the buffer storage before the trace data is written to the file.

The last page (page 5) of the Service page enables you to select the attributes for the entry and exit trace files.

The settings on this page are the same as for the trace file.

Transaction Programs (TPs): You can use this page if you want to select attributes for transaction programs (see Figure 120 on page 191).

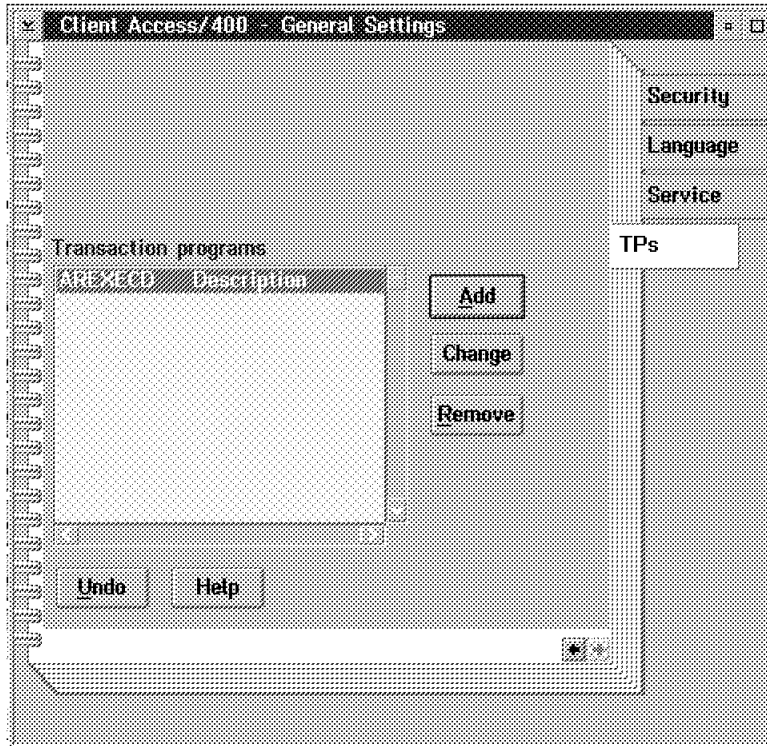


Figure 120. Client Access/400 General Settings Transaction Program (TP) Page

To use the *RUNRMTCMD* command, you must add the *CWBARRRC.EXE* program to the transaction program page. To do this select **Add** button and you are presented with the Transaction Programs Panel (see Figure 121 on page 192).

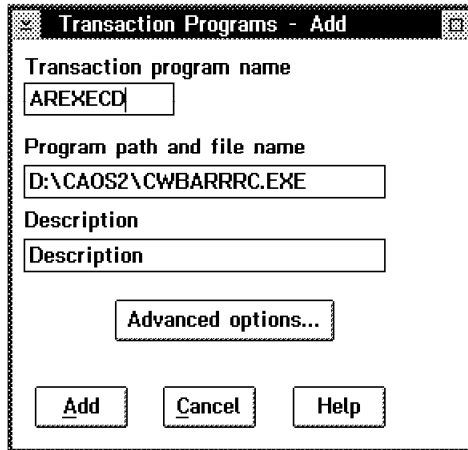


Figure 121. Client Access/400 General Settings TP - Add

The Advanced options button allows you to specify details of how the transaction program is run. For example, the default security setting means that any AS/400 user that has access to RUNRMTCMD is able to remotely execute commands on the PC. Given that PCs do not have the object level security that the AS/400 system has, this means that any AS/400 user would be able to send such commands as ERASE *.* to the PC without restriction! One of the Advanced options is to allow commands to be only sent from users who are authorized by OS/2 User Profile Management.

5.7.4 General Settings for Different Components

Some of the components of Client Access/400 have their own general settings. These are:

- Communications
- SNMP support
- Network drives
- Database access APIs
- Data queues
- Network print
- Remote command / distributed program call

The general settings for communication components and the SNMP Support component allow you to change the communications configuration. For example, you can add or delete links to AS/400 systems, or configure SNMP support. If you want to switch between different connection types (for

example, between TCP/IP and SNA, or between LAN and TWINAX), you must reinstall Client Access/400 Optimized for OS/2.

In the general settings for Network Drives, you will see a notebook with tabs for Cache, Conversion and SNA options. For further information, please see 5.5, "Network Drives" on page 150.

The general settings notebook for Database Access APIs, Data Queues, Network Printers and Remote Command/Distributed Program Call, only shows one page - SNA options. Here you can set the communication mode used by each component. For Database Access APIs, the default is QSERVER. For the others the default mode is QPCSUPP.

5.7.5 Update

The Products registry gives you the option to update your Client Access/400 components immediately. Choose **Selected** from the menu bar, and then **Update now**. Your PC is then updated with code from the AS/400 system straight away. Client Access/400 notifies you when the updates are complete.

You are able to change the Update settings for each product/component installed on your PC. Highlight the product/component that you wish to change the update settings for. Select **Open** from the **Selected** menu, and then **Update Settings**. You are then presented with the Update Settings notebook as shown in Figure 122 on page 194.

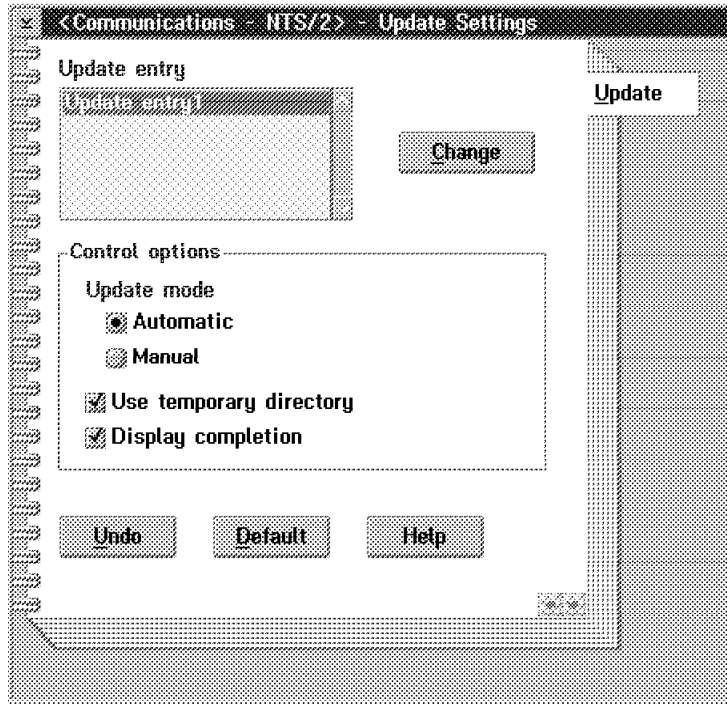


Figure 122. Update Settings Notebook

The Update entry box shows you a list of entries for the component you have chosen. To look at a particular entry, highlight one and select the **Change** button. The Update Entry - Change panel shown in Figure 123 is displayed.

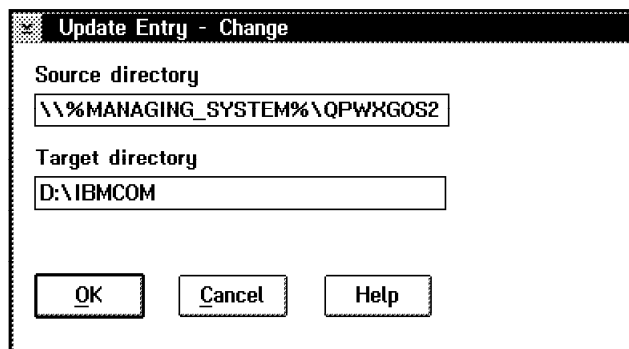


Figure 123. Update Entry - Change Panel

This panel indicates the source directory and the target directory for the update entry. The managing system value in the source directory is taken from page one of the Service page of the Client Access/400 General Settings notebook as shown in Figure 119 on page 189. If you are using a LAN server as the source system for installation and want to retain this server as the source for the update function, over type %MANAGING_SYSTEM% with d:path where **d:** is the drive on the LAN server, and **path** is the path to the QPWXGxx directories on that server.

Note:

A procedure has to be put in place in this situation to ensure that the LAN server is kept up to date with any PTFs that are applied to the AS/400 system.

You can change the way you require updates to happen. There are two radio buttons on the Update Settings notebook: Automatic and Manual. When you start Client Access/400, it uses the startup folder. Within that folder is the automatic update function icon. If you have the automatic button selected when Client Access/400 is started, the automatic update function is started. Those products listed in the products registry that have Automatic under the Update column are affected at this point. Update compares the files on your PC to the files in the Client Access/400 folder on the AS/400 system. If the files are not at matching levels, the update function then copies the appropriate files to the directory on your PC.

If you have the Manual button selected, the components are not updated when the update function runs. Instead you must force the update using the Products Registry.

Attention

An example of the use of manual update is if you load OS/2 LAN Requester Version 4.0 and MPTS after you have already installed Client Access/400. Setting MPTS for manual update in this situation prevents Client Access/400 from overwriting the existing MPTS configuration.

The Use Temporary Directory check box indicates whether you want Client Access/400 to use a temporary directory when Client Access/400 updates your components. If this box is checked, then the files are buffered in a separate directory and updated the next time you start your PC.

The Display Completion Message check box allows you to turn off quiet mode. Quiet mode displays only the minimal messages when running update.

5.7.6 Other Applications

You are able to use APIs to add applications to the products registry. For more information on this, see *Client Access/400 Optimized for OS/2 API and Technical Reference*, SC41-3511.

5.8 Emulation

Client Access/400 Optimized for OS/2 contains RUMBA/400 and PC5250 which have different interfaces for configuration. This section briefly describes the configuration of both of these emulators. For details, refer to the product documentation.

Note:

You must ensure that Client Access/400 is started before using RUMBA/400 or PC5250.

5.8.1 RUMBA/400

Figure 124 on page 197 shows a sample RUMBA/400 panel.

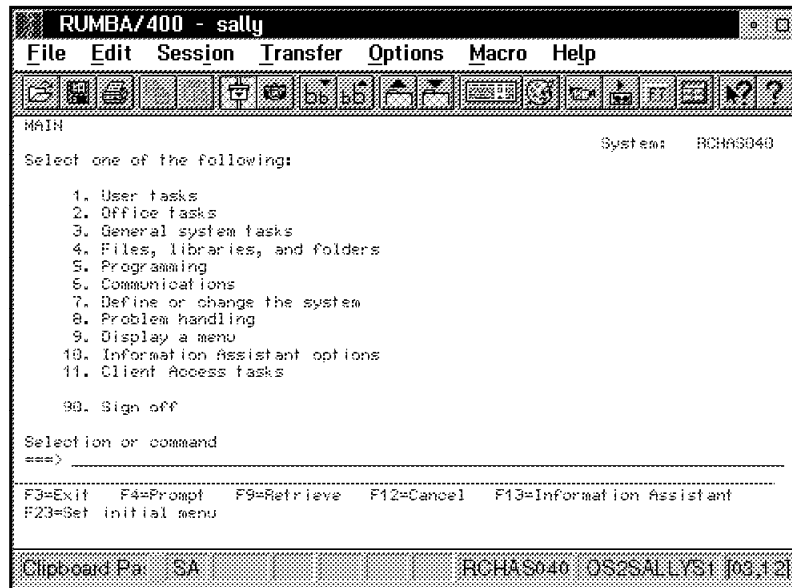


Figure 124. RUMBA/400 - Sample Panel

5.8.1.1 Configuration

Configuring a RUMBA/400 session is similar to the RUMBA/400 within the Client Access/400 for OS/2 original client. For more information, please refer to:

- *Client Access/400 RUMBA/400 User Guide*, SC41-3550.
- *Client Access/400 RUMBA/400 Tools*, SC41-3551.
- *Using V2R3 DOS and OS/2 PC Support/400 under OS/2 2.1, Including CM/400, CM/2 and RUMBA/400 for OS/2*, GG24-4070-01.

The RUMBA/400 Applications icon is in the Software Products folder. When this icon is selected you will see a RUMBA/400 Terminal icon and a RUMBA/400 Printer icon as shown in Figure 125 on page 198. These are the only two icons provided for RUMBA/400 with this client.

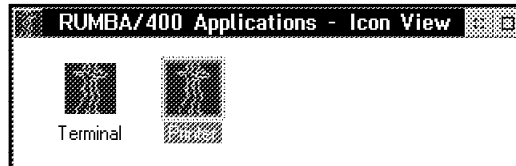


Figure 125. RUMBA/400 Applications - Icon View

Once you have configured your RUMBA/400 session, the terminal profile needs to be saved. Select **File** and **Save**, and the Save Profile panel shown in Figure 126 is displayed.

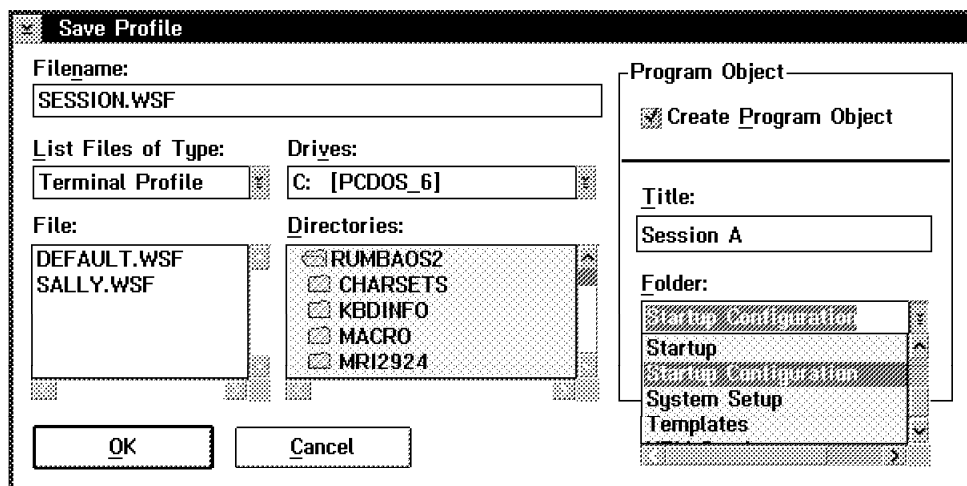


Figure 126. RUMBA/400 Save Profile Panel

Type in the name for your session in the **Filename** box. On this panel, you are also able to select which folder you would like your RUMBA/400 terminal to be saved into. Click on the **Create Program Object** tick box. Type in the title that you want to give your RUMBA/400 terminal icon. In our example, we have typed **Session A**. In the Folder box, you can select any folder in which you want to place your RUMBA/400 terminal icon. If you choose the Startup Configuration folder, your RUMBA/400 session starts automatically when Client Access/400 starts.

If you want to configure more sessions, then just repeat the process. If you want to connect to more AS/400 systems, then see 5.4, "Connections" on page 142, for more information.

5.8.1.2 16-Bit RUMBA/400 already installed

If you already have Client Access/400 for OS/2 (16-bit) RUMBA/400 installed, it does not function with the Client Access/400 Optimized for OS/2 (32-bit) RUMBA/400. You must install and use Client Access/400 Optimized for OS/2 (32-bit) RUMBA/400.

5.8.1.3 16-Bit RUMBA/400 macros

If you have Client Access/400 for OS/2 (16-bit) RUMBA/400 macros, you can use these with the Client Access/400 Optimized for OS/2 (32-bit) RUMBA/400. Before running these macros, copy the macro files into the Client Access/400 Optimized for OS/2 (32-bit) RUMBA/400 \MACRO (C:\RUMBAOS2\MACRO) subdirectory.

Note

If you are intending to run both RUMBA/400 and PC5250 at the same time, you must connect the RUMBA/400 session first. To do this, either place the PC5250 Session icon in another folder and start manually, or have a Configuration folder within the Startup folder. The Configuration folder template can be found in the Client Access/400 Templates folder. Drag and drop the **Configuration Group** template to the Startup folder. Place the PC5250 Session icon into the Configuration folder.

5.8.2 PC5250

If you chose to install PC5250 at the time of installing Client Access/400 Optimized for OS/2, then a PC5250 session is already created and configured for you. If you want to configure further PC5250 sessions, this is done in a different way from configuring RUMBA/400 sessions. However, if you did not select PC5250 to be installed, then there are no sessions pre-configured.

5.8.2.1 Configuring a PC5250 session

There is a **Templates** folder on the desktop. Open this folder and select the **Client Access/400 Templates** folder as shown in Figure 127 on page 200.

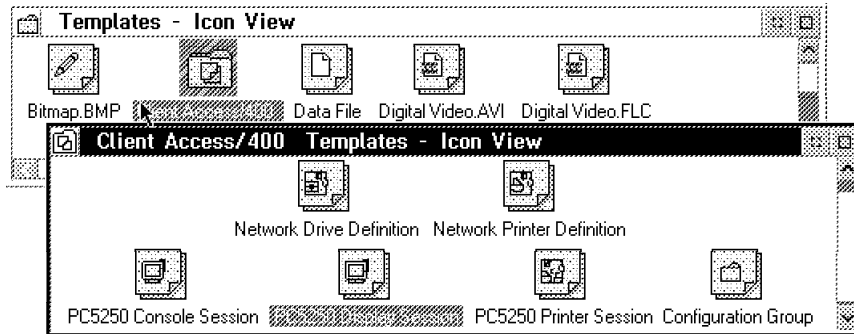


Figure 127. Client Access/400 Templates Folder

There is a **PC5250 Display Session** icon in the Client Access/400 Templates folder. Drag this icon to the Desktop or a folder of your choice. The PC5250 Display Session - Settings notebook shown in Figure 128 is displayed.

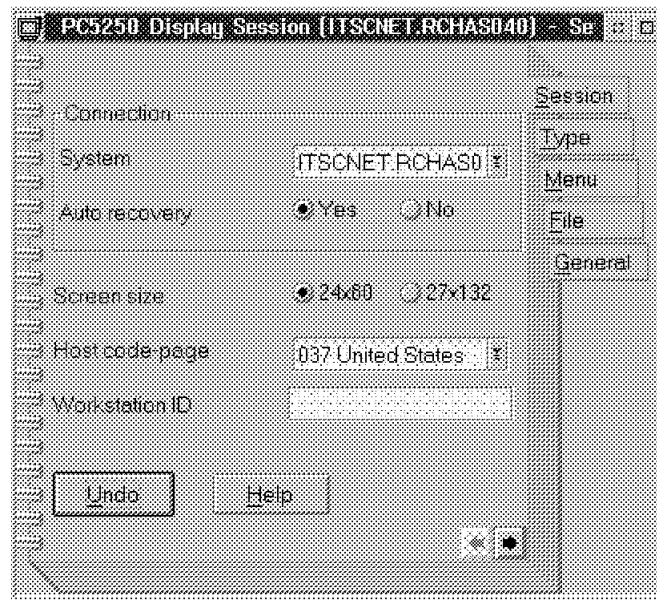


Figure 128. PC5250 Display Session - Settings Notebook

To save the session, double click on the icon in the top left hand corner of the window. Your PC5250 session is now saved to the folder in which you placed the icon.

To start the PC5250 session, double click on the PC5250 session icon.

If you want to configure more sessions, then just repeat the process. If you want to connect to more AS/400 systems, then see 5.4, "Connections" on page 142, for more information.

There is more information about PC5250 and Communications Manager/2 in the README.CA4 file held in the C:\CAOS2 directory.

5.9 Automating Startup


The contents of the Startup Configuration group are automatically started when Client Access/400 is started.

Use the Startup Configuration group folder as a place to keep configuration objects that you want to start every time Client Access/400 starts. See 5.2, "Startup Configuration Group" on page 140.

Note: If you want to start RUMBA/400 and Personal Communications/5250 on the same PC, you have to be careful about the start sequence.

RUMBA/400 has to be started before Personal Communications/5250. Start your RUMBA/400 sessions in the Startup Configuration and the Personal Communications/5250 sessions in a Configuration Group.

The Startup Configuration folder can be compared to the OS/2 Startup folder which starts every time you boot OS/2.

Put your **Start Client Access/400** icon  into the OS/2 Startup folder if you want to start Client Access/400 during system startup. Client Access/400 must be started for many functions to work correctly.

By default, OS/2 restarts every program that was active during the previous shutdown. We recommend that only the programs in the Startup folder are started at this time. To prevent OS/2 from starting everything that was active, edit your CONFIG.SYS, and add or change the following entry:

```
SET RESTSTARTOBJECTS=STARTUPFOLDERONLY
```

This ensures that programs that need Client Access/400 resources are not restarted before those resources have been made available.

5.9.1 LaunchPad

OS/2 Warp introduced the LaunchPad. Think of the LaunchPad as a file cabinet where you can organize frequently used objects. The LaunchPad objects have drawers that slide out and contain additional objects. You can place objects onto the LaunchPad as a main choice, or into a drawer above an existing LaunchPad object. You can add objects between objects or at the end of the LaunchPad. See the OS/2 on-line tutorial for a description of the LaunchPad.

If you do not start Client Access/400 automatically in the OS/2 Startup folder, then place the Start Client Access/400 icon onto the LaunchPad as a main choice. The drawer above could contain the most frequently used Client Access/400 functions.

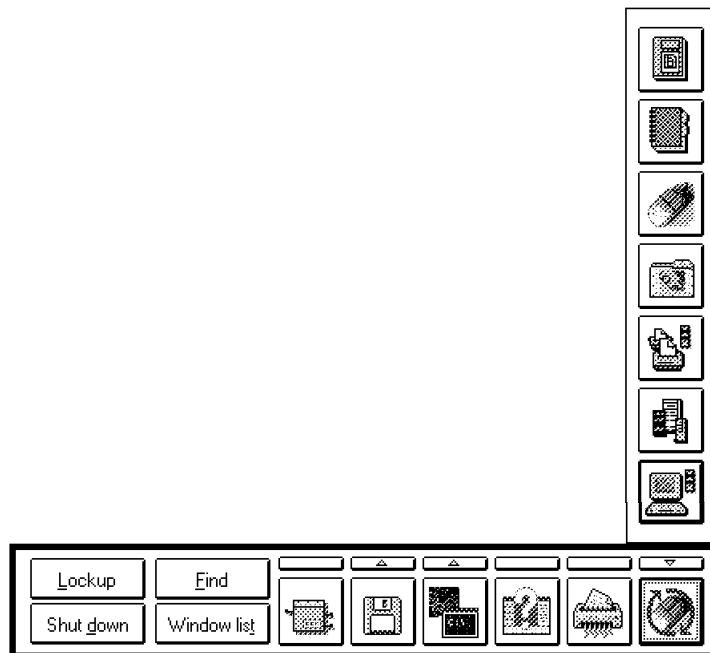


Figure 129. LaunchPad

5.10 Modifying Startup

Starting Client Access/400 causes the following sequence of events:

1. Communications startup

If the Client Access/400 Start Communications icon is present in the startup configuration folder (as it is by default), one or more communications command files are run to start the necessary communications environment. See 5.10.1, "Starting Communications" on page 204 for a complete description of the communications command files.

2. Services startup (CASERV.CMD)

CASERV.CMD is always run as part of Client Access/400 startup. It starts these Client Access/400 services:

- Message logging
- Communications router for the original OS/2 client (for communications compatibility), and for RUMBA/400 support.
- Network drive support
- Problem record logging
- SNMP and managed client capabilities (when enabled - see 6.12, "Configuration" on page 220 for details).

The following is an example of CASERV.CMD:

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CWBLOG.EXE START
STARTRTR.EXE /G
VDMSEV.EXE /Z
CWBBSTRT.EXE
REM CALL CASNMP.CMD
DETACH CWBMGD.EXE
REM DETACH SIASTART.CMD
:EXIT
@ECHO ON
```

3. Startup Configuration

After CASERV.CMD has completed, the startup program starts the rest of the objects in the startup configuration. The default action is taken for each icon; network drives and printers are connected, programs are started, and so on.

5.10.1 Starting Communications

The Start Communications icon runs the following command files in the CAOS2 subdirectory in sequence, each file waiting for the previous one to finish:

1. PRECOM.CMD (if it exists)
2. CACOM.CMD
3. POSTCOM.CMD (if it exists)

A complete description of each command follows:

1. PRECOM.CMD

You can create this file to run programs prior to starting communications, or to start a communications program other than the communications manager that comes with Client Access/400.

If you had a compatible level of Communications Manager/2 already on your PC when you installed Client Access/400, and you decided to use it instead of Client Access/400's communications manager, part 2 of the installation program automatically created PRECOM.CMD for you to ensure that communications is always started properly. The file created by the installation program is:

- For SNA Networks:

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CACMWAIT.EXE 0
@IF NOT ERRORLEVEL 1 GOTO EXIT
START CMSTART.EXE
CACMWAIT.EXE
:EXIT
@ECHO ON
```

- For TCP/IP Networks:

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CALL TCPSTART.CMD
CACMWAIT.EXE 0
@IF NOT ERRORLEVEL 1 GOTO EXIT
START CMSTART.EXE
CACMWAIT.EXE
LULIST d 3
:EXIT
@ECHO ON
```


2. CACOM.CMD

This command file is always created by part 2 of the installation program and runs immediately after PRECOM.CMD (if it exists) finishes. The command file:

- Starts TCP/IP (TCP/IP network users).
- Starts Client Access/400's communications manager, if installed.
- Sets the communications preference to TCP/IP (TCP/IP network users).
- Calls SXSTART.CMD (SNA network users) to start Sockets over SNA (AnyNet) support (when enabled - see 5.10.2, "Startup and Runtime Performance" for details).

3. POSTCOM.CMD

If this command file exists, it runs immediately after CACOM.CMD finishes. You can use it to run any additional programs that you want to run after communications support is started and ready but before other Client Access/400 functions start.

5.10.2 Startup and Runtime Performance

5.10.2.1 Client Management

Client Management support is disabled by default at installation time to improve performance. If you want your PC to be a managed client, or need to run Sockets applications over SNA, then you need to do the following:

- Edit the CASERV.CMD file in your CAOS2 subdirectory:

```
Change  REM CALL CASNMP.CMD      to  CALL CASNMP.CMD
Change  REM DETACH SIASTART.CMD   to  DETACH SIASTART.CMD
```

- For SNA network users, edit the CACOM.CMD file in the CAOS2 subdirectory:

```
Change  REM CALL SXSTART.CMD     to  CALL SXSTART.CMD
```

This enables Sockets and other components required to manage your PC from an SNMP-based managing system. This has the following effects:

- Problem records created by Client Access/400 flow to the SNMP-based managing system.
- The PC is added to the managing AS/400 system's inventory of PCs.

Note:

If you make these changes and then use Selective Install to install Client Access/400 component "OS/2 communications options for DOS," you must make the changes again. Installing "OS/2 communications options for DOS" causes CACOM.CMD and CASERV.CMD to be recreated; manually added changes are lost.

5.10.2.2 Other Functions Affecting Performance

The following is a list of suggestions for improving the overall performance of clients that use Client Access Optimized for OS/2. For each item, if your client meets the condition, performing the action will remove a device driver or running application from your system.

Condition: You don't need the print functions in CA/400.

Action: REM the following lines in your CONFIG.SYS

```
DEVICE=d:\CAOS2\CWBNPRDR.SYS
IFS=d:\CAOS2\CWBNPFS.IFS
RUN=d:\CAOS2\CWBDAEMN.EXE
```

Condition: You will not run RUNRMTCMDs to this client and you will not run an application that uses data queues (note: this includes ManageWare/400 and USF).

Action: Stop Attach Manager

Condition: You do not want messages or problems logged.

Action: REM the following lines in your CASERV.CMD

```
CWBLOG.EXE START
DETACH CWBMGD.EXE
```

Condition: You will only connect to V3Rx AS/400 systems.

Action: Change the following line in your CASERV.CMD

```
CWBBSTRT.EXE
```

to

```
CWBBSTRT.EXE /NOV2
```

and REM the following line in your CONFIG.SYS

```
IFS=d:\CAOS2\EHNSFLO.DLL
```

Condition: You do not need the Virtual DOS support provided by Client Access/400.

Action: REM the following lines in your CONFIG.SYS

```
DEVICE=d:\CAOS2\EHNPCPDD.SYS
```

```
DEVICE=d:\CAOS2\EHNPCVDD.SYS
```

and REM the following line in your CASERV.COMD

```
VDMSERV.EXE /Z
```

Condition: Your client is not using the client management functions, and you will not be selectively installing any new client access functions.

Action: REM the following line in your CONFIG.SYS

```
RUN=d:\CAOS2\DMISL.EXE
```

5.10.3 Recreating Startup Command Files

If you need to recreate CACOM.COMD and CASERV.COMD as originally created by Client Access/400 installation, use the following Client Access/400 command from an OS/2 command line:

```
CWBFW /C
```

5.11 CONFIG.SYS Recommendations

This section describes some of modifications that should be made to CONFIG.SYS when running Client Access/400 Optimized for OS/2.

5.11.1 Restart Objects

We recommend that you add a restart objects statement or change the existing restart objects statement in CONFIG.SYS to:

```
SET RESTARTOBJECTS = STARTUPFOLDERONLY
```

Doing this tells OS/2 to start only the objects in the startup folder when the Workplace Shell is started. This keeps applications that need Client Access/400 functions from starting before Client Access/400 is started.

5.11.2 Autostart Connections

The CONNECTIONS option of AUTOSTART is not supported. Having CONNECTIONS on OS/2's SET AUTOSTART statement tells OS/2 to reconnect remote drive and printer connections that were active when OS/2 shutdown. Client Access/400 connections cannot be restarted at the time OS/2 connects these drives and printers. You can use Client Access/400's startup configuration folder to autostart drives and printers.

You can autostart Client Access/400 by dragging a shadow of the Client Access/400 startup icon to the OS/2 startup folder.

5.11.3 Performance

For a detailed description about performance tuning OS/2 Warp refer to Chapter 13, "Performance Tuning OS/2 Warp" on page 325. The following is only a rough overview of the most important statements:

- Place the directory names in order of usage for the statements LIBPATH, PATH, and DPATH.
- Change the disk cache statement from DISKCACHE=D,LW to the following:

```
DISKCACHE=128,LW,32
```

- Alter the swap path statement depending on your PC hardware. For example:

```
SWAPPATH=d:path 2048 35840
```

If you have multiple disks in your PC, use the least-used directory of the least-used disk to place the SWAPPER.DAT (d:\path).

5.12 Stopping Client Access/400 Optimized for OS/2

There is no automated way of stopping Client Access/400 Optimized for OS/2. The following steps will stop most of the active functions after the client is started.

1. Manually shutdown any emulator, Database Access, file transfer sessions, etc. If these were started via the Client Access Startup Configuration folder, this folder supports a "Disconnect" option on its menu. Anything started in the folder should be shutdown with this option.
2. Build a command file with the following statements to stop almost everything else but CM:

```
REM  Command File to Shutdown Client Access/400 Optimized for OS/2
REM  Do a controlled shutdown of net printers
NET400 RELEASE * /F=CTRL
REM  Do a forced shutdown of net drives
NET400 RELEASE * /F
REM  Remove the net drive background task
NET400 SHUTDOWN
REM  Stop the router
```

```
STOPRTR  
REM Stop service tasks  
CWBLOG SHUTDOWN
```

Adding "STOPCM" to the end would also shutdown CM (for anyone else interested in stopping that as well.)

All of the above statements are documented in the on-line command reference in the information folder except the NET400 SHUTDOWN.

Chapter 6. Client Management

Client Management is provided through the Simple Network Management Protocol (SNMP) agent and System Information Agent (SIA) event reporting. Client Access/400 Optimized for OS/2 reports both the software that is installed on the PC, and software errors to the AS/400 system, making it an easier task to manage PC clients in the network.

This section explains client management concepts, and how Client Access/400 Optimized for OS/2 implements these concepts.

Client management support is not enabled by default, and this section explains how to configure the client to enable the support.

6.1 DMI Overview

The Client Management implementation that is used by Client Access/400 Optimized for OS/2 is based on an emerging industry standard called the Desktop Management Interface (DMI).

The DMI is a set of tools that vendors can use to enable their products to be managed. The set of tools consists of:

- API calls
- A single executable layer

The DMI is enabling technology that provides PC-based software and hardware vendors a simple method for designing manageability into their hardware and software products. Because component manufacturers can write to a single interface, they do not have to understand which management protocol or application might be used to manage the component.

The DMI is being specified and developed by an industry consortium called the Desktop Management Task Force (DMTF).

This task force is an industry body whose stated objectives are to provide a working definition for desktop workstation management. The results of this effort consist of a set of APIs and a reference implementation for the general benefit of the industry, and not for the explicit benefit for any of the charter members of the DMTF.

The following organizations take part in the Desktop Management Task Force:

- Digital Equipment Corporation (DEC)
- Hewlett-Packard Company
- IBM Corporation
- Intel Corporation
- Microsoft Corporation
- Novell Incorporated
- SunConnect (a division of Sun Microsystems Computer Corporation)
- SynOptics Communications Incorporated

The IBM Corporation, Novell, Apple, and Microsoft have committed to incorporating DMI into their desktop operating systems, and the COSE consortium of the Unix world has expressed a strong interest.

6.1.1 DMI Application Programming Interfaces

The DMI APIs provided enable customers and business partners to participate in all of the same manageability and serviceability capabilities that Client Access/400 components use.

For example, a customer can register their home-grown accounting package with the DMI, so the administrator on the AS/400 system can see who is using it, what version and fix level they have, where it is installed, and so on.

6.2 Client Inventory

When an optimized OS/2 client PC starts a connection to the AS/400 system, an inventory of software and hardware installed on the PC is sent to the AS/400 database using an SNMP trap. This database can be queried using any database access tool, or can be accessed by an SNMP manager such as Netview/6000.

6.3 Client Service

The AS/400 system provides a database that contains information about problems. When AS/400 hardware and software components experience errors, they send reports of the error to the problem log on the AS/400 system. This information is useful for administrators who need to track problems, status of problems, and fixes for those problems.

The problem log is part of the global IBM Service and Support strategy. A problem record in the problem log can be forwarded to a service provider or directly to IBM Service personnel. Client Access/400 sends problem records to notify the AS/400 service environment that an error has occurred on the client. The problem record can become the starting point for a service action, such as a PTF. Information from the problem record can start an APAR.

When a Client Access/400 component recognizes it has a problem that IBM Service should know about, it sends it to the AS/400 system in the form of an SNMP trap. On the AS/400 system, the problem is added to the AS/400 problem log.

Client Access/400 extends the service and support capabilities of the AS/400 system to the desktop environment.

Client Access/400 is the first product in the industry to use the DMI to report problems. The Desktop Management Task Force is currently defining a standard to identify different types of DMI events. It allows reporting of problems to the AS/400 system on behalf of any DMI-enabled hardware or software.

6.3.1 Problem Records

Most Client Access/400 parts are programmed to generate problem records when an error occurs. It is particularly important that a problem record be logged when an error occurs that meets one or more of the following criteria:

- The error is an unexpected condition.
- The program can take no actions to recover.
- The user can take no actions to recover.
- IBM Service must be involved.

The information logged in the problem record can be valuable for IBM Service and developers to diagnose the problem.

Many of the Client Access/400 components log problems at the same time they generate a message that recommends the user to contact their IBM Service Representative.

6.4 SIA

SIA (System Information Agent) is a function that gathers hardware and software information through proprietary means. For OS/2, software information is gathered by searching for SYSLEVEL files.

6.5 Simple Network Management Protocol (SNMP)

The AS/400 Systems Management area chose SNMP to be the transport mechanism because SNMP is the industry standard.

Because SNMP is a UDP-oriented protocol, SNMP information flows to the AS/400 system regardless of whether the user has entered a legal USERID and password, or has a valid license. An interesting side effect is that the AS/400 system can be querying the client system for inventory information even when the user cannot legally connect to the AS/400 system.

6.6 User Interface

There is an icon for the Problem Log in the Service Folder. One of the menu bar actions is *Create another...*, which enables a user to create a report for a perceived problem, describe it in their own words, and issue it to the AS/400 problem log.

For inventory information, there is a product called ManageWare/400 that includes a graphical front-end to the hardware and software databases on the AS/400 system. Customers can also use any graphical database query tool to view the databases, or run queries on the AS/400 system itself.

In the Client Access/400 Toolkit, there is a tool called DMIPM (Warp DMI Browser). See Figure 130 on page 215.

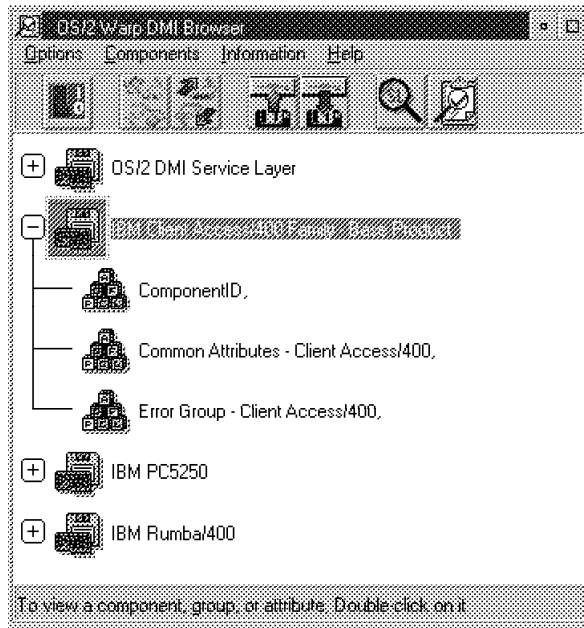


Figure 130. OS/2 Warp DMI Browser

This tool provides a graphical display of all of the components on the PC that are registered to the DMI MIF database.

6.7 Managing Clients Today

How do you manage clients today? In many installations, hand-written paper lists exist. The problem is that they are immediately out-of-date and not consistent. It gets more difficult where more locations are involved. Sometimes this job is done by an administrator and sometimes by an operator.

The limitation of this method is based on the rapidly changing environment, for example:

- Installation of new hardware without telling the administrator.
- Installation of new software without telling the administrator.
- Swapping of hardware between two PCs.
- The need to ensure that license agreements are not violated.

- Installation of remote applications. What happens if the PC does not have enough memory?

Based on the inventory, answers to the following types of questions should be possible:

- How many 80386 processors do we have? Am I able to change the corporate standard from Word for Windows 2.0 to Word for Windows 6.0 which requires a 80486 processor?
- Who still needs a copy of Lotus 1-2-3? Can I delete the master copy of an outdated program version on my FSIOF?
- Who owns PC456, which produces a JOBLOG on the AS/400 system all the time?
- What office is this PC456 located in?

6.8 AS/400 Client Asset Management

Client Access/400 Optimized for OS/2 provides help for client asset management. Everything is stored in a centralized database on the AS/400 system in OS/400 for Version 3.0 Release 1.0.

This function is based on open industry standards such as Simple Network Management Protocol (SNMP) and the Desktop Management Interface (DMI).

The data is stored in a Management Information Base (MIB) in a format called Management Information Format (MIF).

The client management database is divided in to three categories: directory, hardware, and software information. The following information is found in the client information database:

- Directory information
 - Client ID
 - Connectivity information
 - Capabilities
 - Contact information
- Hardware information
 - Machine type
 - Machine model
 - Memory size
 - Storage table

- Device table
- Processor table
- Network table
- Printer table
- Disk storage table
- Software information
 - Software installed table
 - Software fix table

The databases are found in QUSRSYSQAZCAxxx. Refer to *SNMP Support*, SC41-4412, for details.

This DB2/400 database is accessed either with any query facility such as SQL, Query, or in the future using application programming interfaces (APIs).

Client Access/400 Optimized for OS/2 is the first client that supports client asset management.

ManageWare/400 has been enhanced to auto-discover nodes and clients based on the new Client Access/400 functions. In addition, ManageWare/400 provides a graphical presentation of asset information, and is able to update the client management database information.

6.9 SNMP Client Management

To enable the Client Management and Service capabilities of the AS/400 system and Client Access/400, make sure the AS/400 Trap Manager is running. You can start the Trap Manager by running the **STRTRPMGR** command on the AS/400 system.

6.10 Manageability Structure

Figure 131 on page 218 shows most of the pieces involved in Client Access/400 Manageability.

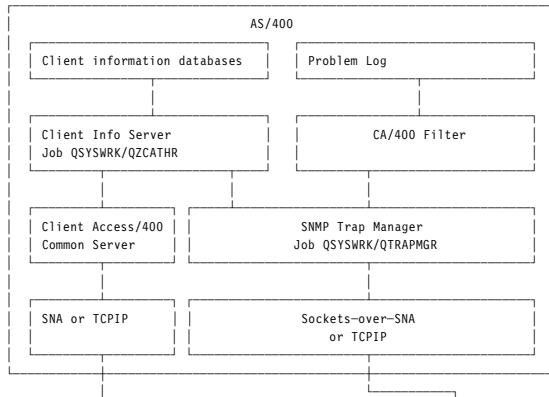


Figure 131 (Part 1 of 2). Client Access/400 Manageability Structure

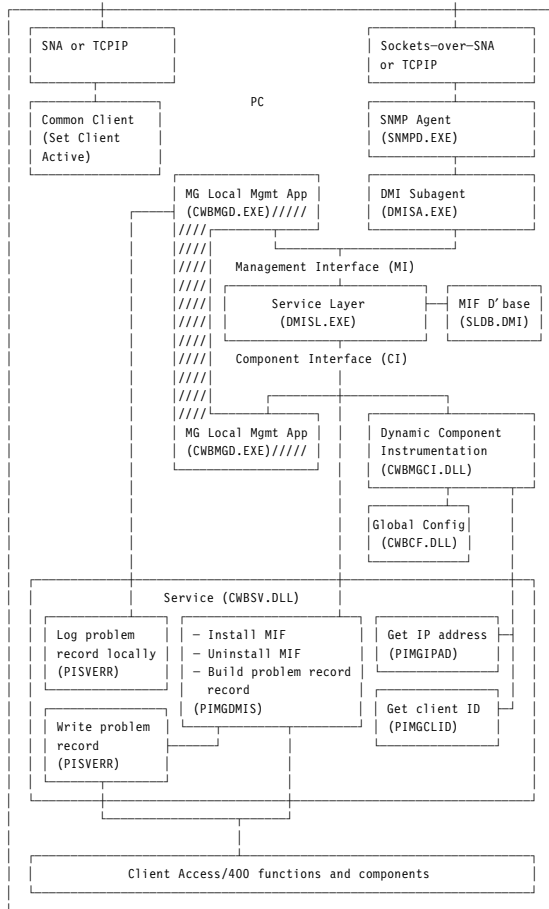


Figure 131 (Part 2 of 2). Client Access/400 Manageability Structure

6.11 CONFIG.SYS and CASERV.CMD

During install phase 1, Client Access/400 Optimized for OS/2 adds the following statement to CONFIG.SYS:

```
SET DMIPATH=d:\path
```

where d: is the drive that Client Access/400 Optimized for OS/2 is installed on, and path is the Client Access/400 Optimized for OS/2 path.

This statement tells the DMI Service Layer where to put the MIF database (the file SLDB.DMI).

RUN=DMISL.EXE

This statement starts the DMI Service Layer when Client Access/400 starts at boot time. During install phase 2, Client Access/400 Optimized for OS/2 does the following:

1. Installs the base MIF CWBCA.MIF.
2. Installs the option MIFs, if selectively installed:
 - CWBWD.MIF (RUMBA/400)
 - CWB5250.MIF (PC5250)

All of the following occurs at Client Access/400 startup time.

1. Service starts

CWBLOG START is run from the CASERV.CMD file.

This starts the message and problem logging by default. Problem logging must be activated to log any problems locally.

2. SNMP Processes Start

CASNMP.CMD is called from the CASERV.CMD file.

This command file starts SNMP functions such as the SNMP agent SNMPD.EXE and the DMI subagent DMISA.EXE. The DMISA sub-agent registers with the DMI Management Interface. Both of these must be running for any of the Client Access/400 problem record or inventory functions to work.

6.12 Configuration

This section describes how the Client Management functions of Client Access/400 Optimized for OS/2 can be enabled.

Following installation of Client Access/400 Optimized for OS/2, Client Management support is not enabled by default even if you choose to enable SNMP support during the installation process. This is because for PCs that do not use the Client Management functions, the programs that need to be loaded on the PC to provide the support represent an unnecessary overhead. For this reason, the command files CASERV.CMD and CACOM.CMD have REM entries in front of the lines that would start the Client Management support. Remove the REM statements shown in Figure 132 on page 221 and Figure 133 on page 221 to enable the support.


```

@REM Client Access/400 Optimized Client
@ECHO OFF
CWBLOG.EXE START
STARTRTR.EXE /G
VDMSERV.EXE /Z
CWBBSTRT.EXE
REM CALL CASNMP.CMD
DETACH CWBMGD.EXE
REM DETACH SIASTART.CMD
:EXIT
@ECHO ON

```

Figure 132. Sample CASERV.CMD

```

@REM Client Access/400 Optimized Client
@ECHO OFF
CACMWAIT.EXE 0
@if NOT ERRORLEVEL 1 GOTO STARTED
START CMSTART.EXE
CACMWAIT.EXE
@if ERRORLEVEL 1 GOTO EXIT
:STARTED
REM CALL SXSTART.CMD
:EXIT
@ECHO ON

```

Figure 133. Sample CACOM.CMD

PTF

Make sure the following PTFs are on your system:

- SF22357 (5763SS1)
This creates the mode description SNACKETS during the system IPL. It is used for SOCKETS over SNA. Otherwise, you have to create the SNACKETS mode manually.
- SF21248 (5763SS1)
This enables Client Access/400 problem records to be added to the AS/400 problem log.

6.12.1 SNMP Configuration

6.12.1.1 Connection Through TCP/IP

PC

1. Go to the Software Products Registry.
2. Select SNMP Support.
3. Open General Settings.
4. Select SNMP tab:
 - System location: Enter the location of your PC (for example, office number).
 - System contact: Enter the owner of the PC.
 - System to notify: Enter the IP address of the managing system (in our example, our AS/400 system RCHAS040 has an IP address of 9.5.69.253).

6.12.1.2 Connection Through SNA APPC

AS/400 System

1. Enter the CFGIPS command on an AS/400 command line.
2. Select Option 1 to define your AS/400 system.
 - Use option 1 to add.
 - Internet address: 10.10.10.10 in our example. If you also have the AS/400 system configured for TCP/IP, you must use a different IP address from the one that is used by TCP/IP.
 - Subnet mask: 255.255.255.0. If you also have the AS/400 system configured for TCP/IP, you must use a different subnet mask from the one that is used by TCP/IP.
3. Select Option 3 to make your PC known to the AS/400 system. You also need to add your AS/400 and other PCs in the network.
 - Use option 1 to add.
 - Remote destination: 10.10.10.48 (this is the IP address of the PC).
 - Subnet mask: *HOST.
 - Remote network identifier: in our example ITSCNET (your network ID).
 - Location template: in our example PCCWAS (your PC location name).

PC

1. Go to the Software Products Registry.
2. Select SNMP Support.
3. Open General Settings.
4. Select Local tab.
 - Network ID: ITSCNET (you network ID).
 - PC location name: PCCWAS (your PC location name).
5. Select SNMP tab.
 - System location: Enter the location of your PC (for example the office number).
 - System contact: Enter the owner of your PC.
 - System to notify: Enter the IP address of the managing system (RCHAS040 10.10.10.10).
 - Select AnyNet - SNA tab.
 - Select the Configure AnyNet button.
 - Local Node tab:
 - IP Address for SNA: 10.10.10.48 (the address you assigned yourself through CFGIPS AS/400 command, option 3).
 - Address Mask: 255.255.255.255.
 - LU Template: PCCWAS (your PC location name).
 - SNA Network Name: ITSCNET (your Network ID).
 - Remote Nodes tab:
 - IP Address for SNA: Enter the IP address of the managing system (RCHAS040 10.10.10.10).
 - Address Mask: 255.255.255.255.
 - LU Template: RCHAS040 (name of the AS/400 system).
 - SNA Network Name: ITSCNET (your network ID).

Shutdown OS/2 and restart Client Access/400.

6.12.2 AS/400 System Setup

Following the instructions in this section to enable the Client Management support on the AS/400 system.

1. Trap Manager

Make sure the trap manager is running. Enter the command:

```
WRKACTJOB SBS(QSYSWRK)
```

You should see:

Subsystem/Job	User	Type
QTRAPMGR	QTCP	BCH
QTRAPRCV	QTCP	BCH
QZCATHR	QTCP	BCH

If you do not, enter the command:

STRTRPMGR

2. AnyNet

Make sure AnyNet is configured. Enter the command:

DSPNETA

Scroll to the last page and check for the line:

Allow ANYNET support : *YES

If ANYNET is not enabled, the following command will enable it:

CHGNETA ALWANYNET(*YES)

3. SNACKETS Mode

For SNA connections, does the SNACKETS mode exist? Enter the command:

DSPMODD MODD(SNACKETS)

If it does not exist, you must create it with the command:

CRTMODD MODD(SNACKETS)

Or, make sure PTF SF22357 is on your system. This PTF creates the SNACKETS mode during IPL.

4. PTF

Make sure the service PTF SF21248 is on the system to enable Client Access/400 problem records to be added to the AS/400 problem log.

6.12.3 Check Client Service and Inventory

1. Go to the Client Access/400 Optimized for OS/2 Service icon and open the Problem Log. Use Create Another to create and send the problem to the problem log. On the client, refresh the Problem Log and verify that the newly-created problem record appears, and that the problem record has a status of sent.
2. On the AS/400 system, enter either the WRKPRB or the DSPPRB command. Verify that the problem record has been added to the AS/400 problem log (match the problem ID with the one on the client, and verify

the contents of the problem record). If it is not there, verify again that the trap manager is started.

3. On the AS/400 system, enter the command:

```
RUNQRY *NONE QUSRSYS/QAZCADIR
```

Verify that an entry for your client exists in the database. Scroll to the right to see the entire database. You can also check to see if your MIF files are registered on the AS/400 system by querying the software database:

```
RUNQRY *NONE QUSRSYS/QAZCASFW
```

You can also check to see when your system was last refreshed in the database by:

```
RUNQRY *NONE QUSRSYS/QAZCAMSC
```

Check the last refresh date in the ZCBSFW column.

6.12.4 Remove a Client from the AS/400 Database

To remove a client from the database, call the AS/400 program:

```
CALL PGM(QZCARMVC) PARM('***index****' X'00000000')
```

where *****index****** is the unique client index associated with the client in the AS/400 database.

6.12.5 Client Inventory Database

Use the following command to query the inventory database:

```
RUNQRY *NONE QUSRSYS/QAZCAxxx
```

where xxx is:

DIR	Directory
MSC	Miscellaneous
SFW	Software
SFX	Software fix
HDW	Hardware
DEV	Hardware devices
DSK	Hardware disk storage
PTN	Hardware storage partitions
STG	Hardware storage
FS	Hardware file system
NET	Hardware network
PRC	Hardware processor

PRT Hardware printer

The following fields are used:


ZCAIDX	Client index
ZCBIDX	Client index
ZCCIDX	Client index
ZCDIDX	Client index
ZCEIDX	Client index
ZCFIDX	Client index
ZCGIDX	Client index
ZCHIDX	Client index
ZCIIDX	Client index
ZCJIDX	Client index
ZCKIDX	Client index
ZCBCLT	Client ID
ZCBDSC	Client description
ZCBCMN	Community
ZCBIPA	IP address
ZCBCPN	SNA address (CP NetID)
ZCBMEM	Memory size (in 1024 bytes)
ZCBUPT	Up time
ZCBSTT	System status
ZCBMBI	Support MIB
ZCBMBH	Support HOST MIB
ZCBMBA	Support APPN MIB
ZCBMBX	Support extensions
ZCBSFW	Hardware refresh date
ZCBSFW	Software refresh date
ZCBCON	Contact
ZCBLOC	Location
ZCBTYP	Machine type
ZCBMDL	Machine model
ZCBUSR	User profile
ZCBOWN	Owner
ZCBPHN	Owner phone
ZCBOFC	Office
ZCJSFW	Software index
ZCJTYP	Software type (2 = Operating System Software, 4 = Application Software, 7 = DMI Enabled Software)
ZCJSTT	Software status

ZCJID	Software ID
ZCJVER	Software version
ZCJOPT	Software option
ZCJFTR	Software feature
ZCJMNF	Software manufacturer
ZCJPTH	Software path
ZCJDAT	Software installation date
ZCJNAM	Software name
ZCJSN	Software serial number
ZCKSFW	Software index
ZCKSFX	Software fix index
ZCKFIX	Software fix ID
ZCADEV	Device index
ZCATYP	Device type (1 = Other, 3 = Processor, 4 = Network, 5 = Printer, 6 = Disk Storage, 10 = Video, 12 = Coprocessor, 13 = Keyboard, 16 = Pointing, 17 = Serial Port, 19 = Clock)
ZCADID	Device ID
ZCASTT	Device status
ZCAERR	Device errors
ZCADSC	Device description
ZCCDEV	Disk device index
ZCCACC	Disk access
ZCCMED	Disk media (3 = Hard Disk, 4 = Floppy Disk)
ZCCRMV	Disk Removable (1 = Yes, 2 = No)
ZCCCAP	Disk capacity
ZCISTG	Storage index
ZCITYP	Storage type (2 = RAM, 3 = Virtual Memory, 4 = Fixed Disk)
ZCIDSC	Storage description
ZCIALU	Storage allocation units
ZCISIZ	Storage size
ZCIUSD	Storage used
ZCIALF	Storage allocation failure
ZCDDFS	File system index
ZCDLMP	File system mount point
ZCDRMP	File system remote mount
ZCDTYP	File system type
ZCDACC	File system access

ZCDBOT	File system bootable (1 = Yes, 2 = No)
ZCDSTG	File system storage index
ZCDFBK	File system full backup
ZCDPBK	File system partial backup
ZCEDEV	Network device index
ZCENIF	Network IFIndex
ZCFDEV	Processor device index
ZCFLOD	Processor load
ZCFFRM	Processor licensed internal code
ZCGDEV	Printer device index
ZCGSTT	Printer status
ZCGERR	Printer error state
ZCHDEV	Storage partition device index
ZCHPTN	Storage partition index
ZCHSIZ	Storage partition size
ZCHFSX	Storage partition FS index
ZCHLBL	Storage partition label
ZCHID	Storage partition ID


Refer to *SNMP Support*, SC41-4412, for details.

6.13 Service

The service folder  contains two icons: the HISTORY.LOG and the PROBLEM.LOG.

It also contains the traces, if started. All logs are started with the program CWBLOG. Refer to 5.7, "Products Registry" on page 180 where you can define the defaults for the history and problem logs as well as for the detail and entry or exit traces.

6.13.1 HISTORY.LOG


The HISTORY.LOG  contains all error messages in chronological order. See Figure 134 on page 229. You can double click on a message to get the second-level help text.

HISTORY.LOG - Details View
Selected View Help
102 Items as of 05-16-95 07:37:13

Icon	Message	Message ID
<input type="checkbox"/>	Starting Update Function	
<input type="checkbox"/>	Version 3 Release 1 Level 0	
<input type="checkbox"/>	Drive F: was successfully assigned to system ITSCNET.RCHAS040	CWBBS0008
<input type="checkbox"/>	The MIF file D:\CAOS2\CWB5250.MIF was installed successfully	CWBMG0001
<input type="checkbox"/>	Drive G: was successfully assigned to system ITSCNET.RCHAS040	CWBBS0008
<input type="checkbox"/>	The MIF file D:\CAOS2\CWBWD.MIF was installed successfully	CWBMG0001
<input type="checkbox"/>	Drive H: was successfully assigned to system ITSCNET.RCHAS040	CWBBS0008
<input type="checkbox"/>	Drive G: was successfully released	
<input type="checkbox"/>	Drive F: was successfully released	
<input type="checkbox"/>	Drive H: was successfully released	

Figure 134. HISTORY.LOG

6.13.2 PROBLEM.LOG

In the PROBLEM.LOG  on the local client, all software and user detected problems are logged as shown in Figure 135.

PROBLEM.LOG - Details View
Selected View Help
2 Items as of 05-16-95 07:36:14

Icon	Problem ID	Status	Date	Time	Product	Component
	9513659015	Sent	05/16/95	16:20:30.37	CA400	MG
	9513659041	Sent	05/16/95	16:24:43.07	CA400	MG

Figure 135. PROBLEM.LOG

These problems are sent automatically to the managing AS/400 system where the problems are logged in the AS/400 problem log. The advantage of this is that these problems are reported using electronic customer support

(ECS). See 6.3, “Client Service” on page 212 for more information about this function.

6.13.3 Traces

You can start and stop traces by using the following commands. The trace output is put in the Service folder.

To start:

```
CWBLOG START /detailtrace
```

for a detailed trace, or:

```
CWBLOG START /entrytrace
```

for an entry/exit trace.

To stop the trace:

```
CWBLOG STOP /detailtrace
```

or:

```
CWBLOG STOP /entrytrace
```

Chapter 7. Accessing AS/400 Data

In this chapter, you can find how to access AS/400 data, and how to transfer data to and from the AS/400 system.

This chapter contains the following sections:

- 7.1, "File Transfer Commands"
- 7.2, "RUMBA/400 File Transfer"
- 7.3, "RUMBA/400 Database Access" on page 236
- 7.4, "Open Database Connectivity" on page 246.

7.1 File Transfer Commands

We recommend that you use the interface provided with the RUMBA/400 file transfer instead of these commands. These commands are provided to ensure compatibility with the current OS/2 PC Support/400 and Client Access/400 for OS/2 users. The format of the panels is the same as in PC Support/400. These are the commands you can use:


RFROMPC	Starts the interactive PC to AS/400 transfer function program.
RFROMPCB	Starts the batch PC to AS/400 transfer function program.
RTOPC	Starts the interactive AS/400 to personal computer transfer function program.
RTOPCB	Starts the batch AS/400 to personal computer transfer function program.

7.2 RUMBA/400 File Transfer

The RUMBA/400 file transfer function of Client Access/400 Optimized for OS/2 is similar in function to the RUMBA/400 file transfer programs in Client Access/400 for OS/2, and also to the file transfer programs of the PC Support/400.

You can transfer files from your AS/400 system to the PC and from the PC to the AS/400 system. The options available for each parameter are displayed in list boxes by clicking with the mouse.

There are two different ways you can start the RUMBA/400 file transfer program.

- The first method is to select the  file transfer icon in the Software Product group (shown in Figure 136).

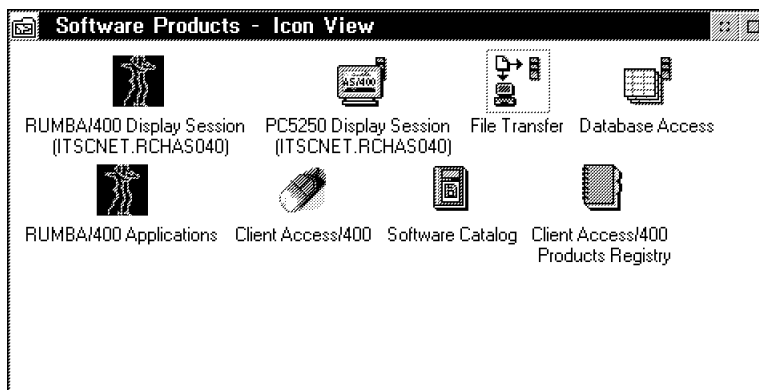


Figure 136. RUMBA/400 File Transfer Icon in Software Product Group

- The second method is to start the file transfer program from your RUMBA/400 terminal session menu bar option **Transfer**.

The RUMBA/400 file transfer interface is shown in Figure 137 on page 233. The name of the window and the direction of the arrow show you the direction of the file transfer.

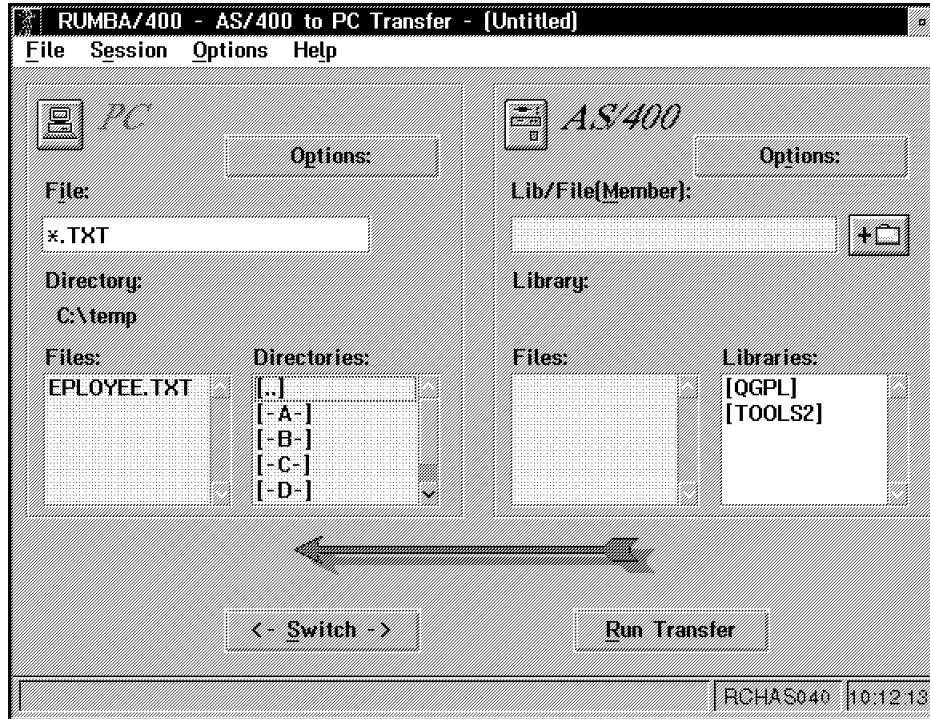


Figure 137. RUMBA/400 AS/400 to PC Transfer

7.2.1 Using RUMBA/400 File Transfer

1. Notice the (green) arrow at the bottom of the window. It shows you the direction of the file transfer. For this example, we use the AS/400 to PC Transfer. Choose the **Switch** button to change directions.
2. Type in your Library and File name on the right side of the window, or use the list boxes to select them. This indicates the file on the AS/400 system containing the records you want to download to your PC. Use the right slash "/" to separate the names.
3. Select the **Options** button on the AS/400 side.
 - a. Choose your Query options. Notice that when you choose an option, the panel changes, and you can select the function from the Summary list.
 - b. Select the field you want to run the function on, and then choose **Add Item**.

- c. Select **OK** when you are finished.
4. Now you are back to the RUMBA/400 file transfer panel.
Change to the PC side and select **Options**. Choose one of the output options: File, Display or Printer.
Select **OK** when you are finished.
5. Choose the appropriate **Options** from the menu bar: Decimal, Date, Time and Sort Sequence as well as the following:

Minimize on Transfer	Minimizes the file transfer window to icon size while the files are transferring.
Monitor Percent Complete	Displays a dialog box that shows you the percentage of data being transferred.
Notify When Complete	Displays a dialog box that lets you know when all files are completely transferred.
Close When Complete	Closes and exits the file transfer window after all files are transferred.
6. Save your file transfer definition:
 - a. Select **File**, then **Save As** and type in a name for your query.
 - b. You can create your own File Transfer Definition icon in the Program Object window by checking the Create Program Object box. Write the Title and folder that contains it. See Figure 138 on page 235.
 - c. Select **OK**.

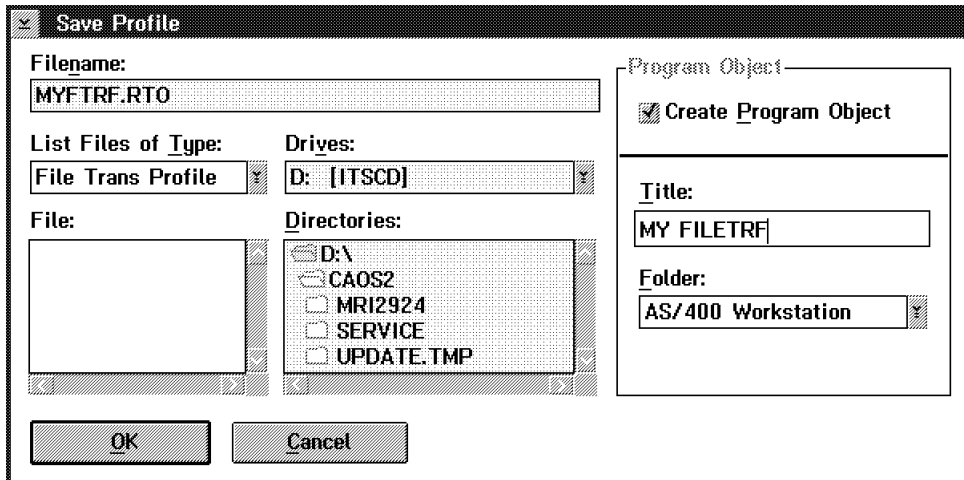


Figure 138. RUMBA/400 File Transfer Save Profile - Panel

7. Start the file transfer by selecting the **Run Transfer** button in the bottom-right corner of the window.
8. Close the session by double clicking on the RUMBA/400 icon in the top-left corner of the window.
9. Start your new icon. It starts the RUMBA/400 file transfer program with your configuration profile. You can run the transfer by choosing **Run Transfer**.

You can automate this as well by using the **AutoRun** Option described in 7.2.1.1, "Using the AutoRun Option."

7.2.1.1 Using the AutoRun Option

The **AutoRun** menu item from the **File** option lets you configure a profile to automatically transfer files when you select the icon for that profile. This can be a very useful feature. For example, if you want to transfer a report daily, you only need to configure the file transfer profile the first time, and then choose the AutoRun option. To transfer data, you just choose the icon rather than opening the file transfer program, opening the profile, and choosing the **Run Transfer** button.

7.3 RUMBA/400 Database Access

RUMBA/400 Database Access allows you to define queries to select and retrieve data from the AS/400 system without you needing to know SQL syntax. Each RUMBA/400 Database Access function is represented by an icon in the tool bar.

The function of each icon is listed in Figure 139.

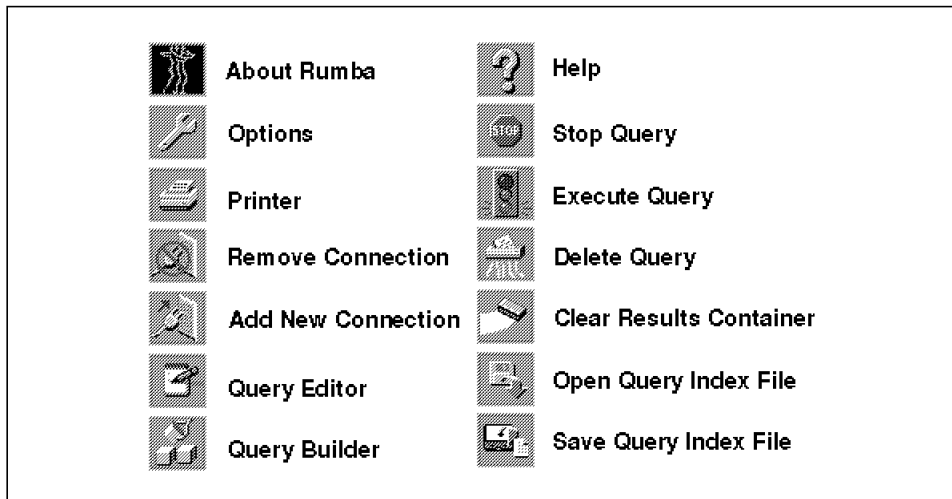



Figure 139. RUMBA/400 Database Access Tool Bar Icons Description

7.3.1 Installation

If RUMBA/400 Database Access was not installed during Client Access/400 Optimized for OS/2 installation, follow the procedure for selective install in 5.7.2, "Selective Install/Removal" on page 182. Once installation has been successfully completed, you should see the new icons in your Client Access/400 Optimized for OS/2 Software Products group.

7.3.2 Connecting to a Data Source

1. Make sure that you have started Client Access/400 Optimized for OS/2 before starting Database Access.
2. Select the  Database Access icon from the Software products group.

3. Select the Add New Connection icon and then an Add New Connection panel is shown.
4. Select the Data Source you want to use by clicking on the down arrow.

Data Source name

If you are running over TCP/IP, the AS/400 system name (data source name) you are connected to is shown as @I000000 on the ADD Connection box. This is because the application uses 8-character names and not the name that is qualified with the network ID. If you want to have the correct name, you have to set an alias name for the system. See 5.4, "Connections" on page 142 for information about setting an alias name.

5. When the connection to the Data Source is successful, you see the message "Logon succeeded". Choose **OK**.

The Data Source name is shown in the Connection site box.

7.3.3 Using the Query Builder

The Query Builder is the part of the RUMBA/400 Database Access that allows users to build SQL queries to the AS/400 database without having to know anything about SQL. It provides a GUI that enables the user to select what data to extract while the required SQL statement is dynamically built.

This section shows an example of a query that joins two files together to form the input to the query. If you are using a data source that points to QIWS, you are able to do a query on QCUSTCDT in QIWS in a similar way, but without any joins.

1. Select the Query Builder icon from the tool bar or **Query** followed by **Create Query** from the menu bar. The Query Builder panel is displayed with a library list.

Note:

The Query Builder extracts only the libraries on the user's library list from the connected AS/400 system. The capability to add to this library list within Database Access is not currently available. However, the user's library list can be modified on the AS/400 system by the system administrator using the following steps:

1. First, use DSPUSRPRF <user profile name> to display the user's profile. Find the name of the Job Description.
2. Then, do a WRKJOBDD <job description name> and choose the option to Change.
3. Press F10 for Additional Parameters.
4. Page down to the entry for Initial Library List and specify all of the names of the libraries to be included in the user's library list.

As you use the Query Builder dialog box to build a query, the clauses are displayed in the Query Statement box. For example:

```
SELECT TOOLS2.ITEM.ORDNUM, TOOLS2.ITEM.PICTURE,  
TOOLS2.ITEM.PRICE, COUNT(TOOLS2.ITEM.PART)  
FROM TOOLS2.ITEM, TOOLS2.PART WHERE  
TOOLS2.ITEM.PART = 'J4750' AND  
TOOLS2.PART.PARTNAME=TOOLS2.ITEM.PART GROUP BY  
TOOLS2.ITEM.ORDNUM, TOOLS2.ITEM.PICTURE, TOOLS2.ITEM.PRICE  
ORDER BY TOOLS2.ITEM.ITEMNUM
```

2. Choose the libraries to be queried by selecting one or more libraries or collections in the Collection/Library list box. The tables (files) in that library appear in the Tables list box and SELECT * FROM appears in the Query Statement box. See Figure 140 on page 239.

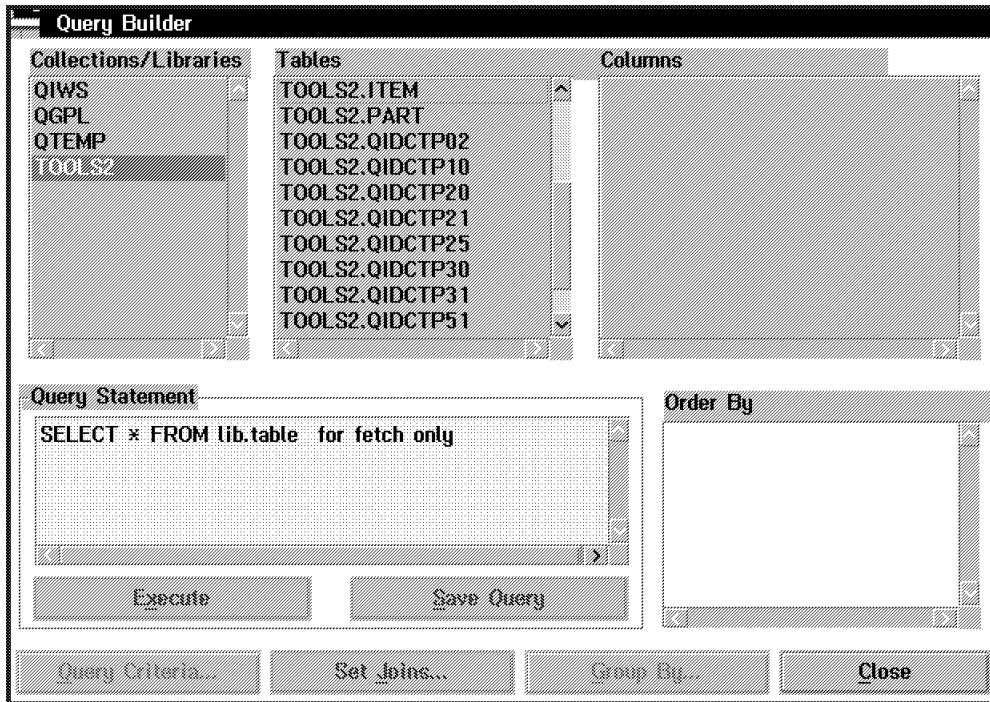


Figure 140. Query Builder - Library List

- In the Tables list box, select the table or tables for your query by clicking on them in the list. When you select a table or tables, the system retrieves the names of the columns (fields) in those tables and displays them in the Columns list box, and then completes the Statement box with the names of the tables. For example:

```
SELECT * FROM TOOLS2.ITEM,TOOLS2.PART
```

- In the Columns list box, select the table columns you want to retrieve information from by clicking on the columns in the list. The SELECT clause is expanded to include the column names in the Query Statement box. For example:

```
SELECT TOOLS2.ITEM.ORDNUM, TOOLS.ITEM.PICTURE,  
TOOLS2.ITEM.PRICE FROM TOOLS2.ITEM, TOOLS.PART
```

Hint:

To retrieve all the columns in the selected table or tables, do not select anything in the Columns list box.

5. You can execute the query now or continue with step 6 on page 240 to refine the query by choosing query criteria, joining tables, and specifying columns for grouping the retrieved data.

6. To enter query criteria, choose the **Query Criteria** button.

In the Query Criteria dialog box, you can select the criteria for your SQL statement. Here you can tell RUMBA/400 for Database Access to retrieve data based on the criteria you set, for example:

```
SELECT TOOLS2.ITEM.ORDNUM, TOOLS2.ITEM.PICTURE,  
TOOLS2.ITEM.PRICE FROM TOOLS2.ITEM, TOOLS2.PART  
WHERE TOOLS2.ITEM.PART = 'J4750'
```

7. To specify the query criteria:

- a. In the Column box, select the column for the first of the criteria.
- b. In the Operator box, select the operator for the first of the criteria.
- c. In the Value box, enter the value for the first of the criteria.
- d. Click on either the **AND** or the **OR** button. The AND/OR logical operators are not displayed for the first condition. The criteria appears in the Query Criteria box as shown in Figure 141 on page 241.

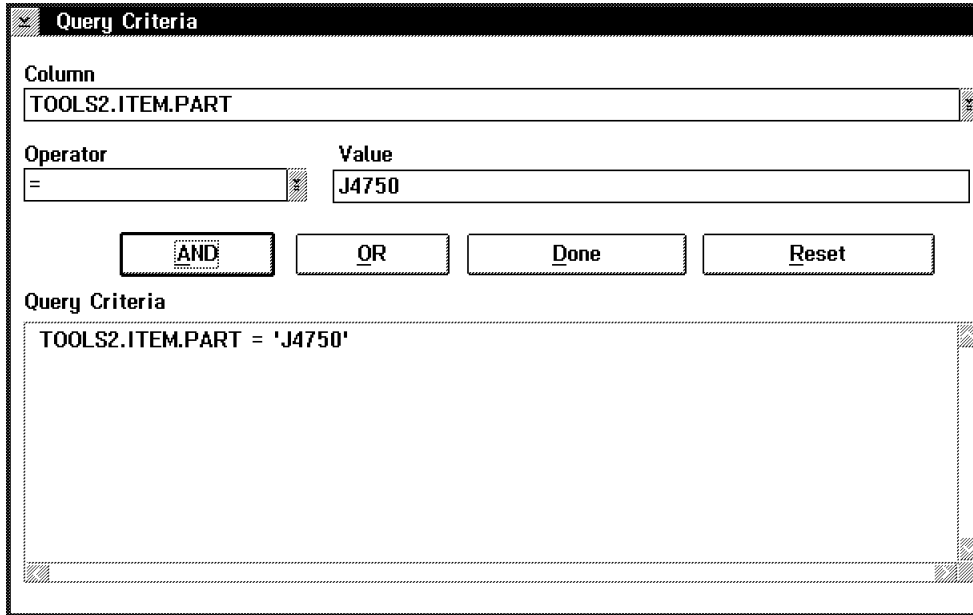


Figure 141. Query Builder - Query Criteria

- e. To add more criteria, repeat steps 7a on page 240 through 7c on page 240.
 - f. To AND the current criteria into the clause, click on the **AND** button. To OR the current criteria into the clause, click on the **OR** button. The criteria appear in the Query Criteria box.
 - g. Continue to add criteria in this fashion until the clause is complete.
 - h. Choose the **Done** button. The **Reset** button clears all the conditions.
- For more information about query criteria see 7.3.4, "Database Access Notes" on page 246.
8. Now you are back on the Query Builder panel.

To set joins between two or more tables, choose the **Set Joins...** button.

In the Join Tables dialog box, you need to define joins between one or more tables by specifying the tables to join and the columns (fields) they are to be joined on. When you execute the query, the system logically creates the Cartesian product of the joined tables.

The join criteria specified in the Join Tables dialog box appear in the WHERE clause of the query. For example:

```
SELECT TOOLS2.ITEM.ORDNUM, TOOLS2.ITEM.PICTURE,
TOOLS2.ITEM.PRICE FROM TOOLS2.ITEM, TOOLS2.PART WHERE
TOOLS2.ITEM.PART = 'J4750' AND
TOOLS2.PART.PARTNAME=TOOLS2.ITEM.PART
```

9. To specify the join criteria:

The columns of both tables appear in the Select Columns to Join Selected Tables on list boxes.

- a. Click on one column in each of the Select Columns to Join Selected Tables on list boxes. These must be equivalent columns.
- b. Click on either the **AND** or the **OR** button in order to add the condition to the join criteria.

The logical operator is not displayed for the first condition. The criteria appears in the Join Criteria box as shown in Figure 142.

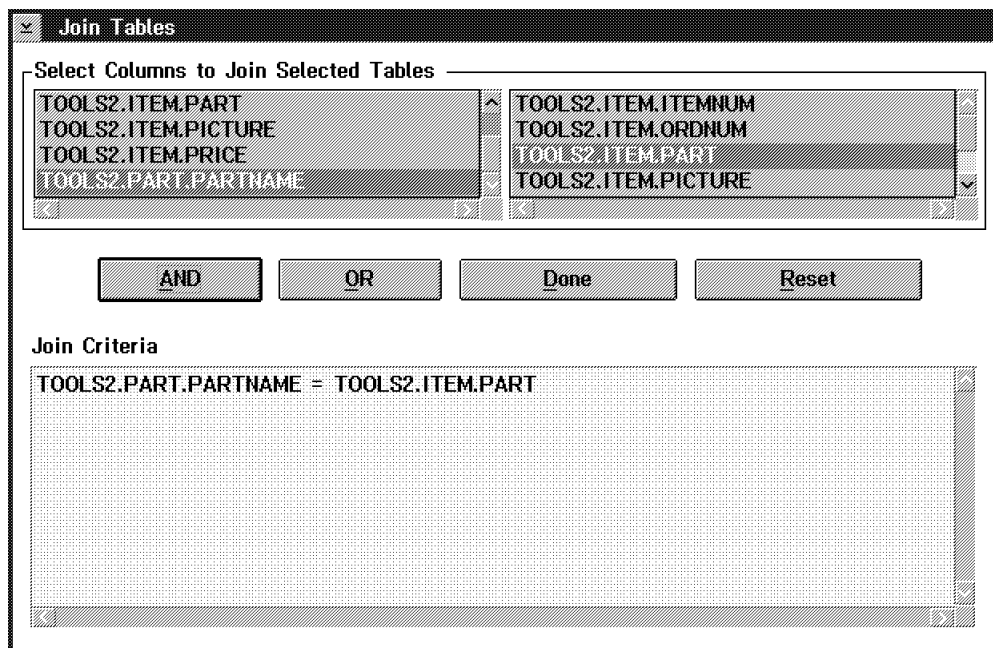


Figure 142. Query Builder - Join Criteria

- c. To add more join criteria, repeat steps 9a and 9b.

- d. To AND the current criteria into the clause, click on the **AND** button.
To OR the current criteria into the clause, click on the **OR** button.
The criteria appear in the Join Criteria box.
 - e. Continue to add join criteria in this fashion until you are finished.
 - f. Choose the **Done** button. The **Reset** button will clear all conditions.
10. Now you are back on the Query Builder panel.

To form groups from the retrieved information, choose the **Group By...** button.

The Group By Criteria dialog box lets you specify columns to group the retrieved data by. You can include an aggregate function in the Group By clause. For example:

```
SELECT TOOLS2.ITEM.ORDNUM, TOOLS2.ITEM.PICTURE,  
TOOLS2.ITEM.PRICE, COUNT(TOOLS2.ITEM.PART)  
FROM TOOLS2.ITEM, TOOLS2.PART WHERE  
TOOLS2.ITEM.PART = 'J4750' AND  
TOOLS2.PART.PARTNAME=TOOLS2.ITEM.PART GROUP BY  
TOOLS2.ITEM.ORDNUM, TOOLS2.ITEM.PICTURE, TOOLS2.ITEM.PRICE
```

11. To set Group By criteria:
- a. In the Aggregate Function drop-down list box, select a function.
 - b. In the Column drop-down list box, select a column for the function to operate on.
 - c. Choose **ADD Aggregate Function**.
 - d. From the Group By list box, select the columns to appear after the aggregate function.
 - e. Choose the **ADD Group by Column(s)** button. The criteria are displayed in the Selected Column Functions and Group by Column(s) boxes as shown in Figure 143 on page 244.

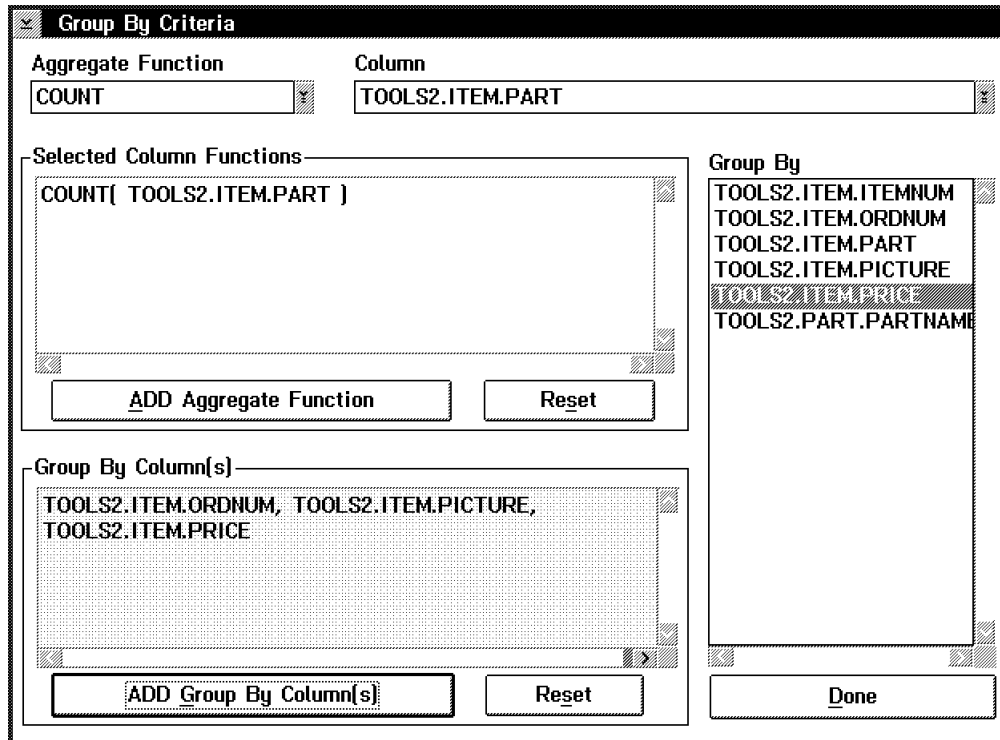


Figure 143. Query Builder - Group Criteria

- f. You can repeat this process for additional functions.
- g. When you are finished setting Group By criteria, choose the **Done** button. The Group By clause is added to the query.
- h. Now you are back on the Query Builder panel.

Use the Order By list box to create an ORDER BY clause in the query. An ORDER BY clause specifies the order of the rows to be returned by the query. To specify the order of the columns in the query, click on the columns in the Order By list box. Use the scroll bar at the right of the list box to scroll through the list. The order in which you select the columns is the order in which they will appear. Notice that you can only order by the columns you have selected from the Columns list box.

For example:

```
SELECT TOOLS.ITEM.ORDNUM, TOOLS.ITEM.PICTURE,  
TOOLS.ITEM.PRICE, COUNT(TOOLS.ITEM.PART)  
FROM TOOLS.ITEM, TOOLS.PART WHERE  
TOOLS.ITEM.PART = 'J4750' AND  
TOOLS.PART.PARTNAME=TOOLS.ITEM.PART GROUP BY  
TOOLS.ITEM.ORDNUM, TOOLS.ITEM.PICTURE, TOOLS.ITEM.PRICE  
ORDER BY TOOLS.ITEM.ITEMNUM, TOOLS.ITEM.PRICE,  
TOOLS.ITEM.PART, TOOLS.PART.PARTNAME
```

A completed Query Builder panel is shown in Figure 144.

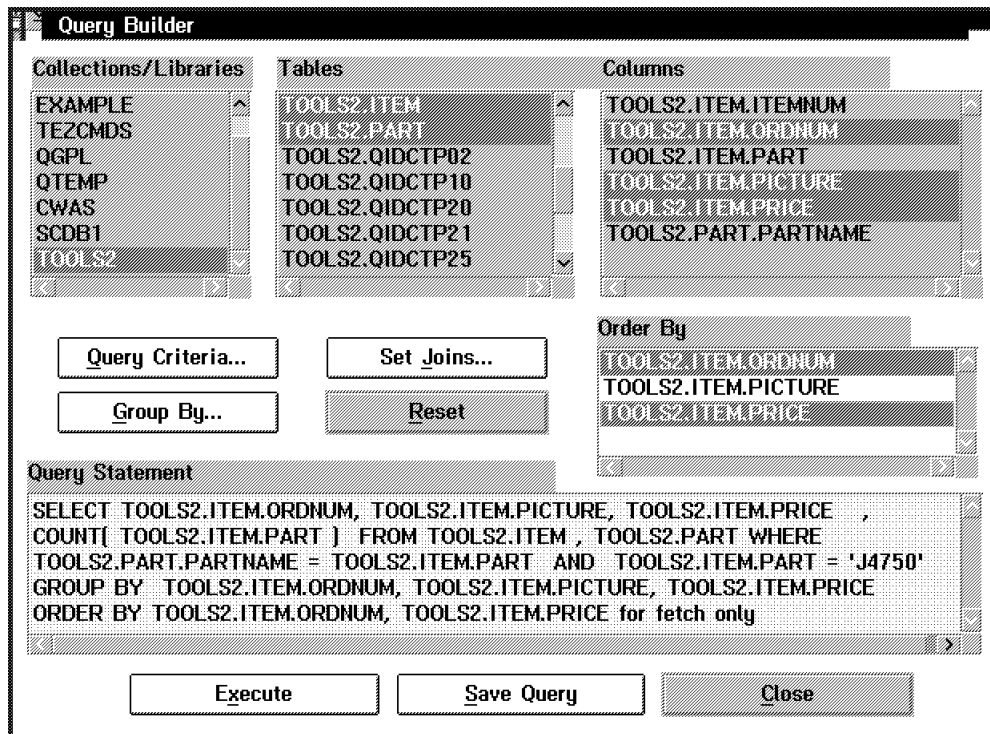


Figure 144. Query Builder - Group Criteria

- i. To save the finished query, choose the **Save Query** button.
- j. To execute the query, choose the **Execute** button.
- k. To reset the Query Builder dialog box and start over, choose the **Reset** button.
- l. To exit the Query Builder dialog box, choose the **Close** button.

Recalling Queries:

A saved query can be recalled by selecting the **Query** list box on the Query Builder panel.

7.3.4 Database Access Notes

- For the IN and NOT IN comparison Operators for the Query Criteria, the list of values should be entered in the Value entry box delimited by commas. For example, if you want to select only the records from the states of MN and NY and TX:
 - Specify the Column lib.table.STATE.
 - Choose the IN comparison Operator, and enter MN, NY, TX in the Value box.

The query criteria is formatted into:

```
lib.table.STATE IN ('MN', 'NY', 'TX')
```

Quotes are added to literal strings automatically. Do not leave any space between the entry values as in MN, NY, TX which are then incorrectly formatted into ('MN', ' NY', ' TX').

- When you choose the BETWEEN or the NOT BETWEEN comparison Operators for the Query Criteria, two Value entry boxes are provided for the first and second values in the BETWEEN <first value> AND <second value> clause.

7.4 Open Database Connectivity

An ODBC driver is shipped as part of the Client Access/400 Optimized for OS/2 client. This ODBC driver allows OS/2 application programs to access DB2/400 data residing on the AS/400. ODBC

The Client Access/400 OS/2 ODBC driver meets level 2, version 1.0 of the ODBC specification. The ODBC specification has three levels of compliance: re, level one, and level two. Core is the minimal level of compliance and each additional level adds significant function. The ODBC specification has undergone revision, with some new APIs added to version 2.0. Further revisions of the specification are expected.

In order to use the Client Access/400 ODBC driver, it is necessary to have ODBC driver manager and administration programs. These programs are

available from companies such as Visigenic Software (<http://www.visigenic.com>), and Intersolv (<http://www.intersolv.com>). They are not provided with Client Access/400 at this time.

The OS/2 Client Access/400 ODBC driver is installed during installation of the OS/2 Optimized client. The ODBC driver consists of three files: the driver program, EHNODBC2.DLL; the set-up program, EHNSTP2.DLL; and the MRI file, EHNODBC2.MR0. In addition two ODBC INI files get updated or created during Client Access installation, ODBCINST.INI and ODBC.INI.

The ODBC administration program is used to create and configure data sources. For convenience, think of a data source as a connection to an AS/400 and a set of attribute parameters for accessing data over that connection.

The ODBC administration program uses the information in the ODBC.INI and ODBCINST.INI files to present menus of drivers and data sources to manipulate. The Client Access/400 ODBC set-up program will be called when: the Client Access/400 driver is selected to add a new data source; a data source associated with Client Access/400 is selected for configuration; a data source associated with Client Access/400 is selected for deletion.

Note

When selecting a system name for a data source, please select an alias and not a fully qualified system name. There is a known bug using the fully qualified system name.

Limitations and known problems

The Client Access/400 Optimized for OS/2 ODBC driver relies upon the router to provide its EBCDIC->ASCII translation tables. If the router is not running, the ODBC driver will encounter a trap in EHNCL000.DLL. By default, the router is started as part of the Client Access startup process.

The ODBC driver will return -1 from the SQLAllocEnv call if the ODBC driver's MRI file, EHNODBC2.MR0, is not in a subdirectory underneath the directory from which the executing program is running. The subdirectory containing the MRI must begin with the letters MRI, such as MRI2924.
PTF

The ODBC driver will return -1 from the SQLAllocEnv call if the application uses a calling convention other than the convention used by the driver

manager. The Visigenic driver manager expects parameters to be on the stack, not in the registers. Try using the /Ms parameter on the compile step. If the calling conventions don't match you'll often see a variety of traps, but not always!

If the AS/400 associated with a data source is down, the SQLAllocEnv and SQLAllocConnect calls in a program will return zero but the SQLConnect call will fail and return -1.

There is a known bug in the ODBC driver which causes the SQLConnect call to fail if the system name for the data source in the ODBC.INI file is fully qualified (networkName.System). Use an alias instead of the fully qualified name.

The Client Access/400 Optimized for OS/2 ODBC driver does not support a user interface in the SQLDriverConnect API at this time.

ODBC applications running under OS/2's WIN-OS2 environment are not supported by this driver. However, the Client Access/400 for Windows 3.1 ODBC driver can be used. Installation and configuration is a manual process and is documented in the ODBC Users Guide (SC41-3533).

Chapter 8. Remote Commands

This section describes the various remote command functions that are provided as part of Client Access/400 Optimized for OS/2 and includes the following:

- 8.1, "RUNRMTCMD Run Remote Command"
- 8.2, "Remote Command" on page 253
- 8.3, "Distributed Program Call" on page 254

8.1 RUNRMTCMD Run Remote Command

The Run Remote Command (RUNRMTCMD) allows AS/400 users to run a command on a remote system that is running the target portion of this function.

Note:

When you run this command on a Client Access/400 client, you need to specify *SNA for the address type, even if you are running Client Access/400 over TCP/IP.

When the command is sent to the remote system, the local system waits for the command to complete, and the output from the remote command will be placed in a spooled file.

An important difference between this command and the STRPCCMD from the PC Support/400 is that you can issue the RUNRMTCMD from any AS/400 terminal to any PC workstation. So you can make, for example, a backup of a PC server from a remote AS/400 terminal to an AS/400 tape unit.

8.1.1.1 Limitations using the RUNRMTCMD

There are some limitations to this capability:

1. **Command Length.** The length of the command sent in the CMD parameter must be no longer than 1000 characters. If it is longer, the resulting output in the spool file will contain an appropriate error message.
2. **Use of the OS/2 command operators.** Command operators of OS/2 provides, such as & which chains multiples commands together and >

which redirects output to a file, are allowed, and operate as expected. However, the output in the resulting spool file may be incomplete when any of these operators are used.

3. **Commands that start other sessions.** It is possible for a command sent from the AS/400 system to start one or more new sessions besides the one it is running in. Some of these other sessions might still be running after the command itself has ended its own session. In this case, in order to return output to the AS/400 system, a 60-second timeout period starts, at the end of which the output so far will be sent to the AS/400 system, and stored in a spool file, even if one or more sessions started by the personal computer command have not yet ended. If there is much output, it may take several minutes just to send the output data back to the AS/400 system.
4. **Commands that run for a long time.** The RUNRMTCMD command, used to send a command to a personal computer, does not return the control to the AS/400 user until the personal computer command has ended. If the command never ends, RUNRMTCMD does not end and no output is produced in a spool file.

8.1.1.2 Set up the Personal Computer for the RUNRMTCMD


In order to enable the Run Remote Command (RUNRMTCMD) command to be used in the PC, you have to add the CWBARRRC.EXE file to the Transaction Program page on the General Setting of the Client Access/400 Optimized for OS/2 product.

Technical

A transaction program (TP) is a program that uses the Advanced Program to Program Communications (APPC) system to communicate with a partner application program in the same node.

The top layer of the Systems Network Architecture (SNA) is the transaction service layer. A transaction involves an exchange of messages that accomplishes a specific task.

Here it is what you have to do:

1. From the software products panel, double click on the  Product Registry icon.

You see a listing of all the Client Access/400 components listed under the main product, Client Access/400 Optimized for OS/2.

2. From the Products Registry, highlight Client Access/400 Optimized for OS/2 product in the list.
3. Click on the right hand button of the mouse (alternatively you can choose Selected from the menu bar). Select **Open** and then **General Settings**.
4. You are now presented with the General Settings notebook.
5. Select the **TPs** page.
6. You use this page if you want to select attributes for transaction programs. For example, RUNRMTCMD.
7. Select the **Add** button.
8. The default is to use D:CAOS2CWBARRRC.EXE, which is the one we want for the RUNRMTCMD command.
9. Choose the **Advanced options** button.

In this panel, you can change the TP presentation and operation type. Presentation type is the method Attach Manager uses to display the TP on the screen. Operation type is the method used to start and load the TP. Operation type also determines if the several copies of a remotely started TP can run at the same time. The TP options are:

Allow Commands from All Users

Use this radio button to indicate that all users are authorized to send commands to this personal computer. A remote command sent from the AS/400 system to the PC does not have the User ID and the password checked through UPM (User Profile Management Services). If you selected this radio button, all users have authority to commands submitted from the AS/400 system.

If the Allow commands sent from the AS/400 system check box is not checked, this radio button is not enabled.

Allow Commands from Authorized Users

Use this radio button to indicate that you allow authorized users to run commands on this personal computer. A remote command sent from the AS/400 system to the PC has the User ID and password checked through UPM.

Authorize users (UPM)

Use this push button to access UPM. UPM enables you to authorize users to run commands on this personal computer,

Background.

Use this radio button to indicate whether you want the transaction program (TP) to run in the background.

Full Screen

Use this radio button to indicate whether you want the transaction program (TP) to run in an OS/2 full-screen session.

Presentation Manager

Use this radio button to indicate whether you want the transaction program (TP) to run under OS/2 Presentation Manager.

VIO-Windowable

Use this radio button to indicate whether you want the transaction program (TP) to run under OS/2 Presentation Manager in an OS/2 window session.

Non-queued, Attach Manager Started

Use this radio button to indicate whether you want the transaction program (TP) to use the non-queued, Attach Manager started operation method. If you select this radio button, several copies of the program can run at the same time, and each is started by Attach Manager.

All TP definitions for a given program must have the same operation type.

Queued, Attach Manager Started

Use this radio button to indicate whether you want the transaction program (TP) to use the queued, attach manager started operation method. If you select this radio button, one version of the program is run at a time, and the program is started by Attach Manager. Subsequent attach requests that arrive while the program is active are queued.

Queued, Operator Started

Use this radio button to indicate whether you want the transaction program (TP) to use the queued, operator started method. If you select this radio button, one version of the program is run at a time.

If an attach request arrives and the program has not been started, a message is issued to you requesting that you start the specified program. Subsequent attach requests that arrive while program is active are queued.

Queued, Operator Preloaded

Use this radio button to indicate whether you want the transaction program (TP) to use the queued, operator-started method. If you select this radio button, one version of the program is run at a time. If an attach request arrives and the program has not been started, the attach request is rejected. Subsequent attach requests that arrive while program is active are queued.

10. Select **OK**.

11. Select **Add**.

You now should have this command listed as a Transaction Program.

12. Close the Settings notebook by double clicking on the top left-hand corner of the notebook.

From the command line on an AS/400 session, you can type:

```
RUNRMTCMD CMD('dir d:\ /s') RMTLOCNAME(xxxxxx)
```

Where xxxxxx is your PC name.

The RUNRMTCMD did a directory listing of the D: drive as a batch command while the PC was being used interactively.

8.2 Remote Command

The Remote Command (RMTCMD) sends an AS/400 CL command or group of commands to an AS/400 system. The commands are sent to the managing or default AS/400 system unless you use the remote system name parameter to specify a different system.

The RMTCMD works in much the same way that it did in PC Support/400, but now it uses a new server application, so it avoids some of the problems that PC Support/400 had. Specifically, the Client Access/400 server application runs with the current user's authority, so users cannot accidentally (or

intentionally) access objects that they do not have authority to. This was a problem in PC Support/400.

The following example issues the Delete Library (DLTLIB) commands and specifies the TEMP1 library as the one to delete. The /z parameter minimizes the number of messages that are displayed on your workstation.

```
RMTCMD DLTLIB TEMP1 /Z
```

The following example issues a series of AS/400 CL commands that are found in a file, COMMANDS.LST.

```
RMTCMD /I COMMANDS.LST
```

8.3 Distributed Program Call

Distributed Program Call is a new API that did not exist in PC Support/400. It allows the user to write an application that calls AS/400 programs or APIs. The DPC API allows input, output, and inout parameters so it can get a lot more data back than RMTCMD, which only allows reply messages to be returned. The other big benefit of the Distributed Program Call is that the application writer on the client now has access to *all* AS/400 objects. In the past, PC Support/400 opened individual interfaces to AS/400 commands or data queues. With the Distributed Program Call API everything that has an AS/400 API is available: user spaces, data areas, and so on. For more information, refer to *Client Access/400 Optimized for OS/2 API and Technical Reference*, SC41-3511.

Chapter 9. Graphical Interfaces

There are now three options to enable you to access AS/400 objects in a graphical manner:

- 9.1, "Graphical Operations"
- 9.2, "System Object Access" on page 258
- 9.3, "Graphical Access for OS/400" on page 259

9.1 Graphical Operations

The first option introduced was Graphical Operations which was originally developed using ENVY/400. ENVY/400 is based on Smalltalk.

Graphical Operations is intended for use by operations and systems management personnel. It was the first product of its kind developed for the AS/400 system, and is recommended for environments in which a single application satisfies the needs, and in which the availability of the more powerful hardware is not a problem. The client workstation requirements are the following:

- Windows 3.1 Client: Min. 16MB memory and a 25MHz/486 processor.
- OS/2 Client: Min. 24MB memory and a 33MHz/486 processor.

The installation program for Graphical Operations is found in the Software Catalog folder, and installs an icon for each AS/400 system that you are connected to. A tutorial is provided that gives an overview of the functions that Graphical Operations provides.

Figure 145 on page 256 is the first panel to be displayed when Graphical Operations is started. From here, you have access to various functions an operator uses in his daily job.

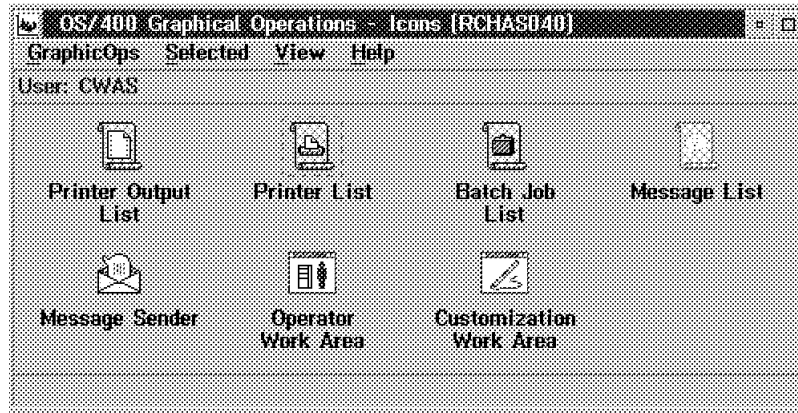


Figure 145. Graphical Operations Main Group

Figure 146 shows an example of a printer list. You have many options to define which columns you want to see, and you can start, stop, and hold the printers.

Icon	Name	Status	Description
[Printer Icon]	[AN4039	Message waiting	Device created for PCCWAS.
[Printer Icon]	PCCWASPA	Powered off or not get	Device created for PCCWAS.
[Printer Icon]	PCCWASS5	Powered off or not get	Device created for PCCWAS.
[Printer Icon]	TRSLOPEZS3	Unavailable	Device created for TRSLOPEZ.

4 items

Figure 146. Graphical Operations Printer List

If you double click on a printer, you see the jobs for that particular printer. Figure 147 on page 257 shows an example of a printer details panel with all of the spool files. It is possible to drag and drop a spool file from one printer to another by just using the mouse.

Icon	Name	User data	User	St
[Icon]	OSYSPRT	CHGLICMF	CWAS	^
[Icon]	OPJOBLOG	P232M030	CWAS	
[Icon]	OPNPSPTF		MRAS	
[Icon]	OSYSPRT		CWAS	v

0 minutes old

10 Items

Figure 147. Graphical Operations Printer List Details

An OS/400 spool file viewing capability is provided with the V3R1M1 refresh as part of the Client Access/400 Optimized for OS/2 Network Print function. This function provides users the ability to view AS/400 spool files on the PC. In addition, a subset of the IBM AFP(TM) Workbench product will be available on a trial basis for viewing and printing documents in shared folders on the user's PC.

A more advanced area for the operator (Figure 148) allows you to fulfill many operator related tasks.

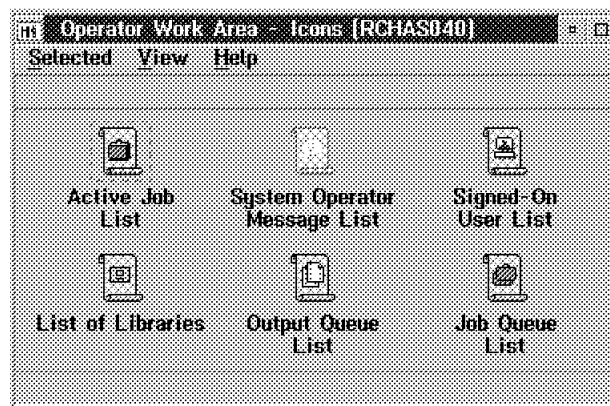


Figure 148. Graphical Operations Operator Work Area

See the Graphical Operations manuals for detailed information:

- *Graphical Operations Setup*, SC41-3122
- *Graphical Operations Getting Started*, SC41-3202

9.2 System Object Access

The second product to provide graphical access to AS/400 systems was System Object Access. System Object Access is only available for use with Client Access/400 for Windows 3.1.

System Object Access was developed partly in response to Graphical Operations resource requirements, but mainly to satisfy the requirement that business partners be able to integrate graphical views of AS/400 objects into their applications. System Object Access provides a full set of APIs for displaying customized lists and attribute views of objects, as well as the ability to access and modify attribute data directly.

You need a minimum of 6MB of memory for your Windows client. It is the intention of IBM to support and enhance this interface and the function behind it.

For Client Access/400 Optimized for OS/2, some of the functions that System Object Access provides are integrated into the product (for example, network printers).

Figure 149 shows the network printer folder where all your AS/400 printers are represented through icons.

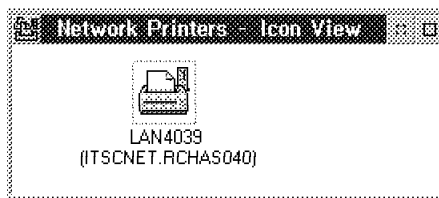


Figure 149. Network Printers

If you double click on a printer icon, the panel shown in Figure 150 on page 259 is displayed with a list of the jobs waiting to be printed.

Icon	File	Status	User	Copies	Pages
	QPJOBLOG	Message waiting	MRAS	1	2
	QPJOBLOG	Waiting to print	MRAS	1	2
	QPJOBLOG	Waiting to print	MRAS	1	2
	QPJOBLOG	Waiting to print	MRAS	1	4
	QPJOBLOG	Waiting to print	MRAS	1	2
	QPJOBLOG	Waiting to print	MRAS	1	4
	QSYSRPT	Held	CWAS	1	1
	QPJOBLOG	Held	CWAS	1	2

Figure 150. Network Printer Details

9.3 Graphical Access for OS/400

While both Graphical Operations and System Object Access are true cooperative processing applications, Graphical Access for OS/400 is not.

Graphical Access for OS/400 reads the 5250 data stream and presents it in a graphical fashion. The application resides on the AS/400 system, and generates the same load to the system that 5250 emulation with RUMBA/400 or PC5250 would do.

The V3R1M1 refresh for Client Access/400 includes Graphical Access for OS/400, which is the new graphical user interface for OS/400. PC users no longer need to change from their graphical environment to a character-based environment to use OS/400 functions. Graphical Access for OS/400 covers OS/400 commands, menus and displays. Now even command prompting can be as simple as the click of a mouse button.

The client workstation requirements are the following:

- Windows 3.1 Client: Min. 8MB memory and a 33MHz/386 processor.

- OS/2 Client: Min. 8MB memory and a 33MHz/386 processor.

Note:

The install option for Graphical Access for OS/400 is not shown on the GO LICPGM panels. You must use RSTLICPGM LICPGM(5763XG1) OPTION(5) to install the product on the AS/400 system. Graphical Access for OS/400 is installed from the Software Catalog on the PC (the catalog can be refreshed by clicking the mouse on the top left corner of the catalog panel, and selecting **Refresh now** from the list).

An example of the AS/400 Main Menu is shown in Figure 151. Note that you can use the menu bar in place of the usual function keys. The same functions are provided in the menu bar pull-down menus. At the bottom are push buttons for the standard functions. Every menu can be selected by a mouse click, but you still have the option of the command line.

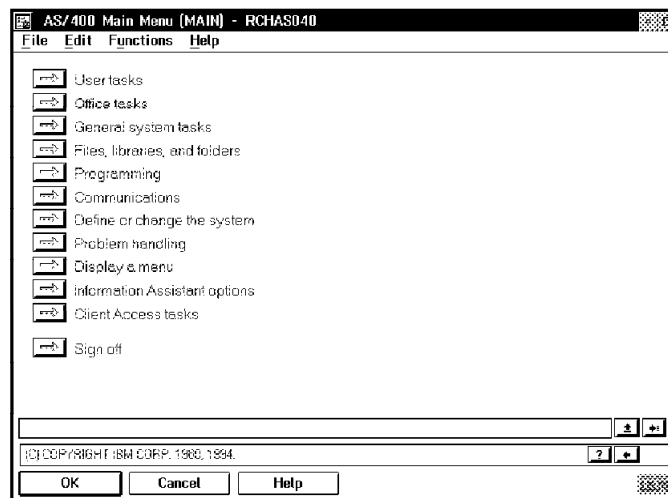


Figure 151. Graphical Access Main Menu

Figure 152 on page 261 shows the presentation for the command WRKWTR.

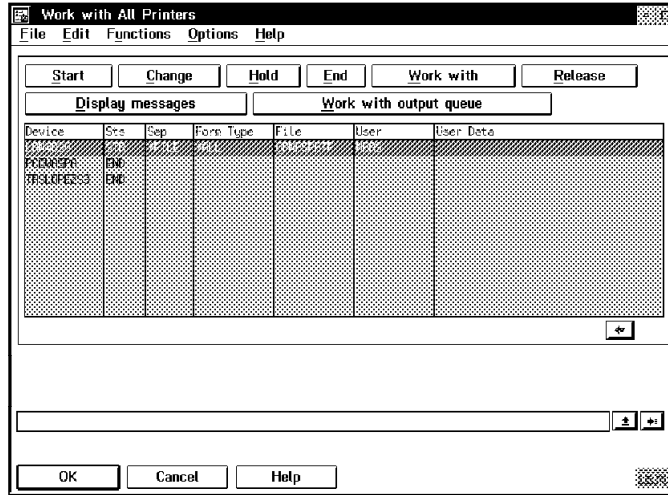


Figure 152. Graphical Access Work with All Printers

If you select a printer and the Work with output queue button, you get a list similar to the one shown in Figure 153. The functionality with Graphical Access for OS/400 is exactly the same as with a 5250 terminal emulator, but you can use your mouse to navigate through the panels.

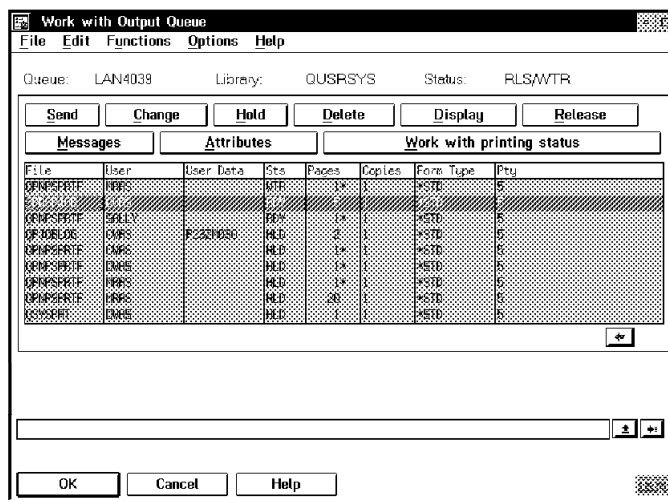


Figure 153. Graphical Access Work with Output Queues

Figure 154 on page 262 shows an example of a command, where you had to type different parameters manually without Graphical Access for OS/400. You can select the domain role by a mouse click on the appropriate radio button. Other options provide a second panel with radio buttons, list boxes, check boxes, and YES/NO fields.

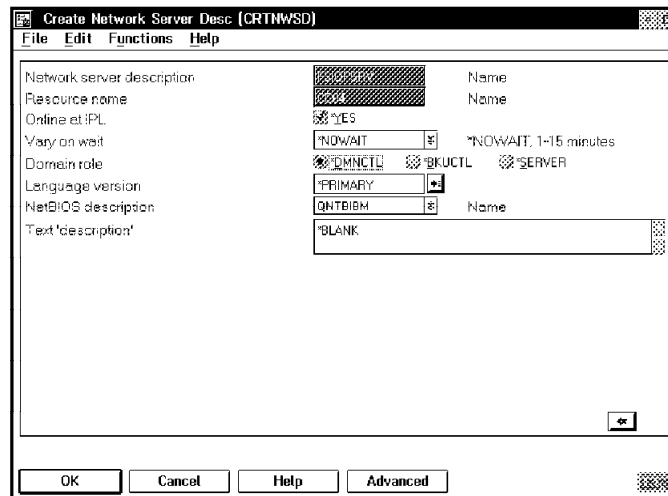


Figure 154. Graphical Access Create Network Server Description

Chapter 10. Emulators

This chapter looks at the emulators that are provided with Client Access/400 Optimized for OS/2 and also at those emulators that are available separately from Client Access/400.

10.1 RUMBA/400

This section covers an introduction to RUMBA/400 and some of the enhancements in Version 3.0 Release 1.0. It focuses on what is new in Version 3.0 Release 1.0, and is not intended to be a comprehensive user's guide to the product. For more information on RUMBA/400 please see the following manuals:

- *Client Access/400 RUMBA/400 User Guide*, SC41-3550
- *Client Access/400 RUMBA/400 Tools*, SC41-3551
- *Using V2R3 DOS and OS/2 PC Support/400 under OS/2 2.1, Including CM/400, CM/2 and RUMBA/400 for OS/2*, GG24-4070-01

10.1.1 Introduction

RUMBA/400 is a package that provides display and printer emulation to personal computers connected to AS/400 systems, and takes full advantage of OS/2 graphical user interface (GUI) capabilities.

RUMBA/400 provides the following functions and features:

- **Edit**

By making use of the OS/2 clipboard, a selected area can be cut and copied or pasted. In addition, data can be pasted to other application programs, such as spreadsheet programs that support the Pastelink function.

- **Graphical User Interface**

The GUI interface provides the following functions:

- QuickStep Pad
- Hotspots
- Macro function
- Automatic macro recording and playing
- Keyboard function setup
- Display color setup

- Automatic font size adjustment
- Fixed font size function
- Display and window appearance setup
- Menu bar setup
- On-line help

- **Display**

Up to 32 sessions (display/printer are supported)

- Text assist feature for OfficeVision/400 users
- Enhanced User Interface

- **Printer**

Printer sessions give you:

- Printing with OS/2 printer drivers
- Print function by OS/400 Host Print Transform (HPT)
- Multiple host print function in multiple sessions

RUMBA/400 provides a wide range of printer features using either the printer session or menu commands. The printer session emulates an IBM 3812 SCS printer. By using the virtual printer support feature of Client Access/400 other users can access the printer for both AS/400 and PC printing.

Without opening a printer session, you can print screens from an AS/400 application using the Application Print feature in the display session. The software supports printing to a file and has a capture feature that supports all OS/2 printer drivers. See 10.1.6, "Application Print" on page 267 for further information on this feature.

- **Programming Interfaces**

- EHLLAPI
- DDE

10.1.2 Enhancements in Version 3.0 Release 1.0

This section looks at some of the enhancements in RUMBA/400 for Version 3.0 Release 1.0. They include such things as a tool bar, status bar and the ability to capture data from one or multiple application screens.

10.1.3 Included with Client Access/400

Prior to Version 3.0 Release 1.0 and Version 3 Release 0.5, RUMBA/400 was a separately- orderable feature of PC Support/400. It is now part of the Client Access/400 family. This means that when you acquire a Client Access/400 license, that user can use RUMBA/400 and/or Personal Communications/5250 for no additional charge.

10.1.4 Color Screen Tool

Display session window colors can be changed to distinguish between different host sessions. For monochrome displays, you can choose between black text on a white background, or white text on a black background. With color displays, the background, text, and host field attribute colors can be set.

The easiest way to change the colors in the display window is to use the color screen icon from the tool bar. You cannot mix a custom color using this method; however, it is quicker and the effects are immediate.

The color dialog is shown in Figure 155. Of course, this book is in black and white so the colors can't be seen.

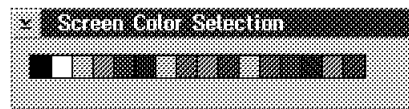


Figure 155. RUMBA/400 - Coloring Tool

Note: Your screen must be in color mode to use the color screen tool. If your screen is not already in color, from the *Options* menu, choose **Display**. Choose the Color radio button, then click **OK** to return to the session window.

To change the screen colors using the screen tool:

1. Choose the color screen icon from the tool bar. The Screen Color Selection box is displayed and the cursor changes to a paint brush.
2. Select a color from the palette by moving the paint brush to the chosen color and clicking the left mouse button.
3. Touch the paint brush to the area of the screen (background or text) you want to change and click the left mouse button.
4. Choose another color and repeat the process.

5. When finished, select **Close** from the system menu to close the Screen Color Selection box.
6. Save the color setting changes by choosing **Save** from the **File** menu.

Note that you may need to color from several different panels to make sure you have changed every type of screen attribute.

To change the colors back to the IBM supplied defaults:

1. Select **Options** and **Display....** followed by **Advanced....** from the menu bar.
2. Select **Default** followed by **OK**.

10.1.5 Print Options

You use the Print Options dialog to set up how all printing under RUMBA/400 will occur. Anytime you perform a RUMBA/400 print operation the settings on this panel determine how and what gets printed. Note that this involves print operations for display emulation sessions only.

You can print all screens, the current screen, or a selected number of screens. The data can be placed on the Clipboard, sent to the current OS/2 printer or printed to a file on disk. If the data is going to be printed on a printer, the text can be formatted in any installed printer font, at any size with any attributes such as bold and italics.

The Print Options dialog is shown in Figure 156:

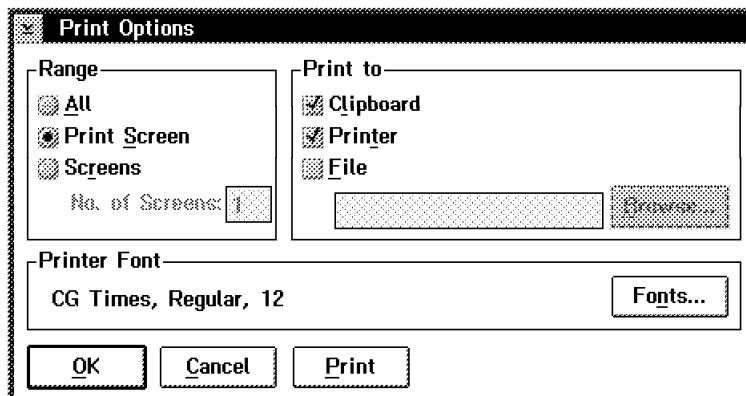


Figure 156. RUMBA/400 - Print Options Panel

In this example we are printing the current screen to both the OS/2 Clipboard and to the default printer using a TrueType Courier New 10 point font.

Additionally, you can use either default parameters or application specific parameters that you can use or set up in the Application Print Setup command. You can also use Print Options with Application Print Setup to automate capturing numerous host application screens.

Once you are satisfied with all of the selections, press **OK** to save these selections and return to the main RUMBA/400 screen without printing. To print these selections, choose **Print** under the File menu, or, from the Print Option dialog box, choose **Print** to save these selections and print as specified.

10.1.6 Application Print

Choose this option to format and print numerous screens from a host application without having to use a host printer. Once the settings for a host application have been entered, all you need to do is go to the application and select **Print** from the File menu for a printout of preselected screens.

An example of when you might want to use the application print function is when you want a printout of all your active jobs. This is typically a multiple page output request, and may involve ten or more screens of data. You could issue a `WRKACTJOB OUTPUT(*PRINT)`, but this would then have to be redirected to a RUMBA/400 printer emulation session to print on your ASCII printer.

The application print function “knows” the format of various system screens, and can be configured for others. `WRKACTJOB` is an example of a screen already known by RUMBA/400. When you execute a print operation from the `WRKACTJOB` screen of your terminal emulation, RUMBA/400 will print the first screen and then automatically page down until it reaches the last screen. The header information will only appear at the top; RUMBA/400 will automatically “cut” the information out of the middle screens. All of this is configured from the Application Print Setup dialog, which is shown in Figure 157 on page 268.

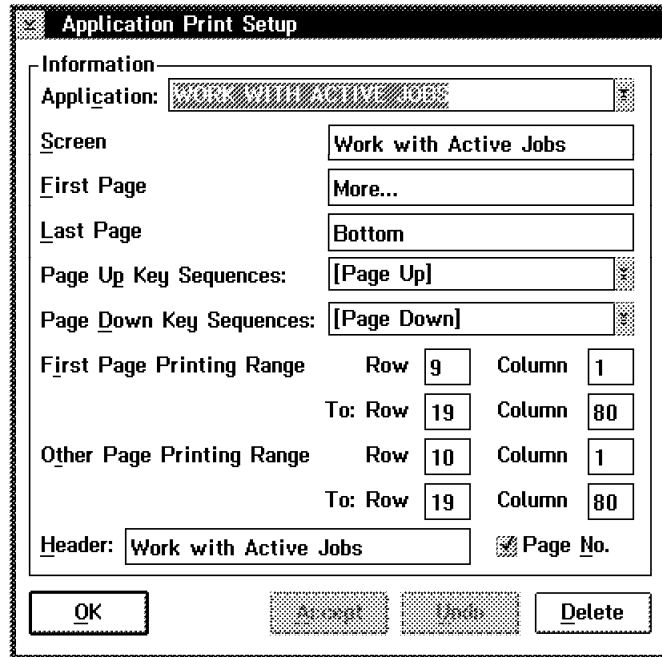


Figure 157. RUMBA/400 - Application Print Setup Panel

This dialog contains the information RUMBA/400 needs to know about the layout of the screen(s) to be captured. Included is such information as how RUMBA/400 can identify the screen (Screen Identification), how it knows when to page down (First Page Identification), and what portion of the screen to “cut out” of the first and remaining screens.

Included in this option are default settings for a number of host applications. You can edit these default settings or add new host applications to the list.

10.1.6.1 Setting up Your Own Application Print

We will show step by step how to set up an application print for a simple command, WRKSYSSTS. In our case we want to print not just the transition data, but the other three screens (pool data, paging option and paging data) all on one screen.

1. Enter WRKSYSSTS and press Enter.
2. Select Application Print Setup from the File menu.
3. Enter WRKSYSSTS for the Application.

4. Enter Work with System Status as the Screen Identification. This must be unique, as it is how RUMBA/400 identifies what application print configuration to use with any given screen.
5. The first screen is identified by the F11=Display transition data at the bottom left. Enter Display transition data as the First Page Identification.
6. The last screen is identified by the F11=Display paging data at the bottom left. Enter Display paging data as the First Page Identification.
7. We move between the different screens by pressing F11, so we enter this as our Page Up and Page Down Key Sequences.
8. We can use the new status bar to see the cursor position. It is shown in the right side of the status bar in the format [r,c], where r and c stand for row and column, respectively. From this we see that the part of the screen that changes is bounded by a box with the upper-left corner at [12,2] and the bottom-right at [18,79]. We enter the printing ranges using these numbers as shown in Figure 158 on page 270.
9. We give our output a header of "Work with System Status Screens."
10. We don't want page numbers in our output, so we turn off the Page No. check box.

Our configuration is shown in Figure 158 on page 270:

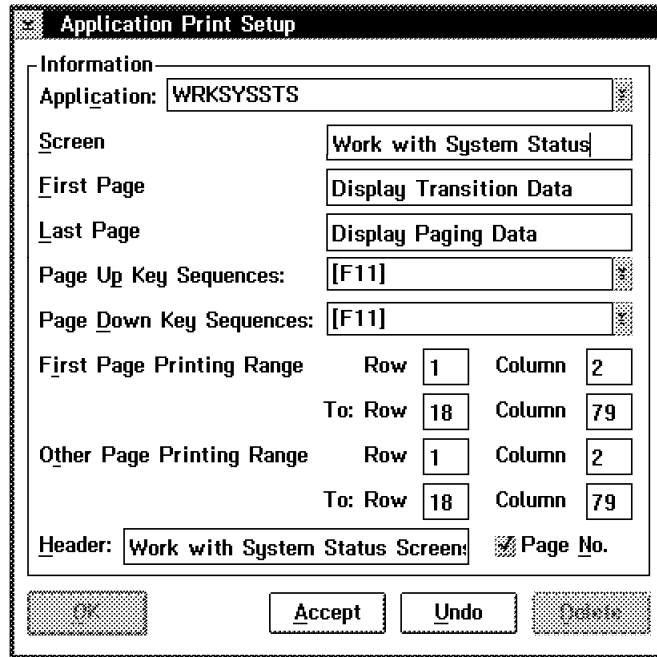


Figure 158. RUMBA/400 - Application Print Setup Panel

10.1.6.2 Using Application Print Setup

Once you have entered the settings in Application Print Setup and Print Options, to print the preselected screens:

1. Go to the application of choice. For our example we will enter WRKSYSSTS.
2. Choose Print from the File menu, or click on the Print icon in the tool bar.

The resulting output is shown in Figure 159 on page 271:

```

Work with System Status Screens

                                Work with System Status                                RCHASMO3
                                                                                   02/02/95 12:32:31
% CPU used . . . . . :          1.6   Auxiliary storage:
Elapsed time . . . . . :    00:29:13   System ASP . . . . . :    3955 M
Jobs in system . . . . . :          738   % system ASP used . . :    67.6654
% addresses used:
  Permanent . . . . . :          3.016   Total . . . . . :    3955 M
  Temporary . . . . . :          .208   Current unprotect used :    1150 M
                                       Maximum unprotect . . :    1154 M

Type changes (if allowed), press Enter.

System  Pool  Reserved  Max  ----DB----  ---Non-DB---
Pool   Size (K)  Size (K)  Active  Fault  Pages  Fault  Pages
  1     12000    5918    +++    .0    .0    .0    .2
  2     21952     0     15    .0    .3    .0    1.0
  3        200     0     1    .0    .0    .0    .0
  4     15000     0     10    .0    .0    .0    1.0

System  Pool  Reserved  Max  Active->  Wait->  Active->
Pool   Size (K)  Size (K)  Active  Wait    Inel    Inel
  1     12000    5918    +++    7.2    .0    .0
  2     21952     0     15    8.7    .0    .0
  3        200     0     1    5.7    .0    .0
  4     15000     0     10    2.4    .0    .0

System  Pool  Reserved  Max
Pool   Size (K)  Size (K)  Active  Pool      Subsystem  Library
  1     12000    5918    +++    *MACHINE
  2     21952     0     15    *BASE
  3        200     0     1    *SPOOL
  4     15000     0     10    *INTERACT

System  Pool  Reserved  Max  Paging
Pool   Size (K)  Size (K)  Active  Option
  1     12000    5918    +++    *FIXED
  2     21952     0     15    *FIXED
  3        200     0     1    *FIXED
  4     15000     0     10    *FIXED

```

Figure 159. RUMBA/400 - Sample Application Print Output

10.1.7 Private Directories

Private directories allow each user to store all user-defined files locally or in their own directory on the network. With private directories, RUMBA/400 can be run from a network drive (usually write-protected), but each time a profile, macro, or other user-defined file is created, it will be saved in the private directory.

Several advantages to using private directories are:

- Users can customize their own macros, QuickSteps, Hotspots and keyboard maps without affecting others.
- Users are afforded some level of security for files they create.
- RUMBA/400 software can be run from a write-protected network drive, while the user defined files reside in a directory with write access.
- The RUMBA/400 software root directory on the server will be less congested.

The files stored in a private directory are:

- RUMBA/400 display, printer and file transfer profiles (*.WSF, *.PRN, *.RTO)
- Interface configuration files (*.CFG, for example)
- Keyboard map files (*.MAP)
- Macro files (*.MAC)
- QuickStep files (*.QKS)
- Hotspot files (*.HSP)

10.1.8 Capture Host Screens

RUMBA/400 terminal emulation lets you capture and save the current host screen for use in any PC application that can import text files.

Choose Capture to copy data displayed in a session window into a storage file (called a Capture File). RUMBA/400 only copies and stores the data a session window is displaying at the time you choose the capture command. Until a file is setup the capture menu item is grayed, showing that it is inactive.

Although you cannot display a capture file within a RUMBA/400 session window, an editor (such as Notepad) can be used to display, edit and print the file.

To capture a session window display do the following:

- Set up a file to store the data to be captured by selecting **Capture Setup** from the *Session* menu.
- Choose **Capture** from the Session menu. RUMBA/400 copies all data displayed in the active session window into the setup file. If there is already data in the capture file, RUMBA/400 places the new data at the end of the data already in the file.

- To save the captured data, return to the *Capture Setup* dialog box and choose the **Close** button. By default the file is saved in the RUMBACAW directory.

Note: A limitation of this function is that the captured files contain the display attributes, which would need removing before using the file for most purposes.

10.1.9 Tool Bar

The RUMBA/400 graphical tool bar gives you quick access to commonly used commands in the display session. The tool bar is initially displayed across the top of the session window. You can show or hide the tool bar or move it to another location on the screen. The tool bar is initially displayed at the top of the display session window.

Because the tool bar uses PC processor resources, you may prefer to hide the tool bar to improve typematic performance, particularly on slower 80386 machines.

Elements of the Tool Bar: Below is a brief description of the tools available in the RUMBA/400 tool bar:



Open File - allows you to use a previously saved session profile.



File Save - allows you to save changes made to an existing profile or save a newly created profile.



Print Screen - allows you to print the contents of one or several session screens.



Copy to Clipboard - choose this smart icon to copy a selection to the clipboard.



Copy from Clipboard - allows you to copy a selection from the clipboard.



Session Connect/Disconnect - you can connect or disconnect to your default machine. This icon changes from red (disconnected state) to black (connected state).



Capture Screen - you can store data being captured from a display window into a file.



Autosize Screen Smaller - reduce the size of your session window and let RUMBA/400 choose the best font size for the screen.



Autosize Screen Larger- as above, except it increases the session window size.



Send File - allows you to send a copy of a file from the PC to the host.



Receive File - you can receive a copy of a file from the host.



Keyboard - perform keyboard mapping and remapping functions.



Color Palette - allows you to change the display session color characteristics.



Macro Record - recorded macros can be saved, loaded, edited and assigned to a QuickStep button.



Macro Play - allows you to select and play a prerecorded macro.



Show Hotspots - allows you to show Hotspots on your display session.



QuickStep - displays the QuickStep Editor so that you can change your QuickStep pads.



Context Help - clicking on this icon turns your pointer into a spy glass, which allows you to point and click on any control to obtain help relevant to that topic. Click again to return to the regular pointer. This function is equivalent to pressing Ctrl-H from the keyboard.



General Help - displays the RUMBA/400 general help screen.

Using the Tool Bar: To make selections from the tool bar, select the icon that represents the function you want to perform. You must use a mouse to operate the tool bar. All of the commands represented on the tool bar can also be selected from a menu. As you move the mouse pointer over the

icons, the status bar displays a brief description of the function in the lower-left corner.

Moving the RUMBA/400 Tool Bar: The tool bar can be positioned at the top or bottom of a window or moved to another location on the screen. You can change the size and shape of the tool bar. To move the tool bar:

1. Place the pointer on any non-icon portion of the tool bar.
2. Click and drag the tool bar to the new location.

If the tool bar intersects the top or bottom of the session window when you release the mouse button, it will align across the top or bottom of the window. If you place the tool bar elsewhere on the screen, it will remain there until you move it again. It can be placed outside the RUMBA/400 window itself, and will be brought to the foreground along with RUMBA/400 itself.

To change the size of the tool bar, use the mouse to re-size the tool bar box as you would any other OS/2 box. RUMBA/400 only allows certain sizes to be configured.

Showing/Hiding the Tool Bar: You can hide or show the tool bar at any time and can store this setting as part of a session profile. The tool bar is displayed by default.

To hide the tool bar:

1. From the Options menu, choose Preferences. A sub-menu will appear.
2. Cancel the tool bar selection by clicking the checked Tool Bar option. The check mark will disappear indicating that it is no longer selected.

To show the tool bar again, repeat the above steps to select the tool bar option. Choose **Save** from the File menu to save the setting in the session profile.

3-D Status Bar: The 3-D status bar is displayed across the bottom of the RUMBA/400 window. It displays information about the session's status. The default is to show the 3-D status bar. If you do not enable it the familiar 5250 status line will be displayed in the session window. This selection can be toggled on or off, either via the menus or by clicking on the bar with your right mouse button.

Because the status bar uses PC processor resources, you may prefer to toggle it off to improve typematic performance, particularly on slower 80386 machines.

The status bar (with reference numbers) is shown in Figure 160:

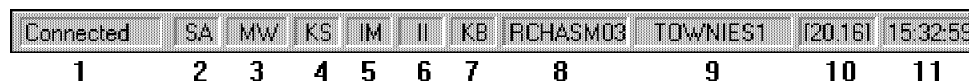


Figure 160. RUMBA/400 - 3-D Status Bar

Using Figure 160 as an example, we can see the status of the session from left to right as follows:

Indicator	Description/Function
------------------	-----------------------------

Indicator 1	Description box
--------------------	-----------------

Indicates various information about the session status such as:

- Connected/Not Connected. Indicates state of connection.
- File Open, Print Screen, etc. Indicates function of item pointed to by mouse.
- RECORD. Indicates a macro is being recorded.
- 0005. Indicates an error occurred.
- etc.

Indicator 2	SA
--------------------	----

If the System Available (SA) indicator is present it means that the system is operating and is available. Our example shows the system is available.

Indicator 3	MW
--------------------	----

If the Message Waiting (MW) indicator is active it means that there are messages waiting for you on the AS/400. Our example shows messages waiting.

Indicator 4	KS
--------------------	----

If the Keyboard Shift (KS) indicator is active it means that your keyboard is in shifted mode (equivalent to Caps Lock). Our example shows keyboard shift mode on.

- Indicator 5** IM
- If the Insert Mode (IM) indicator is active it means that your keyboard is in insert mode. Our example shows that insert mode is active.
- Indicator 6** If the Input Inhibited indicator is active it means that either your AS/400 is processing a request from the keyboard or the input is not being accepted by the AS/400. Press the Error Reset key and if II stays active, the AS/400 is processing a request. Our example shows that input is inhibited.
- Indicator 7** KB
- The Keystroke Buffering (KB) indicator is only active when you are waiting for the II (Input Inhibited) indicator to go off so that keystrokes that have been temporarily saved can be processed. To clear keystroke buffering, press the Error Reset key. Our example shows that keystrokes have been buffered.
- Indicator 8** System Name
- This indicator is only active when you are connected to an AS/400 and displays the name of the AS/400 to which you are connected. Our example shows the system name as RCHASM03.
- Indicator 9** Device Name
- This indicator is only active when you are connected to an AS/400 and displays the name of the active display device. Our example shows the device name as TOWNIES1.
- Indicator 10** Row/Column
- This indicator is only active when you are connected to an AS/400 and displays the cursor row and column locations. Our example shows positions 20,16.
- Indicator 11** Time
- This indicator is displayed at all times. The time is taken from DOS. Our example shows the time as 15:32:29.

10.2 Personal Communications/5250

This section is a very brief introduction to Personal Communications/5250, and is not intended to be a comprehensive guide to the product. For more information on the basic functionality of Personal Communications/5250 please see the following manuals:

- *Client Access/400 Optimized for OS/2 PC5250 Setup (User's Guide)*, SC41-3555
- *Client Access/400 PC5250 Reference Guide*, SC41-3553
- *Client Access/400 PC5250 Programmer's Guide*, SC41-3554

10.2.1 Introduction

Personal Communications/5250 (PC5250) is a package written for the environment which provides AS/400 services using the Client Access/400 router. It provides display and printer emulation to personal computers connected to AS/400 systems and takes full advantage of OS/2 graphical user interface (GUI) capabilities.

Personal Communications/5250 provides the following functions and features:

- **Edit**

By making use of the OS/2 clipboard, a selected area can be cut and copied/pasted. In addition, data can be pasted to other application programs, such as spreadsheet programs, that support the Pastelink function.

- **Graphical User Interface**

The GUI interface provides the following functions;

- Popup keypad
- Hotspot
- Macro function
- Automatic macro recording and playing
- Keyboard function setup
- Mouse button function setup
- Display color setup
- Automatic font size adjustment
- Fixed font size function
- Display and window appearance setup
- Menu bar setup
- On-line help

- **Display**

Display sessions provide:

- Up to 26 emulation sessions (display/printer)
- Text assist feature for OfficeVision/400 users
- Enhanced User Interface

- **Printer**

Printer sessions give you:

- Printing with OS/2 printer drivers
- Print function by PDT/PDF
- Print function by OS/400 Host Print Transform (HPT)
- Multiple host print function in multiple sessions
- Printing supported by the AS/400 Advanced Print Support Utility

Personal Communications/5250 provides a wide range of printer features using either the printer session or menu commands. The printer session emulates an IBM 3812 SCS printer. Using the virtual printer support feature of Client Access/400 other users can access the printer for both AS/400 and PC printing.

- **Programming Interface**

- EHLLAPI
- DDE

10.2.2 Tool Bar

This section looks at the functions available to you on the tool bar. The tool bar can be displayed or removed from your workstation window via the system menu. The menu bar is shown in Figure 161:



Figure 161. PC5250 - Tool Bar

Elements of the Tool Bar



Print Screen - allows you to print the contents of the workstation window.



Copy to Clipboard - allows you to copy the marked area into the OS/2 Clipboard.



Paste from Clipboard - allows you to overlay the current contents of the OS/2 Clipboard onto the workstation window.



Display Setup - allows you to customize the following display characteristics: Cursor; Pointer; Rule Line; Trimming; Sound; Viewing and Palette. You can access the same menu via the menu bar by choosing Appearance and then Display Setup.



Color Mapping - allows you to customize the color of the display session. You can access the same menu by selecting Appearance and then Color Mapping from the menu bar.



Keyboard - allows you to customize the keyboard layout. Using the menu bar you would choose Assist and then Keyboard Layout. When you choose to edit the keyboard layout, you will notice that some keys are greyed out. These are system reserved keys and cannot be changed.



Start Recording Macro - allows you to start recording keystrokes in a macro. To access this function via the menu bar, choose Assist and then Start Recording Macro.



Stop Recording Macro - to use this function via the menu bar, choose Assist and then Stop Recording Macro. Please note that this function will only be accessible from the menu bar if you are currently recording a macro.



Start Playing Macro - start playing a macro that you have recorded. To access this function from the menu bar choose Assist and then Start Playing Macro.



Stop Playing Macro - is only be available via the menu bar if you are currently playing a macro.



View Clipboard - view the contents of the OS/2 Clipboard.



Play Macro USER1.MAC - execute a macro that you have recorded and saved as USER1.MAC.



Play Macro USER2.MAC - execute a macro that you have recorded and saved as USER2.MAC.



Play Macro USER3.MAC - execute a macro that you have recorded and saved as USER3.MAC.



Send/Receive File - execute RUMBA/400 file transfer.



General Help - View the contents of the Personal Communications help file.

10.3 DOS PC Support/400 Workstation Function (WSF)

Workstation Function is a DOS application that you can run in an OS/2 Virtual DOS Machine (VDM). Workstation Function is part of DOS PC Support/400 and provides display and printer emulation.

See also the emulator comparison table to see what features this product can provide (10.7, “Emulator Comparison Table” on page 285).

For information about running WSF with Client Access/400 Optimized for OS/2, see Chapter 11, “Client Access/400 in Virtual DOS Machines” on page 289.

10.4 Communications Manager/2 5250

When installing Client Access/400 Optimized for OS/2, you have the option of using Communications Manager/2 instead of the communications manager that is integrated with Client Access/400 Optimized for OS/2. For more information refer to 3.2, “Communications Manager/2 Version 1.11 and Network Transport Services/2” on page 31.

See also the emulator comparison table to see what features this product can provide 10.7, “Emulator Comparison Table” on page 285.

10.5 Personal Communications for AS/400

Personal Communications for AS/400 is a true 32-bit OS/2 application which uses Presentation Manager, multi-threading and all the other desirable attributes of OS/2. For more information on this product there is the announcement letter ZP95-0215. See also the emulator comparison table to see what features this product can provide 10.7, “Emulator Comparison Table” on page 285.

10.6 PC5250 Console Feature

PC5250 gives you the option to configure a Console session (as does RUMBA/400 at V3R1M1). Within the Client Access/400 Templates folder, there is a PC5250 Console Session Template.

Note

Only configure a PC5250 console session if the PC is to be used purely as an AS/400 system console.

A PC5250 twinaxial console session will not work at the same time as a Client Access/400 Communications Manager twinaxial connection because both device drivers try to use the same adapter. You must remove the Client Access/400 Communications Manager twinaxial connection before using the PC5250 as a twinaxial console.

10.6.1 Configuration

To configure a session, drag and drop the PC5250 console session icon from the the Client Access/400 Templates folder to the desktop or folder of your choice. The PC5250 Console Session - Settings notebook is displayed.

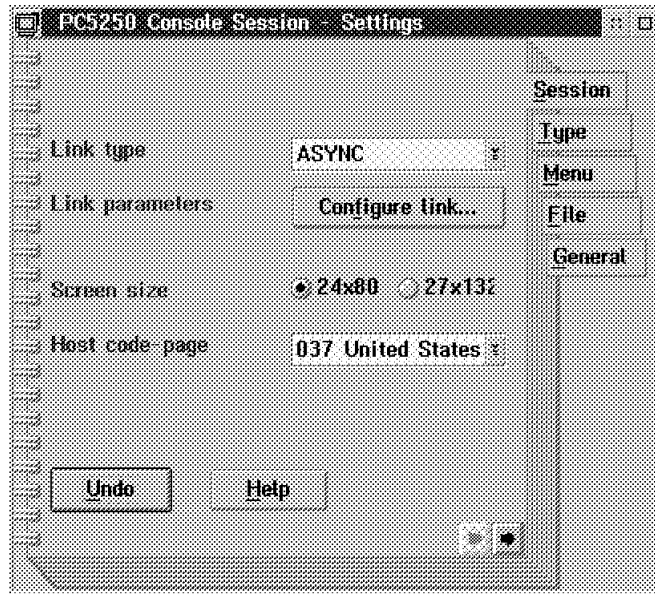


Figure 162. PC5250 Console Session - Settings Notebook

In this notebook, you have only two choices of connection: Twinaxial and Asynchronous. The Link type box is where you make your choice. You then must configure the link type, by clicking on the **Configure link...** button. You will then be displayed with either the Twinaxial Attachment (Console) panel or the SNA-over-Async Attachment (Console) panel as shown in Figure 163.

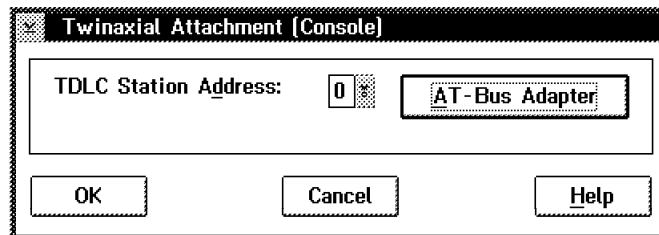


Figure 163. PC5250 Twinaxial Attachment Display

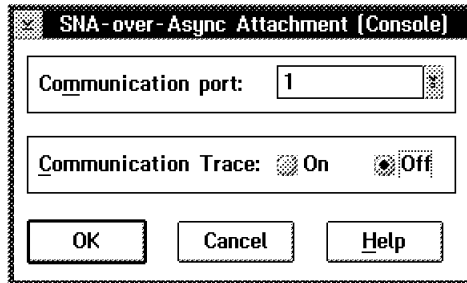


Figure 164. PC5250 SNA-over-Async Attachment Display

For the Twinaxial connection, you must define the TDLC Station Address. For the console session, you must specify the address 0. Select the AT-Bus Adapter button if you are connecting a PC to an AS/400 through an AT-Bus emulation adapter.

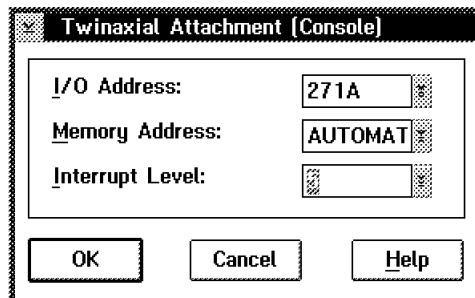


Figure 165. PC5250 Twinaxial Attachment - AT-Bus Adapter Screen

For the SNA-over-Async connection, you must define which communications port you will be using. The default here is 1, where 1 is equivalent to COM1, and 2 is equivalent to COM2 and so on. The Communication Trace is set to Off. If this is changed to On, then a default size trace buffer is allocated and the trace data is stored in the buffer.

For either connection, select **OK** to save the configuration.

To start the session, just double click on the icon that has been created.

For more information, see

- *Client Access/400 Optimized for OS/2 PC5250 Setup (User's Guide)*, SC41-3555.
- *Client Access/400 PC5250 Programmer's Guide*, SC41-3554.

- *Client Access/400 PC5250 Reference Guide*, SC41-3553.

10.7 Emulator Comparison Table

This section consists of a table that compares the functions provided by the various emulators: Extended DOS Client Access/400 Work Station Function (WSF), RUMBA/400 for OS/2, Communications Manager/2 5250 Emulator, PC5250 for OS/2, and Personal Communications for AS/400.

Emulator Function under OS/2 Version 2.1	Extended DOS Client Access/400 Work Station Function	RUMBA/400 for OS/2	Communications Manager/2 5250 Terminal Emulator	PC5250 for Client Access/400	Personal Communications for the AS/400
Windowed screen sessions Each session in a window	Yes No•	Yes Yes	Yes Yes	Yes Yes	Yes Yes
Windowed text size auto-adjusted	No	Yes	Yes	Yes	Yes
Max. sessions (display and printer)	5•	32	15	26	26
Text Assist / Organizer Cursor Draw Multi Column Edit Image Display Shadow Cursor Yes Yes Yes No	Yes	Yes• No No No No	Yes	Yes	Yes
132 column support	Yes•	Yes	Yes•	Yes	Yes
Graphics	Yes	No	No	No	No
122 key keyboard	Yes	Yes•	Yes•		Yes
Mouse support in session	No	Yes	Yes	Yes	Yes
Copy/cut and paste	Yes•	Yes	Yes	Yes	Yes
Drag and drop/point and click	No	Yes	Yes	Yes	
Hotspots User defined	No	Yes Yes	Yes No	Yes	Yes
Keypad (QuickStep)	No	Yes	Yes	Yes	Yes
Macros Recorder	Yes• No	Yes Yes	Yes• No	Yes Yes	Yes Yes
DDE / Hotlink support	No	Yes	No	Yes	Yes

<i>Table 3 (Page 2 of 2). Comparison of Emulators</i>					
Emulator Function under OS/2 Version 2.1	Extended DOS Client Access/400 Work Station Function	RUMBA/400 for OS/2	Communications Manager/2 5250 Terminal Emulator	PC5250 for Client Access/400	Personal Communications for the AS/400
EHLAPI support	No	Yes●●	Yes	Yes	Yes
Printer support	3812 SCS	3812●● SCS	3812●● SCS	3812 SCS	3812 SCS
Enhanced user interface (EUI) support	No	Yes	No	Yes	Yes
National language support	Yes	Yes	Yes	Yes	Yes
<p>Notes:</p> <ol style="list-style-type: none"> 1. However, you can start multiple VDMs; refer to <i>Using V2R3 DOS and OS/2 PC Support/400 under OS/2 2.1, Including CM/400, CM/2 and RUMBA/400 for OS/2</i>, GG24-4070-01, Chapter 12.9. 2. Per VDM. 3. Does not support cursor draw, multiple column edit or view image/graph. 4. Only if 8514/A or XGA adapter installed. 5. Scroll bar with VGA; best results with font size 40 x 128 (VGA), 51 x 146 (XGA or 8514/a). SVGA not tested. 6. Only U.S. English. 7. Only U.S. English. Function keys F13 - F24 can't be remapped. 8. Only copy and paste; mark option must be selected. 9. Via keyboard remap. 10. Available as a PC Support/400 tool in the QIWTOOL folder. 11. Rotation, COR and source drawer selection not supported 12. Rotation, COR and source drawer selection supported with special configuration. 					

Chapter 11. Client Access/400 in Virtual DOS Machines

This chapter contains details of the support provided for Client Access/400 for Extended DOS in OS/2 Warp Virtual DOS Machines (VDMs). This support is basically the same as with Extended DOS PC Support/400 Version 2.0 Release 3.0 and OS/2 2.1. Refer to *Using V2R3 DOS and OS/2 PC Support/400 under OS/2 2.1, Including CM/400, CM/2 and RUMBA/400 for OS/2*, GG24-4070-01, for details. Parts of this document are based on that publication.

It contains the following sections:

- 11.1, "An Introduction to Virtual DOS Machines (VDMs)"
- 11.2, "Client Access/400 for Extended DOS in OS/2 VDMs" on page 295
- 11.3, "Virtual DOS Machine Configuration for Client Access/400" on page 301
- 11.4, "Running Client Access/400 for Extended DOS Under WIN-OS/2" on page 312

11.1 An Introduction to Virtual DOS Machines (VDMs)

OS/2 enables you to run most DOS and Windows applications unchanged by providing an environment called Virtual DOS Machines. Client Access/400 for Extended DOS is an example of a DOS application that can run in an OS/2 Virtual DOS Machine.

Note: Client Access/400 for Windows 3.1 is not compatible with the OS/2 Virtual DOS Machines.

11.1.1 Multiple Virtual DOS Machines

OS/2 provides the user with the ability to run *multiple* concurrent DOS applications, and to multi-task these applications with OS/2 applications. In versions of OS/2 prior to Version 2.0, support for DOS applications was limited to a single DOS session known as the DOS Compatibility Box. This version restricted the amount of memory available to the DOS application. Applications running in the DOS Compatibility Box could operate in full screen mode only, and were suspended when switched to the background.

Support for DOS applications was completely redesigned in OS/2 Version 2.0, Version 2.1, and later. This support allows the execution and management of

multiple concurrent DOS applications where each application is executed as a dual-threaded, protected mode OS/2 program. This capability is provided by a component of OS/2 known as *Multiple Virtual DOS Machines (MVDM)*.

Multiple Virtual DOS Machines introduces powerful DOS application support to OS/2 by exploiting the *virtual 8086 (V86) mode* of the Intel** 80386 processor. This mode of operation allows the emulation of an Intel 8086 processor and associated hardware devices within a protected mode 80386 task. OS/2 uses the virtual 8086 mode to allow the creation of multiple instances of independent Virtual DOS Machines. Through this technique, a virtual interface is provided to each Virtual DOS Machine, giving the impression that the application running in that machine owns all of the required resources, both hardware and software.

The Virtual DOS Machine feature allows us to run Client Access/400 for Extended DOS under OS/2. But again, Client Access/400 for Windows 3.1 is not compatible with the OS/2 Virtual DOS Machines.

11.1.2 Memory Protection

Each Virtual DOS Machine runs as a protected mode process in a manner similar to an OS/2 application. The use of protected mode allows preemptive multitasking of DOS applications and provides a protected system environment in which DOS applications can run. This means that system memory and all other applications (both DOS and OS/2) are protected from ill-behaved applications, and the user can terminate a DOS application that has *hung*. An errant DOS application can affect only its own Virtual DOS Machine; other applications in the system are not affected.

11.1.3 Memory Management

Each Virtual DOS Machine has a great deal more available memory than did the DOS Compatibility Box implemented in versions of OS/2 prior to Version 2.0. Depending on the use of DOS device drivers and Terminate and Stay Resident (TSR) programs, it is possible to have as much as 720KB (DOS_HIGH=On, DOS_UMB=On, VIDEO_MODE_RESTRICTION=CGA) of available memory for running applications. In addition, OS/2 Version 2.1 and later supports the use of the Lotus**-Intel-Microsoft (LIM) Expanded Memory Specification (EMS), and Lotus-Intel-Microsoft-AST** (LIMA) Extended Memory Specification (XMS) memory for those DOS applications that are capable of using such memory extenders.

11.1.4 Windowing Support

Each Virtual DOS Machine can run either in full-screen mode or within a Presentation Manager window. A window containing a DOS application can be sized and manipulated in the same manner as any other Presentation Manager window. Other Presentation Manager desktop features are readily available such as the ability to cut/copy/paste information between applications using the clipboard, or the ability to change fonts. This also allows Client Access/400 to run in a window under the control of OS/2 to use many additional functions not available under DOS, for example cut and paste between Client Access/400 and other applications.

11.1.5 Application Support

There are some DOS applications and products that cannot be supported by DOS emulation due to the nature of the emulation code and the multitasking and protection demands of OS/2. Unsupported products/functions include:

- DOS applications that have internal DOS structure dependencies, such as Microsoft Windows 1.x.
- DOS applications that do not work in a multitasking environment, such as some common disk utility programs and DOS block device drivers.
- DOS network drivers because DOS emulation uses an implementation different from DOS to control its I/O. However, DOS applications running in Virtual DOS Machines can access network services through the normal OS/2 network driver. It is possible to use the IBM LAN Support Program within a single Virtual DOS Machine if the LAN adapter is not needed for any other application.

Some of these applications can be run under OS/2 by booting a specific version of DOS in a Virtual DOS Machine, using the *Virtual Machine Boot* feature of OS/2 known as a Boot VDM.

The fact that block device drivers cannot be used in VDMs under OS/2 prevents you from running Base DOS Client Access/400 shared folders in a VDM because it uses a block device driver (ECYDDX.SYS) for shared folders. For this reason, Base DOS Client Access/400 is not supported under OS/2. Client Access/400 for Extended DOS is fully supported in this environment because it does not use ECYDDX.SYS for shared folder support. But again, Client Access/400 for Windows 3.1 is not compatible with the OS/2 Virtual DOS Machines.

11.1.6 Virtual Device Drivers

Application compatibility in the Virtual DOS Machine was also enhanced in OS/2 Version 2.0. A Virtual DOS Machine can be used to run DOS-based communications applications and other applications that address hardware I/O devices through the use of *virtual device drivers*, which map device driver calls from DOS applications to the appropriate physical device driver within the operating system.

We are primarily interested in two completely separate VDDs when discussing Client Access/400 for Extended DOS in an OS/2 VDM:

- A VDD in OS/2 Client Access/400, which provides a Virtual Device Driver that allows Client Access/400 for Extended DOS to access OS/2 Communications Manager facilities.
- A NetBIOS and IEEE 802.2 LAN VDD supplied with LAPS Version 2.11 and higher that allows DOS NetBIOS and 802.2 applications to share network adapters with OS/2 NetBIOS and 802.2 applications.

Important!

The ability to use Client Access/400 for Extended DOS with this shared IEEE 802.2 connectivity capability of LAPS is not officially supported. Attempts to run can fail with hangs and other possible side effects such as invalid return codes. The Client Access/400 LAN router relies on the CCB, or direct interface of the IBM LAN Support Program and its guarantees to provide data buffer integrity from interrupt-to-interrupt without any re-entrance. Because of the way OS/2 VDMs are architected, LAPS cannot fully implement this CCB interface.

These problems are encountered when multiple applications, (one of these being Client Access/400), attempt to access the LAN adapter simultaneously.

If you must run Client Access/400 for Extended DOS from within a VDM, we suggest to use the virtual device driver supplied with OS/2 Client Access/400 as described in 11.2.1, "Client Access/400 Virtual Device Driver (VDD) Support" on page 296.

Applications using hardware devices that do *not* have to be shared with other applications in the same system can access these devices using the standard DOS device drivers without the need for a virtual device driver.

Certain restrictions still apply with respect to communications line speed and time-critical interrupt handling.

11.1.7 Memory Support in VDMs

Many popular DOS applications, including Client Access/400, use EMS (expanded) or XMS (extended) memory extenders to gain access to memory in protected mode on the 80286, 80386, 80486, or Pentium processors. These extenders allow DOS applications to access memory above the 1MB real-mode addressing limit in order to have total code and data space larger than the available base memory, and to have very large code or data objects loaded into memory for enhanced function and performance. The standard configuration of OS/2 provides both EMS and XMS support in Virtual DOS Machines.

Under Multiple Virtual DOS Machines EMS and XMS memory, allocations are managed as OS/2 pageable virtual memory in the same way as any other memory allocated under OS/2 Version 2.1 and later, and not as fixed physical memory as is the case under DOS. As such, the total expanded/extended memory allocated can exceed the amount of physical memory installed in the system.

11.1.8 DOS Settings

OS/2 Multiple Virtual DOS Machines provides the user with the ability to customize the operation of DOS applications with a feature called *DOS Settings*. This feature allows the user to control special properties which affect the behavior of DOS applications running in a Virtual DOS Machine. The primary reason for the existence of the option to alter these settings is that DOS applications are typically not careful about consuming system resources, such as memory and processor time. Hence, OS/2 must provide a flexible environment for these applications in order to preserve the integrity and performance of the system as a whole.

The DOS Settings feature further enhances the DOS compatibility of a Virtual DOS Machine because it allows a user to configure the Virtual DOS Machine for DOS applications that might otherwise not work well (or not work at all) with the default settings for a Virtual DOS Machine. The DOS Settings feature also gives the user more control over the consumption of system resources by a DOS application. Help is provided for each setting to assist users in tuning the operation of their applications.

DOS sessions have many more customized properties than OS/2 sessions. Multiple Virtual DOS Machines provides a common mechanism that supports both a standard complement of settings and allows virtual device drivers to register custom settings. The standard settings are a subset of the configuration settings available in the CONFIG.SYS file, plus some additional settings required for Multiple Virtual DOS Machines.

DOS Settings are managed on a per-VDM basis and are accessed through Presentation Manager windows. Only those settings that can be changed for that VDM are presented.

OS/2 Warp detects many popular DOS and Windows applications, and chooses automatically the correct DOS and Windows settings for these applications.

Note that while the DOS Settings feature provides significantly enhanced control over the behavior and capabilities of a Virtual DOS Machine, this level of control is not necessarily obvious to the end user. While many applications can run without any changes to any of the DOS settings, some applications, including Client Access/400, need some of these settings changed.

11.1.9 Microsoft Windows Applications in VDMs

OS/2 provides the capability for Microsoft Windows applications to run under OS/2 using WIN-OS/2. This support allows applications written for Microsoft Windows 3.1 and previous versions of Microsoft Windows (except V1.x) to coexist with OS/2 and DOS applications under OS/2. Client Access/400 for Windows 3.1 will not run in a VDM.

Each Microsoft Windows application can run in its own Virtual DOS Machine, or all Microsoft Windows applications can run in a single VDM. In either case, these applications run in a protected mode process. As such, Microsoft Windows applications are subject to the same application protection facilities provided to other protected mode processes under OS/2. Microsoft Windows applications are protected from other DOS and OS/2 applications running in the system, and when configured to run in separate VDMs from other Microsoft Windows applications. This is in contrast to the native Microsoft Windows 3.1 environment, where limited protection is provided for Microsoft Windows 3.1 applications, and no protection for DOS applications unless Microsoft Windows is running in enhanced mode.

Running Microsoft Windows applications as protected mode tasks also allows these applications to use the preemptive multitasking Microsoft Windows support capabilities of OS/2 with full preemptive multitasking between Microsoft Windows applications, OS/2 applications, and DOS applications. This is in contrast to the native Microsoft Windows 3.1 environment. Native Microsoft Windows 3.1 only provides preemptive multitasking between DOS applications and not between multiple Microsoft Windows applications. This can impact performance and prevent many applications written for previous versions of Microsoft Windows from running. OS/2 has no such restriction.

Microsoft Windows applications running under OS/2 can run in a mode equivalent to the *real* or *standard* modes of Microsoft Windows 3.1. OS/2 Version 2.1 and later also provides a Microsoft Windows 3.1 Enhanced Compatibility mode that allows *some* Microsoft Windows 3.1 Enhanced mode applications to run under OS/2. In practice, there are very few applications that are written to run only in Microsoft Windows Enhanced mode.

Settings are available to customize the operating environment for each WIN-OS/2 session in the same way that DOS Settings are available in DOS VDMs (see 11.1.8, "DOS Settings" on page 293). In addition to the settings also available in DOS VDMs, the WIN-OS/2 settings allow you to specify whether WIN-OS/2 should run in Standard or Enhanced Compatibility mode, and whether DDE and Clipboard information can be shared between public WIN-OS/2 and OS/2 sessions.

11.2 Client Access/400 for Extended DOS in OS/2 VDMs

This section provides an overview of the VDM support that is included with Client Access/400 Optimized for OS/2 and Client Access/400 for Extended DOS.

It is very important at this point to understand that there are two ways that Client Access/400 for Extended DOS can be run in an OS/2 VDM:

1. With the APPC communications facilities provided by the Client Access/400 routers. No OS/2 Communications Manager is required. This is referred to as the *native router* support. The native router support is not covered in this Redbook. The native router support allows Client Access/400 for Extended DOS to run in a VDM without the need for an OS/2 communications manager. It does not allow the communications adapter to be shared by other PC applications, and AS/400 resources such as shared folders and virtual printers assigned in the VDM are not

available outside the VDM. Refer to *Using V2R3 DOS and OS/2 PC Support/400 under OS/2 2.1, Including CM/400, CM/2 and RUMBA/400 for OS/2*, GG24-4070-01, for details.

2. With the APPC communications facilities provided by an OS/2 Communications Manager such as the Communications Manager built into Client Access/400 Optimized for OS/2 together with the VDD support of OS/2 and Client Access/400 for Extended DOS. This is referred to as the *virtual or VDM router* support. It is covered in detail in 11.2.1, "Client Access/400 Virtual Device Driver (VDD) Support."

We recommend that you use the VDM support provided by Client Access/400 whenever possible rather than using native Client Access/400 routers for the following reasons:

- Ease of installation.
- Ease of configuration.
- Both Client Access/400 for Extended DOS and OS/2 Client Access/400 can be used.
- OS/2 Client Access/400 functions are available to all applications. For example, network drives and printers assigned with OS/2 Client Access/400 can be used from all DOS, Microsoft Windows and OS/2 applications.

Base Version of DOS Client Access/400:

The Base version of Client Access/400 is not supported in the Virtual DOS Machine environment.

11.2.1 Client Access/400 Virtual Device Driver (VDD) Support

Client Access/400 for Extended DOS enables applications in multiple VDMs to use OS/2 communications facilities with the DOS Client Access/400 router API. This means that DOS Client Access/400 and any other application that is written to the DOS router API is able to run in an OS/2 VDM without modification. Because this support enables VDM applications and OS/2 applications to share the OS/2 communications facilities, it also allows VDM and OS/2 applications to share communications adapters.

Although it is possible to run Client Access/400 for Extended DOS without the VDM support, we recommend that you use the VDM support whenever possible. It provides the greatest function and ease of use. If you want to run Client Access/400 from a VDM without any OS/2 communications software installed, you cannot use the VDM support described in this section;

in this case you must use a native Client Access/400 for Extended DOS router. Refer to *Using V2R3 DOS and OS/2 PC Support/400 under OS/2 2.1, Including CM/400, CM/2 and RUMBA/400 for OS/2*, GG24-4070-01 for details.

Important:

The VDD support provided by Client Access/400 is *not* the same as the IEEE 802.2 VDD provided by LAN Adapter Protocol Support. The former allows Client Access/400 for Extended DOS to communicate with the AS/400 through an OS/2 Communications Manager; the latter is an adapter-level driver that allows multiple applications to access the card simultaneously, but does not support Client Access/400 for Extended DOS in a VDM. These drivers can be used individually or together. They are not dependent on each other in any way.

11.2.1.1 Virtual Device Driver Architecture

Device drivers allow the OS/2 operating system to interact with physical devices attached to the system. Physical device drivers communicate directly with the hardware devices installed in the system such as the keyboard, mouse, and communications adapters. When DOS or Microsoft Windows (not OS/2) applications are used as the operating environment, they expect to have sole access to the hardware resources.

Because OS/2 enables you to have multiple DOS, WIN-OS/2, and OS/2 sessions active at the same time, the operating system has to provide a mechanism to share the physical resources on the system. This mechanism is what is known as a Virtual Device Driver (VDD).

Figure 166 on page 299 shows the relationship between the different components that provide the VDD support to OS/2 VDMs.

There are three new components that provide the VDD support:

Virtual Router

The virtual router is part of Client Access/400 for Extended DOS and is loaded by STARTRTR. It accepts DOS Client Access/400 router API requests from applications in a VDM and passes them to the Virtual Device Driver. It also handles some API requests itself. For example it provides support for translation tables between EBCDIC and ASCII so that each VDM can have different translate tables.

- Virtual Device Driver** The virtual device driver is part of OS/2 Client Access/400 and is loaded in CONFIG.SYS. It allows multiple VDMs to access the OS/2 communications services provided through the VDM Router Server, and passes data between the virtual router and the VDM Router Server.
- VDM Router Server** This part of Client Access/400 Optimized for OS/2, VDMSERV.EXE, is loaded after the OS/2 Client Access/400 router in CASERV.CMD. It translates the DOS Client Access/400 router API requests into Communications Manager APPC API requests and passes them to the OS/2 Communications Manager. The VDM Router Server also communicates with the OS/2 Router API for such things as retrieving the remote system name.

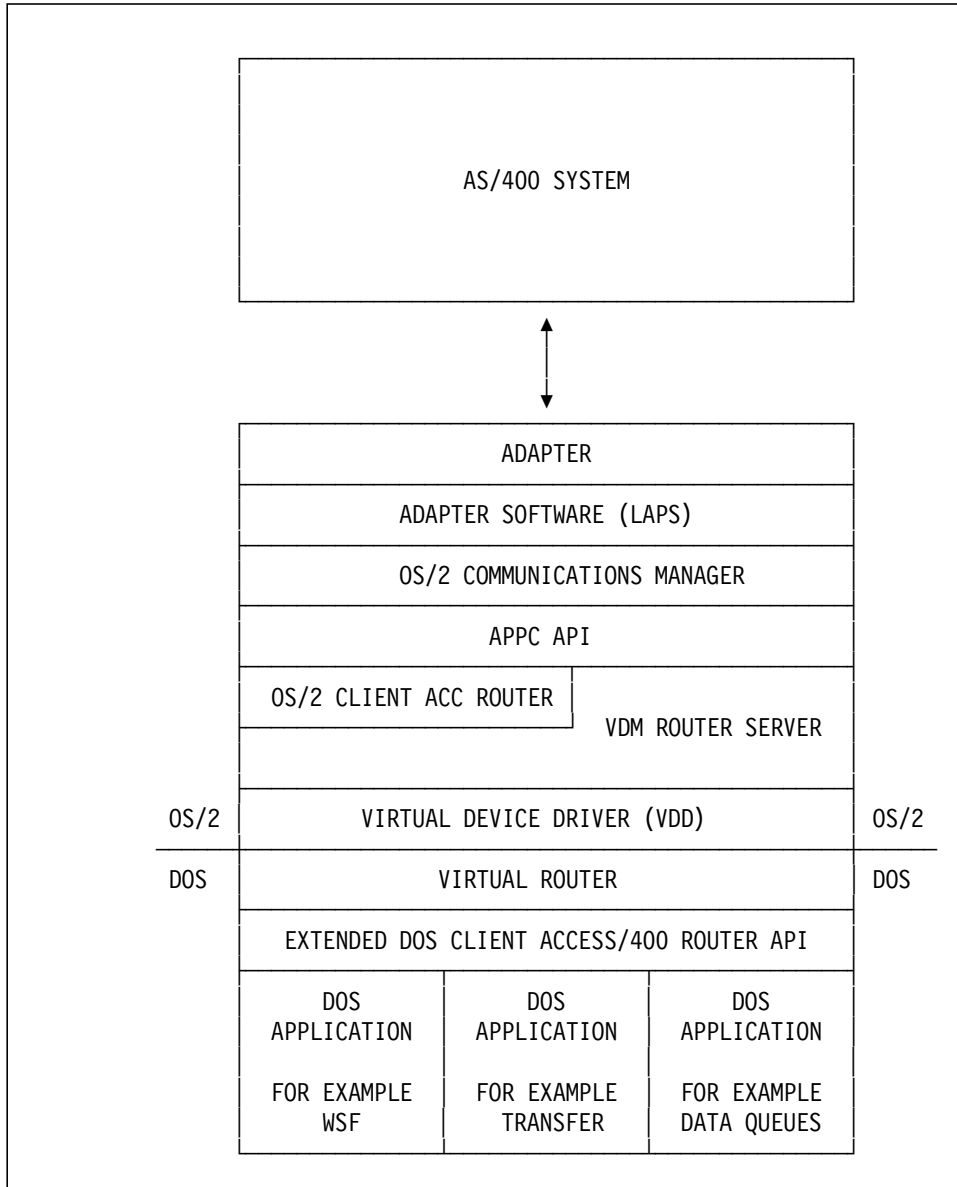


Figure 166. Client Access/400 VDD Architecture

11.2.1.2 VDD Configuration

The use of the VDM Router Server is controlled by two separate configuration steps in Client Access/400 Optimized for OS/2 and DOS Client Access/400 that link together. Despite the fact that you might have many VDMs running Client Access/400 to the same AS/400 system, you only need to have one APPC controller description.

- The Client Access/400 Optimized for OS/2 Product Registry shows you if the component *OS/2 Communications Options for DOS* is installed. The *Selective install* program allows you to choose whether to enable what it calls *OS/2 communications options for DOS*. If the support is enabled, the following device drivers for VDM support are added to your CONFIG.SYS file:

```
DEVICE=C:\CAOS2\EHNPCPDD.SYS
DEVICE=C:\CAOS2\EHNPCVDD.SYS
```

The command to start the VDM server (VDMSERV.EXE) is added to your CASERV.COM file. For details of the changes that are made, refer to 11.3.1, "Client Access/400 Optimized for OS/2 Configuration" on page 301.

- The Client Access/400 for Extended DOS configuration program allows you to choose whether or not to use OS/2 communications for DOS. Depending on the support that you choose, a new entry, *VDMR*, is added to your CONFIG.PCS file. There are three possible values for the *VDMR* entry:

VDMR 0 Always starts the *native* Client Access/400 for Extended DOS router.

VDMR 1 Always starts the *virtual* router.

VDMR 2 Starts the virtual router if the device drivers for VDM support have been loaded from CONFIG.SYS. If not, then the native DOS Client Access/400 router is used. This is the default value, and is assumed if no *VDMR* entry is found in the CONFIG.PCS file.

For details of the configuration options, refer to 11.3, "Virtual DOS Machine Configuration for Client Access/400" on page 301.

If you use the *Selective install* program of the Product Registry to remove the OS/2 communications options for DOS component, the device drivers for VDM support are automatically removed from CONFIG.SYS, and the programs and device drivers are deleted.

11.3 Virtual DOS Machine Configuration for Client Access/400

This section describes how to configure both Client Access/400 Optimized for OS/2 and DOS Extended Client Access/400 so that you can use the Client Access/400 for Extended DOS virtual router from within a VDM.

The following instructions assume that you have already installed Client Access/400 Optimized for OS/2 with it built in Communications Manager/400 or Communications Manager/2 and any prerequisite software such as LAN Adapter Protocol Support.

11.3.1 Client Access/400 Optimized for OS/2 Configuration

This section shows how to configure Client Access/400 Optimized for OS/2 to run the Client Access/400 for Extended DOS virtual router in a VDM:

1. Start the **Client Access/400 Products Registry** which can be found in *AS/400 Workstation, Software Products*.
2. Mark the **Client Access/400 Optimized for OS/2** product and click the right hand mouse button. Select **Selective install**. The panel shown in Figure 167 on page 302 is displayed:

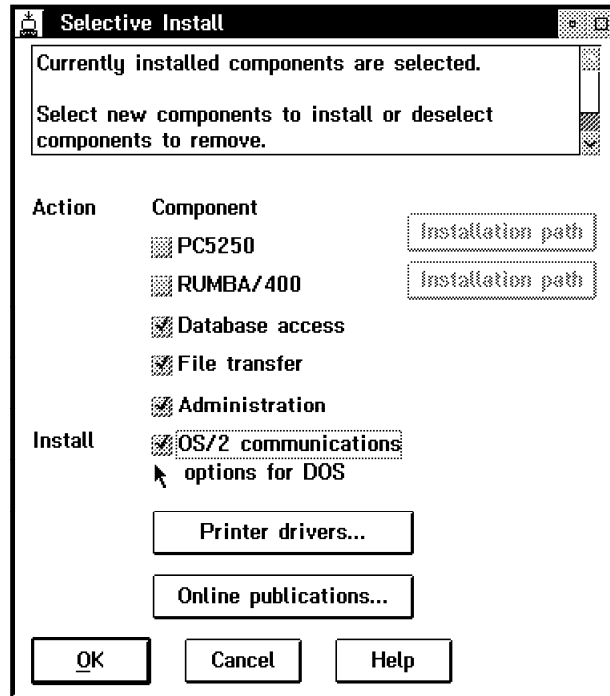


Figure 167. Selective Install - OS/2 Communications Options for DOS

3. Check if the component **OS/2 Communications Options for DOS** for product *Client Access/400 Optimized for OS/2* is installed. If it is, go to 11.3.2, "Client Access/400 for Extended DOS Configuration" on page 303. If not, continue with the next step.
4. Check the **OS/2 communications options for DOS** check box and click on **OK**.
5. The next panel shows you the Selective Install Status. It lists every component that you have chosen to install or remove. In this case, the *OS/2 communications options for DOS* is shown. Select **OK** to start the installation.
6. Select **OK** on the Components Installed panel. Your CONFIG.SYS is modified, so you have to shutdown and start your workstation.

The configuration program modifies your CONFIG.SYS and CASERV.CMD files to enable VDD support by adding the following entries:

CONFIG.SYS

```
DEVICE=C:\CAOS2\EHNPCPDD.SYS
DEVICE=C:\CAOS2\EHNPCVDD.SYS
```

CASERV.CMD

```
VDMSERV.EXE /Z
```

11.3.2 Client Access/400 for Extended DOS Configuration

In the Client Access/400 configuration program under General Options, you can specify whether or not you want to use OS/2 Communications for DOS (in other words, the virtual router). The default configuration is such that Client Access/400 tries to use the VDD support if the necessary Client Access/400 Optimized for OS/2 drivers are loaded in CONFIG.SYS (EHNPCPDD.SYS and EHNPCVDD.SYS). If these drivers are not loaded, then the native Client Access/400 for Extended DOS router is used.

The following instructions detail the process for configuring Client Access/400 for Extended DOS to use the VDM support provided by Client Access/400 Optimized for OS/2:

1. Start Client Access/400 Optimized for OS/2 and make sure that you have a network drive I: assigned to the \QDLS file system.

Note: It is important to assign the drive to the QDLS file system because Client Access/400 for Extended DOS does not know about the Integrated File System and assumes you are in this file system. In addition, some configuration programs of Client Access/400 for Extended DOS need the I: drive.

2. If you did not install Client Access/400 for Extended DOS, now is the time to do it:
 - a. Enter the following at a DOS command prompt:

```
I:\QIWSFL2\INSTALL /Z
```
 - b. Enter the drive to contain Client Access/400 and the drive your personal computer starts from. Accept the default configuration and select **Enter**.
 - c. On the *PC to AS/400 Connection* panel, you have to define the connection type, PC name, AS/400 name, and address. Use the same values you used during your Client Access/400 Optimized for OS/2 installation. Refer to the worksheets 4.3, "Installation Worksheets" on page 43 for your values. Be careful with the *PC location name*. If you are using a NETID other than APPN, you have

to use the format xxxxxxxx.yyyyyyy where xxxxxxxx is your NETID and yyyyyyy the PC name.

d. After choosing **Enter**, the files are copied from the AS/400 system to your PC. The installation of the Client Access/400 for Extended DOS is completed.

3. Enter the following at a DOS command prompt:

```
I:\QIWSFL2\CFGPCS /Z
```

4. Select **General options**.

The menu shown in Figure 168 is displayed:

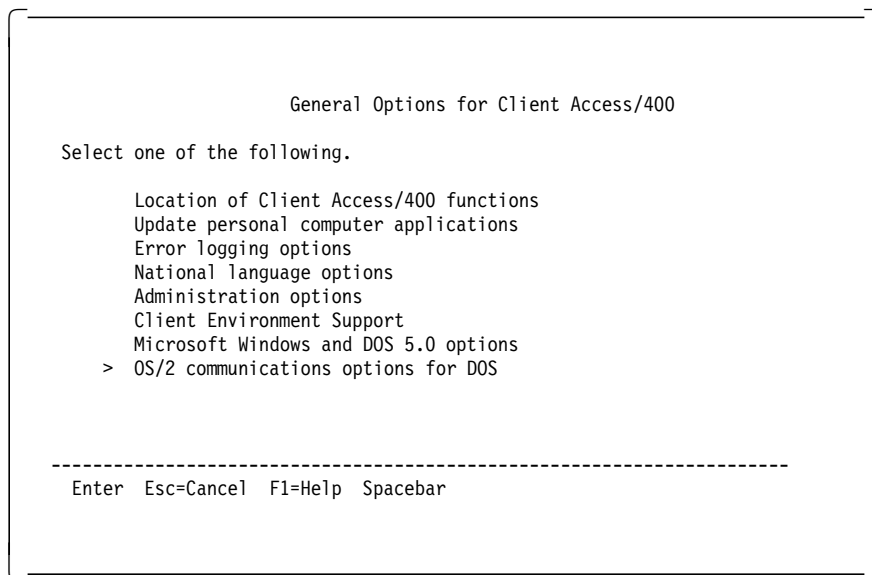


Figure 168. General Options for Client Access/400 for Extended DOS

5. Select **OS/2 communications options for DOS**.

6. Select **1. Yes** with the mouse or space bar.

The menu shown in Figure 169 on page 305 is displayed:

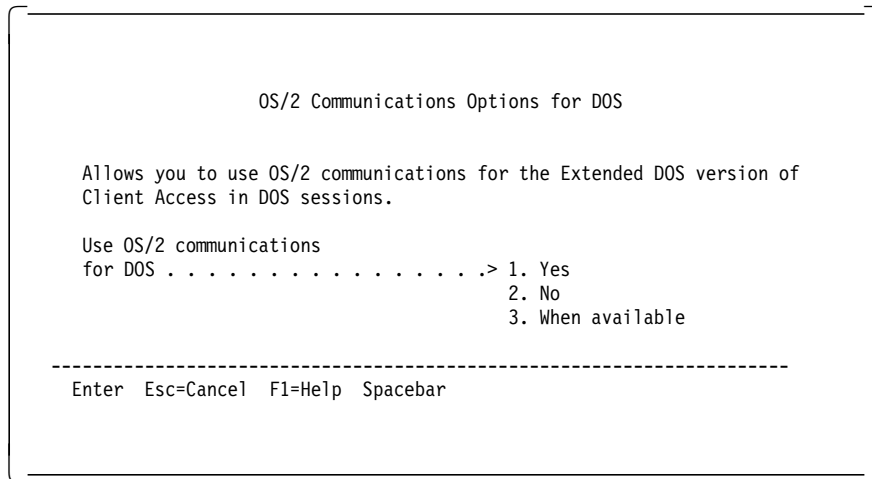


Figure 169. OS/2 Communications Options for DOS

The configuration program adds the following line into your CONFIG.PCS file:

VDMR x

where x is 0, 1 or 2 and determines the type of support:.

- 0** The native Client Access/400 for Extended DOS router is used.
- 1** The virtual router and VDD support is used.
- 2** The virtual router is used if the OS/2 support is available. Otherwise the native Client Access/400 for Extended DOS router is used. This is the default value, and is assumed if no VDMR entry is present in the CONFIG.PCS file.

11.3.3 Creating a Batch File for Client Access/400

This section assumes that you have already installed Client Access/400 for Extended DOS and the virtual router support.

The easiest way to enable Client Access/400 to start in a VDM from an icon on the OS/2 desktop is to create a batch file that starts the appropriate commands.

- Create a file called CA.BAT in the PCS directory that contains the following entries:

```
CALL C:\PCS\STARTPCS.BAT
C:\OS2\MDOS\COMMAND.COM
```

STARTPCS starts Client Access/400 for Extended DOS functions.

COMMAND.COM prevents the VDM from closing when the STARTPCS command has finished running. This is important if you only use Client Access/400 Terminate and Stay Resident (TSR) programs such as shared folders, virtual printers, or Workstation Function.

11.3.4 Creating a VDM Icon on the OS/2 Desktop

1. Select the **Templates** folder from the desktop. The templates folder contains skeleton objects that enable you to create your own objects in the OS/2 environment.
2. Drag the **Program** icon onto the desktop using the right mouse button to create a new program object on the desktop.
3. Enter **C:\PCS\CA.BAT** at the **Path and file name** prompt. This causes the CA.BAT file that you created in 11.3.3, "Creating a Batch File for Client Access/400" on page 305 to be run when the icon for the program object is selected.
4. Select the **Session** tag.
5. Select **DOS settings....**
6. Select **All DOS settings** and **OK**.
7. Select the following DOS Settings to ensure that as much memory as possible is available to the VDM that you are creating:
 - **DOS_HIGH** and the **On** radio button.
 - **DOS_UMB** and the **On** radio button.
 - **EMS_FRAME_LOCATION** and **NONE**.
 - **IDLE_SENSITIVITY** and set to **100**.
 - **INT_DURING_IO** and the **On** radio button.
 - **KBD_CTRL_BYPASS** and **ALT_ESC**. This reserves the Alt-Esc key sequence for use by the VDM so that you are able to use it for Client Access/400 Workstation Function. See 11.1.8, "DOS Settings" on page 293 for details on hot key options.
8. Select the **Save** button to return to the Settings notebook.
9. Select the **General** tab and enter the title that you would like to appear with the program icon. For example, **DOS Client Access/400**.

10. Close the Settings notebook by double clicking the mouse on the top left corner of the window.

You can now start your VDM by double clicking on the icon. Remember, you can switch your DOS session between full-screen and windowed using the **Alt-Home** key. A full-screen session has better performance than a windowed session.

11.3.5 Configuring a VDM for AS/400 Graphics

If you intend to run a graphics display session in a VDM, the correct graphics drivers must be installed when the VDM is started. This section describes how to modify an existing VDM running Client Access/400 for Extended DOS to support graphics. It does not show you how to configure Work Station Function to define a graphics session on the AS/400 system.

1. Start Client Access/400 for Extended DOS in your VDM.
2. If you do not have the Client Access/400 Menu active, start it by entering the following at the VDM command prompt.

```
I:\QIWSFL2\PCSMENU /Z
```

3. Copy the WSF graphics support to your PC using the following instructions.
 - a. Select **Configure Client Access/400** from the Client Access/400 Menu followed by **1. Client Access/400 configuration**.
 - b. Select **General options**.
 - c. Select **Location of Client Access functions**.
 - d. Move your cursor to **Host Graphics Support** and make sure that this option is highlighted using the space bar or the mouse.

Note: This is a sub-function of the **Work Station Function** that has to be selected first.

Select **Enter**.

- e. Select **Save and exit** from the pop-up window.
- f. Select **1. Immediately**.
The files necessary for graphics support are copied from the QIWSFL2 folder on the AS/400 system to the DOS Client Access/400 directory on your PC.
- g. Press the **Esc** key twice followed by **1. Exit configuration**.
This takes you back to the Client Access/400 Menu.

- h. Exit the Client Access/400 Menu by pressing the **Esc** key and selecting **1. Exit Client Access menu** from the pop-up menu.
4. Copy the graphics drivers to your hard disk by entering the following at a command prompt:


```
COPY I:\QIWSFL2\VDIDY012.SYS C:\PCS
COPY I:\QIWSFL2\VDI.SYS C:\PCS
COPY I:\QIWSFL2\INIT_VDI.EXE C:\PCS
```

Note: Depending on the type of display hardware that you have on your PC, you might need to use a driver other than VDIDY012.SYS. Refer to *Client Access/400 for DOS with Extended Memory - Setup*, SC41-3500 for more information.
5. OS/2 2.1 and later allows you to specify a different AUTOEXEC.BAT file for each VDM. Copy your C:\AUTOEXEC.BAT file to a file called C:\PCS\GRAPHICS.BAT:


```
COPY C:\AUTOEXEC.BAT C:\PCS\GRAPHICS.BAT
```

Edit GRAPHICS.BAT to include the following at the end:

```
C:\PCS\INIT_VDI.EXE
```
6. Click the right mouse button once on your VDM icon.
7. Select **Settings**.
The Settings notebook is displayed.
Make a note of the entry in the **Path and file name** box (for example, CA.BAT).
8. Select the **Session** tab.
9. Select **DOS full screen**.
Graphics sessions do not work in windowed sessions. You could also use Alt-Home to switch to the full-screen mode, but we recommend to set the icon properly.
10. Select **DOS settings....**
11. Select **Other DOS settings...** and **OK**.
12. Select **DOS_AUTOEXEC**, and replace C:\AUTOEXEC.BAT in the **Value** box with:


```
C:\PCS\GRAPHICS.BAT
```
13. Select **DOS_DEVICE**, and enter the following in the **Value** box:


```
C:\PCS\VDIDY012.SYS
C:\PCS\VDI.SYS
```


Make sure that these two lines are in the order shown.

14. Save your DOS Settings and close the Settings notebook.
15. Edit the file that you noted in step 7 on page 308 to include the following line after STARTPCS and before COMMAND.COM:

```
C:\PCS\WFGSHOW
```

When you want to display graphics on your AS/400 session, the WFGSHOW program has to be running in the DOS session. Including it in the batch file ensures that it is available when needed. If you need to have the DOS session free to run another program (the Client Access/400 menu for example), you can leave WFGSHOW out of the batch file and just run it when needed.

16. If you do not have your Work Station Function session configured for graphics, do the following:
 - a. Start the Work Station Function Configuration program:

```
I:\QIWSFL2\CFGWSF /Z
```
 - b. Create a new or change an existing session profile and select the **Graphics** display device.
 - c. You now have a new menu option: **Graphics options**. Select the appropriate settings for your needs. Refer to *Client Access/400 for DOS with Extended Memory - Setup*, SC41-3500, for more information.
 - d. **Exit** the Work Station Function Configuration program.

Now you can start the VDM by double clicking the mouse on the icon.

11.3.6 Network Drive / Shared Folder Considerations

When using the OS/2 VDM support, network drives are configured by Client Access/400 Optimized for OS/2 before Client Access/400 for Extended DOS is started. You cannot define the same drive, for example I, with Client Access/400 Optimized for OS/2 and Client Access/400 for Extended DOS. You get a message saying the drive is unavailable to the Shared Folder function (Message 5956).

We strongly recommend that you use Client Access/400 Optimized for OS/2 to assign all of the network drives that you need for DOS Client Access/400 in a VDM for the following reasons:

- Drives assigned in this way are available to all DOS, WIN-OS/2, and OS/2 applications. Drives assigned within a VDM are only available from within that VDM.

- More memory is available to applications running in the VDM if the shared folders programs have not been loaded in the VDM.

To prevent Client Access/400 for Extended DOS from starting shared folders, do the following:

1. Edit the CONFIG.PCS file in the PCS directory to remove the following line:

```
SFLR 1,I,,xxxxxxx (where xxxxxxx is the name of your AS/400 system)
```

2. Edit your STARTPCS.BAT file in the PCS directory to remove the following lines:

```
:SSFLR
STARTFLR %1
@IF ERRORLEVEL 20 GOTO EXIT
:ESFLR
:SCFLR
CFGFLR %1
@IF ERRORLEVEL 20 GOTO EXIT
@IF NOT ERRORLEVEL 15 GOTO CDIFLR
@ECHO 5049 - DRIVE I: WAS NOT ASSIGNED TO A SPECIFIED SYSTEM
@GOTO EXIT
:ECFLR
```

11.3.7 Network Printer / Virtual Printer Considerations

If you are using OS/2 communications from a VDM, we recommend that you use Client Access/400 Optimized for OS/2 to assign network printers. This is because of the following:

- Printers assigned in this way are available to all DOS, WIN-OS/2, and OS/2 applications. Printers assigned from a VDM are only available from within that VDM.
- More memory is available to applications running in the VDM if the virtual print programs have not been loaded in the VDM.

11.3.8 Running Client Access/400 from Multiple VDMs

It is possible to run Client Access/400 from more than one Virtual DOS Machine at the same time if you are using the virtual router. This section contains details of how this can be achieved.

One reason that you might want to run Client Access/400 in more than one VDM, is to give you separate windows for multiple Workstation Function

sessions so that you can see more than one AS/400 session on your screen at the same time.

Configuration is different for multiple VDMs depending on whether you are using the native Client Access/400 for Extended DOS router (refer to *Using V2R3 DOS and OS/2 PC Support/400 under OS/2 2.1, Including CM/400, CM/2 and RUMBA/400 for OS/2*, GG24-4070-01 for details), or using OS/2 communications facilities with OS/2 VDM support.

Note that performance can be unacceptable when running Workstation Function in multiple VDMs, particularly in windowed mode.

To enable multiple VDMs to run Client Access/400 using the virtual router, you need to ensure that the names used for the virtual device descriptions in Workstation Function do not conflict. By default, the Workstation Function session names are based on the PC Location Name (RTLN entry) that you use in your CONFIG.PCS file. When using the virtual router, all VDM Client Access/400 sessions communicate through the same AS/400 connection to the same APPC controller on the AS/400 system. Because of this, if you do not specify a display station ID during Workstation Function configuration, all your VDMs default to the same name for the WSF sessions, and only the first WSF session can become active.

Important:

To have multiple WSF sessions using the virtual router in multiple VDMs, you must configure unique WSF session profiles using CFGWSF for each WSF session required.

11.3.9 VDMSERV Parameters

There are three parameters that can be used with the VDMSERV.EXE program:

- /Z** This option reduces the number of messages displayed for this program.
- /F** This parameter forces VDMSERV to end. All VDMs running the Client Access/400 for Extended DOS virtual router are unable to communicate with the AS/400 system.
- /D** This option displays the status of the VDMSERV program. An example of its output is shown in Figure 170 on page 312.

```

C:\CAOS2>vdmserv /d
Client Access/400
Operating System/2
DOS Session Server
(C) Copyright IBM Corp. 1984, 1994. All rights reserved.
Version 3.0 Release 1.0 Level 00

OS/2 Server Name and ID          DOS session ID
-----
EHNRTSRV.EXE    00000059          STARTRTR.EXE    A6C00000
                  STARTRTR.EXE    A6400000
                  STARTRTR.EXE    A6800000

```

Figure 170. Example of Output from VDMSERV /D

This example shows that three instances of the Client Access/400 for Extended DOS virtual router are currently using the services of VDMSERV.

11.4 Running Client Access/400 for Extended DOS Under WIN-OS/2

This section contains details of how to configure and run Microsoft Windows and DOS applications that use Client Access/400 functions from WIN-OS/2 sessions.

This section explains how to start a VDM for Microsoft Windows applications such as Current-OV/400 Workgroup, ShowCase VISTA, or RUMBA/400 for Microsoft Windows that need access to the Client Access/400 for Extended DOS router APIs. These applications are dependent on both Windows and Client Access/400 support. As such, it is necessary to get Client Access/400 working together with WIN-OS/2.

In addition, this section discusses how to configure Client Access/400 for Extended DOS to run under a WIN-OS/2 using the virtual router. Refer to *Using V2R3 DOS and OS/2 PC Support/400 under OS/2 2.1, Including CM/400, CM/2 and RUMBA/400 for OS/2*, GG24-4070-01, for details about the native router.

With Version 3.0 Release 1.0 Client Access/400 for Windows 3.1, a very powerful Open Database Connectivity (ODBC) driver with full function and good performance was introduced. ODBC is a standard database access definition for the Windows environment and many applications support it. For example the Client Series tool Impromptu from Cognos, the Lotus products Lotus 1-2-3 and Approach, or the Microsoft products Access, Excel and Word.

The fact that the Client Access/400 for Windows 3.1 client does not work in a VDM requires additional configuration to use the Client Access/400 for Windows 3.1 ODBC driver with the Client Access/400 for Extended DOS client in a VDM. This is covered as well.

The steps that you need to go through to start a WIN-OS/2 VDM with the Client Access/400 for Extended DOS router active are similar to starting Client Access/400 for Extended DOS in a simple VDM. This is because OS/2 actually runs the WIN-OS/2 environment inside a VDM. The virtual DOS support of OS/2 is so robust that it is possible to run Microsoft Windows from within a VDM. However, this environment is very complex due to the multiple configuration possibilities available for OS/2, WIN-OS/2, and Client Access/400 for Extended DOS.

11.4.1 WIN-OS/2 Overview

There are three ways to run Microsoft Windows programs under OS/2.

WIN-OS/2 Full Screen: Running WIN-OS/2 in a full-screen session starts the WIN-OS/2 Program Manager in a VDM. You are able to hot-key between the OS/2 desktop and the WIN-OS/2 Program Manager. When you have one in the foreground, the other is active in the background. OS/2 and Microsoft Windows programs do not run side-by-side in this mode; either OS/2 controls the desktop, or WIN-OS/2 does.

Since OS/2 starts WIN-OS/2 in a single VDM, if one Windows program crashes, it can bring down the entire WIN-OS/2 environment. This is in fact how Microsoft Windows 3.1 operates; Windows programs depend on each other to behave **correctly**.

You are able to launch DOS or OS/2 programs from the WIN-OS/2 full-screen session, but they run under the OS/2 desktop.

WIN-OS/2 Window: This mode allows you to run Microsoft Windows applications on the OS/2 desktop side-by-side with other Windows, OS/2, or DOS applications. It is also sometimes called **seamless** WIN-OS/2. Unlike the full-screen mode, you are able to see all applications simultaneously. This requires a display driver that supports seamless presentation of OS/2 and WIN-OS/2 applications.

With this mode you can have an icon of a Microsoft Windows program on your OS/2 desktop so it can be invoked like any other program.

There are two ways to run WIN-OS/2 in a window; in a common session, or in separate sessions.

- Common Sessions

Running in this mode causes OS/2 to start the WIN-OS/2 environment in a single VDM, and then to run all subsequent Microsoft Windows applications using this common environment. It then manages the presentation of the sessions such that they are seamlessly placed on the OS/2 desktop. Like the full-screen mode of WIN-OS/2, and like Microsoft Windows 3.1, if one Windows program crashes, it can bring down the entire WIN-OS/2 environment.

The advantage of common sessions is in the area of performance. The first Windows program takes a while to start as a copy of WIN-OS/2 is being started beneath it. Subsequent Windows programs, however, start very quickly. It is similar to running Microsoft Windows natively under DOS. Starting the environment takes several seconds, but once DOS and Microsoft Windows are active, starting programs is quite fast.

Another advantage is in the area of Client Access/400. You can configure WIN-OS/2 such that Client Access/400 for Extended DOS is started along with the first Windows program. Since in this mode there is only one VDM, all Microsoft Windows programs started using the common session have access to the Client Access/400 for Extended DOS router.

Common sessions are the default for WIN-OS/2 windowed sessions.

- Separate Sessions

Using separate sessions causes OS/2 to start a new VDM, each with its own WIN-OS/2 environment for each Microsoft Windows application. This means that for each session it starts a VDM, it starts a copy of WIN-OS/2 in that VDM, and then starts the Windows program. Unlike the other modes of WIN-OS/2, and unlike Microsoft Windows 3.1, if one Windows program crashes, it *cannot* bring down the entire WIN-OS/2 environment. The applications are protected from each other by the native VDM support of OS/2.

The advantage of separate sessions is in the area of integrity: Windows programs are protected from each other. The level of protection is even better than that provided by native Microsoft Windows 3.1.

The major disadvantage of separate sessions is in their relatively poor performance. Each Windows program run in this way has a great deal of overhead, and the start-up time can be very long.

Another area where separate sessions are difficult to use involves Client Access/400. Unless you are using the virtual router support along with an OS/2 Communications Manager, it is almost impossible to allow each Windows application access to the Client Access/400 router. Even when using the virtual router support, you must deal with the performance issue. Performance is worse by the fact that all of Client Access/400 for Extended DOS must be started in the VDM prior to the entire WIN-OS/2 environment. Configuration and usage of this environment is not exhaustively detailed in this publication, since it is found to be more or less unacceptable.

It is important to note, however, that the type of session used, namely common or separate, can be configured on a program-by-program basis. For example, you could have three icons that call different Microsoft Windows programs on your OS/2 desktop. The first two, requiring Client Access/400, could be configured for common sessions, while the third, which is a mission-critical application not requiring Client Access/400, could be run in a separate session.

Native Microsoft Windows 3.1: Although it is possible to run the actual Microsoft Windows 3.1 code in a VDM, this environment is not covered in this publication.

11.4.2 Configuring Client Access/400 for Extended DOS for Microsoft Windows

Before performing any OS/2 configuration, you must make sure that Client Access/400 for Extended DOS is configured to run with Microsoft Windows. This can be done with the Client Access/400 configuration program (CFGPCS.EXE).

1. Start the CFGPCS program.
2. Select **General options** from the main menu.
3. Select **Microsoft Windows and DOS 5.0 options** from the **General Options for Client Access** menu.
4. Choose **Yes** for the **Run Client Access with Microsoft Windows** prompt.
5. Choose **Microsoft Windows** for the **AS/400 connection environment**. This causes the router Signon to occur from *within* Microsoft Windows.
6. Select **No** for the **Create Client Access/400 group** prompt. Your panel should look like the one shown in Figure 171 on page 316:

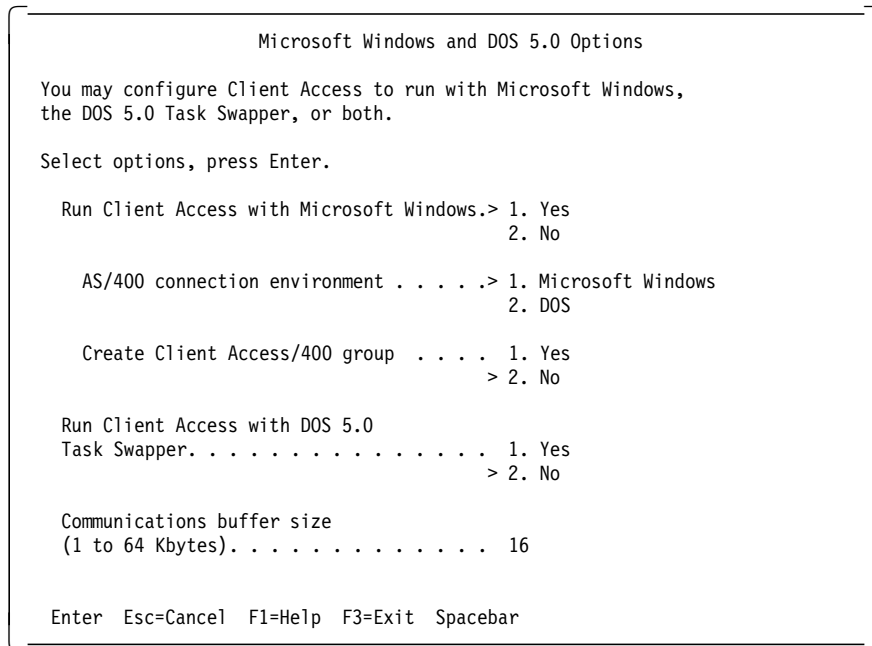


Figure 171. Configuring Client Access/400 for Extended DOS for Microsoft Windows

7. Press **Enter** and select **1. Save and exit**. Files can be copied to your PC fixed disk.
8. Exit the CFGPCS program. Client Access/400 for Extended DOS should now be enabled to run with Microsoft Windows the next time it is started.

11.4.3 General Rules

As discussed, it is now possible to launch DOS applications from the WIN-OS/2 environment. This means that it should be possible to run Client Access/400 from WIN-OS/2. We strongly recommend that you do not use this option for the following reasons:

- Client Access/400 is not available to any Windows applications running under WIN-OS/2. By starting a DOS application such as Client Access/400 for Extended DOS from WIN-OS/2, you cause OS/2 to start a *new* VDM. This VDM is separate and totally protected from the VDM under which the WIN-OS/2 environment is running.
- The batch files that are created for use with the Client Access/400 icons do not work in this environment. This is because each expects access to

the Client Access/400 router, but this is not available because of the reasons mentioned in the previous point.

This means that you should *not* use the following icons from the Client Access/400 group of WIN-OS/2:

- WSF
- Host Command
- Data Transfer
- Folders
- Virtual Print
- Messages
- Store Messages

The best way to make Client Access/400 functions available to Windows applications running in the WIN-OS/2 environment is to start Client Access/400 in the VDM *before* the WIN-OS/2 environment is invoked. This is very similar to how Client Access/400 works with native Microsoft Windows in a plain DOS environment. Client Access/400 resident programs such as the router and shared folders are started prior to Windows. The PCSWIN module ensures router communications integrity.

Important:

The best advice we can give you in this environment is that you should use the Client Access/400 for Extended DOS virtual router support under WIN-OS/2 whenever possible. This allows you to:

- Assign network drives and printers from Client Access/400 Optimized for OS/2, making them available to *all* Windows, DOS and OS/2 applications.
- Access the Client Access/400 router without signing on. This is especially important when running Client Access/400 for Extended DOS together with the windowed mode of WIN-OS/2.
- Easily start Client Access/400 for Extended DOS in multiple VDMs. Without using the virtual router, this is impossible.

11.4.4 Creating a Batch File for Client Access/400

The easiest way to enable Client Access/400 to run with WIN-OS/2 is to create a batch file that starts the appropriate commands.

- Create a file called WINCA.BAT in the PCS directory that contains the following entries:

```
CALL C:\AUTOEXEC.BAT
CALL C:\PCS\STARTPCS.BAT
```

AUTOEXEC sets up the DOS environment as you like it, and STARTPCS starts Client Access/400 for Extended DOS functions.

11.4.5 Creating a VDM Icon on the OS/2 Desktop

You can create a WIN-OS/2 session that calls the WINCA.BAT file you created in 11.4.4, "Creating a Batch File for Client Access/400." The WINCA.BAT file is started from the DOS_AUTOEXEC setting.

1. Select the **Templates** folder from the desktop. The templates folder contains skeleton objects that enable you to create your own objects in the OS/2 environment.
2. Drag the **Program** icon onto the desktop using the right mouse button to create a new program object on the desktop.
3. Enter the **file name** of your Windows application which requires the Client Access/400 for Extended DOS router (for example Current-OV/400 or ShowCase VISTA) at the **Path and file name** prompt. If you want to use a general WIN-OS/2 full screen session, type a * into the **Path and file name** prompt.
4. Select the **Session** tag.
5. Select **WIN-OS/2 full screen** or **WIN-OS/2 window** depending on your previous decision.
6. Select **WIN-OS/2 settings....**
7. Select **All DOS and WIN-OS/2 settings** and **OK**.
8. Select the following DOS Settings to correctly configure the VDM:
 - Select **DOS_AUTOEXEC** and replace C:\AUTOEXEC.BAT in the **Value** box with:
C:\PCS\WINCA.BAT
 - **DOS_HIGH** and the **On** radio button.

- **DOS_UMB** and the **On** radio button.
 - **EMS_FRAME_LOCATION** and **NONE**.
 - Select **IDLE_SENSITIVITY** and set to **100**.
 - Select **INT_DURING_IO** and set to **On**.
 - Select **VIDEO_8514A_XGA_IOTRAP** and set to **Off**. This speeds up the display, and is the setting used by OS/2 for WIN-OS/2 sessions.
 - Select **VIDEO_RETRACE_EMULATION** and set to **Off**.
 - Select **VIDEO_SWITCH_NOTIFICATION** and set to **On**. This tells WIN-OS/2 when it is switched to or from full-screen, and is the setting used by OS/2 itself for WIN-OS/2 full-screen sessions.
9. Select the **Save** button to return to the Settings notebook.
 10. Select the **General** tab and enter the title that you would like to appear with the program icon. For example, **WIN-OS/2 Client Access/400**.
 11. Close the Settings notebook by double clicking the mouse on the top left corner of the window.

11.4.6 Using Your New Icon

Now you can start your VDM by double clicking on the icon you created in 11.4.5, “Creating a VDM Icon on the OS/2 Desktop” on page 318. Make sure that you start your Client Access/400 Optimized for OS/2 before starting your icon. When you double click on the icon you are taken to a WIN-OS/2 session. The Client Access/400 for Extended DOS functions contained in your STARTPCS.BAT file is called. Because you are using the virtual router support, you are not asked to sign on to the Client Access/400 router. WIN-OS/2 is started. If you require access to shared folders or virtual printers, you should assign them from the Client Access/400 Optimized for OS/2 using network drives and printers.

11.4.7 Stopping Your New Icon

When you exit your WIN-OS/2 application, that application is ended. If it is the only WIN-OS/2 windowed session running in the *common* session mode, the underlying WIN-OS/2 environment is also ended. This ends the entire VDM, including your Client Access/400 for Extended DOS session. In addition, this is how all windowed WIN-OS/2 configurations using *separate* sessions end.

If other Windows applications are active that were configured to use the *common* windowed mode, the underlying WIN-OS/2 environment is *not* ended, nor is the associated Client Access/400 for Extended DOS session and VDM ended. They are only destroyed when *all* common windowed sessions have been ended.

11.4.8 Client Access/400 for Windows 3.1 ODBC in a VDM

These instructions enable the ODBC driver packaged with the Client Access/400 for Windows 3.1 client to be used with the Client Access/400 for Extended DOS client in a OS/2 Virtual DOS Machine. Since this involves a manual install of the ODBC driver, no automatic updates are done when the Client Access/400 for Extended DOS update function is used. You are responsible for determining if later versions of the client ODBC code exists on the server and then installing those later versions on the client.

1. Install the Client Access/400 for Extended DOS router as per the instructions to work with Windows. See 11.3, "Virtual DOS Machine Configuration for Client Access/400" on page 301 and 11.4, "Running Client Access/400 for Extended DOS Under WIN-OS/2" on page 312 for details on how to install and configure Client Access/400 for Extended DOS in a WIN-OS/2 Virtual DOS Machine.
2. Copy the following files from the QPWXCWN directory that contain the base code for Client Access/400 for Windows 3.1. If the files already exist in the target directory, then use the later of the two versions. Check the date on the file for the most recent copy.

```
C:\OS2\MDOS\WINOS2\SYSTEMCTL3D.DLL  
C:\OS2\MDOS\WINOS2\SYSTEM\ODBC.DLL  
C:\OS2\MDOS\WINOS2\SYSTEM\ODBCINST.DLL  
C:\OS2\MDOS\WINOS2\ODBCADM.EXE  
C:\OS2\MDOS\WINOS2\ODBCADM.HLP
```

3. Copy the following files from the QPWXCWN directory. If the files already exist in the target directory, then you should not copy the files. We will modify them later.

```
C:\OS2\MDOS\WINOS2\ODBCINST.INI  
C:\OS2\MDOS\WINOS2\ODBC.INI
```

If ODBCINST.INI was already there, edit the file adding the following lines:

```
[ODBC Drivers]
Client Access/400 ODBC Driver=Installed
```

```
[Client Access/400 ODBC Driver]
Driver=c:\pcs\ehnodbc3.dll
Setup=c:\pcs\ehnstp3.dll
```

If the ODBC.INI file already existed, you can use the ODBC administrator function later to add a new data source.

4. Copy the following files from the QPWXCWN directory:

```
C:PCSEHNODBC3.DLL
C:\PCS\EHNSTP3.DLL
```

5. Copy the following files from the QPWXCWNMRIxxxx directory:

```
C:PCSMRIxxxxEHNODBC3.HLP
C:\PCS\MRIxxxx\EHNODBC3.MRO
```

MRIxxxx is the directory for the language sensitive code, for example xxxx=2924 for U.S.English or xxxx=2939 for German Multinational.

6. Start WIN-OS/2 and add a new program item to an existing or new program group. Choose C:OS2MDOSWINOS2ODBCADM.EXE for the program name and C:OS2MDOSWINOS2 for the working directory. Name the new program item ODBC Administration.
7. Use the ODBC administration facility to add a new data source that uses the ODBC driver you just installed.

You are now ready to use your ODBC driver with ODBC enabled Windows applications.

Chapter 12. Mixed Version Networks

This section describes the issues involved when running Client Access/400 Optimized for OS/2 in a network consisting of AS/400 systems with different levels of OS/400. Some functions provided by Client Access/400 for OS/2 are not provided by Client Access/400 Optimized for OS/2. It is possible to run both Client Access/400 Optimized for OS/2 and Client Access/400 for OS/2 on the same PC to provide a full set of functions where this is necessary. See 3.1, "OS/2 PC Support/400 or Client Access/400 for OS/2" on page 30 for details.

12.1 Using Client Access/400 Optimized for OS/2 on Pre-V3R1 Systems

In many cases, there could be a network that includes two or more AS/400 systems, where the OS/400 is on a different level on each machine. For example, one AS/400 system could be on Version 3.0 Release 1.0 and another could be on Version 2.0 Release 3.0. You are still able to use Client Access/400 Optimized for OS/2 to connect to both Version 3.0 Release 1.0 and Version 2.0 Release 3.0 AS/400s.

The following functions of Client Access/400 Optimized for OS/2 can be used on AS/400 systems that are at a lower level than OS/400 Version 3.0 Release 1.0:

- 5250 display and print emulation
- File transfer
- Network drives (shared folders)

As there is no Integrated File System (IFS) on systems with OS/400 before Version 3 Release 1, you see only shared folders and not the rest of the data in the IFS.

- SNA connectivity

All other functions of Client Access/400 Optimized for OS/2 require OS/400 Version 3.0 Release 1.0 or later. It is possible to run both Client Access/400 Optimized for OS/2 and Client Access/400 for OS/2 on the same PC to provide a full set of functions where this is necessary. See 3.1, "OS/2 PC Support/400 or Client Access/400 for OS/2" on page 30 for details.

12.1.1 User ID and Password Verification to Pre-Version 3.0 Release 1.0 AS/400 Systems

Client Access/400 cannot validate your user ID and password to Pre-V3R1 AS/400 systems until a function (RUMBA/400, network drives, and so on) is started. If you use an invalid user ID and password to access a Pre-V3R1 system then the following can happen:

- The logon panel responds with the "Logon was successful" message.
- The function reports the error. For example, if you are trying to start a RUMBA/400 emulation session, RUMBA/400 reports the security error. For V3R1 and later AS/400 systems, the logon panel reports the error.
- You must logoff before you attempt the function again. You logoff by typing **LOGOFF /n=nodeName**, at an OS/2 prompt, where the nodeName is the name of your AS/400 system.

Chapter 13. Performance Tuning OS/2 Warp

There are some basic considerations that need to be made about the computer that you install Warp on. It breaks down into three elements: processor, memory, and disk.

Processor versus Memory

In most cases, the processor that you have in your system has a minimal impact on performance compared to the amount of memory and the speed of the disk.

The only real consideration to make with respect to the processor is age. You want to avoid 386 and 386SX processors. You want processors that can be upgraded, and those that support instruction caching (sometimes referred to as a Level 1 or a Level 2 cache). There really is no optimum level instruction cache size. More instruction cache is usually better than less. The only real determinant should be the cost.

Memory

Without enough memory, the performance of your system will be compromised.

Memory, also called RAM, is a different story. If you cannot afford to buy memory for your system, then you must manage the things you install. You only want to install fonts, device drivers, objects, and applications that you are actually going to use. You might think that just because you have not started an installed application, it is not using any memory. This is not always the case. Many newer OS/2 applications register classes and objects with the Workplace Shell, or add items into path statements, set statements, and the like. Many of these things require memory to be used even when the program is not running. In some cases, the program requires special device drivers to be installed that also use memory.

Hard Disk

Probably the most important piece of hardware on your system is the hard disk.

It affects the performance of starting your system, loading applications, the speed of applications, and the general performance of your system.

It is best to have a disk subsystem that uses a bus-mastering type of adapter. Many SCSI devices and some of the PCI devices have this capability. These types of devices allow for multiple requests to be sent to the disk device to be processed rather than just one command or function at a time. They also allow what is called scatter or gather capabilities. Without bus mastering, data that is transferred between the memory of the computer and the disk must be in contiguous memory, one byte after the other. With bus mastering, the data does not have to be contiguous and does not have to be on a 64K byte boundary. Bus-mastering relieves the system of a lot of overhead and therefore performs faster in actual usage, although you can see little or no difference when running benchmarks.

When the memory in your system is over-committed, that is, the operating system and the applications you are running need more memory than is physically available in your computer, Warp pages, or swaps code and data that has not been accessed for a while to the disk in order to make room for the needed code and data. In this instance, the disk is the single most important factor in your system with respect to performance.

13.1 File Systems

OS/2 supports two file systems for use on your hard disks: FAT and HPFS. No matter which file system is used, there are some basic considerations. You need to install the file system depending on which operating systems access the data. If you plan to boot a DOS or Windows system natively, then any data that is accessed must exist on a FAT disk partition. If you are only running DOS and Windows applications in a Warp VDM (Virtual DOS Machine), then the file system can be HPFS or FAT. Also, when accessing a file on a server, and the server file system is HPFS (for example the File Server Input/Output Processor with LAN Server/400), you do not need to install HPFS on your local client machine. HPFS only needs to be installed on a computer when a partition on a local hard disk is formatted as HPFS.

The amount of memory you have in your machine should affect the decision about which file system to use. When HPFS is installed, it requires a minimum 200 to 250KB of working set, plus the space allocated for its cache. This is a large amount of memory and is the main reason why FAT is used when Warp is installed on a system that contains 4MB of physical memory.

Regardless of which file system you select, you need to plan for future requirements: How are maintenance and fixes applied? Where are applications installed? Where does data reside, and so on? We recommend that when you set up your hard disk, you create a minimum of three partitions. One is for the operating system or systems, one for your applications and static data files, and another for dynamic data files and temporary files. Decide whether you want to use Boot Manager or Dual Boot. If you select Dual Boot, then OS/2 must be installed with the FAT file system.

For temporary files, it is better to have them preallocated and use them again rather than create and destroy them every time. Extending a file can be almost twice as slow as just writing to a file. Also, if you use files again, it definitely reduces the fragmentation in your disk directories.

Now look at some specifics with regards to the two file systems.

13.1.1 FAT

FAT is best suited for *disk partitions that are 80MB or less in size* or that have a limited number of files installed. Usually, 256 files is a good target, with up to 500 acceptable. The number of files become important because FAT files are allocated based on a sector size. The sector size is determined by the size of the disk partition and can be 2K, 4K, 8K, or higher. Since most file sizes are not an exact multiple of the sector size, disk space gets wasted. For example, installing DOS, Windows and Warp on a 100MB partition resulted in 2.2MB of disk space being wasted.

Also, when Warp is allocating space for a file in a FAT partition, it looks for the largest available free space area to write the data or create the file. If lots of files were created and deleted, or expanded, these free space areas become smaller and smaller, and are spread out over the disk. This is referred to as fragmentation. When a file is stored in many areas on the disk, it takes longer to read that data simply because the disk head has to do more seeking.

The FAT file system disk cache is defined by the *DISKCACHE=* statement in the CONFIG.SYS file. New in Warp is the **D** designation for the size of the disk cache. Warp allocates space for the disk cache based on the amount of physical memory that is installed in the system. If more than 8MB is installed, 10% of the physical memory is used for the disk cache up to a maximum of 14.4MB. Based on what applications and support you install in your system, this can be too high, and cause you to over-commit your

memory. If there is not a lot of disk work done on your system, or you are using DB/2 or HPFS, then you should reduce the size of your disk cache. A number between 128 and 256K is sufficient for most systems. On a 4MB system, we set the disk cache to 48K.

In conjunction with the cache size, you should also set the cache threshold. This determines which records being written or read is placed in the cache. The default is 1 sector. If your cache size is 128K or larger, increase this value to at least 16 and preferably 32. More detail about the DISKCACHE= statement is given in 13.2, "System Tuning CONFIG.SYS" on page 329.

Some additional items for improving performance using FAT are:

- Group files by usage, the most used files first, and least used files last.
- Group files based on whether they are static or dynamic. All dynamic and temporary files should be placed in a separate partition.
- If possible, place all temporary files in a single directory.
- If possible, permanently create temporary files and use them again.
- Only create directories that are really needed. The fewer number of directories you have to search, the faster your search is going to be.
- Defragment your partitions after installing new applications, deleting files, or applying maintenance and fixes. Any DOS defragmentation program that is aware of hidden files can be used.

13.1.2 HPFS

HPFS does away with some of the concerns that are prevalent with FAT. Files are allocated based on a 512-byte granularity instead of a sector size, therefore fragmentation is greatly reduced. Also HPFS is especially efficient when handling large partition sizes, (> 100MB), and large numbers of files, (> 500). One thing you should look out for is not to allocate more than 5000 files in a sub-directory or directory. When you exceed 5000 files, you start to degrade performance. The HPFS file system shipped with the Warp product has a cache limit of 2MB. There is no such limit when using the HPFS386 file system that comes with the LAN Server products.

HPFS does not have a separate line for the cache parameters. These are specified on the *IFS statement in the CONFIG.SYS file*. As with FAT, you should specify the caching threshold value. Use the /CRECL parameter to do this. Here you specify a number in terms of K bytes. *32K is usually a good starting value.*

As mentioned earlier, the big drawback to HPFS is the amount of extra memory that it requires. Even if there is no HPFS partition on your system, it costs between 200 and 250K in working set memory, as well as the space for the HPFS cache. If you are installing Warp on an existing DOS and or Windows system, you do not want to install HPFS. When your system is up and running, you can check the working set of your system. If there is enough free memory and you want to create a HPFS partition, you can use selective reinstall to install the HPFS support. Remember that any data stored in the HPFS partition cannot be accessed if you boot your machine under DOS.

Another advantage of HPFS over FAT is in the area of extended attributes (EAs). EAs are data attached to a file and used to provide information about the file it is attached to. The name of an object that appears in an OS/2 folder or on the OS/2 Desktop is stored in EAs. In HPFS, EAs are part of the HPFS file control block which is read when the file is open. In FAT, EAs are stored in a separate file and require additional I/O to access them, and are therefore slower.

13.2 System Tuning CONFIG.SYS

Now look at specific things in the CONFIG.SYS file that you should change to help improve the performance of your Warp system.

Before you read further, please make a copy of your CONFIG.SYS file! Just in case...

Statement	Meaning
LIBPATH=	This tells the system where to find DLL files and disk device drivers that Warp and applications use. Place the directory names <i>in order of usage</i> . The most accessed directory should be first, the least used last. If possible, place the DLL file used by a program in the same directory as the working directory when the program is running. Then you do not need to add that directory to the LIBPATH statement. Also, place all directories that are on a network at the end of your LIBPATH statement in case the network goes down and they cannot be accessed. See the discussion of dynamic LIBPATH support later on in this paper for additional considerations when accessing network drives.

PATH= PATH is used to specify where Warp searches for program files that are running, EXE, COM, CMD, BAT, and so on. Place the directories *in order of most used first*, least used last. If programs are run from an object on your desktop or folder, specify the path there and not in the PATH statement. Only place directories in the PATH statement for running programs that are called from other programs or commands.

DPATH= The same principle applies to DPATH as PATH and LIBPATH. For resources that applications use, place *the most used directories first* and the least used last.

BUFFERS=90 Buffers are physical memory used to support partial sector reads and writes in a FAT file system environment. They are also used to cache FAT directory entries and for swap file disk I/O. Because BUFFERS are used to cache FAT directory entries, this number should not be reduced below 60, unless you are not using the FAT file system on your disks. Reducing this number increases the number of disk reads that are done to the FAT directory entries, and therefore slows down your system.

MAXWAIT=3 This specifies the maximum amount of time that a thread is in a ready-to-run state without receiving a time slice to run in. After this time expires, the thread is given a boost in priority so it gets a chance to run. Reducing this value to 2 can help in systems where there are a lot of programs running, or multiple separate DOS/Windows programs running. Reducing it to 1 on systems where there is swap activity taking place can slow down the system.

DISKCACHE=D,LW,T,AC

This is used to specify the amount of physical memory set aside to cache data that is being read from, or written to disk. D represents a dynamic disk cache value that varies in size from 48K to 14400K, based on the amount of physical memory you have in your system. If you have more than 8MB in your system, D is 10% of your the physical memory of your system. The D should be changed to the actual amount of disk cache space you require. If you have a system where your programs do not do much disk I/O or where your memory is being used up by your applications, you might want to set this value to 128. Also, reduce this

value if you are using the DB/2 product or any other product that provides its own disk data caching.

The T parameter is not defined in the default CONFIG.SYS file. It defines the cache threshold for records that go into the cache. The default value is 4. This means that any record that is 4 sectors or less goes into the cache, while those greater do not. If your disk cache size is 128K or larger, add this parameter to the disk cache statement. If you know this value, set it to the largest record size used. Otherwise, set the value to 32.

The LW parameter activates the Lazy Write, or write behind feature. This allows the application to get control back before the data is actually written to disk. A separate thread will write the data from the cache to the disk when necessary or opportune to do so. You should *always use this option*, and code your applications to open files with a cache bypass option if disk data security is imperative.

SWAPPATH=D,R,S

SWAPPATH specifies where code and data pages are swapped to on disk when more physical memory is needed than is available in your system. D represents the path where your SWAPPER.DAT file is located. For systems that have multiple partitions or multiple disks, this should be placed on *the least used directory of the least used disk*. Also, try to physically locate the swap file on the disk based on its usage. If you are doing a lot of swap activity, place the swap file at the start of the disk. If it is rarely used, place it at the end.

S is the size that the swap file is initialized to when you start your Warp system. Make this *large enough* so that it does not have to grow in size while you are running your programs. You should perform your normal computer functions and look at the size of the swap file when you have the most activity. Then set the value of S to this size in the CONFIG.SYS file. If you are using the FAT file system, IPL your system under DOS, delete the SWAPPER.DAT file, defragment the disk partition where the swap file is located, and then IPL your OS/2 system. This should keep your swap file from getting fragmented.

R specifies the amount of free space that must be in the swap file. The default for this value is adequate and only needs to be changed if you want to be warned earlier about a possible out-of-memory situation.

THREADS= THREADS defines how many threads the system is able to use. One page of resident memory is needed for approximately every 32 threads that are defined. When using Client Access/400 Optimized for OS/2, we recommend that you use the usual Warp default of 256.

13.3 Additional CONFIG.SYS Considerations

You should only install the device drivers that your programs actually need to run. Do not install extra communication, printer, video, or device drivers if they are not going to be used. The following is a list of device drivers and virtual device drivers that are normally found in CONFIG.SYS, and that might not be needed. (Virtual device drivers are used to support DOS and Windows applications, and they usually have a V at the beginning of their name.)

Device Driver	Meaning
VEMM.SYS	Used to support Expanded Memory use in DOS and Windows programs.
VXMS.SYS	Supports Extended Memory in DOS and Windows applications.
VDPMI.SYS	Supports the DPMI memory access and is required to support all Windows applications.
VW32S.SYS	Supplies support for the WIN32S Windows APIs. Not needed for Windows programs that do not use WIN32S APIs.
IBMxFLPY.ADD	x is either a 1 or a 2. 1 is used for family 1 machines and 2 is for MCA machines. You do not need both.
XDFLOPPY.FLT	This is required for reading diskettes that are written using the XDF (Extended Disk Format) format. These are usually OS/2 and PCDOS 7 installation diskettes, printer, and video driver diskettes, and possibly CSD diskettes. The Warp Install and Disk 1 diskettes do not use the XDF format.
COM.SYS and VCOM.SYS	Are only required if you are doing serial or async communications.

13.4 System Settings

Now look at some of the System Settings and Desktop settings that can be tuned to improve the performance of your system. In the System Setup Folder, there are many utilities that are available.

Spooler: The drop-down menu provides an option to disable the spooler. This can be done without problems when only one job is active on your printer at a time. This saves a little bit of memory, and one process and thread in your system. If you have a dedicated print spool machine, then you should raise the priority of the spooler to the highest point. For non-dedicated print spool systems, the priority should remain at the default. You would only increase this if, for example, you raised the priority of a DOS session and wanted to print documents while running the DOS session. In this case, you would want to make the priority of the print spooler the same as the DOS session.

Schemes and Color Palette: You should use solid colors and avoid the use of bitmaps for desktop and folder backgrounds. These particular options use more memory and require more processing time to display them.

Sounds: Do not select the System Sounds options, unless you like the noises when opening and closing your folders. It costs between 250 and 300K in working set just to hear the noise. An additional 40K or so of working set can be saved by running DINSTSND.COM in an OS/2 command session. This unhooks the system sounds from the OS/2 desktop. To get them back, you can run INSTSND.COM.

Font Palette: Only install the fonts that you are actually going to use in your system. Also, try not to mix fonts in folders, or on the OS/2 Desktop. If you do, you are using extra memory. Outline fonts tend to be a little smaller in terms of memory than bitmap fonts, and once they are in the cache, they perform just as fast.

WIN-OS/2: When defining a Windows program, select common sessions. Make DDE and Clipboard support both private. If floating-point is used in your Windows applications, use the enhanced run mode for Windows. Also, if you have a Windows application that you always run, it is better to start it through the Startup Folder than to use the Fast Load option and start it from the Desktop. Finally, ensure that when you migrate, install, or add Windows programs to your system, the run mode for these is the same as the common session run mode. If run modes are different, then you can have

two separate Windows sessions running even though you stated that a common session is to be used.

System Setup: Disabling the Animation and Print Screen option can save a little in code path and memory. Setting the System Logo option to none can save some time when loading applications that check this parameter to see how long to display their applications logo. The type-ahead option uses a little more memory. When selecting screen resolutions, remember that higher resolutions require more memory. Very high resolution and color support can require 100 to 200K of physical memory.

Mouse: Mouse pointers are basically bitmaps. The amount of memory used is affected by which mouse pointer style you choose. If you activate the comet cursor, this requires additional memory and processing time whenever the mouse is being used.

Desktop Settings: Desktop settings are selected by choosing the Settings option on the Desktop menu. Choosing Automatic Lockup causes extra code path and processing time to occur. Normally this is very minimal until the timeout value expires. Then you are looking at about 40 to 50K of working set.

13.5 Conclusion

All the bells and whistles, neat features, applications, and devices come at a cost. They all cost disk space, they all use memory, and they all have the potential for slowing your system down. To minimize this, plan ahead. Decide what the system is to be used for and what your future uses require. Then, set up the system accordingly. Install only the things that you are actually going to use and need. Ensure that there is a match between the software you install and the hardware you install it on. If an application or feature costs more memory than you have, either do not install the feature, or get more memory for your system. Finally, be creative and logical. You can set the system up with different configurations and different support defined to optimize performance based on the particular functions you perform and applications you use. Become aware of what Warp has to offer, and use it to your advantage.

Chapter 14. Hints and Tips

This section contains a selection of miscellaneous hints and tips that you may find useful.

14.1 Consideration for LIBPATH

Insert the path entry “.” in the CONFIG.SYS LIBPATH statement just after the equal sign: LIBPATH=.;C;\... This informs OS/2 to search through the current directory before the other directories that are listed.

14.2 Recreate Icons

If you have deleted Client Access/400 Optimized for OS/2 icons, you can recreate them with the following command:

```
CWBFW /R
```

CWBFW /A will rebuild all of the icons.

14.3 TCP/IP

When connecting to an AS/400 system via TCP/IP, you may be able to improve your performance with a simple change to the AS/400 TCP/IP interface and route configuration.

Currently, the AS/400 system defaults to a Maximum Transmission Unit (MTU) of 576 when you add a route to the configuration (via CFGTCP option 2 or ADDTCP RTE). This value ensures packets are not dropped over this route as all TCP/IP implementations have to support at least a 576-byte transmission unit.

In many cases, however, this value is unnecessarily small since you know this route is only be used on this Ethernet or Token Ring, and there are no intermediate hops that only support a 576-byte packet. If this is the case, you should change the route maximum transmission unit size to *IFC. This changes the MTU on the route to the interface MTU size which defaults to the line description frame size. This defaults to approximately 2000 for token ring and 1500 for Ethernet.

There are also cases where the 576-byte size can cause Adapter overruns, which put TCP/IP in retransmit mode and slow things to a crawl.

This change often results in a huge increase in your throughput over TCP/IP, especially when running network drives, or installing products.

14.4 OS/2 Window

Every time you open an OS/2 window, it starts with the same size. If you want to maximize every window, do the following:

1. Open an OS/2 window.
2. Press **Shift** and click on the **Maximize Button**.
3. Close your window with **exit**.

Every new OS/2 window is now maximized when it starts.

14.5 Forward Slashes (/) Not Supported

The use of forward slashes for path names on GUI panels is not supported. The use of forward slashes in command line commands is allowed.

14.6 Refreshing the Software Catalog

The software catalog contents are determined during part 2 of Client Access/400 installation. In general, the catalog will contain icons for each product defined in the file CWBCATLG.DAT in the managing system's QPWXGOS2 folder. If your user profile on the managing system does not have read authority to a software product's installation program, that product will not appear in your Client Access/400 Software catalog.

If the contents of CWBCATLG.DAT change, or if authorities change, you can refresh your software catalog by doing the following:

1. Open the Software Catalog folder.
2. Click once on the system icon on the left of the folder's title bar to see the folder's system menu.
3. Select the option *Refresh now*. The refresh process can take up to several minutes.

14.7 Error Messages

14.7.1.1 Power Failure During Installation

If you power down the workstation in the middle of the installation and you want to start again, first you have to delete the temporary directory CWB\$TEMP created by the Client Access/400 Installation process.

14.7.1.2 Installation Return Code x'0C08'

If you receive a return code of x'0C08' during installation, stop the installation and restart (re-boot) your personal computer. After restarting the personal computer, rename or move any files in d:\OS2\INSTALL\CMLIB with the extension .LST (where d: = the OS/2 boot drive).

14.7.2 LAN Adapter Protocol Support

14.7.2.1 LT00208 - Duplicate Logical Adapter Numbers

A bug in LAN Adapter Protocol Support can result in a wrong error message. If you get the message: *You cannot have duplicate logical adapter numbers for a protocol driver using the multiple network adapters* and you are using a code page other than 437 (for example 850), try to configure LAN Adapter Protocol Support again after the following command:

```
CHCP 437
```

14.7.2.2 Locked MPTS or NTS/2 Files

If you want to reconfigure or remove LAN Adapter Protocol Support (whether it is MPTS or NTS/2) LAN Adapter Protocol Support may tell you that the files are locked and that you should re-boot your machine. If you find that a re-boot of the machine does not clear this message, open an OS/2 Window and delete the IBMLANLK.LST file from the C:\OS2INSTALL subdirectory.

14.7.3 Error Defining Connection names running over TCP/IP

When you exit from the option **Define connection names** you may get the error message in Figure 172 on page 338. This error message can be ignored. Just select **OK**.

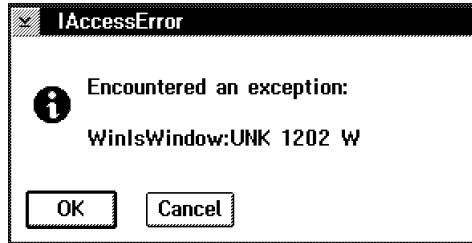


Figure 172. Error Defining Connection Names Running Over TCP/IP

14.7.4 CWBUI0058 - Error getting a drive connection for the Find option

Make sure the connection to the AS/400 system is started. Try again when the connection is running. This message can appear during the Find Directory process for network drives. Another reason could be the SWTDSC parameter in your controller description. If it is set to *YES, which is the default, the connection will be terminated if there is no activity. Change this value to *NO in a LAN environment.

14.7.5 RUMBA/400

You must start RUMBA/400 sessions first, if you are using both PC5250 and RUMBA/400.

14.7.5.1 Interface Cannot Be Found

Make sure the connection to the AS/400 system is started. Try again when the connection is established. This message can appear during Client Access/400 startup if your RUMBA/400 sessions are to be automatically started in the Startup Configuration. Another reason could be the SWTDSC parameter in your controller description. If it is set to *YES, which is the default, the connection will be terminated if there is no activity. Change this value to *NO in a LAN environment.

14.7.5.2 WinPcs2 Error

You may receive this error if communications manager has not fully started during Client Access/400 startup.

An example of this WINPcs2 error is shown in Figure 173 on page 339.

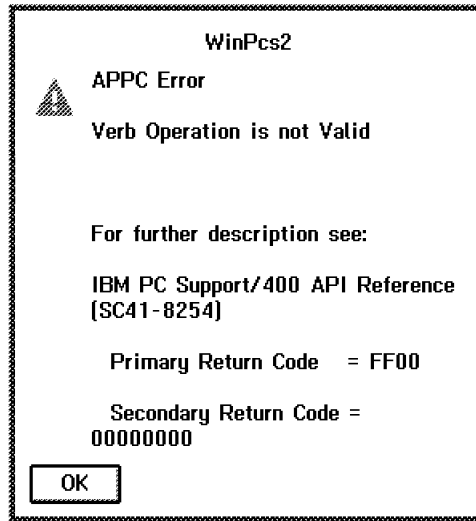


Figure 173. WinPcs2 Error Panel

This is because your RUMBA/400 session starts (for example, you have a RUMBA/400 terminal session icon in startup folder). You should press **OK** to exit, wait until communications manager is fully started, and then reconnect your RUMBA/400 session.

The dialog on the error panel incorrectly states that you should refer to the IBM PC Support API Reference (SC41-8254) for return code information. You should instead refer to the Client Access/400 Optimized for OS/2 API and Technical Reference manual (SC41-3511).

14.7.6 Client Access/400 Connections

If you change the Alias name of the AS/400 system you have to restart Client Access/400 Optimized for OS/2 again in order to use this new alias name.

14.7.7 CWB4004 - Security error occurred for system NETID.SYSNAME

Make sure the connection to the AS/400 is started. This message can appear because the SWTDSC parameter in your controller description is set to *YES. If it is set to *YES, which is the default, the connection will be terminated if there is no activity. Change this value to *NO in a LAN environment.

14.7.8 Updating to V3R1M1

If you have the V3R1M0 version of the optimized client already installed, then run the Client Access/400 update function after installing the V3R1M1 level on the AS/400 to update the PC code.

14.7.9 Using the Client with WARP Connect

The NTS/2, TCP/IP and sockets over SNA (AnyNet) support that are shipped with the optimized client can cause conflicts with WARP Connect. The README.CA4 file contains information on how to install the client in this environment, but even then the client management support will not work in an SNA environment. It is possible to use the client management support over a TCP/IP connection.

14.7.10 README.CA4

Read the README.CA4 file on the CD-ROM or the first installation diskette. It contains the latest information about installing the client that is not found in the documentation.


Appendix A. Documentation

This section contains information on where to find help and documentation on Client Access/400 Optimized for OS/2. It covers the following topics:

- A.1, "Introduction"
- A.2, "Information"
- A.3, "Error Messages" on page 343
- A.4, "Publications" on page 343


A.1 Introduction

The introduction explains the different Client Access/400 tasks and shows

you how to run them. Select the **Introduction**  icon in the Client Access/400 folder that is part of the Software Products folder. To view a list of tasks, select the plus sign (+), or press the + key.

A.2 Information

The information folder contains the manuals, command references, and message references for the different product components of Client Access/400 Optimized for OS/2, and a Readme file. See Figure 174 on page 342.

Open the **Information** folder  which is part of the Client Access/400 folder.

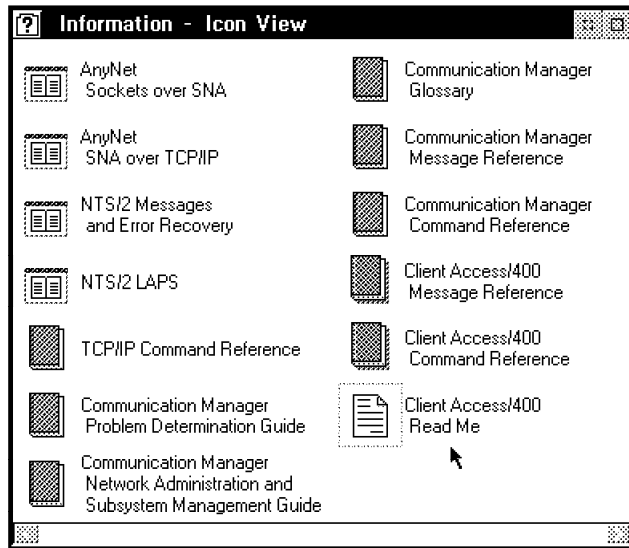


Figure 174. Information Folder

The **Client Access/400 Read Me** icon represents an important file with supplementary information to the on-line help and the publications. It includes such things as newly added functions, hint, tips, restrictions, and corrections.

Read Me

This file is in the QPWXGOS2 directory (README.CA4) and you should print it before you install Client Access/400 Optimized for OS/2. It contains important information.

You should also view the Readme files that belong to other components of Client Access/400.

NTS/2 has a Readme file that is located in d:\IBMCOWR07045.INF. Use the OS/2 VIEW command to show the contents of this file.

A.3 Error Messages

Client Access/400 Optimized for OS/2 provides a command line interface to get help:

```
CWBHELP msgid
```

or

```
VIEW /msgid
```

This starts the message reference and displays the requested message.

Alternatively, you can use the information folder and access the corresponding message reference (see A.2, "Information" on page 341), or you can start the history log and double click on the message (see 6.13.1, "HISTORY.LOG" on page 228).

A.4 Publications

The base set of printed manuals is shipped when the Client Access for OS/400 Family product is ordered. The publications features for printed manuals are no-charge features that must be selected when the initial order is placed. By default the publication features are not shipped.

Base set shipped with the product

- *Client Access/400 Family of Products*, SC41-3560
- *Client Access/400 RUMBA/400 User Guide*, SC41-3550
- *Graphical Operations Setup*, SC41-3122
- *Graphical Operations Getting Started*, SC41-3202
- *Ultimedia System Facilities Installation and Administration*, SC41-4540
- *Ultimedia System Facilities User Guide*, SC41-4541
- *Graphical Access for OS/400*, G325-6293

Optimized for OS/2 Client - Publication Feature 7507

- *Client Access/400 Optimized for OS/2 Getting Started*, SC41-3510
- *Client Access/400 Optimized for OS/2 PC5250 Setup (User's Guide)*, SC41-3555

Publications available for purchase

The following publications are not shipped with the Client Access/400 product features. Printed versions of the publications are available for purchase. Softcopy versions of the publications are in the AS/400 Softcopy Library.

- *Client Access/400 Optimized for OS/2 API and Technical Reference*, SC41-3511
- *Client Access/400 RUMBA/400 Tools*, SC41-3551
- *Client Access/400 PC5250 Reference Guide*, SC41-3553
- *Client Access/400 PC5250 Programmer's Guide*, SC41-3554
- *Ultimedia System Facilities Programming*, SC41-3652
- *OS/400 Server Concepts and Administration*, SC41-4740

A.4.1 InfoSeeker

With Version 3.0 Release 1.0 the manuals are available in softcopy form. You have access to the manuals using the InfoSeeker in a 5250 terminal emulation session.

Start a terminal session and type:

GO INFO

Select **20. Start InfoSeeker (BookManager)**.

A more powerful interface into the on-line books is described in A.4.2, "IBM Library Reader."

A.4.2 IBM Library Reader

The IBM Library Reader provides a more powerful interface into the on-line books than InfoSeeker in a 5250 emulation session.

To install the Library Reader, do the following:

1. Assign a network drive **J** to directory **QDLSQBKBOOKS**.
2. Start the following program from an OS/2 window:

J:EZ2INSTINSTALL

Use option **3** in panel 2 and add the path **J:BOOKS** to the Library Reader directory in panel 3. Start the installation with **F10**.

3. Select the new folder **IBM On-line Library** from the desktop and start the icon **All Available Bookshelves**.

You now have access to all AS/400 manuals which are grouped in bookshelves. There are different bookshelves for Client Access/400, and you can create your own bookshelf containing the books that you really need.

Appendix B. Directory Structure

<i>Table 4. Client Access/400 Optimized for OS/2 Directory Structure</i>		
Name	Option	Root folder
Client Access/400 Optimized for OS/2	Base	QPWXGOS2 --/DBCS --/SBCS --/ANYNET2 --/COMM_MGR --/NTS2 --/NTS2/LANLK --/NTS2/IBMCOM/DLL --/NTS2/IBMCOM/MACS --/NTS2/IBMCOM/PROTOCOL --/TCPIP --/UPM --/MRI2924 --/MRI2924/DBCS --/MRI2924/SBCS
Rumba Optimized for OS/2	1	QPWXGRB --/MRI2924 --/CHARSETS --/KBDINFO --/MACRO
PC5250 Optimized for OS/2	2	QPWXGPC --/MRI2924 --/PDFPDT
GraphicOps Optimized for OS/2	3	QPWXGGY --/MRI2924 --/QSTART
Ulitmedia System Fac. Optimized for OS/2	4	QPWXGUM --/MRI2924 --/INCLUDE --/LIB

Appendix C. Configuration Files

C.1 Performance

Figure 175 shows an example of a CONFIG.SYS file which is optimized for performance.

```
CALL=D:\CAOS2\PRPP2.EXE D:\CAOS2
IFS=D:\OS2\HPFS.IFS /CACHE:512 /CRECL:32 /AUTOCHECK:DC
SET RESTARTOBJECTS=STARTUPFOLDERONLY
PROTSHELL=D:\OS2\PMSHELL.EXE
SET USER_INI=D:\OS2\OS2.INI
SET SYSTEM_INI=D:\OS2\OS2SYS.INI
SET OS2_SHELL=D:\OS2\CMD.EXE
SET AUTOSTART=PROGRAMS, TASKLIST, FOLDERS, CONNECTIONS, LAUNCHPAD
SET RUNWORKPLACE=D:\OS2\PMSHELL.EXE
SET COMSPEC=D:\OS2\CMD.EXE
LIBPATH=.;D:\IBMCOM\DLL;D:\CAOS2;D:\OS2\DLL;D:\CMLIB\DLL;D:\TCPIP\DLL;
D:\SIA\DLL;D:\PCOMOS2;D:\RUMBAOS2;D:\OPSOS2;D:\GA400OS2;D:\OS2\MDOS;D:\;
D:\OS2\APPS\DL
L;D:\MMOS2\DLL;D:\MUGLIB\DLL
SET
PATH=D:\CAOS2;D:\OS2;D:\CMLIB;D:\OS2\SYSTEM;D:\OS2\INSTALL;D:\;
D:\TCPIP\BIN;D:\SIA\BIN;;D:\PCOMOS2;D:\RUMBAOS2;D:\OPSOS2;D:\OS2\MDOS;
D:\OS2\APPS;C:\WINDOWS;
D:\MMOS2;D:\MUGLIB
SET
DPATH=D:\IBMCOM;D:\CAOS2;D:\OS2;D:\CMLIB;D:\CMLIB\EN_US;D:\OS2\SYSTEM;
D:\OS2\INSTALL;D:\;D:\OS2\BITMAP;D:\TCPIP\BIN;D:\OS2\MDOS;D:\OS2\APPS;
C:\WINDOWS;D:\MM
OS2;D:\MMOS2\INSTALL;D:\MUGLIB\DLL;
SET PROMPT=$i.$p^
SET HELP=D:\CAOS2\MRI2924;D:\OS2\HELP;D:\OS2\HELP\TUTORIAL;D:\MMOS2\HELP;
D:\CMLIB;D:\CMLIB\EN_US;
SET GLOSSARY=D:\OS2\HELP\GLOSS;
SET IPF_KEYS=SBCS
PRIORITY_DISK_IO=YES
FILES=20
BASEDEV=IBMKBD.SYS
DEVICE=D:\IBMCOM\PROTOCOL\LANPDD.OS2
DEVICE=D:\IBMCOM\PROTOCOL\LANVDD.OS2
DEVICE=D:\IBMCOM\LANMSGDD.OS2 /I:D:\IBMCOM
DEVICE=D:\IBMCOM\PROTMAN.OS2 /I:D:\IBMCOM
DEVICE=D:\OS2\BOOT\TESTCFG.SYS
DEVICE=D:\OS2\BOOT\DOS.SYS
DEVICE=D:\OS2\BOOT\PMDD.SYS
```

Figure 175. Sample CONFIG.SYS File Optimized for Performance 1/3

```

BUFFERS=90
IOPL=YES
DISKCACHE=128,LW,32
MAXWAIT=3
MEMMAN=SWAP,PROTECT
SWAPPATH=d:\OS2\SYSTEM 2048 35840
BREAK=OFF
THREADS=256
PRINTMONBUFSIZE=134,134,134
COUNTRY=001,D:\OS2\SYSTEM\COUNTRY.SYS
SET KEYS=ON
SET BOOKSHELF=D:\CAOS2\MRI2924;D:\OS2\BOOK;D:\MMOS2;D:\CMLIB\EN_US\BOOK;
SET SOMIR=D:\OS2\ETC\SOM.IR;D:\OS2\ETC\WPSH.IR;D:\OS2\ETC\WPDSEVR.IR
SET SOMDDIR=D:\OS2\ETC\DSOM
REM SET DELDIR=C:\DELETE,512;D:\DELETE,512;E:\DELETE,512;
BASEDEV=PRINT01.SYS
BASEDEV=IBM1FLPY.ADD
BASEDEV=IBM2FLPY.ADD
BASEDEV=IBM1S506.ADD
BASEDEV=XDFLOPPY.FLT
BASEDEV=OS2DASD.DMD
SET EPMPATH=D:\OS2\APPS;
PROTECTONLY=NO
SHELL=D:\OS2\MDOS\COMMAND.COM D:\OS2\MDOS
FCBS=16,8
RMSIZE=640
DEVICE=D:\OS2\MDOS\VEMM.SYS
DOS=LOW,NOUMB
DEVICE=D:\OS2\MDOS\VXMS.SYS /UMB
DEVICE=D:\OS2\MDOS\VDPMI.SYS
DEVICE=D:\OS2\MDOS\VDPX.SYS
DEVICE=D:\OS2\MDOS\VWIN.SYS
DEVICE=D:\OS2\MDOS\VW32S.SYS
DEVICE=D:\OS2\BOOT\OS2CDROM.DMD /Q
IFS=D:\OS2\BOOT\CDFS.IFS /Q
DEVICE=D:\OS2\MDOS\VCDROM.SYS
BASEDEV=IBMIDEC.D.FLT
DEVICE=D:\OS2\MDOS\VMOUSE.SYS
DEVICE=D:\OS2\BOOT\POINTDD.SYS
DEVICE=D:\OS2\BOOT\MOUSE.SYS
DEVICE=D:\OS2\BOOT\COM.SYS
DEVICE=D:\OS2\MDOS\VCOM.SYS
CODEPAGE=437,850
DEVINFO=KBD,US,D:\OS2\KEYBOARD.DCP
DEVINFO=SCR,VGA,D:\OS2\BOOT\VIOTBL.DCP
SET VIDEO_DEVICES=VIO_VGA
SET VIO_VGA=DEVICE(BVHVGA)
DEVICE=D:\OS2\MDOS\VVGA.SYS
SET MMBASE=D:\MMOS2;
SET DSPPATH=D:\MMOS2\DSP;
SET NCDEBUB=4000
DEVICE=D:\MMOS2\SSMDD.SYS
DEVICE=D:\MMOS2\ROSTUB.SYS

```

Figure 176. Sample CONFIG.SYS File Optimized for Performance 2/3

```

SET LOCPATH=D:\CAOS2\
SET EHNL=2924
SET LANG=en_US
RUN=D:\IBMCOM\PROTOCOL\NETBIND.EXE
RUN=D:\IBMCOM\LANMSGEX.EXE
DEVICE=D:\IBMCOM\PROTOCOL\SNACKETS.SYS
DEVICE=D:\IBMCOM\PROTOCOL\SXIFNDIS.SYS
DEVICE=D:\IBMCOM\PROTOCOL\LANDD.OS2
DEVICE=D:\IBMCOM\PROTOCOL\LANDLDD.OS2
RUN=D:\IBMCOM\PROTOCOL\LANDLL.EXE

DEVICE=D:\CMLIB\ACSLANDD.SYS
DEVICE=D:\CMLIB\CMKFMDE.SYS
SET CMPATH=D:\CMLIB
DEVICE=D:\OS2\LOG.SYS
RUN=D:\OS2\SYSTEM\LOGDAEM.EXE
DEVICE=D:\OS2\EPWDD.SYS
RUN=D:\OS2\EPWDDR3.EXE
RUN=D:\OS2\EPWROUT.EXE 1
RUN=D:\OS2\EPW.EXE
RUN=D:\TCP\BIN\CNTRL.EXE
SET ETC=D:\TCP\ETC
SET HOSTNAME=ANYNET010010010048
DEVICE=D:\SIA\BIN\THESEUS2.SYS
SET NETVIEW_PATH=D:\SIA
SET DMIPATH=D:\CAOS2
RUN=D:\CAOS2\DMISL.EXE
IFS=D:\CAOS2\CWBBS.IFS
DEVICE=D:\CAOS2\CWBNPRDR.SYS
IFS=D:\CAOS2\CWBNPFS.IFS
RUN=D:\CAOS2\CWBDAEMN.EXE
IFS=D:\CAOS2\EHNSFLO.DLL
SET
CWBC4MSG=CWBMMSG.INF+CWBABMSG.INF+CWBADMSG.INF+CWBARMMSG.INF+CWBBSMSG.INF
+CWBCFMSG.INF+CWBCSMMSG.INF+CWBDBMSG.INF+CWBINMSG.INF+CWBLMMSG.INF
+CWBMGMSG.INF+CWBMLM
SG.INF+CWBPNPMSG.INF+CWBRCMSG.INF+CWBSYMSG.INF+CWBUIMSG.INF
DEVICE=D:\CAOS2\EHNPCPDD.SYS
DEVICE=D:\CAOS2\EHNPCVDD.SYS
SET READIBM=D:\CAOS2\MRI2924
DEVICE=D:\IBMCOM\MACS\IBM16TR.OS2
SET SXMODE_DEFAULT=SNACKETS

```

Figure 177. Sample CONFIG.SYS File Optimized for Performance 3/3

C.2 TCP/IP

Figure 178 shows an example of a CONFIG.SYS file for Client Access/400 over TCP/IP.

```
CALL=D:CAOS2PRPP2.EXE D:CAOS2
.
.
.
.
DEVICE=D:\TCP\BIN\SNACKETS.SYS
DEVICE=D:\TCP\BIN\SXIFNDIS.SYS

DEVICE=D:\CMLIB\CMKFMDE.SYS
SET CMPATH=D:\CMLIB
DEVICE=D:\OS2\LOG.SYS
RUN=D:\OS2\SYSTEM\LOGDAEM.EXE
DEVICE=D:\OS2\EPWDD.SYS
RUN=D:\OS2\EPWDDR3.EXE
RUN=D:\OS2\EPWROUT.EXE 1
RUN=D:\OS2\EPW.EXE
RUN=D:\TCP\BIN\CNTRL.EXE
SET ETC=D:\TCP\ETC
SET HOSTNAME=tcppc01
SET ANYNETPATH=D:\ANYNET2
SET SNASUFFIX=SNA.IBM.COM
SET CRITICAL_WS=NO
SET CONNWAIT_SECS=30
SET CONN_RETRY_SECS=300
SET MPTN_WELL_KNOWN_PORT=397
SET TCPWAIT_MINS=15
SET UNACKED_DG_RETRY_SECS=30
SET UNSENT_DG_RETRY_SECS=3
SET INACTIVITY_TIMER_SECS=90
DEVICE=D:\SIA\BIN\THESEUS2.SYS
SET NETVIEW_PATH=D:\SIA
SET DMIPATH=D:\CAOS2
RUN=D:\CAOS2\DMISL.EXE
IFS=D:\CAOS2\CWBBS.IFS
DEVICE=D:\CAOS2\CWBNPRDR.SYS
IFS=D:\CAOS2\CWBNPFS.IFS
RUN=D:\CAOS2\CWBDAEMN.EXE
IFS=D:\CAOS2\EHNSFLO.DLL
SET CWBC4MSG=CWBMMSG.INF+CWBABMSG.INF+CWBADMSG.INF+CWBARMMSG.INF+
CWBBSMSG.INF+CWBFCMSG.INF+CWBSCMSG.INF+CWBDBMSG.INF+CWBINMSG.INF+
CWBLM.MSG.INF+CWBMGMSG.INF+CWBNLMSG.INF+CWBNPMSG.INF+
CWBRCMSG.INF+CWBSYMSG.INF+CWBUIMSG.INF
DEVICE=D:\CAOS2\EHNPCPDD.SYS
DEVICE=D:\CAOS2\EHNPCVDD.SYS
SET READIBM=D:\CAOS2\MRI2924
```

Figure 178. Sample CONFIG.SYS for Client Access/400 over TCP/IP

C.3 Communications Manager/2 1.11 and NTS/2

Figure 179 shows an example of CONFIG.SYS.

```
....  
  
RUN=D:\IBMCOM\PROTOCOL\NETBIND.EXE  
RUN=D:\IBMCOM\LANMSGEX.EXE  
DEVICE=D:\IBMCOM\PROTOCOL\NETBEUI.OS2  
DEVICE=D:\IBMCOM\PROTOCOL\NETBIOS.OS2  
DEVICE=D:\IBMCOM\PROTOCOL\LANDD.OS2  
DEVICE=D:\IBMCOM\PROTOCOL\LANDLDD.OS2  
DEVICE=D:\IBMCOM\MACS\IBMTOK.OS2  
RUN=D:\IBMCOM\PROTOCOL\LANDLL.EXE  
  
DEVICE=D:\CMLIB\ACSLANDD.SYS  
DEVICE=D:\CMLIB\CMKFMDE.SYS  
SET CMPATH=D:\CMLIB  
DEVICE=D:\OS2\LOG.SYS  
RUN=D:\OS2\SYSTEM\LOGDAEM.EXE  
DEVICE=D:\OS2\EPWDD.SYS  
RUN=D:\OS2\EPWDDR3.EXE  
RUN=D:\OS2\EPWROUT.EXE 1  
RUN=D:\OS2\EPW.EXE  
SET LOCPATH=D:\CAOS2\  
SET EHNL=2924  
SET LANG=en_US  
  
DEVICE=D:\TCP\BIN\SNACKETS.SYS  
DEVICE=D:\TCP\BIN\SXIFNDIS.SYS  
RUN=D:\TCP\BIN\CNTRL.EXE  
SET ETC=D:\TCP\ETC  
SET HOSTNAME=ANYNET001001001001  
DEVICE=D:\SIA\BIN\THESEUS2.SYS  
SET NETVIEW_PATH=D:\SIA  
SET DMIPATH=D:\CAOS2  
RUN=D:\CAOS2\DMISL.EXE  
IFS=D:\CAOS2\CWBBS.IFS  
DEVICE=D:\CAOS2\CWBNPRDR.SYS  
IFS=D:\CAOS2\CWBNPFS.IFS  
RUN=D:\CAOS2\CWBDAEMN.EXE  
IFS=D:\CAOS2\EHNSFLO.DLL  
SET CWBC4MSG=CWBMMSG.INF+CWBABMSG.INF+CWBADMSG.INF+CWBARMMSG.INF+  
CWBBSMSG.INF+CWBCFMSG.INF+CWBCSMSG.INF+CWBDBMSG.INF+CWBINMSG.INF+  
+CWBCFMSG.INF+CWBCSMSG.INF+CWBDBMSG.INF+CWBINMSG.INF+CWBRCMSG.INF  
+CWBSYMSG.INF+CWBUIMSG.INF  
DEVICE=D:\CAOS2\EHNPCPDD.SYS  
DEVICE=D:\CAOS2\EHNPCVDD.SYS  
SET READIBM=D:\CAOS2\MRI2924  
SET SXMODE_DEFAULT=SNACKETS
```

Figure 179. Sample CONFIG.SYS File

Figure 180 on page 354 shows an example of PRECOM.CMD.

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CACMWAIT.EXE 0
@IF NOT ERRORLEVEL 1 GOTO EXIT
START CMSTART.EXE
CACMWAIT.EXE
:EXIT
@ECHO ON
```

Figure 180. Sample PRECOM.CMD File

Figure 181 shows an example of CACOM.CMD.

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CACMWAIT.EXE 0
@IF ERRORLEVEL 1 GOTO EXIT
@REM CALL SXSTART.CMD
:EXIT
@ECHO ON
CACOM.CMD
```

Figure 181. Sample CACOM.CMD File

Figure 182 shows an example of CASERV.CMD.

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CWBLOG.EXE START
STARTRTR.EXE /G
VDMSEV.EXE /Z
CWBBSVRT.EXE
@REM CALL CASNMP.CMD
DETACH CWBMGD.EXE
@REM DETACH SIASTART.CMD
:EXIT
@ECHO ON
```

Figure 182. Sample CASERV.CMD File

C.4 OS/2 LAN Requester 4.0 and MPTS

Figure 183 shows an example of CACOM.SYS.

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CACMWAIT.EXE 0
@IF NOT ERRORLEVEL 1 GOTO STARTED
START CMSTART.EXE
CACMWAIT.EXE
@IF ERRORLEVEL 1 GOTO EXIT
:STARTED
:EXIT
@ECHO ON
```

Figure 183. Sample CACOM.COM File

Figure 184 shows an example of CASERV.COM.

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CWBLOG.EXE START
STARTRTR.EXE /G
VDMSEV.EXE /Z
CWBBSTRT.EXE
DETACH CWBMGD.EXE
:EXIT
@ECHO ON
```

Figure 184. Sample CASERV.COM File

C.5 OS/2 LAN Requester 4.0 and MPTS, Communications Manager/2 1.11

Figure 185 on page 356 shows an example of PRECOM.COM.

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CACMWAIT.EXE 0
@IF NOT ERRORLEVEL 1 GOTO EXIT
START CMSTART.EXE
CACMWAIT.EXE
:EXIT
@ECHO ON
```

Figure 185. Sample PRECOM.CMD File

Figure 186 shows an example of CACOM.CMD.

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CACMWAIT.EXE 0
:EXIT
@ECHO ON
```

Figure 186. Sample CACOM.CMD File

Figure 187 shows an example of CASERV.CMD.

```
@REM Client Access/400 Optimized Client
@ECHO OFF
CWBLOG.EXE START
STARTRTR.EXE /G
VDMSERV.EXE /Z
CWBBSTRT.EXE
DETACH CWBMGD.EXE
:EXIT
@ECHO ON
```

Figure 187. Sample CASERV.CMD File

Appendix D. CID CID Response File Example

Figure 188 and Figure 189 on page 358 show the response file used in the example in 4.9, "CID Installation" on page 131. For information about the format of this file, refer to *Client Access/400 Optimized for OS/2 API and Technical Reference*, SC41-3511.

```
** Example CID file for Client Access/400 Optimized for OS/2
** created for PC workstation D911PC12. File name D911PC12.RSP

***** Installation Keywords
** Where to install the code
CATARGET=d:

** Do not install if present
CA_NO_OVERWRITE

** Which drive to place \CWB$TEMP
CATEMP=c:

** Type of network          ( 1=SNA 2=TCP/IP )
CANETWORK=1

** Type of connection      ( 1=LAN 2=Twinax )
CACONNECTION=1

** NTS/2                   ( 4 = Token ring )
CACOMPONENT = (
    NAME = NS
    CATARGET = d:
    LOCAL_ADDRESS = T400009110112
    ADAPTER_TYPE = 4
)
** Communications Manager
CACOMPONENT = (
    NAME = CM
    CATARGET = d:
)
** LAN adapter number and type
LAN_DLC = (
    NAME = 0
    ADAPTER_TYPE = 2
)
```

Figure 188. CID response file example 1/2

```

** User profile management
CACOMPONENT = (
    NAME = UM
    CATARGET = d:
)
** Sockets over SNA
CACOMPONENT = (
    NAME = AN
    CATARGET = d:
    SNACKETSLOCALNODE = 10.9.11.12 255.255.255.255 D911PC12 ITSCNET
)
** SNMP information
CACOMPONENT = (
    NAME = SN
    CATARGET = d:
    SYS_LOCATION = Dept. 911 in Rochester
    SYS_CONTACT = xt.6020, D911MR, Morten Rasmussen
    SYS_NOTIFY = 10.10.10.10
)
** SIA
CACOMPONENT = (
    NAME = SI
    CATARGET = d:
)
** DMI
CACOMPONENT = (
    NAME = DM
    CATARGET = d:
)
** Information
CACOMPONENT = (
    NAME = CA
    OPTIONS = AD,DU,ID,OD,LG,A2,S2,AW,TF
)
** PC5250
CACOMPONENT = (
    NAME = PC
    CATARGET = d:
)
** RUMBA
CACOMPONENT = (
    NAME = RM
    CATARGET = d:
)

```

Figure 189. CID response file example 2/2

Appendix E. Refresh, Availability

For Version 3 Release 6, Client Access/400 Family is renamed Client Access for OS/400(R) Family. Client Access for OS/400 Version 3 Release 6 will contain all the functions being added to the clients at this time, along with all previously announced functions. The individual client products shipped with either Version 3 Release 1 or Version 3 Release 6 of Client Access for OS/400 can communicate with any AS/400 system using OS/400 Version 3. Thus, customers migrating from V3R1 to V3R6 do not need to upgrade end-user PC code.

Additionally, this announcement includes enhancements to the Client Access for OS/400 Family and availability of National Language Versions for the Windows 3.1 and Optimized for OS/2(R) clients for Version 3 Release 1. With these enhancements, end users can be more productive and have the latest technologies and options available to them.

Client Access for OS/400 now includes Graphical Access for OS/400, which changes OS/400 from a green screen interface to a graphical, easy, point-and-click user interface. Graphical Access for OS/400 covers OS/400 commands, menus, and displays. Users now accustomed to the PC graphical environment can have a similar graphical environment to all their favorite OS/400 functions. Even command prompting is as simple as the click of a mouse button.

For a complete description of the Client Access for OS/400 Family product content, refer to Software announcements, IBM Client Access/400 Family, ZP94-0299, dated May 3, 1994, and IBM Client Access/400 Family Enhancements, ZP95-0106, dated February 7, 1995. For previously announced availability updates, refer to Software announcement, ZA95-0151, dated March 28, 1995.

E.1 General Availability

Planned Availability Dates:

Optimized for OS/2 - Version 3 Release 1
Enhancements and National Language Versions September 29, 1995

E.2 Highlights

Client Access for OS/400 Enhancements:

- A CD-ROM feature is now available that contains a complete set of code for each of the Client Access for OS/400 clients.
- Optimized for OS/2 Client enhanced to include:
 - Graphical Access for OS/400, the new, easy-to-use, graphical user interface for OS/400.
 - OS/400 spool file viewing capability
 - Availability of Ultimedia System Facilities APIs for multimedia applications
 - Asynchronous, SDLC and AutoSync connectivity using the communications support shipped with the client.

A CD-ROM feature is now available that contains a complete set of code for each of the Client Access for OS/400 clients. It provides the capability to install all the client code directly from a PC-attached CD-ROM instead of needing to download the software from an AS/400 system. This capability may be useful in a WAN where communications transfer speeds may be slower than local area networks.

The following additional new functions are being included in the enhanced Optimized for OS/2 client.

- Graphical User Interface (GUI) support for OS/400 Functions
 - Client Access for OS/400 now includes Graphical Access for OS/400. This function changes OS/400 from a green screen interface to a new, exciting, easy-to-use, point-and-click graphical user interface. Graphical Access for OS/400 covers OS/400 commands, menus, and displays. Users now accustomed to the PC graphical environment can have a similar graphical environment to all their favorite OS/400 functions, even command prompting is as simple as the click of a mouse button.
 - An OS/400 spool file viewing capability is provided as part of the Network Print function. This function provides users the ability to view AS/400 spooled files. In addition, the IBM AFP(TM) Workbench product will be available on a trial basis for viewing and printing documents in shared folders on the user's PC. For more information on the IBM AFP Workbench product description and ordering

instructions, refer to Software announcement, ZP95-0203, dated February 7, 1995. The availability date for the IBM AFP Workbench for OS/2 Feature for Client Access/400 is now September 29, 1995.

The following previously announced functions are now available with the enhanced Optimized for OS/2 client.

- Application Enablers
 - The Ultimedia System Facilities GUI interface and APIs which enable AS/400 and PC applications to integrate multimedia capability (for example: video, audio, image, and graphics) is now available.
 - Open Database Connectivity (ODBC) driver is available as an alternative programming interface for OS/2 applications to use to access DB2 for OS/400 data.
- 5250 Emulation
 - RUMBA is now included in the PC Console for Optimized for OS/2 feature in addition to PC5250.

E.3 Function Availability Dates

Following are the functions provided for each Client Access for OS/400 client.

- An "x" indicates what functions are currently available for each client. The functions with dates indicate when the functions are planned to be available.
- The Optimized for OS/2 client is currently available English SBCS/DBCS only until September 29, 1995. For availability date information, refer to Software announcement, IBM Client Access/400 Optimized for OS/2 Availability Update, ZP95-0151, dated March 28, 1995.
- The Schedule Tables represent functions available and planned for both Version 3 Release 1 and Version 3 Release 6 of Client Access for OS/400.

E.4 Availability Dates by Detailed Function

Function	Windows 3.1	Optimized OS/2	OS/2	DOS Extended	DOS
License Mgmt	x	x	x	x	x
Enhanced Security	x	x	x	x	
SNA Networks					
- APPC APIs	x	x	x	x	x
- CPI-C APIs	6/95(6,8)	x	x		
- Sockets APIs		x			
- Twinax	x	x	x	x	x
- Asynchronous	x	9/95(1,2)	(1)	x(SBCS)	x
- X.25	6/95(6,8)	(1)	(1)		
- SDLC	6/95(6,8)	9/95(1,2)	x	x	x
- Token-Ring	x	x	x	x	x
- Ethernet	x	x	x	x	x
- ISDN		(1)	(1)		
TCP/IP Networks					
- APPC APIs	6/95(6,8)	x			
- CPI-C APIs	6/95(6,8)	x			
- Sockets APIs		x			
- Token-Ring	6/95(6,8)	x			
- Ethernet	6/95(6,8)	x			
Communications Programs					
- Subset of CM/2		x	x		
- NS/Windows	x				
- DOS Router (APPC)				x	x
- AnyNet (MPTN)	6/95(6,8)	x (6)			

Function	Windows 3.1	Optimized OS/2	OS/2	DOS Extended	DOS
Comm. Support Programs					
- LAN Support Program (LSP)	x (6)			x	x
- NTS/2		x (6)	x		
- TCP/IP Stack	6/95(5)	x (6)			
5250 Emulation					
Display and Print					
- RUMBA (SBCS/DBCS)	x (3)	x (3)	x	x	
- PC5250 (SBCS/DBCS)	x (3)	x (3)			
- WSF (SBCS)				x	x
- AS/400 PC Console					
- PC5250	x	x			
- RUMBA	6/95(6,8)	9/95			
GUI Interfaces					
- Graphical Operations	x	x	x		
- Graphical Access for OS/400	6/95(6,7,8)	9/95(7)			
- Sys Obj Access APIs	x (6,8)				
- AFP Workbench Subset	x (6,8)	9/95			
Multimedia Enablers					
- Ultimedia Sys Fac	6/95(6,8)	9/95	x	x	
File/Database Functions					
- Shared Folders (QDLS)	x	x	x	x	x
- Check-in/Check-out			x	x	x
- Integ File Syst(IFS)	x	x			
- Transfer Function	x	x	x	x	x
- Database Access GUI	x (4) 6/95(6,8)	x			
- ODBC Level 1				x	
- ODBC Level 2	x	9/95			
- Remote SQL APIs	x	x	x	x	
- Extensions to Remote SQL APIs		x			
- DRDA 1	x	x	x	x	
- DRDA 2		x			

Function	Windows 3.1	Optimized OS/2	OS/2	DOS Extended	DOS
Client Management					
- SNMP Client Mgmt		x			
- Desktop Mgmt (DMI)		x			
- PC Update	x	x	x	x	x
- Central Admin Functn	x	x	x	x	x
- Migration Utility	x (7)				
- Node Oper Facility (NOF)	x				
Application Command Level APIs					
- Data Queues	x	x	x	x	
- Submit Remote Cmd	x	x	x	x	x
- Distributed PGM Call	6/95(6,8)	x			
Mail/Office Functions					
- WorkGroup for OS/400	Beta(10)	Beta(10)			
- MAPI (AnyMail/400)	Beta(10)				
- VIM (AnyMail/400)		Beta(10)			
- MAPI(OfficeVision/400)	x (4,9)				
- PC Text Assist(OV/400) (SBCS only)	x	x		x	x
Command Level APIs (on AS/400)					
- Start PC Command (STRPCCMD)	x		x	x	x
- Run Remote Command (RUNRMTCMD)		x			
- Copy to PC Document (CPYTOPCD)	x	x	x	x	x
- Copy from PC Document (CPYFRMPCD)	x	x	x	x	x
- Send Message (SNDMSG)	x		x	x	x

Function	Windows 3.1	Optimized OS/2	OS/2	DOS Extended	DOS
Print Serving					
- AS/400 Printers	x	x	x	x	x
- PC Network Printers	x	x	x	x	x
- AFP Printer Driver	x	x	x	x	
Programmer Tools					
- PC Tools Folder (QIWSTOOL)	x		x	x	x
- CA/400 Toolkit (5763-XM1)	x (6)	x (6)			
PC Code Installable from					
- PC Diskettes	x	x	x	x	x
- CD-ROM	6/95(6,8)	6/95(6,8)	6/95(6,8)	6/95(6,8)	

NOTES

1. Stand-alone Communications Manager/2 (CM/2) can provide this connectivity. Client Access/400 can also be used in conjunction with this CM/2.
2. Client Access/400 will provide native support for this connectivity beginning first half 1996.
3. DBCS is Japanese only.
4. Supports English SBCS only.
5. Provides communication stack. Applications (ie:TELNET) are not provided. Supports English only SBCS (DBCS data transmission supported).
6. Supports English SBCS/DBCS.
7. Function will be provided via PTF for Version 3 Release 1.
8. NLV(SBCS/DBCS) delivery begins September 29, 1995.
9. NLV(SBCS only) delivery begins September 29, 1995.
10. Beta is available for Version 3 Release 1 only.

List of Abbreviations

AFP	Advanced Function Printing	FFST	First Failure Support Technology
AFPDS	Advanced Function Printing Data Stream	HPFS	High Performance File System
APA	all points addressable	IFS	Integrated File System
APAR	Authorized Program Analysis Report	IBM	International Business Machines Corporation
API	Application Programming Interface	ITSO	International Technical Support Organization
APPC	Advanced Program-to-Program Communication	MC	Micro Channel
APPN	Advanced Peer-to-Peer Networking	LAPS	LAN Adapter and Protocol Support
ASCII	American National Standard Code for Information Interchange	MPTS	Multi Protocol Transport Services
AT	???	NTS	Networking Transport Services
CD-ROM	Compact Disk - Read Only Memory	OO	Object Oriented
CID	Configuration, Installation, Distribution	OOP	Object Oriented Programming
CSD	Corrective Service Delivery	MIB	Management Information Base
DMI	Desktop Management Interface	MIF	Management Information Format
DMTF	Desktop Management Task Force	PROFS	Professional Office System
DSOM	Distributed System Object Model	PTF	Program Temporary Fix
EA	Extended Attribute	SCS	SNA Character String
ECS	Electronic Customer Support	SIA	System Information Agent
EGP	???	SNMP	Simple Network Management Protocol
FAT	File Allocation Table	SOA	System Object Access
		SOM	System Object Model

TCP/IP

Transmission Control
Protocol/Internet
Protocol

UPM

User Profile
Management

TP

Transaction Program

VIM

Vendor Independent
Messaging

VDM

Virtual DOS Machine

Index

Numerics

386 processor 325
386SX processor 325
4033 LAN connection for printers and
plotters 12
4039 printer internal network adapter option 12
5250 data stream 259
5250 emulation 259
5250 emulators 11
5250 terminal emulation session 344
5250 terminal emulator 261

A

abbreviations 367
access to data 14
access, system object 258
acronyms 367
additional CONFIG.SYS considerations 332
administration, central 230
administrator
fixes 212
job 215
Advanced Function Printing
OS/2 or Windows printer output 13
AIX optimized client 1
anynet 224
AnyNet concept 25
APAR. 213
API 296
Client Access/400 9
API (application program interface) 258
APPC over TCP/IP 26
apple 212
application program interface (API) 258
application programming interface (API) 217
application programming interfaces, DMI 212
application programming, .Client Access/400 9

applications 325, 327
APPN Remote Location List 90
AS/400 client asset management 216
AS/400 printers
as AS/400 network printer 12
AS/400 system setup 223
AS/400 system using SNA APPC 222
AS/400 systems management 214
AS/400 trap manager 217
AS/400 users
easier access to PC data with new file system
directory 14
ASCII printer data stream 12
assigning a drive 155
assigning a printer 165
asynchronous desktop connections to AS/400
system 10
automatic lockup 334
automatically started configuration groups 141
automating startup 201
autostart connections 207

B

base DOS Client Access/400 296
block device drivers 291
bookmanager 344
bookshelves 345
boot manager 327
boot VDM 291
BUFFERS 330
Business Graphics Utilities/400 12

C

capabilities 216
CASERV.CMD 219, 298, 300, 302
CASNMP.CMD 220
central administration 230

- central optimized server 2
- centralized database 216
- CFGIPS (Configure IP over SNA Interface)
 - command 55
- CFGTCP
 - See configure TCP/IP menu
- CFGTCP (Configure TCP/IP) command 83
- Change Configuration List (CHGCFGL)
 - command 90
- changing
 - configuration list 90
- check box 262
- check client service and inventory 224
- CHGCFGL (Change Configuration List)
 - command 90
- Client Access/400 341
- Client Access/400 for Extended DOS
 - configuring for VDMs 303
 - creating a VDM batch file 305, 318
 - shared folders in VDMs 309
 - virtual printers in VDMs 310
- Client Access/400 for OS/2
 - OS/2 PC Support/400 30
- Client Access/400 for Windows 3.1 312
 - coexistence with OV/400 14
 - compatibility 289, 290, 291
- Client Access/400 for Windows 3.1 client 1
- Client Access/400 for Windows 3.1 ODBC 320
- Client Access/400 Optimized for OS/2
 - installation
 - SNA Ethernet 50
 - SNA LAN 50
 - SNA Token-Ring 50
 - twinaxial 50
- client ID 216
- client inventory 212
- client inventory database 225
- client management 211
- client management overview 211
- client series 312
- client service 212
- COM.SYS and VCOM.SYS 332
- command line interface 156, 179
- command references 341
- command, CL
 - CFGIPS (Configure IP over SNA Interface) 55
 - CFGTCP (Configure TCP/IP) 83
 - Change Configuration List (CHGCFGL) 90
 - CHGCFGL (Change Configuration List) 90
 - Configure IP over SNA Interface (CFGIPS) 55
 - Configure TCP/IP (CFGTCP) 83
 - Create Controller Description (APPC) (CRTCTLAPPC) 88
 - Create Line Description (Token-Ring Network) (CRTLINTRN) 81
 - Create Mode Description (CRTMODD) 52
 - CRTCTLAPPC (Create Controller Description (APPC)) 88
 - CRTLINTRN (Create Line Description (Token-Ring Network)) 81
 - CRTMODD (Create Mode Description) 52
 - Display Line Description (DSPLIND) 59
 - Display Network Attributes (DSPNETA) 51, 87
 - Display Problem (DSPPRB) 224
 - DSPLIND (Display Line Description) 59
 - DSPNETA (Display Network Attributes) 51, 87
 - DSPPRB (Display Problem) 224
 - Run Remote Command (RUNRMTCMD) 87, 249
 - RUNRMTCMD (Run Remote Command) 87, 249
 - Start Trap Manager (STRTRPMGR) 217, 224
 - STRTRPMGR (Start Trap Manager) 217, 224
 - Work with Directory Entries (WRKDIRE) 51
 - Work with Mode Descriptions (WRKMODD) 52
 - Work with Problems (WRKPRB) 224
 - Work with Writers (WRKWTR) 260
 - WRKDIRE (Work with Directory Entries) 51
 - WRKMODD (Work with Mode Descriptions) 52
 - WRKPRB (Work with Problems) 224
 - WRKWTR (Work with Writers) 260

- Communications Manager/2
 - replacing 32
- Communications Manager/2 version 1.11 31
- concept 21
 - AnyNet 25
 - TCP/IP 21
- CONFIG.PCS 300, 305
- CONFIG.SYS 219, 302
- CONFIG.SYS recommendations 207
- configuration 135, 141, 150
 - emulation 196
 - for client management 220
 - network printer 161
 - PC5250 199
 - RUMBA/400 196
 - SNA 149
 - SNMP 222
- configuration group 141
 - automatically started 141
 - shared 142
- configuration list
 - changing 90
- configuration parameters
 - Ethernet installation 43
 - LAN installation 43
 - SNA Ethernet installation 43
 - SNA LAN installation 43
 - SNA Token-Ring installation 43
 - SNA Twinaxial installation 43
 - TCP/IP installation 47
 - Token-Ring installation 43
 - twinaxial installation 43
- configuration using templates 139
- Configure IP over SNA Interface (CFGIPS)
 - command 55
- Configure TCP/IP (CFGTCP) command 83
- configure TCP/IP menu 82
- configuring
 - Client Access/400 for Extended DOS for VDMs 303
 - IP over SNA interface 55
 - OS/2 Client Access/400 for VDMs 301
 - TCP/IP 83
 - VDM for graphics 307
- conflict using universal naming convention 160
- connection through SNA APPC 222
- connection through TCP/IP 222
- connections 142
 - add direct 146
 - add indirect 148
 - autostart 207
 - change or remove 148
 - connect or disconnect 148
 - previous 149
- connectivity information 216
- connectivity option for Client Access/400 10
- contact information 216
- controller description (APPC)
 - creating 88
- corrections 342
- COSE 212
- create another 214, 224
- Create Controller Description (APPC)
 - (CRTCTLAPPC) command 88
- Create Line Description (Token-Ring Network)
 - (CRTLINTRN) command 81
- Create Mode Description (CRTMODD)
 - command 52
- create network server description 262
- creating
 - controller description (APPC) 88
 - line description (Token-Ring Network) 81
 - mode description 52
- CRECL 328
- criteria 213
- CRTCTLAPPC (Create Controller Description
 - (APPC)) command 88
- CRTLINTRN (Create Line Description
 - (Token-Ring Network)) command 81
- CRTMODD (Create Mode Description)
 - command 52
- CSD diskettes 332
- CTL3D.DLL 320
- Current-OV/400 Work group 312
- CWBHELP msgid 343
- CWBLOG 228
- CWBLOG START 220

D

- data queues
 - optimized server 2
 - original server 2
- data source 321
- database 217
 - hardware 214
 - software 214
- Database Access GUI
 - database support 14
- database server optimized server 2
- database support 14
- DBCS print services 13
- DEC (digital equipment corporation) 212
- Desktop Management Interface (DMI) 27, 211
- desktop management task force (DMTF) 211
- desktop operating systems 212
- desktop service
 - PC environment with Client Access/400 2
- desktop settings 334
- desktop workstation management 211
- DEV 226
- device drivers 292, 325
 - physical 292, 297
- device table 217
- devices
 - PCI 326
 - SCSI 326
- digital equipment corporation (DEC) 212
- DIR 226
- directory entries, working with 51
- directory information 216
- disk storage table 217
- disk, speed of 325
- DISKCACHE 327, 330
- Display Line Description (DSPLIND)
 - command 59
- Display Network Attributes (DSPNETA)
 - command 51, 87
- Display Problem (DSPPRB) command 224
- displaying
 - line description 59
 - network attributes 51, 87

- distributed new software
 - with Client Access/400 update function 9
- DMI (Desktop Management Interface) 27, 211
- DMI application programming interfaces 212
- DMI MIF database 215
- DMI overview 211
- DMIPM (warp DMI browser) 214
- DMTF (desktop management task force) 211
- documentation 341
- documents, data access 14
- DOS 326
- DOS and Windows in SNA networks 10
- DOS Base original client 1
- DOS box 289
- DOS Extended original client 1
- DOS settings 293, 306, 308
- double-byte character set print services 13
- DPATH 330
- DPMI 332
- DSK 226
- DSPLIND (Display Line Description)
 - command 59
- DSPNETA (Display Network Attributes)
 - command 51, 87
- DSPPRB (Display Problem) command 224
- dual boot 327
- dynamic data files 327

E

- EAs (extended attributes) 329
- ECS (electronic customer support) 230
- ECYDDX.SYS 291
- EHNODBC3.DLL 321
- EHNODBC3.HLP 321
- EHNODBC3.MR0 321
- EHNPCPDD.SYS 300, 303
- EHNPCVDD.SYS 300, 303
- EHNSTP3.DLL 321
- electronic customer support (ECS) 230
- EMS 290
- EMS in virtual DOS machines 293
- emulation configuration 196

- emulation product provided by Client
 - Access/400 11
- emulator 263
- encryption 14
- enhanced original client 1
- ENVY/400 255
- error messages 228, 343
 - Installation Return Code x'0C08' 337
- Ethernet desktop connections to AS/400
 - system 10
- Ethernet LAN attached PC printer 12
- expanded 332
- expired passwords 14
- extended attributes (EAs) 329
- extended disk format (XDF) 332
- Extended DOS PC Support/400 Version 2.0
 - Release 3.0 289
- extended memory 332
- EZ2INST 344

F

- FAT
 - file system 326
 - fragmentation 327
- FDDI desktop connections to AS/400 system 10
- feature 7507 343
- Fiber Distributed Data Interface desktop
 - connections to AS/400 system 10
- file server - shared folder type 2
 - optimized server 2
- File Server Input/Output Processor 326
- file serving subsystem 14
- file systems 326
- file transfer database support 14
- folders/documents data access 14
- font palette 333
- fonts 325
- fragmentation
 - FAT 327
 - HPFS 328
- FS 226

G

- general settings 185
 - different components 192
 - network drive 154
- general setup considerations 325
- GO 255
- GO INFO 344
- graph ops 255
- graphical access
 - create network server description 262
 - main menu 260
 - work with all printers 261
 - work with output queues 262
- Graphical Access for OS/400
 - 5250 data stream 259
 - 5250 emulation 259
 - refresh 259
- graphical database query tool 214
- graphical front-end 214
- graphical interface
 - graphical operation
 - ENVY/400 255
 - smalltalk 255
- graphical operation
 - IBM AFP(TM) Workbench 257
 - installation 255
 - jobs 256
 - main group 256
 - operator work area 257
 - printer list 256
 - printer list details 257
 - systems management 255
 - tutorial 255
 - view spooled file 257
 - workstation requirements 255
- Graphical Operations Support
 - OS/400 15
- graphics, configuring VDM for 307
- GUI 5250 emulators 11
- GUI for AS/400 system functions 15

H

- hard disk 325
- hardware
 - database 214
 - information 214
 - installation 216
 - installed 212
- hardware information 217
- HDW 226
- help text, second level 228
- hewlett-packard company 212
- hint 342
- HISTORY.LOG 228
- host graphics 12
- host printers as AS/400 network printer 12
- host servers feature 37
- Host Table
 - See TCP/IP Host Table
- HPFS
 - file system 326
 - fragmentation 328
- HPFS386 328

I

- IBM AFP(TM) Workbench 257
- IBM corporation 212
- IBM LAN support program 292
- IBM library reader 344
- IBM service 213
- ibmxfly.add 332
- icon
 - creating for a VDM 306, 318
 - for AS/400 tasks 15
- IFS statement 328
- Impromptu tool 312
- information
 - command references 341
 - hardware 214
 - manuals 341
 - message references 341
 - software 214

- infoseeker 344
- install 342
 - phase 1 219
 - phase 2 220
- installation 255
 - hardware 216
 - remote applications 216
 - software 216
- installing printer drivers 165
- instruction caching 325
- Integrated File System 5
 - access to data 14
- intel corporation 212
- interface
 - desktop management (DMS) 211
 - graphical 255
 - user 214
- internal network adapter option 12
- introduction 341
- inventory information 214
- IP over SNA interface
 - configuring 55
- IPDS
 - network printers 13
 - OS/2 or Windows
 - printer output 13
- ISDN desktop connections to AS/400 system 10

J

- join table 241

L

- LAN
 - adapter and protocol support for OS/2 in SNA networks 10
 - support program for DOS and Windows in SNA networks 10
- LAN Adapter Protocol Support
 - TCP/IP for OS/2 34
- LAN server 328
- LAN Server/400 6, 326

- LAPS 292
 - desktop connections to AS/400 system 10
 - for OS/2 in SNA networks 10
- launchpad 202
- level 1 cache 325
- level 2 cache 325
- LIBPATH 329
- libraries/objects data access 14
- license agreements 216
- license management original server 2
- LIM 290
- LIMA 290
- line description
 - displaying 59
- line description (Token-Ring Network)
 - creating 81
- LINKTYPE(*ANYNW) 88
- Lotus
 - Approach 312
 - Lotus 1-2-3 312
- LU name to IP address Mapping 93

M

- machine model 217
- machine type 217
- main menu 260
- manageability structure 217
- management information base (MIB) 216
- management information format (MIF) 216
- manageware/400 214, 230
 - asset information 217
 - auto-discover nodes 217
 - graphical presentation 217
 - update 217
- managing clients today 215
- manuals 341, 344
- MAXWAIT 330
- MCA 332
- memory 325
- memory size 217
- menu
 - pull down 260
 - push buttons 260

- message function
 - original server 2
- message reference 341, 343
- MIB (management information base) 216
- microsoft 212
 - Access 312
 - Excel 312
 - Word 312
- microsoft corporation 212
- MIF (management information format) 216
- MIF files 225
- migration 29
- mixed version network 323
- mode 221
- mode description
 - creating 52
- mode descriptions
 - working with 52
- modifying startup 203
- mouse 334
- MPTN 10
- MSC 226
- multiple virtual DOS machines 289, 310, 311
- Multiprotocol Transport Networking 10
- Multiprotocol Transport Services (MPTS)
 - OS/2 LAN Requester 4.0 32
- multitasking 289
- MVDM 290

N

- national language version (NLV) print
 - services 13
- NET 226
- network attributes
 - displaying 51, 87
- network drive 153, 258, 309
 - general settings 154
 - products registry 153
- network drive definition - settings 151
- network drives 150
- network print
 - optimized server 2
 - services 12

- network printer 258, 310
 - details 259
 - PC printer 12
- network printer definition - settings 163
- network printers 161
- network table 217
- Network Transport Services/2 31
- newly added functions 342
- NLV (national language version) print services 13
- novell 212
- novell incorporated 212
- NTS/2 342
- NTS/2 program
 - for OS/2 in SNA networks 10

O

- objects 325
 - data access 14
- ODBC (open database connectivity) 312
- ODBC Administration. 321
- ODBC.DLL 320
- ODBC.INI 320
- ODBCADM.EXE 320
- ODBCADM.HLP 320
- ODBCINST.DLL 320
- ODBCINST.INI 320
- OfficeVision/400
 - coexistence with Client Access/400 for Windows 3.1 14
- on-line help 342
- Open Database Connectivity
 - database support 14
- open database connectivity (ODBC) 312
- operating system 327
- operation, graphical 255
- operator
 - job 215
 - work area 257
- optimized
 - 32-bit client 217
 - client 1
 - support 2

- original client
 - DOS Base 1
 - DOS Extended 1
 - OS/2 1.3 1
- original server 2
- OS/2 1.3 original client 1
 - Client Access/400
 - update program 1
- OS/2 2.1 289
- OS/2 32-bit
 - optimized client 1
- OS/2 Client Access/400
 - configuring for VDMs 301
- OS/2 communications options for DOS 302, 303, 304
 - removed 300
- OS/2 compatible byte stream files
 - data access 14
- OS/2 LAN Requester 3.0 and NTS/2 32
- OS/2 LAN Requester 4.0
 - Multiprotocol Transport Services (MPTS) 32
- OS/2 PC Support/400
 - Client Access/400 for OS/2 30
- OS/2 printer output 13
- OS/2 Warp 289, 294
- OS/400 Graphical Operations Support 15
- OV/400
 - coexistence with Client Access/400 for Windows 3.1 14
- overview
 - client management 211
 - DMI 211

P

- page 326
- partition 327
- passwords, expired 14
- PATH 330
- PC
 - connection through SNA APPC 223
 - connection through TCP/IP 222
- PC data access
 - improved with new file system directory 14

- PC printers
 - as AS/400 network printer 12
- PC5250 configuration 199
- PC5250 emulation product
 - provided by Client Access/400 11
- PCDOS 7 332
- PCI devices 326
- performance 208
 - impact on 325
 - increase over shared folder with new file system directory 14
- performance improvements
 - with OS/400 Version 3.0 Release 1.0 4
- performance tuning OS/2 warp 325
- Personal Communications/5250 for Windows
 - emulation product provided by Client Access/400 11
- phase 1 install 219
- phase 2 install 220
- physical device drivers 292, 297
- PRC 226
- print service
 - double-byte character set 13
 - national language version (NLV) 13
- print services 12
- printed manual
 - charge feature 343
 - ship 343
- printer
 - hold 256
 - list 256
 - start 256
 - stop 256
 - table 217
- printer driver setting 167
- problem
 - fixes 212
 - hardware errors 212
 - log 212, 213, 214
 - records 213
 - software detected 229
 - software errors 212
- PROBLEM.LOG 228, 229

- processor 325
- processor table 217
- product registry 300, 301
- product, managed 211
- products registry 180
 - network drive 153
 - selective install/removal 182
- program no actions to recover 213
- proprietary 214
- protect mode 290, 294
- protocol, udp-oriented 214
- PRT 226
- PTF 213, 221, 224
- PTN 226
- publication
 - listed in read me file 342
 - printed manual charge feature 343
 - purchase 344
 - ship 343

Q

- QBKBOOKS 344
- QCMN 3
- QDLS 6
- QLANSrv 6
- QOpenSys 6
- QPWXCWN 320
- QSERVER 4
- QSYS.LIB 6, 8
- query 217
- Query Builder 237
- qursysqazcaxxx 217

R

- radio button 262
- RAM 325
- readme 341
- README.CA4 342
- recreating startup command files 207
- register 212
- releasing a drive 155

- releasing a printer 179
- remote applications 216
- remote command
 - running 87, 249
- Remote Location List
 - See APPN Remote Location List
- remote SQL
 - original server 2
- remove client 225
- replacing Communications Manager/2 32
- reports 212
- resource requirements 258
- restart objects 207
- restrictions 342
- root 6
- root file system directory 14
- RUMBA/400 312
 - emulation product provided by Client Access/400 11
 - Query Builder
 - collection 237
 - criteria 237
 - group by 237
 - set joins 237
 - tables 237
 - using 237
- RUMBA/400 configuration 196
- Run Remote Command (RUNRMTCMD)
 - command 87, 249
- running
 - remote command 87, 249
- RUNRMTCMD (Run Remote Command)
 - command 87, 249

S

- SBCS print services 13
- schemes and color palette 333
- SCSI devices 326
- SDLC desktop connections to AS/400
 - system 10
- second level help text 228
- security improvements
 - with Client Access/400 14

- selective install 300, 301
- send problem log 224
- server job 3
- service
 - folder 214, 228
 - provider 213
- set statements 325
- setup, AS/400 system 223
- SFW 226
- SFX 226
- shared configuration group 142
- shared folder
 - original server 2
- shared folder considerations using VDMs 309
- shared folder type 2
 - optimized server 2
- shared folders 5
- ShowCase VISTA 312
- SIA 214
- SIA (System Information Agent) 211, 214
- simple network management protocol (SNMP) 27, 211
- single-byte character set print services 13
- size 327
- smalltalk 255
- SNA configuration 149
- SNA connectivity options 10
- SNA Domain Name Suffix 93
- SNA Ethernet
 - installation
- SNA LAN
 - installation
 - Client Access/400 Optimized for OS/2 50
- SNA Token-Ring
 - installation
- SNA with Ethernet worksheet 43
- SNA with LAN worksheet 43
- SNA with Token-Ring worksheet 43
- SNA with TWINAX worksheet 43
- SNA.IBM.COM SNA Domain Name Suffix 93
- SNACKETS 221
- SNACKETS mode 224
- SNMP 214

- SNMP (simple network management protocol) 27, 211
- SNMP client management 217
- SNMP configuration 222
- SNMP trap. 213
- sockets over SNA 26
- softcopy 344
- software
 - catalog 255
 - database 214
 - fix table 217
 - information 214, 217
 - installation 216
 - installed 212
 - installed table 217
- software detected problems 229
- sounds 333
- spooler 333
- SQL 217
- Start Trap Manager (STRTRPMGR)
 - command 217, 224
- starting Client Access/400 products
 - registry 181
- starting communications 204
- startup and runtime performance 205
- startup configuration group 140
- static data files 327
- status of sent 224
- STG 226
- storage table 217
- STRTRPMGR (Start Trap Manager)
 - command 217, 224
- subsystem
 - for server job 3
 - new for file serving 14
- sunconnect 212
- support
 - TCP/IP 25
- swap 326
- SWAPPATH 331
- SWAPPER.DAT 331
- synoptics communications incorporated 212
- SYSLEVEL files 214

- System Information Agent (SIA) 211, 214
- system object access
 - application program interface (API) 258
 - network drive 258
 - network printer 258
 - pull down menu 260
 - push button menu 260
 - resource requirements 258
 - windows 258
- system settings 333
- system setup 334
- system tuning CONFIG.SYS 329

T

- TCP/IP
 - APPC over 26
 - concepts 21
 - configuring 83
 - connectivity options 10
 - for OS/2
 - LAN Adapter Protocol Support 34
 - support 25
 - terminology 22
- TCP/IP Host Table 85
- TCP/IP through LAN installation worksheet 47
- templates 138, 306, 318
- temporary files 327
- terminology
 - TCP/IP 22
- text file conversion 157
- THREADS 332
- tips 342
- token-ring
 - desktop connections
 - to AS/400 10
- token-ring attached
 - PC printer 12
- traces 228
 - detail 228
 - entry or exit 228
- transport mechanism 214
- trap manager 223

Twinaxial
desktop connections to AS/400 system 10
installation Client Access/400 Optimized for
OS/2 50

U

udp-oriented protocol 214
unexpected condition 213
UNIX 212
optimized client 1
UNIX compatible byte stream files
data access 14
usage 329
user interface 214
user no actions to recover 213

V

VDM (virtual DOS machine) 326
VDMR 305
VDMSERV 298, 303, 311
VDMSERV.EXE 298, 300
VDPMI.SYS 332
VEMM.SYS 332
Version 3.0 Release 1.0
new support 2
VIEW /msgid 343
view spooled file 257
virtual 8086 mode 290
virtual device driver, Client Access/400 296,
297
architecture 297
configuration 300
Virtual DOS Machine
alternative approaches 296
application support 291
configuring for graphics 307
configuring OS/2 Client Access/400 301
DOS Client Access/400 configuration 303
DOS settings 293, 294
memory management 290
memory support 293
Microsoft Windows applications 294

Virtual DOS Machine (*continued*)
multiple VDMs using Client Access/400 310,
311
shared folder considerations 309
VDD configuration 301
VDM router server 298, 303
VDMR identifier 305
virtual device driver (VDD) support 296, 297
virtual device drivers 292
virtual printers in VDMs 310
virtual router 297, 300
virtual router configuration 301
WIN-OS/2 settings 295
windowing support 291
virtual print
original server 2
virtual printers in VDMs 310
virtual router 297, 300
VW32S.SYS 332
VXMS.SYS 332

W

warp 332
warp DMI browser (DMIPM) 214
warp VDM (virtual DOS machine) 326
WFGSHOW 309
WIN-OS/2 291, 294, 333
modes 295
WIN32S windows apis 332
Windows 258, 326
future releases of optimized client 1
printer output 13
Windows and DOS
SNA networks 10
Work with Directory Entries (WRKDIRE)
command 51
Work with Mode Descriptions (WRKMODD)
command 52
Work with Problems (WRKPRB) command 224
Work with Writers (WRKWTR) command 260
working with
directory entries 51
mode descriptions 52

- working with (*continued*)
 - output queues 262
 - printers 261
 - writers 260
- Workstation Function 310
 - running in separate windows 310
- Workstation function 5250 emulation 12
- workstation requirements 255, 259
- WR07045.INF 342
- writers, working with 260
- WRKDIRE (Work with Directory Entries)
 - command 51
- WRKMODD (Work with Mode Descriptions)
 - command 52
- WRKPRB (Work with Problems) command 224
- WRKWTR (Work with Writers) command 260
- WSF 5250 emulation 12

X

- X.25 desktop connections to AS/400 system 10
- XDF (extended disk format) 332
- XDFLOPPY.FLT 332
- XMS 290
- XMS in virtual DOS machines 293

Z

- ZCxxxx 226



Printed in U.S.A.

SG24-2587-00

