

Part No. MAN-0021-7
January 2001

OmniCore 5052/5022

Users Guide, Release 3.3

Xpress™ and XpressPLUS™ Service Programs: An Alcatel service agreement brings your company the assurance of no-excuses technical support. Xpress and XpressPLUS Service Programs were “expressly” designed to offer customers the highest level of reliability that today’s mission-critical network operations demand. Featuring 7x24x365 access, a team of technical networking experts, onsite support, web-based access, software upgrades, and troubleshooting tips, Alcatel’s service programs offer you every resource required to maximize your network performance. For more information on plan details and pricing, contact your Alcatel sales representative.

GNU Statement: Certain portions of this software were obtained under the conditions of the "GNU LIBRARY GENERAL PUBLIC LICENSE Version 2, June 1991". This license provides for free access to the original version of the source code from which these portions of the Alcatel product was created. To obtain a copy of this original source code and/or to obtain information regarding the original software version from which the Alcatel work is derived, contact Alcatel Technical Support.

Copyright (c) 1982, 1986, 1988, 1993 Regents of the University of California. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions, and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions, and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgement:

This product includes software developed by the University of California, Berkeley and its contributors.

4. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS “AS IS” AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

This manual documents OmniCore 3.3 software.

The functionality described in this manual is subject to change without notice.

Copyright © 2001 by Alcatel. All rights reserved. This document may not be reproduced in whole or in part without the express written permission of Alcatel.

Alcatel is a registered trademark of Alcatel, a sociere anonyme organized under the laws of the Republic of France. OmniCore is a trademark of Alcatel. All other brand and product names are trademarks of their respective companies.

**11707 E Sprague, Suite 106
Spokane, WA 99214-0497**

**US Customer Support – (800) 995-2696
International Customer Support – (818) 878-4507
Internet – <http://www.ind.alcatel.com>**

**Part Number: MAN-0021-7
January 26, 2001**



User Guide Conventions

The following conventions are used throughout this manual:

- File names, directories, and CLI commands used in text are displayed in *italics*.

Example: Copy *startup.config* to the primary EMM using the *utils file copy* command.

- Information you enter from a keyboard is displayed in **courier bold** font.

Example: `OmniCore> vlan 10 tag 10 create`

- On screen text is displayed in `courier` font.

Example: `Broadcast Priority: default`

- CLI command names are used for reference. You can look them up alphabetically in the CLI Reference Manual by name to find syntax and usage information.

Example: Command name: *utils tftp*

Command syntax: `utils tftp {get | put} <filename>`

The following headings bring related information to your attention:

◆ Note ◆

The note label introduces special instructions or features.

◆ Caution ◆

Text following this caution label indicate statements that must be read and understood to avoid system damage, data loss, or personnel injury.

◆ Warning ◆

Text following this warning label indicate statements that must be read and understood to avoid areas or procedures that could expose service personnel to electric shock.

Table of Contents

1 OmniCore 5052 and 5022 Overview 1-1

Feature Summary	1-2
Infinite Routing Features	1-2
IP Routing	1-2
IPX Routing	1-3
IPv6 Routing	1-4
IP Assist Capabilities (IP Helper)	1-4
Switching Features	1-4
Addresses	1-4
Spanning Tree	1-4
Port Trunking	1-5
Link Aggregation Control Protocol (LACP)	1-5
Virtual LANs (VLANs)	1-5
Hot-Standby Routing Protocol	1-5
High Density and Flexible Connectivity Features	1-5
10/100/1000 Mbps Ethernet Interface Modules	1-5
FDDI Interface Modules	1-6
POS Interface Modules	1-6
Mission-Critical Reliability Features	1-6
Redundant Memory Fabric (5052 Only)	1-6
Redundant Enterprise Management Module (EMM)	1-7
Redundant Physical Interfaces	1-7
Application-Aware Networking Features	1-7
QoS Policy Management	1-7
Layer 2 QoS 802.1p/Q	1-8
Layer 3 QoS IP Type of Service (TOS)/Precedence	1-8
Queuing Mechanisms	1-8
Network Management	1-8
Command Line Interface (CLI)	1-8
TrackView Network Management	1-9
Simple Network Management Protocol	1-9
RMON	1-9
Network Time Protocol and Timezone	1-10
OmniCore 5052 and 5022 Relevant Standards	1-10
Hardware Descriptions	1-12
OmniCore 5052	1-12
OmniCore 5052 System Packet Memory Cards	1-12
OmniCore 5022	1-13
OmniCore 5022 System Memory Modules	1-13
Power Supply	1-13
System Safety Features	1-14
Environmental Controls	1-14

Over-Temperature Automatic Shutdown	1-14
Cooling Fans	1-14
Interface Modules	1-15
Gigabit Interface Converter (GBIC) Modules	1-17
2-Port 1000BASE-SX Gigabit Ethernet Interface Module	1-18
2-Port/2-Redundant Port 1000BASE-SX Gigabit Ethernet Interface Module	1-19
6-Port 1000BASE-SX Gigabit Ethernet Interface Module	1-20
2-Port 1000BASE-LX Gigabit Ethernet Interface Module	1-21
2-Port/2-Redundant Port 1000BASE-LX Gigabit Ethernet Interface Module	1-22
2-Port 1000BASE-LH Gigabit Ethernet Interface Module	1-23
10-Port 100BASE-FX Fast Ethernet Interface Module	1-24
20-Port 100BASE-FX Fast Ethernet Interface Module	1-25
20-Port 10/100BASE-TX Fast Ethernet Interface Module	1-26
2-Port OC-3c Packet-Over-SONET (POS) Interface Module.	1-27
2-Port OC-12c Packet-Over-SONET (POS) Interface Module.	1-28
2-Port DAS/SAS FDDI Interface Module	1-29
2 GBIC-Port/2-Redundant GBIC-Port Gigabit Line Card	1-30
6 GBIC-Port 1000BASE Gigabit Server.	1-31
Enterprise Management Module (EMM).	1-32
Enterprise Management Module with Gigabit Ethernet Port	1-33
Architecture.	1-34
Operation	1-35
Switching.	1-35
IP Routing	1-35
IPX Routing	1-36
Other Routing Protocols	1-36
Multicast Support	1-36
OmniCore Frame Prioritization.	1-37
Port Priority	1-38
VLAN Tagged Frame Priority	1-38
Ingress Translation	1-38
Egress Translation	1-39
VLAN Priorities	1-39
IP Precedence	1-39
IP Route Policy	1-40
TrackView Policies.	1-40

2 Configuring Users and Authentication Services 2-1

Users and Authentication Services Commands.	2-1
Configuring Users and Passwords.	2-2
Defining the Password Length-Checking Mode	2-2
Defining the Authentication Mode for Unconfigured Users.	2-3
Creating a User Name and Password.	2-3
Defining User Access Privilege	2-3
Defining the Password Type.	2-4
Changing a Password.	2-4
Deleting a User Name	2-4
Viewing User Name Information.	2-4

Configuring the Access Control List	2-5
Configuring RADIUS	2-7
Configuring TACACS+	2-8
Authentication	2-8
Authorization	2-9
TACACS+ Privilege Level and Switch Authority Level	2-9
Accounting	2-10
TACACS+ Commands	2-11
Executing CLI Commands	2-11
Commands Sent to TACACS+ for Authorization	2-12
Commands Not Sent to TACACS+ for Authorization	2-12
Configuring TACACS+	2-13
Recovering From Lock-Out	2-16
3 Configuring VLANs and Priority	3-1
VLAN Commands	3-2
Configuring Port-Based VLANs	3-3
Basic Port-Based VLAN Management	3-3
802.1Q Tagging	3-5
Configuring Protocol-Based VLANs	3-7
Basic Protocol-Based VLAN Management	3-7
Generic Protocol-Based VLAN Management	3-9
Configuring Priority for VLANs	3-11
Queuing Mechanisms and PBQ	3-12
WFQ and Strict Mode	3-12
PBQ (Programmable Bandwidth Queuing) Mode	3-12
Configuring PBQ	3-14
4 Configuring IP	4-1
IP Commands	4-1
Configuring IP for Switching	4-2
Configuring IP for Routing	4-3
Creating Static Routes	4-4
Creating Route Policies	4-5
5 Configuring IP/RIP	5-1
IP/RIP Commands	5-1
Configuring IP/RIP	5-2
6 Configuring IP Multicast Protocols	6-1
IP Multicast Commands	6-1
Configuring DVMRP	6-3

Configuring IGMP	6-4
Configuring Multicast Containment	6-5
PIM-SM	6-6
PIM-SM Commands	6-6
Configuring PIM-SM	6-8
Optional PIM-SM Settings	6-9
Monitoring PIM-SM Parameters	6-11
7 Configuring OSPF	7-1
OSPF Commands	7-2
Configuring OSPF	7-4
Configuring a Stub Area	7-7
Not-So-Stubby-Areas	7-7
OSPF Redistribution	7-8
Redistribution Procedure	7-9
8 Configuring IPX	8-1
IPX Commands	8-1
Configuring IPX	8-3
9 Configuring POS	9-1
POS Commands	9-1
Configuring POS	9-2
10 Configuring AppleTalk	10-1
AppleTalk Commands	10-2
Configuring AppleTalk	10-2
11 Configuring HSRP	11-1
HSRP Commands	11-1
Configuring HSRP	11-2
12 Configuring BGP	12-1
BGP Commands	12-2
Enabling BGP	12-3
BGP Aggregation	12-4
BGP Dampening	12-5
BGP Networks	12-6
BGP Paths	12-7
Regular Expressions	12-8
Configuring BGP Peers	12-11
Configuring Internal and External Peers	12-13

BGP Policies	12-14
Policy Matching Rules	12-14
Policy Matching Flowchart	12-16
Displaying BGP Policies	12-17
BGP Policy Commands	12-18
BGP Redistribution Filters	12-20
13 Configuring Key Features.	13-1
Configuring Proxy ARP	13-1
Configuring BOOTP and DHCP	13-2
Configuring Bridging and Spanning Tree	13-4
Configuring Bridging and STP for a Single Spanning Tree	13-5
Configuring Bridging and STP Per VLAN (Multiple VLANs).	13-6
Configuring Edgeport for a Single Spanning Tree.	13-7
Configuring Edgeport Per VLAN	13-7
Configuring Jumbo Packet Settings	13-8
Configuring Port Mirroring	13-9
Configuring RMON	13-11
Configuring Syslog.	13-12
Configuring Trunk Groups	13-13
Configuring LACP	13-15
Configuring Network Time Protocol	13-16
NTP Commands.	13-18
Configuring NTP Client	13-19
Configuring NTP Server	13-21
Configuring Timezone	13-22
Timezone Commands.	13-22
Configuring Timezone	13-22
Current Timezone.	13-23
Default Timezone.	13-23
Custom Timezone	13-24
Daylight Saving Time	13-24
14 OmniCore Software	14-1
OmniCore Software Commands	14-2
Bootting Options	14-3
Selecting a Boot Device	14-3
Selecting a Boot Configuration File	14-4
Selecting a Boot Image File	14-5
Setting the EMM's Jumper Position	14-6
Setting the Jumper for Booting from the EMM	14-7
Transferring Files.	14-8
Using TFTP to Transfer Files.	14-8
Downloading a File Using TFTP	14-8

Uploading a File Using TFTP	14-8
Using Xmodem to Transfer Files	14-9
Downloading a File Using Xmodem	14-9
Performing Software Upgrades	14-11
Upgrading Software Via TFTP	14-11
Upgrading Software Via Xmodem	14-13
Upgrading Software Via Flash Card	14-14
Working with Software Images and Configuration Files	14-16
Copying Files	14-16
Saving Files	14-17
Deleting Files	14-17
Renaming Files	14-18
Using Configuration File Naming Conventions	14-18
Basic System Configuration (BSC) File	14-18
Installing Bootstrap Software	14-19
Viewing Directory Contents	14-20
Reformatting Flash Memory	14-20
Reformatting a Device During an Active CLI Session	14-20
Reformatting a Device During Rebooting	14-21
A Servicing Components	A-1
Powering Down the System	A-1
Removing and Installing Interface Modules and EMMs	A-1
Removing an Interface Module or EMM	A-2
Installing an Interface Module or EMM	A-3
Removing and Installing AC Power Supplies	A-4
Removing an OmniCore AC Power Supply	A-4
Installing an OmniCore AC Power Supply	A-6
Removing and Installing DC Power Supplies	A-7
Removing an OmniCore DC Power Supply	A-7
Installing an OmniCore DC Power Supply	A-9
Removing and Installing Rear Cards	A-10
Removing a Rear Card on the OmniCore 5052	A-10
Installing a Rear Card in the OmniCore 5052 Switch	A-10
Remove a Rear Card in the OmniCore 5022	A-12
Installing a Rear Card in the OmniCore 5022	A-13
Using a Modem with the Console Port	A-14
Attaching a Modem to the EMM's Console Port	A-14
Attaching a Modem to Your PC	A-14
Configuring HyperTerminal Settings	A-15
Establishing a HyperTerminal Session	A-15
Using Mode-Conditioning Patch Cords	A-16
B Troubleshooting	B-1
General Checks	B-1

C	Technical Specifications	C-1
	LED Indicators	C-3
	Connector Pin Assignments	C-4
	Console Port	C-4
	Modem Port	C-4
	Mini-DIN Port	C-5
	Maximum Link Lengths	C-5
	Evaluating Power Budget for Optical Data Links	C-6
	Approximating the Multimode Power Margin	C-6
	Multimode Power Margin Example	C-8
	Single-Mode Power Margin Example	C-8
	Interface Modules Part Numbers	C-10
	To Determine the Interface Modules Installed	C-10
	To Determine the Current Software Version	C-15
D	Technical Support	D-1
	Internet Site	D-1
	Technical Support	D-1
	Returning Products for Repair	D-1
E	Safety Information	E-1
F	Translations	F-1
G	Regulatory Compliance	G-1
	FCC Statement	G-1
	Lithium Battery Caution	G-1
	Canadian Department of Communications Compliance Statement	G-2
	Avis de conformité aux normes du ministère des Communications du Canada	G-2
	Declaration of Conformity - (Brief)	G-2
	EN60950 Compliance	G-2
	Laser Type	G-2
	CE Marking (EN60950 Plus EMC)	G-3
	UL Notice	G-3
	VCCI Notice	G-3
	BSMI Warning Statements	G-3
H	Standard Warranty	H-1
	Hardware	H-1
	Software	H-1
	Standard Service	H-1
	Dead On Arrival (DOA) Service	H-2

Warranties Exclusive	H-2
Limitation of Liability	H-2
Governing Law	H-2