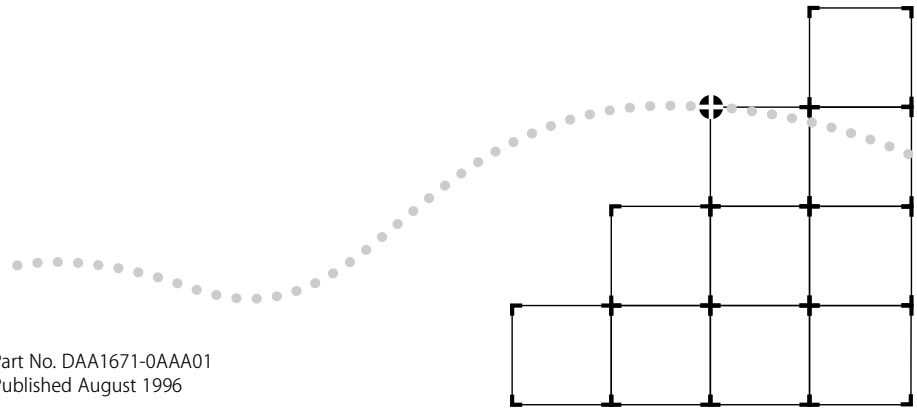
OFFICECONNECT™ REMOTE SUPPORT TOOL APPLICATION GUIDE



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About this Application Guide

This application guide describes the Remote Support Tool for the OfficeConnect Hub 8/TPM (referred to as **'OfficeConnect hub'** in this document). This guide is designed for use by a network administrator or service provider wishing to remotely monitor and manage OfficeConnect hubs (that are not linked back to the central office by a Bridge or Router connection) using a simple modem connected to a telephone line. By using this application guide the reader should be able to configure the hub, modem, AccessBuilder remote access server and Transcend network management components into a working system. It is assumed that the reader has a basic knowledge of IP networking and is familiar with Local Area Networks. This application guide is split into sections which describes the Remote Support Tool and how to set it up. The following table shows where to find specific information in this guide:

If you are looking for information on:	Turn to this section:
The Remote Support Tool	"Introduction" on page 9
What equipment is needed and assigning IP and SLIP information	"Before You Start" on page 16
Setting up the OfficeConnect hubs and connecting modems to them	"Setting Up a Remote Site" on page 22
Setting up the AccessBuilder and managing the OfficeConnect hubs remotely using Transcend	"Setting Up the Central Site" on page 33
Testing if traps are correctly reported and if Transcend can manage the hub	"Testing Your Setup" on page 43
Solving any problems	"Problem Solving" on page 44
The cable you can use, operational limitations and product information	"Technical Information" on page 45

If you have not set up the Remote Support Tool before, we recommend that you start by reading the "Introduction" on page 9 to get an idea of what is involved. Otherwise, you can go straight to "Before You Start" on page 16. Read through the sections before performing any of the actions, so that you have a clear understanding of what you are doing.

Conventions

The following tables show the icons and text conventions that are used throughout this guide:

Icon	Type	Description
	Information Note	Information notes call attention to important features or instructions.
	Caution	Cautions alert you to personal safety risk, system damage, or loss of data.
	Warning	Warnings alert you to the risk of severe personal injury.

Convention	Description
"Enter" vs. "Type"	When the word "enter" is used in this guide, it means type something, then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says "type."
Text represented as `screen display`	`This typeface` is used to represent displays that appear on your terminal screen, for example: `Login:`
Text represented as **`commands`**	**`This typeface`** is used to represent commands that you enter, for example: **`communitystring james`**
Keys	When specific keys are referred to in the text, they are called out by their labels, such as "the Return key" or "the Escape key," or they may be shown as [Return] or [Esc].
Italics	*Italics* are used to denote *new terms* or *emphasis*.

In addition to these conventions, this guide also describes the entering of information as a string of text, for example:

`Enter command>` **`Telnet`** *IP Address* [space] **`3000`** [enter]

This example simply means that at the `Enter command>` prompt, you type the word **`Telnet`** , type an *IP Address*, press [space], type the number **`3000`** , and press [enter].

INTRODUCTION

System Overview

The OfficeConnect hub with Version 2.0 (or later) agent provides new remote management capabilities. Now, it is possible to manage a remote hub from the familiar and powerful Transcend network management platform without the need for the complex and costly overheads of a leased line, WAN, or ISDN connection. The system used to achieve this is shown in Figure 1.

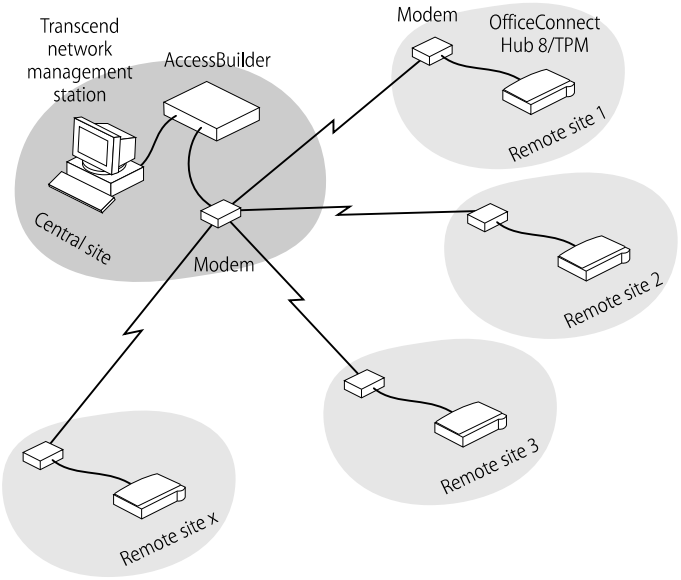


Figure 1 The Remote Support Tool System

With a simple low cost system it is possible to obtain the following:

- Full Out-of-band management
- Automatic Dial on Demand Fault/Alert reporting
- Full RMON monitoring
- Store Network Statistics
- Packet Filter and Capture
- Remote Workgroup Monitoring
- Action-on-Event providing proactive self healing network capabilities
- Remote Software Upgrade

Unlike Transcend Enterprise Manager, Transcend WorkGroup Manager does not provide RMON monitoring.

Full Out-of-Band Management

Remove the security risk of your management data being 'snooped'. With Out-of-band management, users never see or get affected by the network management traffic, and you can remotely download future agent upgrades.

Automatic Dial on Demand

Under normal circumstances when the network is healthy the OfficeConnect hub remains a silent partner, constantly monitoring and checking for any preset or customized network conditions. If the hub detects an alert condition it will automatically dial up the network management station and deliver its warning message.

RMON Management

RMON has become 'the' standard by which products are judged on their effectiveness to monitor and diagnose network problems. Set the hub to perform automatic logging of data within its memory, perhaps to be downloaded in the event of an error condition occurring or maybe determine the growth trends of the network utilization. More powerful still, is the ability of the hub to perform packet capture locally and download this to the Transcend network management station for further diagnostics.

Value Added SmartAgent Features

Remote Workgroup Monitoring and Action-on-Event are both SmartAgent features which provide the hub with the ability to act in a predefined manner should any particular condition arise. For example, if the hub detects a local server down, you may choose to light the Alert LED and send a message to a remote Transcend network management station. Alternatively if a local workstation becomes faulty and begins 'jamming' the local network, you may choose to either temporarily disable that workstation or disconnect it completely from the network, automatically.

The Remote Support Tool in More Detail

The Remote Support Tool allows a standard network management station to manage many remotely situated managed OfficeConnect hubs which do not have a traditional wide area or leased line type connection.

The Remote Support Tool is built from the following devices (a comprehensive list of orderable items can be found in "Product Information" on page 49):

- Transcend network management station at the central site
- AccessBuilder model 4000 or 2000 at the central site
- At least one modem to connect to the AccessBuilder
- One modem per OfficeConnect hub at each remote site
- A managed OfficeConnect hub per remote site

The network management station and AccessBuilder reside on a Local Area Network at the central site from which the network administrator wishes to manage and monitor the remotely located OfficeConnect hubs.

A modem connects the AccessBuilder to a standard dial telephone line. This modem can dial up and receive calls from any of the modems connected to the OfficeConnect hubs at the remote locations, as shown in Figure 2.

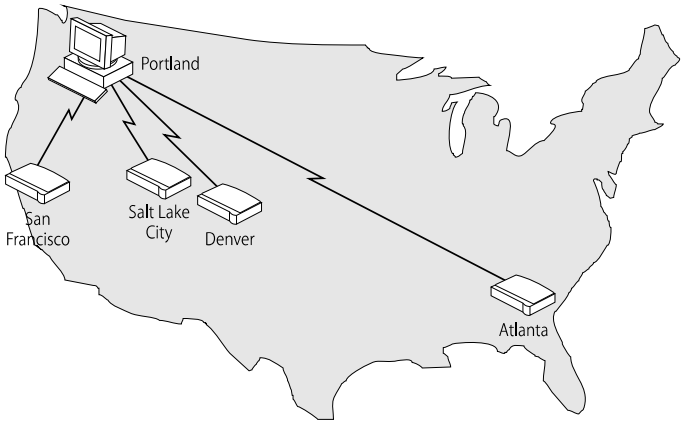


Figure 2 Manage Many Remote Sites Using Low Cost Telephone Lines and Modems

The RMON monitoring features of the OfficeConnect hub enable it to gather and store a wide variety of network statistics at the remote site without the need for a permanent connection to the network management station.

Furthermore the OfficeConnect hub can raise various alert conditions which, as well as lighting the Alert LED on the hub itself, can also cause the hub to generate an SNMP Trap. These SNMP Traps can be thought of as network management Alert messages that are sent over the network to the network management station and logged in an event log. When a remote OfficeConnect hub detects that an alarm threshold has been exceeded or that an alert condition has occurred it can cause its connected modem to dial up the central site's AccessBuilder, log in to authenticate connection to the central site's network and then actually send the Trap message to the network management station.

When the OfficeConnect hub has set up a modem link and sent the Trap, it clears down the modem link after a fixed time period of one minute with no data activity over the modem link. When the AccessBuilder sets up the modem link it controls when the modem link is cleared. This can be varied, see step 5 on page 36.

In the event of all the central site's modems being busy or in use, the OfficeConnect hub will retry (up to twenty times at two minute intervals) to send the trap message to the central site's network management station. If this still results in a failure to establish the connection, the retries will cease.

If the remote network personnel discover that they are having an unusual problem with their network, the central site's network management station can monitor the hub and its network just as easily as if it were a locally connected hub. Again, RMON is a powerful tool providing detailed statistics on what's happened on the remote network and allowing the capturing of traffic for downloading to the console, allowing more detailed problem analysis to take place.

Communication Over SLIP

SLIP stands for Serial Line Internet Protocol. On a local network 3Com Transcend network management applications manage and communicate with the OfficeConnect hub using either Simple Networking Management Protocol (SNMP) or Telnet applications. SNMP or Telnet run over a number of other higher level protocols, the most common one being IP (Internet Protocol). SNMP over IP can be referred to as SNMP/IP although as this is the most common use of the term it is often abbreviated to simply SNMP.

Figure 3 shows the OfficeConnect hub communicating using SNMP/IP to a Transcend network management station connected to one of its Ethernet (network) ports. Because the management traffic travels on the same pieces of cable that the network uses to transmit data, this is known as In-band management.

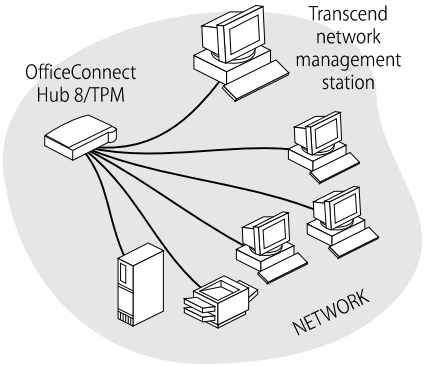


Figure 3 In-band Management — A Traditional Local Area Network With a Server, Workstations, a Printer and a Network Management Station on the Same Physical Network

SLIP is basically the same IP protocol that 'talks' over Ethernet, but adapted specifically to communicate over serial connections using the hub's serial port. In this way it is possible to connect a management console directly to the hub's serial port and manage it as though over the network. Transcend Quick Configuration Manager uses SNMP over SLIP.

Figure 4 shows an example of Out-of-band management using Quick Configuration Manager because the management traffic is now isolated from the Ethernet (network) traffic.

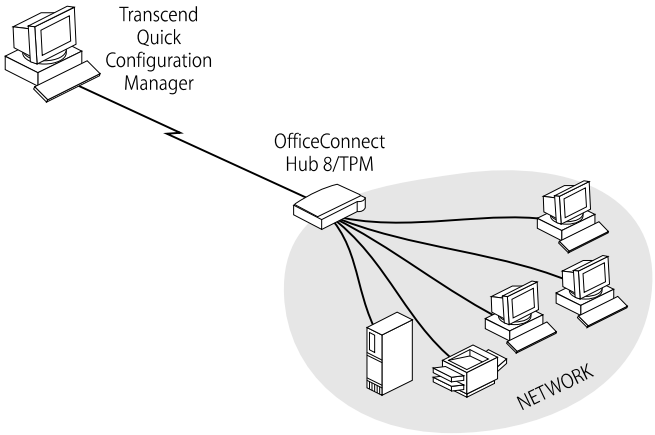


Figure 4 Out-of-band Management — Quick Configuration Manager Provides Basic Configuration and Monitoring of the Hub, Isolating the Management Traffic to the Serial (SLIP) Connection

With the OfficeConnect hub Version 2.0 agent software comes a new and important feature allowing full modem control of the OfficeConnect hub serial port. The OfficeConnect hub agent software is freely available on 3Com Bulletin boards and can be easily downloaded into the OfficeConnect hub. For more information on 3Com bulletin boards please see the manual that accompanies the OfficeConnect hub.

This now means that the hub can be fully managed Out-of-band over a modem linked telephone line while still maintaining all the powerful features that make it so desirable for In-band management.

BEFORE YOU START

What Equipment is Needed?

This section describes the equipment you need for your central site and the remote sites you are going to remotely connect to. The equipment you need to configure the sites is also described.

Figure 5 shows what an example setup may look like, with the central and remote sites.

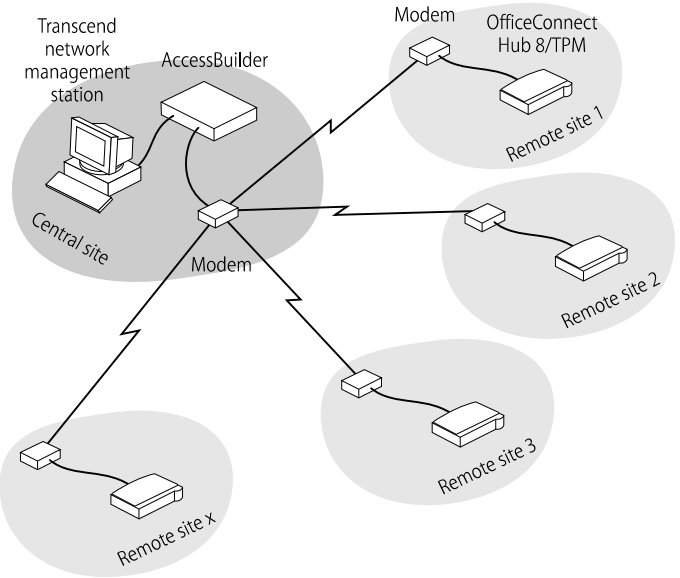


Figure 5 Example Setup Showing the Central and Remote Sites

Equipment Needed for each Remote Site

You can manage up to 255 remote sites from each AccessBuilder. Each remote site needs the same basic equipment to connect to the central site.

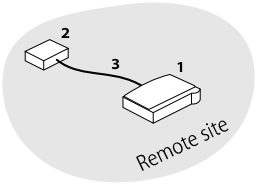


Figure 6 Equipment for a Remote Site

The equipment needed for **each** remote site, as shown in Figure 6, is:

1 One OfficeConnect Hub 8/TPM (the hub you are remotely managing and monitoring).

A copy of Quick Configuration Manager is supplied with each hub. This application runs under Windows 3.1, NT and '95, and is designed as an easy to use configuration tool for the OfficeConnect hub.

2 One modem.

Each remote site needs a modem with access to a standard dial telephone line. 3Com has fully tested and supports the use of the following modems to be connected to the OfficeConnect hub:

- Hayes Optima 144
- Multitech MT1932ZDX
- Multitech MT2834ZDX
- US Robotics Sportster 14.4

These are the modems that 3Com support. There is no technical reason preventing the use of other modems. For information on verifying other modems, see "Technical Support" on page 60.

3 One straight-through modem cable (9 pin - 25 pin) — for connecting the modem to the OfficeConnect hub.
For information about the specifications of these cables, see "Cable Specifications" on page 46.

Equipment Needed for the Central Site

All of the management and monitoring of the remote sites will take place from one central site.

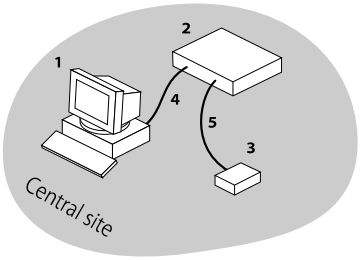


Figure 7 Equipment for the Central Site

The equipment needed for the central site, as shown in Figure 7, is:

1. One network management station running Transcend Enterprise Manager, or Transcend WorkGroup Manager (if RMON is not required).

2. One AccessBuilder 2000 or 4000.

   The AccessBuilder must be running system software Version 6.1 or later. If this is not the case, instructions on how to do an upgrade can be found in the documentation that accompanies the AccessBuilder. Contact your nearest 3Com distributor to order the latest system software.

3. At least one modem.

   You need to consider two areas:

   - The greater the number of modems connected to the AccessBuilder, the better the chance that remotely sent Trap Alert messages will get through without delay. 3Com recommend a minimum of one modem per 20-50 remote sites (to be managed).
   - The number of modems connected to the AccessBuilder limits the number of remotely connected hubs that can be managed concurrently. You need a minimum of one modem per concurrent network management session.

If multiple modems are used on the AccessBuilder they should be connected to a phone line hunt group, this allows all of the modems connected to the AccessBuilder to have the same telephone number.

3Com have tested that all the modems that can be used at the remote site can also be used at the central site connected to the AccessBuilder.

4 One crossover 10BASE-T cable — for connecting the AccessBuilder to the network management station.

5 One straight-through modem cable (25 pin - 25 pin) for **each** modem — for connecting the modems to the AccessBuilder.

For information about the specifications of these cables, see "Cable Specifications" on page 46.

Equipment Needed for Configuring the Remote and Central Sites

You need:

- One PC (IBM-compatible personal computer) — for configuring the OfficeConnect hubs (using Quick Configuration Manager), the AccessBuilder and the modems (using a Windows terminal emulator).
- One null modem cable (9 pin - 9 pin) — for configuring the OfficeConnect hubs and the AccessBuilder 2000.
- One straight-through modem cable (9 pin - 25 pin) — for configuring the AccessBuilder 4000.

The remote site modems can be configured using the same straight-through modem cable (9 pin - 25 pin) that is used to connect the OfficeConnect hub to the modem.

The equipment must be configured before it is connected together. The following sections describe how to configure and connect the equipment. You may want to configure all the equipment for the different remote sites, at one specific site (maybe your central site), and then take it to the remote sites and connect it together.

Information Needed to Configure the System

While doing the installation you need to configure each hub and the AccessBuilder for each remote site with the following information. We recommend that you decide on this in advance, as part of your planning process and make a note of it in the table in "Recording Information" on page 57:

- The SLIP address of the hub — programmed into the hub and the AccessBuilder.
- The SLIP subnet mask — programmed into the hub and the AccessBuilder.
- The Ethernet IP address and subnet mask of the hub if it is also going to be managed over the Ethernet (network) — programmed into the hub only.
- The default router IP address if the Transcend network management station is not on the same subnet as the hubs and AccessBuilder — programmed into the hub and the AccessBuilder.
- A Username and Password for each hub allowing it to log in to the AccessBuilder — programmed into the hub and the AccessBuilder.
- The telephone number of the modem attached to the hub — programmed into the AccessBuilder only.
- The telephone number of the modem(s) attached to the AccessBuilder — programmed into the hub only.
- The hub's Device Name, Location and Contact. This helps you to identify the hub and your contact at that location (it is part of the MIB II information) — programmed into the hub only.

Additionally the AccessBuilder and Transcend network management station will need to be assigned IP addresses.

Assigning IP and SLIP Addresses

The rules for assigning IP and SLIP addresses for the AccessBuilder and OfficeConnect hubs are simple. All these devices should be on the same IP subnetwork. For example:

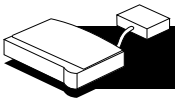
OfficeConnect hub at remote site 1	SLIP address = 191.1.1.1
OfficeConnect hub at remote site 2	SLIP address = 191.1.1.2
OfficeConnect hub at remote site 3	SLIP address = 191.1.1.3
OfficeConnect hub at remote site 4	SLIP address = 191.1.1.4
AccessBuilder at central site	IP address = 191.1.1.201
Transcend network management station at central site	IP address = 191.1.1.200

If the network management station needs to be on a different IP subnet or network for other reasons, then it is important that the correct default gateway entry is setup in the OfficeConnect hub, AccessBuilder and Transcend network management station. The default gateway should be the IP address of the local router port interconnecting the subnets.

We recommend that you work out all of the information you are going to assign to your equipment before you start setting it up.

Quick Setup for Experienced Users

If you have set up the Remote Support Tool before and are confident in doing so again, there is a quick setup option at the back of this guide which highlights the main points of setting up the whole system. See "Quick Setup" on page 51.



SETTING UP A REMOTE SITE

This section describes how to set up a remote site. If you are setting up multiple remote sites, you would perform these action for each site. Read through this whole section before you perform any of the actions, so that you fully understand what is required.

Always keep a note of the information you configure for the equipment. There is a blank table at the back of this guide for you to copy and fill in, see "Recording Information" on page 57.

Setting Up the OfficeConnect Hub

Overview

Each hub has both an IP address and a SLIP address associated with it. The rules governing the assignment of IP addresses mean that the serial port (SLIP) address must be part of a different IP network to the hub's IP address which is used on the Ethernet ports of the hub. No data traffic will pass between the Ethernet ports and the serial port, although the management agent listens to and will respond to requests from either.

By default the OfficeConnect hub is shipped with no IP address, and a default SLIP address that is used for connection to Transcend Quick Configuration Manager.

For remote access the following parameters must be configured:

- SLIP address
- Subnet Mask
- Modem Dial Out String
- Serial Port Speed
- Serial Port Flow Control
- Modem Login String
- IP Address of the Transcend network management station
- Serial Connection

The following parameters may be needed:

- Ethernet IP Address and Subnet Mask, if the hub is to be managed over the Ethernet (network)
- Default Router, if the Transcend network management station is not on the same SLIP subnet

The following parameters can also be configured. The default for these parameters is '3Com' and should be changed:

- Contact Name
- Contract Number

Editing the QUICKMGR.INI File

Before using Quick Config Manager you need to modify the `QUICKMGR.INI` file. The initialization file can be found in the `C:\WINDOWS\` directory.

1 To allow you to have access to the SLIP and modem configuration dialog screens which are otherwise hidden, edit the file and change the entry **`reseller=0`** to **`reseller=1`** under the `[system]` group as shown below:

```
[system]
path=C:\QUICKMGR
reseller=1
```

2 By default both the hub's serial port and Quick Configuration Manager operate at 9600 baud. The performance can be doubled by setting this to 19200 baud. To ensure Quick Configuration Manager can communicate with the hub when it is set for 19200 baud, change the `SerialAttrib` entry under the `[slip]` group as shown below:

```
[slip]
SerialAttrib=COM1;19200;n,8,1
```

Configuring the OfficeConnect Hub

Using the PC with Transcend Quick Configuration Manager (version 2), connect a null modem cable (9 pin - 9 pin) from the serial port of the PC to the serial port of the OfficeConnect hub.

Start Quick Configuration Manager and configure the parameters of the hub as follows:

1 From the *Configure* menu select *IP Setup...*

If no IP address has been assigned to the hub, the Easy Setup dialog box is displayed. If this is the case, simply click on *Abort*.

The IP Configuration dialog box is displayed, as shown in Figure 8.

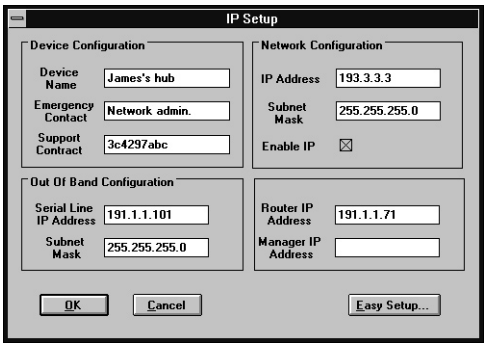


Figure 8 IP Configuration Dialog Box

2 Fill in the Serial Line IP Address and Subnet Mask.

This will be the address that will be used when connecting into or monitoring the hub from the central site. Ensure that the subnet mask is the same as that used on the central site.

3 Fill in the IP address of your network management station in the Manager IP address field. You can configure more than one address for the hub. If this is the case, an address is not displayed in this field.

4 If your network management station is not on the same subnet as the Serial Line IP (SLIP) address of the hub, you must enter the IP address of the router that connects the two subnets, in the Router IP address field.

5 From the *Configure* menu select *General Info...*

The General Info dialog box is displayed.

6 Optionally complete the Device Name, Emergency Contact and Support Contract. This is to help operators of the network management station identify the hub they are managing.

7 In the General Info dialog box, choose the *Dial Out* category.

The Dial Out dialog box is displayed, as shown in Figure 9. This dialog box configures the modem dial out, as well as the security sequence to log in to the AccessBuilder. No logout sequence is needed for the AccessBuilder.

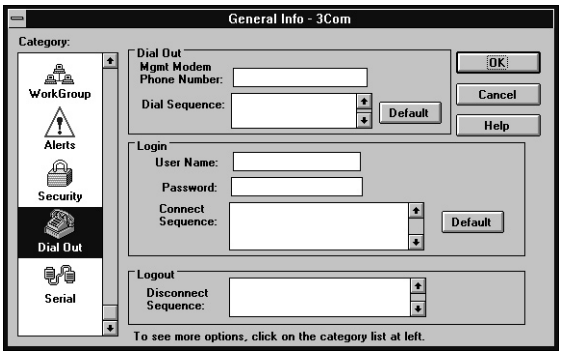


Figure 9 Dial Out Dialog Box

8 In the Dial Out section, enter the Mgmt Modem Phone Number and click on the *Default* button to automatically generate the Dial Sequence.

The Mgmt Modem Phone Number is the central site's telephone number, that connects directly to the AccessBuilder's modem or modem pool. This number is used to automatically generate the Dial sequence which will contain extra control characters required for the modem control.

The Dial Sequence can be manually edited, if desired, and is the actual control sequence used to dial up the central site. If you are experienced at configuring modems you can enter a sequence here or, alternatively, one will be automatically generated based on the Mgmt Modem Phone Number when the *Default* button is clicked on. The generated sequence is a common sequence that works with all of the modems that 3Com support. Figure 10 shows an example of a typical generated Dial Sequence.

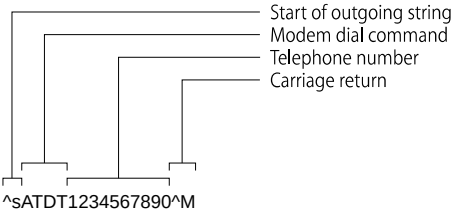


Figure 10 Example Dial Sequence

The *Default* button is not active until a Mgmt Modem Phone Number is entered.

9 In the Login section, enter a User Name and Password of a new account to be configured on the AccessBuilder, and click on the *Default* button to automatically generate the Connect Sequence.

CAUTION: *This will be a unique login for this remote site. This task should only be performed if the hub already has a SLIP address. If you change the SLIP address of the hub, you need to repeat this task, as the Login sequence contains the hub's SLIP address.*

Both the Username and the Password fields can be used to automatically generate a login sequence to log in to the AccessBuilder at the central site, once the modem has successfully established a link. Figure 11 shows an example of a typical generated Connect Sequence.

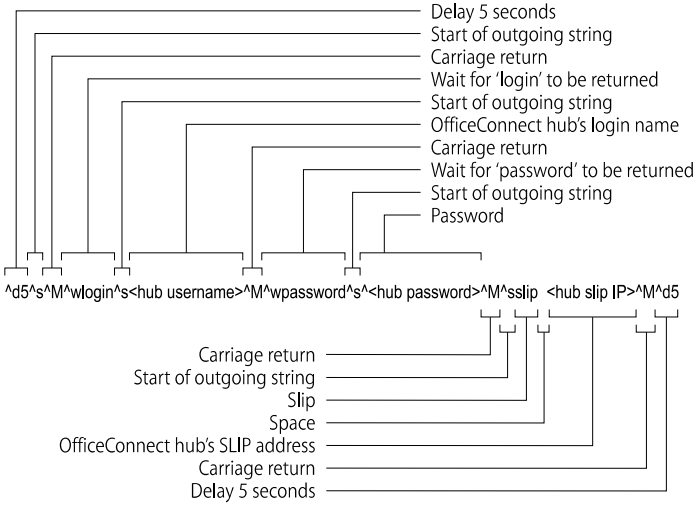


Figure 11 Example Connect Sequence

The Disconnect Sequence is not needed with an AccessBuilder.

10 Click on *OK*.

11 From the *Configure* menu select *General Info...* again.

The General Info dialog box is redisplayed.

12 In the General Info dialog box, choose the *Serial* category.

The Serial Connection dialog box is displayed, as shown in Figure 12.

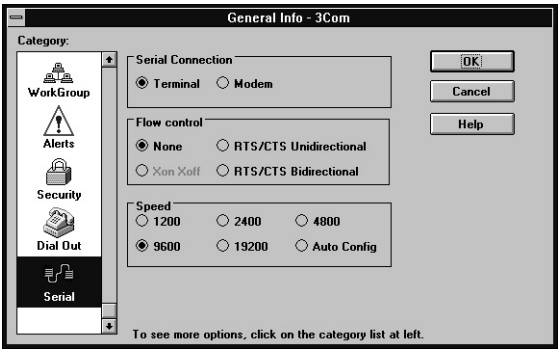


Figure 12 Serial Connection Dialog Box

Any changes made to the hub's serial port, using the Flow Control and Speed sections of this dialog box, will also be made to the serial port on the PC to maintain communication (Xon Xoff is disabled because SLIP will not work with it).

13 Set the Serial Connection to 'Modem', Flow Control to 'RTS/CTS Bidirectional', and Speed to '19200' to allow maximum management data transfer rates across the telephone/modem link.

While changing the speed, the message 'Unable To Contact Device Using New Serial Settings' may be displayed. If this happens, Quick Configuration Manager's line speed has become out-of-sync with that of the OfficeConnect hub. To resolve this problem, determine the OfficeConnect hub's speed using the VT100 screens (refer to the OfficeConnect Hub 8/TPM User Guide) and change the 'SerialAttrib' entry to **`SerialAttrib=COM1:`***line speed*`,n,8,1` under the `[slip]` section of the QUICKMGR.INI file. Restart Quick Configuration Manager.

14 Click on *OK*.

15 Reset the hub for all the changes to take effect.

From the *Configure* menu select *Reset*. Quick Configuration Manager asks you to confirm the reset. Click on *OK*.

Setting Up the Modem

The remote site's modem must be configured before connecting it to the OfficeConnect hub. The modem needs to be configured to Autoanswer on an incoming call. To do this connect the modem to your PC using a straight-through modem cable (9 pin - 25 pin).

The straight-through modem cable is used to connect the PC with the terminal emulator to the modem to configure it, and the same cable is then used to connect the hub to the modem.
This cable is different from the one used for configuring the hub with Quick Configuration Manager. For information about the specifications of these cables, see "Cable Specifications" on page 46.

You will need to run a local terminal emulator to configure the modem. On Windows 3.1 and 3.11 systems, select *Run...* from the *File* menu, type **`TERMINAL.EXE`** and click on *OK*. If using Windows '95 or NT, select *Run...* from the *Start* menu, type **`HYPERTRM`** and click on *OK*.

The terminal emulator should be using 19200 baud, with 8 data bits, 1 stop bit and no parity.

CAUTION: *The terminal emulator baud rate must be set to 19200 baud as the modem will 'auto-baud' and use the baud rate of the terminal emulator, which must be the same as the hub's baud rate.*

When the ATQ1 command is entered, there is still communication between the PC and the modem but no acknowledgments will be given.

Configuring the Hayes 144

If you have a Hayes 144 modem, type the following:

AT&F [enter]	this resets the modem to factory defaults
AT&Y0 [enter]	power up using profile 0
AT&D2 [enter]	monitor DTR signal. When an 0n-to-off transition of DTR signals occur, hang up and enter command state
AT&C1 [enter]	track presence of carrier detect signal
ATS0=1 [enter]	auto Answer on first ring
ATS110=1 [enter]	prevent auto-negotiation (the default value of this setting results in a pair of these modems clearing a call after 60 seconds)
ATQ1 [enter]	do not return results code
AT&W0 [enter]	store configuration

Configuring the Multitech MT1932ZDX and MT2834ZDX

If you have a Multitech MT1932ZDX or MT2834ZDX modem, type the following:

AT&F0 [enter]	this resets the modem to factory defaults
AT&SF1 [enter]	select DSR not to follow DCD
AT&S0 [enter]	select DSR to be on
AT$SB19200 [enter]	set the serial port baud rate which should match that set up on the OfficeConnect hub
ATQ1 [enter]	do not return results code
AT&W0 [enter]	store configuration

Configuring the US Robotics Sportster 144 (including Sportster Vi)

If you have a US Robotics Sportster 144 modem, type the following:

AT&F [enter]	this resets the modem to factory defaults
AT&B1 [enter]	fixes the baud rate
ATS0=1 [enter]	sets to Auto answer of first ring (only applicable to the Sportster Vi, which doesn't have DIP switches)
ATQ1 [enter]	do not return results code
AT&W0 [enter]	store configuration

Some Sportster 14.4 modems also have DIP switches, to aid configuration. This table shows the DIP Switch Information:

Switch	Position	Function
1	OFF (up)	DTR on for the modem to go on-line
2	OFF (up)	Verbal result codes
3	OFF (up)	Do not display result codes
4	OFF (up)	Echo Keyboard commands
5	OFF (up)	Enable auto-answer
6	OFF (up)	DCD on only when modem on-line and data path exists
7	OFF (up)	Load saved configuration on power on
8	ON (down)	Enable AT command set recognition

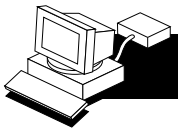
Connecting the OfficeConnect Hub and Modem

When you have configured your OfficeConnect hub and modem, you are ready to connect them together at the remote site:

1. Connect the OfficeConnect hub to the modem, using a straight-through modem cable (9 pin - 25 pin). This is the same cable that was used by the PC with the terminal emulator to configure the modem. For information about the specifications of these cables, see "Cable Specifications" on page 46.

2. Connect the phone line to the modem.

The remote site is now ready for use.



SETTING UP THE CENTRAL SITE

This section describes how to set up your central site. Read through this whole section before you perform any of the actions, so that you fully understand what is required.

Always keep a note of the information you configure for the equipment. There is a blank table at the back of this guide for you to copy and fill in, see "Recording Information" on page 57.

Setting Up the AccessBuilder 2000 or 4000

This section describes how to configure an AccessBuilder for the central site so that it can both receive incoming Alert messages from the remote sites' hubs and also direct outgoing queries from the Transcend network management station correctly to the hub to be managed.

A null modem cable (9 pin - 25 pin) is required to directly attach to an AccessBuilder 2000 console port, or if using an AccessBuilder 4000 then a straight-through modem cable (9 pin - 25 pin) should be used. Both AccessBuilder models work with a terminal or terminal emulator running at 9600 baud with 8 bits, 1 stop bit and no parity.

Alternatively you can use Telnet to access the AccessBuilder. To do this you must specify Telnet port 3000, for example:

`Telnet` *191.1.1.201* [space] **`3000`** [enter]

Enter the following commands at the server's User Interface:

1 Log on to the console port as SU (super user) and add the remote OfficeConnect hubs as new user, by typing the following for **each**:

`cd \admin` [enter]

`\admin>` **`add user`** [enter]

`1> User Name(10 chars.):` *James* [enter]

`2> Privilege(*1:User, 2:Administrator):` **`1`** [enter]

`3> Password(8 chars.):` *Hello* [enter]

`4> Phone Number(press 0 if none):` *1234567890* [enter]

`5> Call Usage(*1: CallBack, 2: SLIP dial):` **`2`** [enter]

`6> IP Address(press <CR> if none):` *191.1.1.1* [enter]

`!#=Edit, !q=Quit, !s=Save:`**`!s`** [enter]

The User Name and Password that you are supplying here, are the same user name and password that you have configured for the hub. The IP Address of the hub required here is the Serial Line IP (SLIP) address.

You can display a table of the users that have been set up for the AccessBuilder by typing:

`\admin>` **`dp user`** [enter]

`1> User Name(10 chars.):` **`all`** [enter]

2 Configure the server's Async port:

- On an AccessBuilder 2000 type:

  cd \port\port1 [enter]

  set sn="hayes optima144" [enter] sets the script name*

  set br=57600 [enter] sets the baud rate

- On an AccessBuilder 4000 for port 1 on the module in slot 1, type:

  cd \port\s1_async1 [enter]

  set sn="hayes optima144" [enter] sets the script name*

  set br=57600 [enter] sets the baud rate

*other options include "usr sportster144" or "multitech 1432b" (for both the Multitech MT1932ZDX and MT2834ZDX)

You can display the setup of the serial port and statistics about it by typing:

\port\port1> **sh all** [enter]

You can display all the available modem scripts in the server by typing:

cd \admin [enter]

\admin> **dp script /b** [enter]

1> User Name(10 chars.): **all** [enter]

3 Enable the routing of packets over the modem links by typing:

cd \ip\router [enter]

set routerenabled=yes [enter]

4 Configure the server's IP address by typing:

cd \ip\router [enter]

\ip\router> **ch localpath** [enter]

1> Path Name(12 chars.): **ethernet** [enter]

1> Path Name(12 chars.): ethernet
2> IP Address: 0.0.0.0
3> Net Mask: 255.255.0.0
4> Zero For Broadcast(0:yes, *1:no): 1

!£=Edit, !q=Quit, !s=Save: **!2** [enter]

2> IP Address:0.0.0.0 NewVal: **191.1.1.201** [enter]

3> Net Mask:255.255.0.0 NewVal: **255.255.255.0** [enter]

4> Zero For Broadcast(0:yes, *1:no):1 NewVal: **1** [enter]

!£=Edit, !q=Quit, !s=Save: **!s** [enter]

You can display this information by typing:

\ip\router> **dp localpath** [enter]

1> Path Name(12 chars.): **ethernet** [enter]

For the AccessBuilder 2000 the Path Name is 'ethernet', and for the AccessBuilder 4000 the Path Name is 'ms_ethernet'

5 Optionally change the idle time-out.

By default the AccessBuilder clears down modem links that it has established after 5 minutes. This can be changed using the following commands, changing it to 3 minutes in this example:

cd \admin\tuneup

set rait=3

6 Reboot the AccessBuilder for all the changes to take effect:

   a Enter **rb** at server UI prompt.
   A message is returned with `Are You Sure?`, enter **yes**.

   b **For AccessBuilder 2000 only** — Enter **yes** at the save configurations prompt (AccessBuilder 4000 saves configurations automatically whenever you change parameters).

You can PING any host on the LAN from the AccessBuilder by entering **ping** *IP Address* at the AccessBuilder UI console, for example **ping 191.1.1.23**.

Connecting the Management Station, AccessBuilder and Modem

When you have configured the AccessBuilder, you are ready to connect the equipment together at your central site:

1 Connect the Transcend network management station to the AccessBuilder, using a crossover 10BASE-T cable.

2 Connect the AccessBuilder to the modems, using modem cables.

3 Connect the phone lines to the modems.

The central site is now ready for use.

Managing a Hub Remotely Using Transcend

Overview

The following Transcend network management products support the OfficeConnect hub:

- Transcend Enterprise Manager V5.0 or later, for Windows (3C15010E)
- Transcend Enterprise Manager V4.0 or later, for UNIX (3C27850D)

Transcend WorkGroup Manager can also manage the OfficeConnect hub but does not provide RMON management.

When managing a hub remotely over a dial up telephone line, there are a number of important differences in the way in which the OfficeConnect hubs should be monitored. Most important is the need to keep the traffic burden on the telephone line as low as possible due both to the relatively low bandwidth available and to the cost of prolonged use of a dial up telephone line. In order to achieve this it is recommended that the network management station is set up **not** to poll for up/down status of the hub frequently. The default condition for most network management systems is to poll regularly (simply to check that it is still operational) but over a telephone line supporting many remote hubs this activity can consume a large portion of time, even simply dialing up every remote site.

This section aims to clarify how the Transcend applications can be best configured for use in this remotely connected scenario.

Transcend Enterprise Manager for Windows

Adding a Hub to be Managed

It is recommended that each remote OfficeConnect hub to be managed is added manually. To do this follow these steps for each hub:

1 From the initial network map that is presented from the *Tools* window, double-click on and drag a subnet icon onto the map. Double-click on the *Tools* menu again to return to normal cursor mode.

2 From the *Configure* Menu select *Device/Subnet...*

The Subnetwork Configuration dialog box is displayed, as shown in Figure 13.

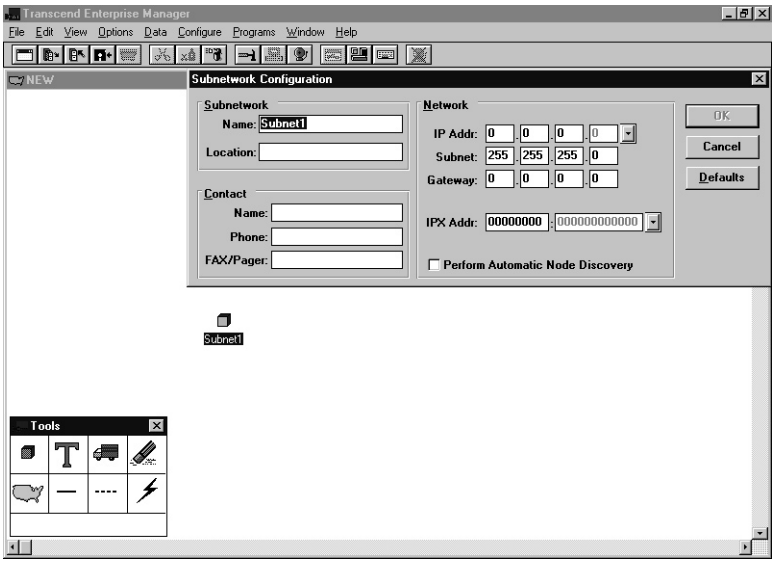


Figure 13 Subnetwork Configuration Dialog Box

3 Fill in the IP address information of the subnet on which the AccessBuilder and remote hubs reside, and click on *OK*.

4 Double-click on the subnet icon to expand an empty subnet view. Scroll the *Nodes* window to find the OfficeConnect hub (Hub/8TPM), as shown in Figure 14.

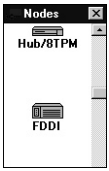


Figure 14 Nodes Window

5 Click on the OfficeConnect hub and (holding the mouse button down) drag the icon onto the map. Release the mouse button to drop it onto the map.

6 Double-click on the OfficeConnect hub's icon to display the hub's Device Configuration dialog box, as shown in Figure 15.

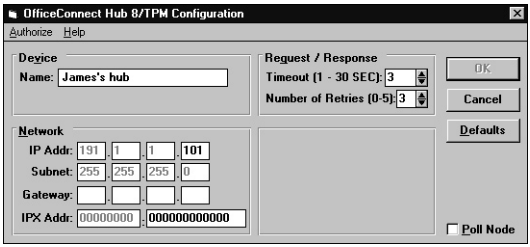


Figure 15 Device Configuration Dialog Box

7 Fill in the SLIP address of the hub you are adding to the map (for example *191.1.1.1*). Using this dialog box, we recommend that you:

- Set the Request/Response Timeout to **30** seconds.
- Ensure the Poll Node check box is unchecked.

8 Click on *OK*.

Any management task now performed on this device should initiate communication with the hub. The modem link will remain up while a device view is being displayed and will only shut down once all communication between the network management station and hub has ceased.

There may be a short delay (possibly of up to 30 Seconds) while the AccessBuilder establishes the connection. As a test try double-clicking on the hub icon and after a short delay the Device View of the hub should be displayed, as shown in Figure 16. PING may also be used to determine connectivity but remember that during the call initiation management packets destined for the hub (including PINGs) may be lost. If this continually fails, see "Problem Solving" on page 44.

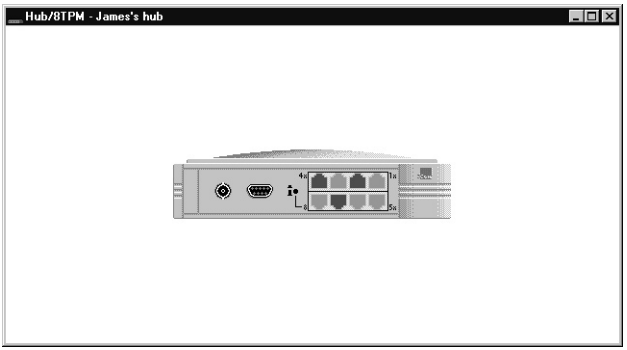


Figure 16 Device View of the Hub

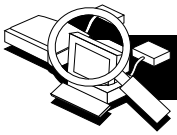
There is a five minute delay before the AccessBuilder drops a call. This is the default idle time which the AccessBuilder takes before it hangs up. During this time, no access can be made to the device.

Transcend Enterprise Manager for UNIX

The network management platform needs to be configured not to poll the OfficeConnect hubs at the remote sites. If this is not done, the dial up connection could remain permanently established (HP OpenView can poll a remote device about once every minute) or at the very least lead to vastly increased call charges because of the polling activity.

If you use Device View, you need to set up a connection, otherwise Device View will time out. One way of setting up a connection is to initially PING the hub.

For information on managing a hub remotely using Transcend Enterprise Manager for UNIX, refer to your network management platform and Transcend Enterprise Manager for UNIX documentation.



TESTING YOUR SETUP

To test if the hub reports traps correctly:

1 Disconnect and reconnect the hub's power cord to turn it off and on.

Check that it dials up and reports a warm start trap.

2 Wait two minutes for the link to get cleared down.

To ensure that Transcend Enterprise Manager can manage the OfficeConnect hub correctly:

1 Select a hub on the map and PING it. When successful, display the graphical representation for it.

2 Select the Alert category to display the Alerts dialog box. Enable the Alert LED test and click on *OK*.

Check that the Alert LED lights on the hub.

3 Disable the Alert LED test and click on *OK*.

Check that the Alert LED goes off on the hub.

4 Close down the window containing the graphical representation.

5 Wait five minutes for the modem link to the hub to get cleared down.

There is a five minute delay before the AccessBuilder drops a call. This is the default idle time which the AccessBuilder takes before it hangs up. During this time, no access can be made to the device. For information on changing the idle time, see step 5 on page 36.

PROBLEM SOLVING

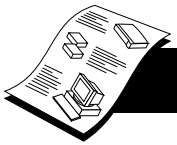
Problems Configuring the OfficeConnect Hub

Quick Configuration Manager will not communicate with hub. Check that a null modem cable (9 pin - 9 pin) is being used between the PC running Quick Configuration Manager and the OfficeConnect hub. If Flow Control has been enabled (as instructed) it will be necessary to have the hardware flow control signal lines connected. Hardware flow control means that a simple three wire null modem cable is **not** sufficient to communicate with the hub.

For information about cable specifications, see "Cable Specifications" on page 46.

Problems Using the AccessBuilder

How do you alter the timeout period before the AccessBuilder connection shuts down? There is a parameter call 'rasidletime' under the `\admin\tuneup` directory which specifies the idle timeout in minutes. You can use the set command to change its value.



TECHNICAL INFORMATION

Operational Limitations

When using Transcend to manage an OfficeConnect hub over a telephone line it is possible that the limited bandwidth available on the line may restrict the speed of response to management operations.

This section details the known limitations with this system at the time of publication.

RMON 'History All' Limitations

RMON 'History All' Limitations, using Transcend for UNIX:

- 'History all' always gives no response over a modem link.

RMON 'History All' Limitations, using Transcend for Windows:

- 'History all' occasionally gives no response.
- The response time is related to the Ethernet traffic.
- The more traffic there is, the slower the response.

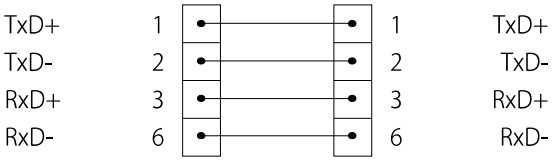
With the following traffic levels, it occasionally gives no response and is slow:

- 5,000 Unicast packets per second over 32 end station conversations.
- 2 ARP broadcasts per second.

Cable Specifications

This section shows examples of the pin connections for the cables you should use when configuring and connecting your equipment.

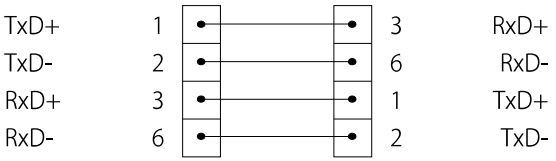
Straight-through 10BASE-T Cable



Pins 4, 5, 7 and 8 are not used

Figure 17 Example of Straight-through 10BASE-T Cable

Crossover 10BASE-T Cable



Pins 4, 5, 7 and 8 are not used

Figure 18 Example of Crossover 10BASE-T Cable

Straight-through Modem Cable (9 pin - 25 pin)

This cable is used to connect the:

- PC with terminal emulator (9 pin) to the remote site modem (25 pin), for configuration.
- OfficeConnect hub (9 pin) to the remote site modem (25 pin), for permanent installation.
- PC with terminal emulator (9 pin) to the AccessBuilder 4000 console port (25 pin), for configuration.

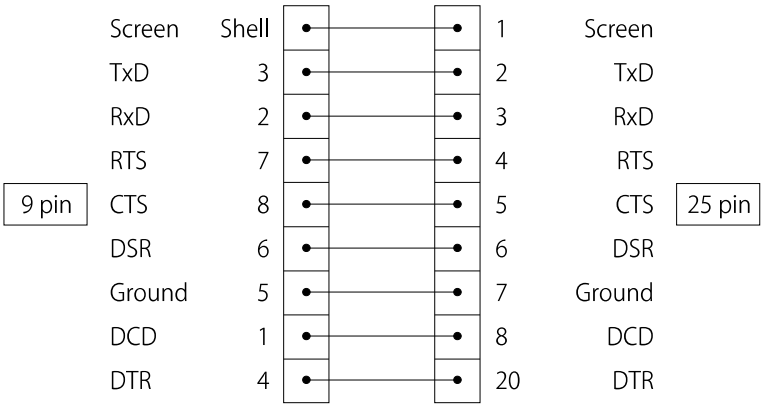


Figure 19 Example of Straight-through Modem Cable (9 pin - 25 pin)

Straight-through Modem Cable (25 pin - 25 pin)

This cable is used to connect the AccessBuilder 2000 or 4000 (25 pin) to a central site modem (25 pin), for permanent installation.

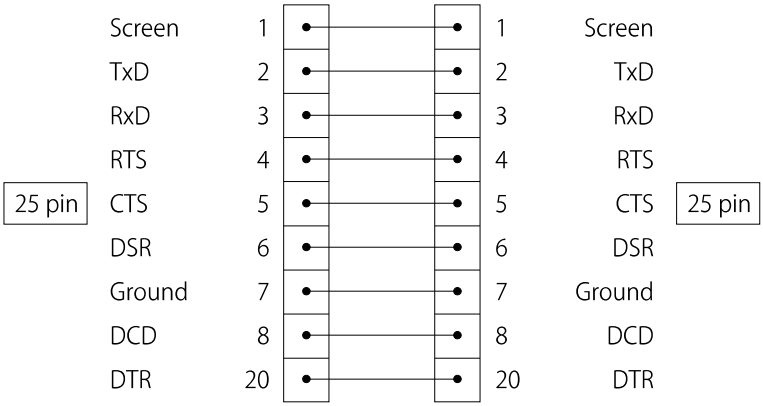


Figure 20 Example of Straight-through Modem Cable (25 pin - 25 pin)

Null Modem Cable (9 pin - 9 pin)

This cable is used to connect the PC with Quick Configuration Manager (9 pin) to the OfficeConnect hub (9 pin), for configuration.

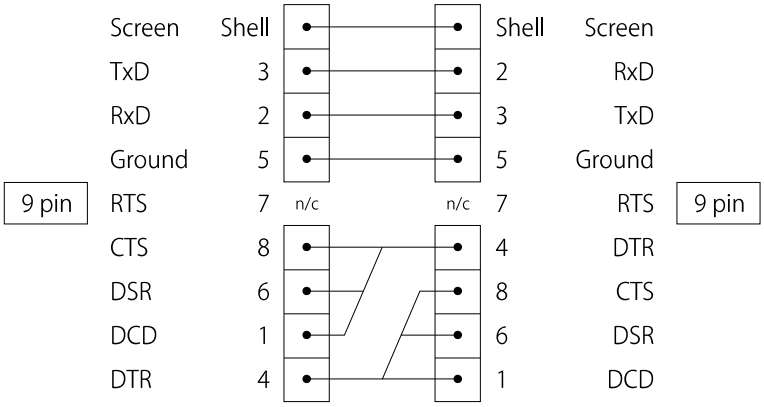


Figure 21 Example of Null Modem Cable for a Management Station (9 pin - 9 pin)

Null Modem Cable (9 pin - 25 pin)

This cable is used to connect the PC with terminal emulator (9 pin) to the AccessBuilder 2000 console port (25 pin), for configuration.

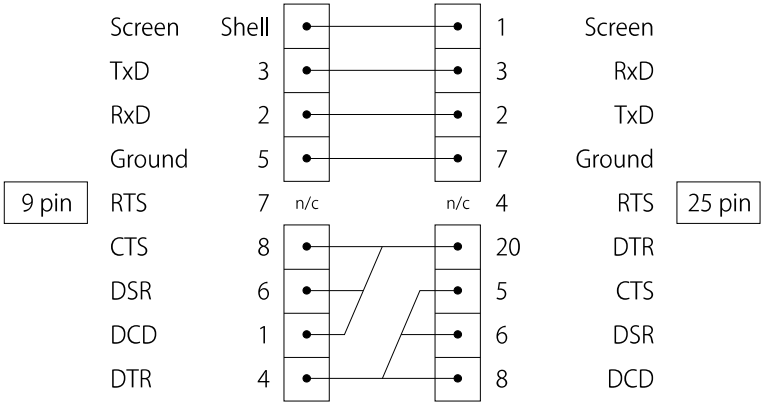


Figure 22 Example of Null Modem Cable for a Management Station (9 pin - 25 pin)

Product Information

Here is some brief information on the 3Com products featured in this setup. For more detailed information and ordering information, call 1 800 NET 3COM (U.S.) or your local 3Com sales office. Visit 3Com's World Wide Web site at **http://www.3com.com**

OfficeConnect Hub 8/TPM

3C16710

The OfficeConnect Hub 8/TPM is easy to install and works seamlessly with other OfficeConnect hubs, print servers and fax servers. It requires little attention and has diagnostic LEDs and a unique Alert LED which visually lets you know when there are network problems. It has eight shielded 10BASE-T ports and a 10BASE-2 (Coax) port.

AccessBuilder 2000

3C7204, 3C7208

The AccessBuilder 2000 remote access servers provide four or eight ports plus one Ethernet LAN interface, and give plug-and-play remote access to workgroup and remote office Ethernet LAN resources, at up to 115.2 Kbps. They are quick to install and configure and include preloaded software, user-upgradeable memory, standard modem connectors, and up to 33 LEDs for easy monitoring and diagnostics. The Point-to-Point (PPP) protocol, SLIP and AppleTalk Remote Access (ARA) 1.0, 2.0 and 2.01 are supported.

AccessBuilder 4000

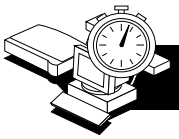
3C7513, 3C7515, 3C7517, 3C7519

The AccessBuilder 4000 remote access servers provide 8 and 16 port dial up access, for Ethernet or Token Ring. The high-performance RISC architecture provides the fastest dial up connections available today over digital ISDN and conventional analog links. Concurrent multiprotocol bridging and routing includes IPX, TCP/IP, and AppleTalk (routed or bridged), and NetBEUI, NetBIOS, DECnet, VINES, XNS, and other IEEE 802.3 protocols (bridged).

Transcend Enterprise Manager

Windows — 3C15010E (v5.0)
UNIX — 3C27850D (v4.0)

Transcend Enterprise Manager is comprehensive network management tool that's easy to use, and is available for both Windows and UNIX. From a single network management station, it provides full graphical management for a wide range of 3Com products.



QUICK SETUP

This is a quick setup section for experienced users who have set up the Remote Support Tool before and are confident in doing so again. This section is an overview of the tasks you have to perform when setting up the system. For more information about each task, refer to the relevant section in the body of this guide.

Remote Sites

Setting Up the OfficeConnect Hub

For Quick Configuration Manager, modify the `QUICKMGR.INI` file to be **`reseller=1`** under the `[system]` group, and **`SerialAttrib=COM1;19200;n,8,1`** under the `[slip]` group.

Using Quick Configuration Manager, for **each** OfficeConnect hub:

1. Connect the PC running Quick Configuration Manager to the hub using a null modem cable (9 pin - 9 pin).

2. In the IP Configuration dialog box, fill in the:
   - Serial Line IP Address
   - Subnet Mask
   - IP address of your network management station (in the Manager IP Address field)
   - Router IP Address if the Transcend network management station is not on the same subnet as the hub's SLIP address
   - Device Name, Emergency Contact and Support Contract ID
   - Network Configuration IP Address and Subnet Mask if the hub is going to be managed over it's local Ethernet (network) as well.

3 In the Dial Out dialog box, fill in the:

- Mgmt Modem Phone Number
- Dial Sequence (generate it)
- User Name
- Password
- Connect Sequence (generate it)

4 In the Serial Connection dialog box, set the:

- Serial Connection to 'Modem'
- Flow Control to 'RTS/CTS Bidirectional'
- Speed to '19200'

5 Reset the hub, by selecting *Reset* from the *Configuration* menu.

Setting Up the Modem

Ensure your terminal emulator is using 19200 baud, with 8 data bits, 1 stop bit and no parity.

For **each** modem, connect the PC to the modem using a straight-through modem cable (9 pin - 25 pin), and using a terminal emulator:

- If you have a Hayes 144 modem, type the following:

  AT&F [enter]

  AT&Y0 [enter]

  AT&D2 [enter]

  AT&C1 [enter]

  ATS0=1 [enter]

  ATS110=1 [enter]

  ATQ1 [enter]

  AT&W0 [enter]

- If you have a Multitech MT1932ZDX or MT2834ZDX modem, type the following:

  AT&F0 [enter]

  AT&SF1 [enter]

  AT&S0 [enter]

  AT$SB19200 [enter]

  ATQ1 [enter]

  AT&W0 [enter]

- If you have a US Robotics Sportster 144 modem, type the following:

  AT&F [enter]

  AT&B1 [enter]

  ATS0=1 [enter]

  ATQ1 [enter]

  AT&W0 [enter]

  Some Sportster 14.4 modems also have DIP switches, to aid configuration. This table shows the DIP Switch Information:

Switch	Position	Function
1	OFF (up)	DTR on for the modem to go on-line
2	OFF (up)	Verbal result codes
3	OFF (up)	Do not display result codes
4	OFF (up)	Echo Keyboard commands
5	OFF (up)	Enable auto-answer
6	OFF (up)	DCD on only when modem on-line and data path exists
7	OFF (up)	Load saved configuration on power on
8	ON (down)	Enable AT command set recognition

Connecting the OfficeConnect Hubs and Modems

When you have configured your OfficeConnect hubs and modems, for **each** site:

1. Connect the OfficeConnect hub to the modem, using a straight-through modem cable (9 pin - 25 pin).
2. Connect the phone line to the modem.

Central Site

Configuring a New AccessBuilder Server

Using AccessBuilder Quick Start, for the AccessBuilder (at the server's User Interface):

1. Log on as SU (super user).
2. For **each** OfficeConnect hub, type:

   `cd \admin` [enter]

   `\admin>` **`add user`** [enter]

   `1> User Name(10 chars.):` *James* [enter]

   `2> Privilege(*1:User, 2:Administrator):` **`1`** [enter]

   `3> Password(8 chars.):` *Hello* [enter]

   `4> Phone Number(press 0 if none):` *1234567890* [enter]

   `5> Call Usage(*1: CallBack, 2: SLIP dial):` **`2`** [enter]

   `6> IP Address(press <CR> if none):` *191.1.1.1* [enter]

   `!#=Edit, !q=Quit, !s=Save:`**`!s`** [enter]

3. Configure the server's Async port:
   - On an AccessBuilder 2000 type:

     `cd \port\port1` [enter]

     `set sn="hayes optima144"` [enter]

     `set br=57600` [enter]

- On an AccessBuilder 4000 type:

  `cd \port\s1` [enter]

  `set sn="hayes optima144"` [enter]

  `set br=57600` [enter]

  (other options include "usr sportster144" or "multitech 1432b")

4 Enable the routing of packets over the modem links by typing:

`cd \ip\router` [enter]

`set routerenabled=yes` [enter]

5 Configure the server's IP address by typing:

`cd \ip\router` [enter]

`ch localpath` [enter]

6 Reboot the AccessBuilder:

a Enter **`rb`** at server UI prompt.

b **For AccessBuilder 2000 only** — Enter **`yes`** at the save configurations prompt (AccessBuilder 4000 saves configurations automatically whenever you change parameters).

Connecting the Management Station, AccessBuilder and Modem

When you have configured the AccessBuilder, at your central site:

1 Connect the Transcend network management station to the AccessBuilder, using straight-through 10BASE-T cable.

2 Connect the AccessBuilder to the modems, using modem cables.

3 Connect the phone lines to the modems.

Managing the Hubs Remotely Using Transcend

Ensure that your network management station is set up **not** to poll for up/down status of the hubs frequently.

Using Transcend Enterprise Manager for Windows

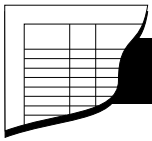
For **each** hub:

1. Drag a subnet icon onto the network map.
2. In the Subnet Configuration dialog box, fill in the IP address information of the subnet on which the AccessBuilder and remote hubs reside.
3. Expand an empty subnet view.
4. Drag the OfficeConnect icon from the *Nodes* windows, and drop it onto the network map.
5. In the hub's Configuration dialog box:
   - Fill in the SLIP address of the hub
   - Set the Request/Response Timeout to **30** seconds (recommended)
   - Ensure the Poll Node check box is unchecked

Using Transcend Enterprise Manager for UNIX

Refer to "Using Transcend Enterprise Manager for UNIX" on page 56.

When the set up is completed, test it to see if it works correctly, see "Testing Your Setup" on page 43.



RECORDING INFORMATION

There is a blank table over the page, for you to copy and fill in, while you configure the equipment. Always keep a note of the information you configure for the equipment.

	AccessBuilder	Hub example	Hubs		
Ethernet IP Address		193.3.3.3			
Ethernet Subnet Mask		255.255.255.0			
SLIP IP Address		191.1.1.1			
SLIP Subnet Mask		255.255.255.0			
User name		James			
Password		Hello			
Hub telephone number		1234567890			
Management telephone number		2345678910			
Device name		James's hub			
Location		Marketing dept.			
Contact		Network admin.			

TECHNICAL SUPPORT

If you want to verify other modems than those mentioned in this application guide, or want to obtain technical support from 3Com, contact the telephone numbers in this section.

In the U.S. and Canada, call **(800) 876-3266** for customer service.

If you are outside the U.S. and Canada, contact your local 3Com sales office to find your authorized service provider:

Country	Telephone Number	Country	Telephone Number
Australia (Sydney)	(61) (2) 9937 5000	Japan	(81) (3) 33457251
(Melbourne)	(61) (3) 9653 9515	Mexico	(525) 531 0591
Belgium*	0800 71429	Netherlands*	06 0227788
Brazil	(55) (11) 546 0869	Norway*	800 13376
Canada	(905) 882 9964	Singapore	(65) 538 9368
Denmark*	800 17309	South Africa	(27) (11) 803 7404
Finland*	0800 113153	Spain*	900 983125
France*	05 917959	Sweden*	020 795482
Germany*	0130 821502	Taiwan	(886) (2) 577 4352
Hong Kong	(852) 2501 1111	United Arab Emirates	(971) (4) 349049
Ireland*	1 800 553117	U.K.*	0800 966197
Italy*	1678 79489	U.S.	(1) (408) 492 1790

* These numbers are toll-free.

Support Contracts

3Com offer a range of support contracts. End users should contact their Resellers for more information on these services, and Resellers should contact their local 3Com sales office for further information on these services:

- *Software Update (Option 1)* — Contract taken out against a single software product, for example Transcend Enterprise Manager for Unix. Provides one major upgrade and any associated minor and/or maintenance releases. Also provides telephone support for two 'incidents' connected with the upgrade. Contract renewable annually.
- *Software Update (Option 2)* — As option 1 but provides ALL major/minor/maintenance upgrades which become available within the twelve month period.
- *Guardian* — Contract taken out against specific items of 3Com equipment. Provides on-site support with a choice of response times (2, 4 or 8 hour), as well as unlimited telephone support (1 hour response time), advance hardware exchange and latest software updates. Contract renewable annually.
- *Express* — Taken out against specified pieces of equipment. Provides advanced hardware exchange, unlimited telephone support (1 hour response) and latest software updates. Contract renewable annually.
- *Infopak* — This contract isn't tied to any specific items of equipment. Provides telephone support (1 hour response) for up to twelve 'incidents'. The contract is renewable annually, or whenever the twelve incidents have been used, whichever comes first.
- *Extended Warranty* — Contract taken out against specified equipment. Provides a choice of 4, 8, 24 hour or 5 day advance exchange, or 20 day repair turnaround depending on the level of cover chosen. Contract renewable annually.

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