

CB Turbo

Version 1.0

*User Manual
and Network
Administrator
Guide*

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Contents

Welcome to CB Turbo

Welcome to CB Turbo Version 1.0!

What is CB Turbo?

For large spreadsheet models, the task of calculating the model repeatedly over the course of a Crystal Ball simulation can take many hours. CB Turbo speeds up the simulation by distributing the work of model calculation to other workstations across a network. Using distributed computing technology, CB Turbo automatically and transparently divides the Crystal Ball simulation into multiple, concurrently executing tasks on a collection of workstations. Analysis that once took hours, completes in a fraction of the time. You can now solve, using CB Turbo, Crystal Ball simulations that once were unsolvable because of time constraints.

If you are already familiar with Crystal Ball, you will find CB Turbo simple to use. This manual will guide you through the steps required to run your simulation in turbo mode.

Who this program is for

CB Turbo is for Crystal Ball users with time-consuming simulations who need:

- Improved model accuracy
- Better solutions in a fixed amount of time
- The same solution in a shorter amount of time
- To take advantage of the computer power of the existing network

How this manual is organized

The manual includes the following:

- **Chapter 1 - “Getting Started”**

This chapter describes the components of CB Turbo and compares running a simulation in normal mode with running in turbo mode. It also contains a brief tutorial designed to give you a quick overview of how to use CB Turbo. Read this chapter if you are a new CB Turbo user.

- **Chapter 2 - “Using CB Turbo”**

This chapter describes in detail how to run a turbo simulation and set run preferences for a turbo simulation. It also describes special model setup considerations that you must take into account when running a turbo simulation. Read this chapter carefully if you are a new CB Turbo user.

- **Chapter 3 - “System Requirements and Installation”**

This chapter describes the system and software requirements for CB Turbo, the different components of CB Turbo, and how to install each component. Read this chapter if you are the network administrator responsible for installing and setting up CB Turbo.

- **Chapter 4 - “Administrating CB Turbo”**

This chapter describes in detail how each component participates in a turbo simulation. It also describes how to change the setup of CB Turbo and some common issues that affect turbo simulations. Read this chapter if you are the network administrator responsible for maintaining CB Turbo.

- **Appendices**

- A - “Administrative Commands, Tools, and Configuration files”

This appendix describes some advanced CB Turbo commands and their options.

- B - “Troubleshooting and Error Recovery”

This appendix lists the most important CB Turbo error messages with directions for error recovery.

- **Bibliography**

A list of related publications.

- **Glossary**

A compilation of terms specific to CB Turbo.

- **Index**

An alphabetical list of subjects and corresponding page numbers.

Additional resources

Decisioneering, Inc. offers additional resources to increase the effectiveness with which you use our product.

Technical support

If you have a technical support question or would like to comment on CB Turbo, there are a number of ways to reach technical support. The most current numbers are listed in the README.doc file.

Conventions used in this manual

Notes provide additional information, expanding on the text. There are different categories of notes:

CB Turbo Note: Notes that provide additional directions or information about using CB Turbo.

Crystal Ball Note: Notes that provide additional directions or information about using Crystal Ball.

Windows Note: Notes that provide additional information about using the program on a Windows system.

Screen capture notes

All of the screen captures in this manual were taken in Excel 97 for Windows 95.

Also, due to round-off differences between various system configurations, you might notice slightly different calculated results than those shown in the examples.

Example file names

Example files are listed with descriptive names in the Examples folder. For example, to find the “Vision Research” example, you would select “Vision.xls”.

Chapter 1

Getting Started



- The CB Turbo components
- Running a simulation in turbo mode
- Loan tutorial

This chapter describes the components of CB Turbo and compares running a simulation in normal mode with turbo mode. It also contains a brief tutorial designed to give you a quick overview of how to use CB Turbo. Read this chapter if you are a new CB Turbo user.

In this chapter

How CB Turbo works

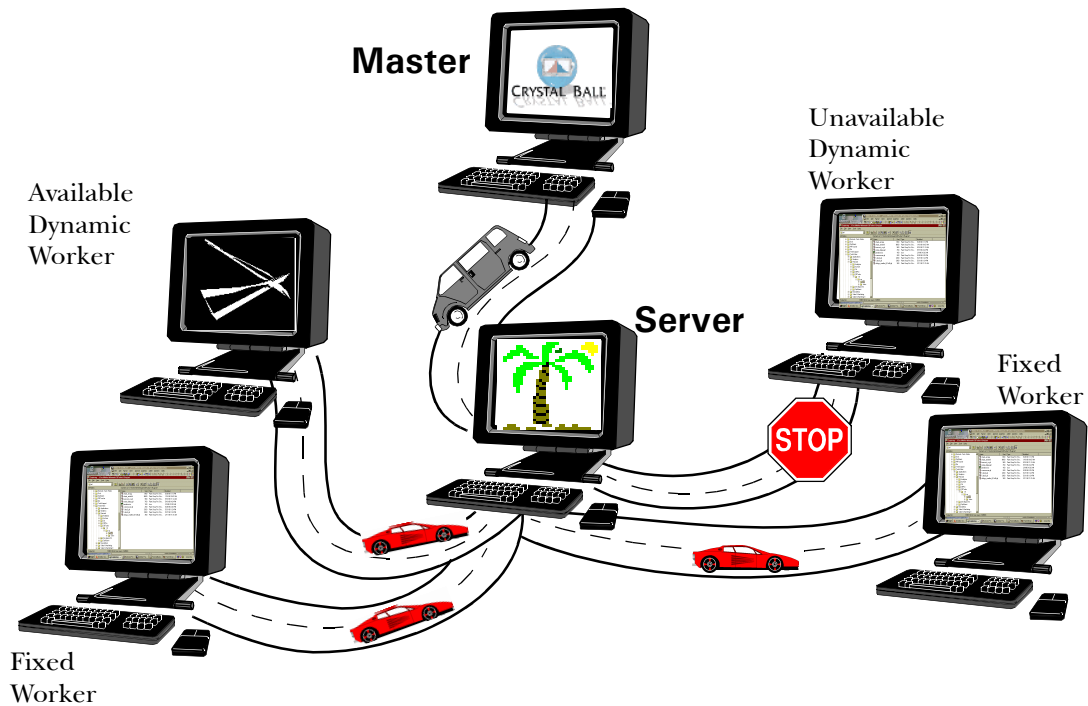
Components

CB Turbo speeds up the time required to perform lengthy, complex simulations by distributing the model recalculations to other workstations on the network. CB Turbo also speeds up analyses that require multiple simulations, such as the OptQuest optimization module in Crystal Ball Pro.

The four different components of CB Turbo that participate in a turbo simulation are:

master	<p>Starts a turbo simulation. The master does not actually run any trials—it generates sets of assumption values and tallies the results, but distributes all the model calculation work load to available workers.</p> <p>Masters exist wherever Crystal Ball is installed.</p>
fixed worker	<p>Runs part of a turbo simulation. A fixed worker is always available to participate in a turbo simulation.</p> <p>Fixed workers usually run on dedicated workstations or workstations that aren't heavily used.</p>
dynamic worker	<p>Runs part of a turbo simulation only if the workstation is idle. When the workstation is in use (the screen saver is not on), the workstation doesn't participate in any turbo simulations.</p> <p>Dynamic workers usually run on workstations that are heavily used.</p>
Paradise [®] server	<p>Central component that lets the master distribute tasks to the workers.</p>

The Paradise server usually runs on a network server.



Normal mode and turbo mode

You can run a simulation in one of two modes:

- | | |
|-------------|---|
| normal mode | Runs the simulation only on the workstation where you start the simulation. This is the same as running a Crystal Ball simulation without CB Turbo installed. |
| turbo mode | Runs the simulation concurrently on networked workstations, using fixed workers and any dynamic workers on inactive workstations. This requires CB Turbo. |

Simulating in turbo mode

Glossary Term:

task—

A set of assumption values that a master bundles together for distribution to workers.

When you run a simulation in turbo mode, the master generates sets of assumption values and sends them in the form of **tasks** (along with a copy of the open workbooks) to every available worker.

The workers each run Excel on their local workstations to calculate their tasks. When the workers finish their tasks, they return the forecast results to the master and obtain another task to process, until all the tasks are done.

Meanwhile, as other dynamic worker workstations become inactive and available, they too begin running tasks. Also, some dynamic worker workstations are reactivated by their users in the middle of tasks and return their partially completed tasks to the **task pool** for other workers to finish.

Glossary Term:

task pool—

Designated server space where the master passes tasks to the workers and where the master collects completed forecast results.

The workers pass the forecast results back to the master that initiated the simulation. For every returned task, the master generates a new set of assumption values for a replacement task, until all the simulation tasks are generated. The master also compiles all the returned results and updates forecast charts as if it had run the trials and generated the results itself.

Tutorial

To see the performance difference CB Turbo makes, you can simulate a complex model normally, and then run it as a turbo simulation. Using the file LoanCost.xls, which is artificially slowed down by a formula in cell A15, calculate the cost of a particular loan.

CB Turbo Note: Before you run this tutorial, the CB Turbo master component must be installed on your workstation, worker components must be installed on at least four other workstations, and CB Turbo must be initialized. See your network administrator if you have any questions.

Running the simulation in normal mode

1. Start Crystal Ball.
2. Open the file LoanCost.xls from the Crystal Ball Example folder.

	A	B	C	D	E
1	Loan Cost Calculator				
2					
3		Interest Rate		Total Interest Cost/Yr	
4		7.53%		\$16,918.49	
5					
6					
7		Lender	Loan Amount	Interest Cost/Yr	
8		People's Bank	\$180,000.00	\$13,551.35	
9		CitiBank	\$7,000.00	\$527.00	
10		M&D Bank	\$25,000.00	\$1,882.13	
11		Car Loan	\$12,725.00	\$958.01	
12					
13					
14	Slow		Iteration		
15	5		0		
16					

Figure 1.1 LoanCost spreadsheet model

3. Select Run > Run Preferences > Mode.

The Run Preferences Mode dialog appears.

CB Turbo Note: If the Mode button doesn't appear on the dialog, the master component isn't installed properly, or you are running Crystal Ball version 4.0e or earlier. Contact your network administrator to install Crystal Ball 4.0g or later.

4. Make sure Simulation Mode is set to Normal.
5. Click on Trials.
6. Set the Maximum Number Of Trials to 100.
7. Click on Speed.
8. Select Use Burst Mode When Able.
9. Set the Burst Amount to 5.
10. Make sure Suppress Forecast Windows is unchecked.
11. Click on OK.

CB Turbo Note: Prepare to time your simulation.

12. Start the simulation by selecting Run > Run.

The Forecast windows appear.

13. When the simulation is finished, note:

- The mean of the Total Interest Cost Per Year forecast
- How long it took to run the simulation

Running the simulation in turbo mode

To run the simulation in turbo mode:

1. In Crystal Ball, select Run > Run Preferences > Mode.

The Run Preferences Mode dialog appears.

2. Change the mode to Turbo.

3. Make sure the correct Paradise server host name and port number appear in the Server Name field.

CB Turbo Note: If this field is blank or <server name> appears, contact your network administrator to set up the master component with the correct Paradise server host name and port number.

4. Click on OK.

5. Reset the simulation.

6. Start the simulation.

CB Turbo Note: Showing the forecast windows doesn't significantly slow down the simulation in turbo mode.

7. Compare the results with the results of the normal simulation.

The results of the normal and turbo simulations should be the same. However turbo mode finds the results in a fraction of the time.

Chapter 2

Using CB Turbo



- Running a turbo simulation
- Setting run preferences for turbo simulations
- Special spreadsheet considerations for turbo simulations

This chapter describes in detail how to run a turbo simulation and set run preferences for a turbo simulation. It also describes special spreadsheet setup considerations you must take into account when running a turbo simulation. Read this chapter carefully if you are a new CB Turbo user.

In this chapter

Using CB Turbo

When you start Crystal Ball 4.0g or later, the CB Turbo master component automatically starts with it. You can tell if the master component is running by selecting Run > Run Preferences. If the master component is running, the Run Preferences dialog will have a Mode button.

Running a turbo simulation

Before you run a simulation in turbo mode, CB Turbo must be installed on your network by your network administrator. If you can't run CB Turbo, the network administrator should see "Installing CB Turbo" on page 36 and "Starting CB Turbo" on page 56.

To run a turbo simulation:

1. **In Crystal Ball, select Run > Run Preferences > Mode.**

The Run Preferences Mode dialog appears. For more information on the fields in this dialog, see "Run Preferences Mode dialog" on page 22.

2. **Change the simulation mode to Turbo.**
3. **Make sure the Server Name field contains the server host name and port number you are using for your turbo simulations.**

CB Turbo Note: If this field is blank or <server name> appears, contact your network administrator to set up the master component with the correct server host name.

4. **Click on Trials.**
5. **Set the Maximum Number Of Trials.**

For information on using this setting with turbo simulations, see "Maximum Number Of Trials" on page 23.

6. **Click on Speed.**
7. **Set the Burst Amount.**

For information on using this setting with turbo simulations, see "Burst Size" on page 23.

8. **Click on Sampling.**

9. Set the Sample Size For Correlation And Latin Hypercube.

For information on using this setting with turbo simulations, see “Sample Size” on page 24.

10. Start the simulation.**Run Preferences Mode dialog**

The Run Preferences Mode dialog lets you run turbo simulations.

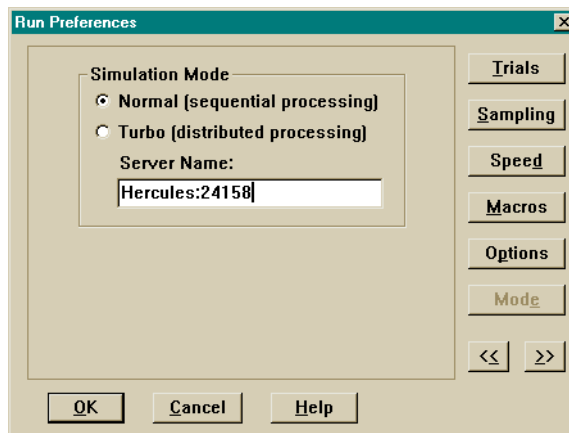


Figure 2.1 Run Preferences Mode dialog

The options and field in this dialog are:

Normal	Sets to run simulations in normal mode (without CB Turbo). This is the default.
Turbo	Sets to run simulations in turbo mode, which requires CB Turbo.
Server Name	Indicates which server and port number to use for turbo simulations. The syntax is

`<host_name>:<port_number>`

where `<host_name>` is the Paradise server host name and `<port_number>` is the port number on the server that CB Turbo uses, usually 24158. See your administrator to change your server settings.

Setting turbo simulation run preferences

There are three Crystal Ball preferences that affect turbo simulations. They are:

- Maximum Number Of Trials
- Burst Size
- Sample Size

And their settings should depend on:

- Number of workers available
- Amount of time it takes to recalculate one iteration
- Size of the simulation: number of assumptions and forecasts

Maximum Number Of Trials

The maximum number of trials is the total number of iterations Crystal Ball will run for the current simulation.

Recommendations

To begin, decide how many trials you want to run, just as in normal mode, but remember that it takes less time to run more trials in turbo mode.

Glossary Term:
task duration—
The approximate length of time it takes a worker to complete one task. This equals the time to run one trial times the number of trials in a task.

Burst Size

The burst size controls the number of simulation trials in a task and the **task duration**. A larger burst size passes larger tasks to the workers, minimizing the number of information exchanges that must take place between the workers and master. However, if a worker connection breaks or if the user stops and then continues the simulation, workers that pick up the unfinished tasks must redo more calculations.

Glossary Term:
trail-off effect—
The time that a last simulation task can potentially add to the total simulation time.

A larger burst size also increases the **trail-off effect**, wasting network resources and time, sometimes unreasonably. This compares to a smaller burst size that would better distribute the last trials of a simulation among the workers and not extend the simulation time unreasonably.

Recommendations

Select an appropriate burst size before selecting your sample size. Generally, a reasonable task duration is between 30 seconds and 2 minutes for an average worker.

Increase the burst size when the model size is small and the time to calculate a trial is short.

Decrease the burst size when the model size is large and the time to calculate a trial is long.

The maximum number of trials and the burst size determine the total number of tasks for each simulation, according to:

$$\frac{\text{total number of tasks in the simulation}}{\text{burst size}} = \frac{\text{maximum number of trials}}{\text{burst size}}$$

Generally, the total number of tasks should be at least 100. This ensures that the server can distribute the work evenly across the network and limits the time the last task can delay the final results (trail-off effect).

Sample Size

In turbo mode, the sample size option has an additional role. In turbo mode, the sample size:

- Determines the number of tasks available in the task pool at any given time
- Controls the number of assumption values Crystal Ball generates ahead of time

Increasing this number requires extra memory in both Crystal Ball and the server.

Recommendations

The maximum number of available tasks in the task pool at any one time is:

$$\frac{\text{maximum number of tasks in the task pool}}{\text{burst size}} = \frac{\text{sample size}}{\text{burst size}}$$

Generally, keep the number of available tasks in the task pool to at least twice the number of available workers (more, especially if your simulation is short). CB Turbo warns you when the ratio of sample size to burst size falls below 10, since this degrades the performance.

However, like for a normal simulation, the sample size still controls accuracy, so don't set the sample size below the recommended minimum of 500.

Very large sample sizes (such as where the sample size is equal to the maximum number of trials) require extra memory for both Crystal Ball and the server. If the very large sample size results in a very large number of tasks in the task pool, the extra memory expense does not improve performance, unless there is also a very large number of available workers. In other words, a turbo simulation with 10 available workers and 40 tasks in the task pool completes just as quickly as a turbo simulation with 10 workers and 50 or 100 or more tasks in the task pool.

Example of preference settings

If, for example, you have the following setup:

- Each trial of your simulation takes 30 seconds to calculate
- There are 9 fixed workers
- There are 11 dynamic workers

First, you want to calculate the maximum number of trials per simulation. To achieve sufficient accuracy for tail-end percentile estimates, you want to run 1000 trials.

Then you can calculate the burst size. The recommendations say to keep the length of one task to between 30 seconds and 2 minutes. Since each trial takes 30 seconds, you should select between 1 (resulting in a 30-second task) and 4 (resulting in a 2-minute task) for a burst size. You also want to keep the number of tasks in the simulation above 100. You set the burst size to 3. A burst size of 3 will result in a task duration of 1 minute 30 seconds and more than 300 tasks, so this works.

Finally, calculate the sample size. You have between 9 and 20 workers available for any turbo simulation. To keep the total number of tasks in the task pool to at least twice the number of available workers, the number of tasks in the task pool should be at least 40, resulting in a sample size of 120.

However, since sample size still controls accuracy, you don't want to set the sample size below the recommended minimum of 500.

The final results are:

- Maximum number of trials is 1000
- Burst size is 3
- Sample size is 500

With these settings, CB Turbo generates 500 sets of values. Those 500 sets of values result in 166 tasks maintained in the task pool until CB Turbo runs 1000 trials for the simulation.

Turbo vs. normal mode

Running Crystal Ball in turbo mode instead of normal mode is almost transparent, except for the notable speed advantage. However, there are some differences that can affect the way you run the simulation and construct your model. These differences affect:

- Runtime behavior
- Dynamic cell references
- Probability functions
- Open spreadsheets
- Linked workbooks
- Macro names
- Excel add-ins
- Inter-trial dependencies

Runtime behavior

In a turbo simulation, the workers run their own local copy of Excel to calculate simulation trials, so the master has free time to display forecasts and respond to user input.

Opening forecast windows

Having forecast windows open while running a turbo simulation does not significantly increase the time required to run the simulation, as in normal mode.

Stopping the simulation

You can stop a turbo simulation as you would a normal simulation. Stopping a simulation using the Run > Stop command generally stops a turbo simulation faster than a normal simulation because the master remains more responsive to user input.

Dynamic cell references

You cannot use dynamic cell references for assumptions when running a simulation in turbo mode.

Probability functions

You cannot use probability functions in a turbo simulation. The only exception is the iteration function CB.IterationsFN, which you can use in formula cells.

Open spreadsheets

In turbo mode, Crystal Ball doesn't update the open spreadsheet windows with new values, since the master doesn't perform the calculations. The only numbers that Crystal Ball updates during a turbo simulation are the number of trials and workers on the Excel status bar and the forecast windows.

Linked workbooks

If your spreadsheet has any cells linked to other workbooks, and you want those linked cells to automatically update in the main workbook, you *must* open the linked workbooks before performing a turbo simulation. When CB Turbo distributes the tasks, it distributes any open workbooks with them. If any workbooks are linked but not open, they aren't passed to the workers, and those linked values and cells aren't updated. They keep the values originally passed from the master.

However, since CB Turbo distributes copies of all open workbooks to the workers, you should only open workbooks needed for the simulation. Passing unnecessary workbooks increases the time required to send the workbooks to the workers and the disk space required by each worker to keep copies of the workbooks.

If your linked cells only need to be updated once when the main workbook opens on the master, you can leave the linked workbooks closed.

Macro names

If you are using any VBA procedures in the Crystal Ball Run Preferences Macros dialog, you must specify them using the complete identifying syntax, such as:

`'Book1.xls'!Sheet1.Macro2`

where Macro2 is a macro associated with Sheet1, or

`'Book2.xls'!Module3.Sub_fast`

where Sub_fast is a VBA subroutine in Module3.

Excel add-ins

If your simulation uses an Excel add-in, the add-in must be:

- Installed on each worker workstation before you run the turbo simulation
- Loaded on each worker workstation automatically by the workbook

To have your workbook automatically load an add-in:

1. **In Excel, with the workbook open, select Tools > Macro > Visual Basic Editor.**
2. **In the Project - VBAProject window, under the project for the workbook, select Microsoft Excel Objects > ThisWorkbook.**

The ThisWorkbook (Code) window appears.

3. **Add the following VBA Event code in the ThisWorkbook window:**

```
Private Sub Workbook_Open()  
    AddIns("<add-in title>").Installed = False  
    AddIns("<add-in title>").Installed = True  
End Sub
```

where <add-in title> is the title of the add-in, not the file name.

Inter-trial dependencies

Since the trials in a turbo simulation occur in a random order and don't have the results of previous trials available to them, inter-trial dependencies result in incorrect results. For example, if you define `trialnum()` as:

```
sub trialnum()  
    count = range("A1").value  
    count = count + 1  
    range("A1").value = count  
end sub
```

You couldn't use `trialnum()` to determine the current trial number in turbo mode. You would need to use `CB.IterationsFN()` instead.

To avoid inadvertently adding inter-trial dependencies to your spreadsheet, don't use before-recalculation or after-recalculation macros except as described below.

Before/After-recalculation macro rules - safe macros

Crystal Ball before-recalculation macros cannot use as inputs any values that are results of spreadsheet cell calculations (e.g., a formula output), because this makes the current trial dependent on the previous trial.

Similarly, after-recalculation macros cannot set as outputs any values that are used as inputs by the spreadsheet, because this makes the next iteration depend on the current iteration.

Chapter 3

System Requirements and Installation



- System requirements
- Software prerequisites
- Installing CB Turbo

This chapter describes the hardware and software you need to run CB Turbo and how to install it.

In this chapter

Overview

CB Turbo speeds up the time it takes to perform lengthy, complex simulations by distributing the model recalculations to other workstations on the network. CB Turbo also speeds up analyses that require multiple simulations, such as the OptQuest optimization module in Crystal Ball Pro.

The four different components of CB Turbo that participate in a turbo simulation are:

master	<p>Starts a turbo simulation. The master does not actually run any trials—it generates sets of assumption values and tallies the results, but distributes all the model calculation work load to available workers.</p> <p>Masters exist wherever Crystal Ball is installed.</p>
fixed worker	<p>Runs part of a turbo simulation. A fixed worker is always available to participate in a turbo simulation.</p> <p>Fixed workers usually run on dedicated workstations or workstations that aren't heavily used.</p>
dynamic worker	<p>Runs part of a turbo simulation only if the workstation is idle. When the workstation is in use (the screen saver is not on), the workstation doesn't participate in any turbo simulations.</p> <p>Dynamic workers usually run on workstations that are heavily used.</p>
Paradise server	<p>Central component that lets the master distribute tasks to the workers.</p> <p>The Paradise server usually runs on a network server.</p>

What you will need

System requirements

Network

To run CB Turbo, your workstations must be connected to a network file system for installation, and the workstations must be running the TCP/IP protocol to participate in turbo simulations.

For best performance, all workstations involved in the simulations should be connected with the most up-to-date network hardware. For example, if you have five workers connected through a 100 Mbps hub, and another three workers connected to another same-speed hub, but the two hubs are connected with a 10 Mbps coax cable, performance will be significantly below expectations. In this case, installing all the CB Turbo components on the same hub on the network, thus avoiding coaxial cable connections, eliminates the problem and optimizes performance. Also, CB Turbo works fastest if all the workstations have IP addresses in the same subnet.

Server

To run CB Turbo, you will need the following on the Paradise server:

- Personal computer with Pentium microprocessor and at least 16 MB RAM
- VGA or 256-color graphics adapter and monitor
- Hard disk drive with at least 12 MB free
- Windows NT 4.0 or Windows 95 or later
- CD-ROM drive—4X or faster

Configure the Paradise server with as much RAM as possible to avoid swapping. To estimating the RAM and swap space requirements:

- Most of the memory stores the Excel workbook files on the Paradise server. So estimate this requirement:
(Number of concurrent simulations) * (size of workbook)
- The Paradise server itself uses about 1 MB RAM.

Recommended system requirements are:

- Pentium II, 200 MHz or faster
- 64 MB RAM or more

Workstations

To run CB Turbo, you will need the following on each master and worker workstation:

- Personal computer with Pentium microprocessor and at least 16 MB RAM
- VGA or 256-color graphics adapter and monitor
- Hard disk drive with at least 16 MB free
- Windows NT 4.0 or Windows 95 or later
- CD-ROM drive—4X or faster

Recommended system requirements

- Pentium II, 200 MHz or faster
- 24 MB RAM or more

Software prerequisites

Before you install CB Turbo, the following software must be installed on each master workstation:

- Microsoft Excel 95 or later
- Crystal Ball Version 4.0g or later

Additional requirements for the worker workstations:

- Microsoft Excel 97 or later (see the server README file for Excel 95 compatibility information).
- Workers running on Windows 95 also require the Microsoft Distributed Communication Object Model (DCOM). If the workstation doesn't have DCOM already, the installer automatically installs this program. For more information, see "Cannot find OLE32.DLL." on page 91.

Installing CB Turbo

For information on troubleshooting the installation, see “Troubleshooting the installation” on page 85.

Deciding which components to install

The Crystal Ball 4.0g (or later) CD has all the files for installing all the CB Turbo components. Before installing CB Turbo, you must decide which workstations will be:

- A Paradise server
- Masters
- Fixed workers
- Dynamic workers
- Both masters and workers

Some tips for identifying the best components for each workstation are:

- Server-based worker workstations must have automatic logons to the Paradise server. Therefore, install Paradise on a network server.
- The Paradise server should be a reliable computer, probably not on a user’s desk. The Paradise server should have as much RAM as possible to avoid swapping. For more information on the Paradise server RAM requirements, see “Server” on page 34.
- Do not set up the Paradise server as either a worker or a master.
- If you set up a workstation as both a master and a worker in a network environment with less than 10 workers, set up the worker component as a fixed worker. In this environment, using the master as a worker likely won’t interfere with the master’s duties, since there aren’t enough workers returning information to the master to use all the workstation’s resources.

- If you set up a workstation as both a master and a worker in a network environment with more than 10 workers, set up the worker component as a dynamic worker. In this environment, using the master as a worker interferes with the master's duties, since so many workstations are returning information to the master.
- Install the fixed worker component on any workstation you want to always work on turbo simulations. Set up as many fixed workers as possible.
- Install dynamic workers on workstations with heavy interactive user demands. A web browser or simple word processor is usually not as demanding as a compiler.
- Install the master component on any workstation where a user might want to initiate a turbo simulation.

Install the server before you install any workers. If you already installed Crystal Ball 4.0g or later on any workstation, you installed the master component automatically. Install additional masters after you install the Paradise server.

To see a difference in the performance of a small-model simulation, set up at least four workers (to compensate for the overhead of the server information swapping). To see the difference for large models, you only need two workers.

Updating the CB Turbo license

If you have a demonstration license for CB Turbo, you don't have to totally reinstall all the CB Turbo components to update to a permanent license. When you call Decisioneering to purchase the permanent license, the CB Turbo registration representative will ask you for your server computer information. You can find this information by selecting, in Windows:

Start > Programs > CB Turbo > Server Information

CB Turbo registration will then email or read you a registration key. After you receive a permanent registration key, run the server installation.

To update a license:

1. Start the installation.

- a. Insert the Crystal Ball CD into the server CD-ROM drive.**
- b. In Windows, select Start > Run.**

The Run dialog appears.

c. Enter:

D:\Eva\CBTurbo\Setup.exe

where D: is the drive letter for your CD-ROM drive.

d. Click on OK.

The installation starts. An information dialog asks if you have the necessary administrator privileges to continue.

2. Either:

- If you have administrator privileges, click on Yes.
The Welcome dialog appears.
- If you don't have administrator privileges, click on No to exit the installation and have your network administrator install CB Turbo.

3. Click on Next.

The License Key dialog appears, displaying the server host name, host identification number, and IP address.

4. Enter the license key in the field.

5. Click on Next.

6. When prompted, select to update the registration number by clicking on Yes.

This ends the installation and updates your CB Turbo license. The installer doesn't start any CB Turbo components after updating license information. You must restart the Paradise server manually to enable the new registration number.

Installing server-based components

When you install the Paradise server, you install the server files and the worker setup files. You will use the worker setup files to install the worker workstations and, in some cases, to run the workers from the server.

CB Turbo Note: When prompted for CB Turbo registration (license key), call Decisioneering using the phone numbers or email address listed inside the front cover. For an evaluation, ask for a demonstration license key. For a purchased product, ask for a permanent license key.

You might be prompted for Server Information.

To install the Paradise server and the worker setup files:

1. **Start the installation.**

- a. **Insert the Crystal Ball CD into the server CD-ROM drive.**
- b. **In Windows, select Start > Run.**

The Run dialog appears.

- c. **Enter:**

D:\Eva\CBTurbo\Setup.exe

where D: is the drive letter for your CD-ROM drive.

- d. **Click on OK.**

The installation starts. An information dialog asks if you have the necessary administrator privileges to continue.

2. **Either:**

- If you have administrator privileges, click on Yes.

The Welcome dialog appears.

- If you don't have administrator privileges, click on No to exit the installation and have your network administrator install CB Turbo.

3. **Click on Next.**

The License Key dialog appears, displaying the server host name, host identification number, and IP address.

CB Turbo Note: *If you are reinstalling but not updating the license key information, you can skip steps 4 and 5, and leave the license key field blank. The installer will use your existing license key information.*

4. Call Decisioneering and ask for CB Turbo registration:

- In the United States, 1-800-289-2550
- Outside the United States, call 1-303-534-1515

5. Enter the license key in the field.

6. Click on Next.

7. If you are installing CB Turbo over a previous version (such as installing a permanent license over a temporary license), if prompted, either:

- Update the registration number but do not totally reinstall CB Turbo by clicking on Yes.

This ends the update installation. The installer doesn't start any CB Turbo components after updating the license information. You must restart the Paradise server manually to enable the new registration number.

- Totally reinstall all server and worker components by clicking on No.

The Paradise Server Location dialog appears.

8. If you want to install the Paradise server somewhere besides C:\Program Files\CB Turbo, browse to select the folder where you want to install the Paradise server and click on OK.

9. Click on Next.

The Choose Configuration dialog appears.

10. Select the types of workers you intend to set up, either:

- All dynamic workers
- All fixed workers
- Workstation setup prompt, if you expect to install both dynamic and fixed workers

11. Click on Next.

The Choose Physical Location dialog appears.

12. Either:

- To run the worker software over the network from the server (making it easier to upgrade the workers), click on Server-based.
- To run the worker software from the local workstations (decreasing the amount of network traffic, or avoiding the need for a networked file system entirely for participation in simulations), click on On Local Workstations.
- To have the worker installation prompt you, if you expect to install both server-based and local workers, click on Workstation Setup Will Ask You To Choose The Location.

13. Click on Next.

The Default Paths dialog appears.

14. Enter the default network path (e.g., \\Hercules\CBTurbo) where you want to run the worker files from.

CB Turbo Note: *The network folder must have public access. You must enter a default network path even if you selected local workers. In this case, the installer will only use the network path if the local path is unavailable.*

15. Enter the default local installation folder for the worker component files on each worker workstation.

The default is C:\Program Files\CB Turbo.

CB Turbo Note: *You must enter a default local path even if you selected server-based workers. In this case, the installer will only use the local path if the network path is unavailable.*

16. Click on Next.

The Worker Component Path Confirmation dialog appears.

17. Either:

- To confirm the default path during the workstation setup, select Yes.
- To automatically install the worker component files to the default folder during workstation setup, select No.

CB Turbo Note: *If the default folder is not available, the installer will prompt you no matter which option you choose.*

18. Click on Next.

19. Enter the network path (e.g., \\Hercules\CBTurbo\WSetup) for the workstation setup files.

CB Turbo Note: You can delete this folder after you finish installing the workers. However, if you delete this folder or its files later, you must reinstall the Paradise server to recreate them.

20. Click on Next.

An information dialog appears announcing the installation of server-based workstation setup files.

21. Click on OK.

22. If you are prompted to install DCOM, click on OK.

23. When the installation prompts you to create a floppy disk for starting the worker setup on the worker workstations, either:

- Create a floppy disk to start the workstation setups by clicking on Yes and inserting a floppy disk into your drive.
- Start the workstation setups without a floppy disk by selecting No, noting the displayed network path of the workstation setup, and then clicking on OK in the Network Path dialog.

The setup program transfers server files to the Paradise server.

CB Turbo Note: If you were prompted to install DCOM, the CB Turbo installation finishes at this point, and the DCOM installation takes over.

You must install DCOM if prompted, or CB Turbo will not work.

24. If DCOM installs, accept the DCOM license agreement by clicking on Yes.

25. If the Restart dialog appears, prompting you to restart your computer now or later, either:

- Restart your computer immediately after the installation by selecting Yes.
- Restart your computer manually after the installation by selecting No.

26. Click on Finish.

The Paradise server installation is complete. If you are not prompted to reboot during the installation, the installer starts the server and worker initialization automatically when you finish the installation.

CB Turbo Note: You can uninstall CB Turbo server-based components at any time using the Windows Uninstall tool. Look for CB Turbo Worker and CB Turbo.

Installing a worker component

To install a worker on a workstation:

1. **If you created a floppy during the server installation, place the floppy into the workstation floppy drive.**
2. **Select Start > Run.**

The Run dialog appears.

3. **Either:**
 - If you have a setup floppy, type A:\wsetup.
 - Type the network path to the workstation setup. For example, the network path might look like:
\\Hercules\CBTurbo\Wsetup\Wsetup.exe.
4. **If your workstation setup prompts you to select the worker type, select either:**
 - Dynamic
 - Fixed

For more information on worker types, see “Deciding which components to install” on page 36.

5. **Click on Next.**
6. **If prompted to select whether the worker should be server-based or local, either:**
 - To run the worker from the server or on a network drive, select Server-based and then click on Next.
 - To install the worker files and run the worker from your local computer, select Local and then click on Next.

7. If prompted to confirm the destination path, either:

- Accept the default path by clicking on Next.
- Browse to select another folder and then click on Next.

If you are installing on a Windows 95 workstation that doesn't have the latest version of DCOM installed, an information dialog tells you that the installer is going to install it.

8. If the DCOM information dialog appears, click on OK.

CB Turbo Note: You must install DCOM, if prompted, or CB Turbo will not work.

9. If DCOM installs, accept the DCOM license agreement by clicking on Yes.**10. When the Restart dialog appears, prompting you to restart your computer now or later, either:**

- Restart your computer immediately after the installation by selecting Yes.
- Restart your computer manually after the installation by selecting No.

An information dialog appears when the installation is complete.

11. Click on OK.

A worker starts automatically when you finish the installation.

12. If you have a setup floppy, remove it from the drive.**13. Install any Excel add-ins that a master simulation might require.**

Excel Note: You must install any Excel Add-ins that a simulation might need on every worker workstation that might be used for the simulation. For more information, see "Excel add-ins" on page 28.

14. Make sure the TEMP environment variable on each worker workstation points to a folder on a drive with enough space to hold copies of all the workbooks used for a simulation.

For more information on the TEMP variable, see "TEMP" on page 65.

This completes the worker installation.

CB Turbo Note: You can uninstall worker components at any time using the Windows Uninstall tool. Look for CB Turbo Worker.

Installing the master component

If you already have Crystal Ball 4.0g or later installed on a workstation, the master component of CB Turbo is already installed. To install the master component of CB Turbo (by installing or upgrading Crystal Ball) on a workstation without Crystal Ball 4.0g:

1. **Make sure the master workstation has a compatible version of Excel already installed.**

For more information, see “Software prerequisites” on page 35.

2. **Start the installation.**

- a. **Insert the Crystal Ball CD into the server CD-ROM drive.**

- b. **In Windows, select Start > Run.**

The Run dialog appears.

- c. **Enter:**

D:\Setup.exe

where D: is the drive letter for your CD-ROM drive.

- d. **Click on OK.**

The installation starts. A Welcome dialog appears.

3. **Read the Welcome dialog information.**

4. **Click on Next.**

The User Information dialog appears.

5. **Enter your name, company, and Crystal Ball registration number.**

The registration number is on the back of the Crystal Ball CD jewel case.

6. **Click on Next.**

The Automatic Start Option dialog appears.

7. Either:

- Start Crystal Ball automatically when you launch Excel by clicking on Yes.
- Start Crystal Ball manually from Excel by clicking on No.

You can change this setting later using Excel's Tools > Add-ins command.

8. Click on Next.

The Locate Microsoft Excel dialog appears.

9. Either:

- If the location of Microsoft Excel is correct, click on Next.
- If the location of Microsoft Excel is incorrect, browse to find the correct location, and then click on Next.

The Choose Destination Location dialog appears.

10. Either:

- Accept the installation folder for Crystal Ball by clicking on Next.
- Change the installation folder for Crystal Ball by clicking on Browse, changing the location, clicking on OK, and then clicking on Next.

Crystal Ball Note: You can install Crystal Ball in any folder, on any drive where you have write permissions. It doesn't have to be under the Excel folder.

11. Click on Next.

The Select Components dialog appears. By default, all the Crystal Ball components are selected.

12. To *not* install a component, uncheck its checkbox.

To select specific extenders to include, select Crystal Ball Extenders and click on Change.

13. Click on Next.

The installation program copies the program files to the installation folder.

Crystal Ball Note: If you are installing over a previous version of Crystal Ball, you might be prompted to overwrite existing read-only files. Click on Yes and continue.

When the setup is complete, the program prompts you to view the Readme file.

14. Either:

- View the Readme file by clicking on Yes.

The Readme file opens.

The Readme file has the most recent information on changes to the documentation, compatibility issues, platform limitations, and technical support.

- Finish the installation without viewing the Readme file by clicking on No.

The Setup Complete dialog appears.

15. Click on Finish.

This completes the master installation, but you must still set up the master to point to the Paradise server.

CB Turbo Note: You can uninstall master components at any time using the Windows Uninstall tool. Look for Crystal Ball or Crystal Ball Pro.

Setting up the master component

After you install the master, you must set up the master component to point to the Paradise server. You can do this in one of two ways:

- Automatically, using the MSetup tool
- Manually, inside Crystal Ball

MSetup is a shortcut (on the floppy you created during the Paradise server installation) to the Msetup.exe tool, which is in the server-based WSetup folder. You must close Crystal Ball before you run MSetup. Run either one of these from the workstation with the master component you need to set up.

To use MSetup to set up the master automatically:

1. **If you have not previously installed Crystal Ball version 4.0g or later on the workstation, open and close Crystal Ball.**
2. **If you created a floppy during the server installation, place the floppy into the master workstation floppy drive.**
3. **Select Start > Run.**

The Run dialog appears.

4. **Either:**

- If you have a setup floppy, type A:\Msetup.
- Type the network path to the MSetup tool. For example, the network path might look like:

\\Hercules\CBTurbo\Wsetup\Msetup.exe.

5. **Click on Yes.**

To manually set up the master component:

1. **In Crystal Ball, select Run > Run Preferences > Mode.**

The Run Preferences Mode dialog appears.

2. **Enter the Paradise server host name and port number in the Server Name field, using the format:**

<server>:<port_number>

The port number is usually 24158. You can check the port number by checking the ParadisePort variable in the WSetup.ini file. For more information on this file, see “Worker setup configuration file” on page 74.

3. **Click on OK.**

This completes the master setup.

Uninstalling CB Turbo components

You can uninstall any CB Turbo component using the Windows uninstall tool on the workstation or server. To run the uninstall tool, select Start > Settings > Control Panel > Add/Remove Programs. In the Add/Remove Programs Properties dialog, look for:

<i>To uninstall:</i>	<i>Select:</i>
-----------------------------	-----------------------

server-based components	
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	CB Turbo Worker and CB Turbo (Uninstall the CB Turbo Worker first)
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worker	CB Turbo Worker
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master	Crystal Ball or Crystal Ball Pro
--------	----------------------------------

All components should be closed before trying to uninstall them.

Chapter 4

Administrating CB Turbo



- How CB Turbo components work together
- Changing the CB Turbo setup
- Common issues concerning CB Turbo

This chapter describes in detail how each component participates in a turbo simulation. It also describes how to change the setup of CB Turbo components and common issues that affect turbo simulations. Read this chapter if you are the network administrator responsible for maintaining CB Turbo.

In this chapter

Overview

To administrate and troubleshoot a network program like CB Turbo, you must have a thorough understanding of how the components interact with each other, as well as some common issues that a CB Turbo network administrator needs to resolve.

CB Turbo architecture

CB Turbo has four components:

- Master
- Fixed workers
- Dynamic workers
- Paradise server

Master

A master can start a turbo simulation. Any workstation with Crystal Ball 4.0g or later already has the necessary CB Turbo master files installed. They are in the CBTurbo folder under the Crystal Ball installation folder (for example, C:\Program Files\MSOffice\Office\CB\CBTurbo).

The master component of CB Turbo cannot run in turbo mode unless its workstation is connected with a TCP/IP connection to a Paradise server and worker workstations. If the server and workers are installed and set up, the master can run a simulation in turbo mode.

When a master starts a turbo simulation, it partitions the simulation into tasks and generates enough tasks to fill the task pool on the server (determined by the Sample Size and Burst Size. For more information, see “Setting turbo simulation run preferences” on page 23). The master then places the tasks and copies of all open workbooks into the task pool where they are ready for available workers.

As the workers return the calculated results of the tasks to the master, the master adds the results to the forecast charts and generates replacement tasks to replace the completed task. This continues until the master generates tasks for all the simulation trials and compiles all the results.

When the simulation nears completion, the master stops sending tasks, and the task pool empties. After the workers complete the final tasks and the master picks up the final results, the master closes the task pool created for the simulation, and the workers wait for another simulation.

Workers

There are two types of CB Turbo workers:

- Dynamic workers
- Fixed workers

Dynamic workers

A dynamic worker only runs when its workstation is inactive. In dynamic mode, a separate program called Piranha[®] runs in the background. It starts a worker only when the screen saver starts. When the workstation user moves the mouse or begins typing, Piranha shuts down the worker and returns any partially completed task to the task pool for another worker to finish.

Because dynamic workers aren't always available, are easily interrupted, and require another process to start and stop them, using dynamic workers usually isn't as fast as using fixed workers. However, if a fixed worker slows down a user's workstation enough to interfere with productivity, using a dynamic worker can keep their productivity up by only using the workstation's inactive time.

Fixed workers

A fixed worker is always available to run tasks. The network administrator usually sets up fixed workers to start when the workstation starts, and the workers run Excel in the background as soon as they establish a connection with the Paradise server. Such fixed workers usually run until either the server shuts down (causing the worker to stop Excel) or the worker workstation shuts down.

Fixed workers require some of the workstation's memory resources all the time, even when not running part of a simulation. However, fixed workers run a little faster than dynamic workers because they are always available.

Common worker functionality

Both types of workers run part of a simulation for the master. As soon as an available worker connects to a Paradise server, the worker starts Excel (usually in hidden mode) and waits for a task from a master. When a master populates a task pool with tasks, the available workers (including all fixed workers and all available dynamic workers) begin running tasks.

Before a worker runs its first task for a simulation, it obtains a copy of all the master's open workbooks from the task pool. The worker keeps copies of these workbooks in a TEMP folder until the simulation ends.

A task itself contains the generated assumption cell values for a certain number of trials (determined by the burst size). The worker calculates results for the forecast cells and returns the results to the master. The worker then obtains another task. This repeats until there are no tasks left or until the worker becomes unavailable.

When the simulation is complete, the workers delete any temporarily saved workbooks and wait for a task from the next simulation.

Workers obtain tasks in a fault-tolerant manner. If a worker stops suddenly, the worker's current task automatically returns to the task pool where another worker can pick it up and complete it. No forecast results are lost. The only wasted effort is the few trials that the stopped worker ran before stopping; they are recalculated by another worker. If the worker sends back an incomplete task because the worker became unavailable, the incomplete task returns to the task pool.

Any worker can stop suddenly, if:

- The spreadsheet has an error that keeps the worker from completing the task
- The user reboots the worker workstation
- The worker workstation freezes
- The user shuts down the worker workstation
- The TCP/IP connection breaks

The more workers participating in a simulation, the better the performance of CB Turbo. However, running multiple workers on a single processor workstation doesn't increase performance and slows down the turbo simulation by increasing network traffic unnecessarily.

Paradise server

The Paradise server enables the fault-tolerant distributed communications between the master and the workers.

When the Paradise server first starts and becomes available, each available worker starts Excel and waits for a task. The server maintains the task pool with available tasks and copies of workbooks required for the tasks.

Starting CB Turbo

Because CB Turbo has several connected components, before a master can run a simulation in turbo mode, all the components must be started. You can start CB Turbo:

- Automatically
- Manually
- Automatically the next time you reboot your workstation

Starting CB Turbo automatically

When you install CB Turbo, the installation sets up everything to start automatically using registry entries. The entries that the installation sets up start:

- On the server computer: the Paradise server and, for initialization, a dynamic worker initialization for all Piranhas to use
- On fixed workers: the fixed worker
- On dynamic workers: the Piranha
- On the master: nothing automatically starts

Starting CB Turbo manually

To start CB Turbo manually, you must at least start:

- The Paradise server. If you have multiple servers, you must start at least one.
- Workers. You must start at least one worker pointing to the started Paradise server. To make sure that there is one available worker at all times, you should start at least one fixed worker (the dynamic worker initialization on the server doesn't count).
- A master. A master must initiate CB Turbo.

Starting a Paradise server

To start a Paradise server, on the computer with the server software installed, use the Windows Start menu. To start the Paradise server and the dynamic version of the worker for the Piranha to use, select:

Start > Programs > CB Turbo > Paradise Server

And then:

Start > Programs > CB Turbo > Worker Initialization

If there is no CB Turbo in the Programs menu, you can:

1. **Open an MS-DOS Prompt window.**

2. At the prompt, enter either:

```
<winsys>\cbtrunx.exe paradise  
<winsys>\cbtrunx.exe cbwinit
```

where <winsys> is your Windows System folder. Or start the server by entering the following commands in the command window.

CB Turbo Note: You cannot use the method below if you want to run dynamic workers. However, the `cbtrunx.exe` command uses some configuration options as you set them last in the component manager. So to make sure you run the configuration you want, use the procedure below and specify the `paradise.exe` options you want.

```
set PARADISE_HOST = <DNS_host_name>:<port>  
set LINDA_PATH = <CB Turbo_install>\paradise  
cd <CB Turbo_install>\paradise\bin  
paradise.exe
```

where:

<CB Turbo_install>

Is the CB Turbo installation folder.

<DNS_host_name>

Is the DNS host name found by right-clicking on the Network Neighborhood and then selecting Properties > Configuration > TCP/IP > Properties > DNS Configuration > Host.

<port>

Is the TCP/IP port number. You should use the number in the `WSetup.ini` file. For more information on this file, see “Worker setup configuration file” on page 74.

CB Turbo Note: You can add other command line options. For more information on these parameters, see “`cbworker` command line options” on page 73.

CB Turbo Note: You need to use the same port number for all components for them to communicate with the server.

Starting fixed workers

To start a fixed worker, you can use the Windows Start menu by selecting:

Start > Programs > CB Turbo > Fixed Worker

The fixed worker starts with the configuration options set in the Component Manager for the CB Turbo Worker > Fixed Worker. To start multiple fixed workers with different configuration options, change the options in the Component Manager > CB Turbo Worker > Fixed Worker before you start the additional workers using this method. For more information, see “Component Manager” on page 61. Starting multiple fixed workers using this method will not improve performance unless you have multiple processors.

If there is no CB Turbo in the Programs menu, you can start it manually:

1. **Open an MS-DOS Prompt window.**
2. **At the prompt, enter either:**

`<winsys>\cbtrunx.exe fixed`

where <winsys> is your Windows System folder.

CB Turbo Note: *The cbtrunx.exe command uses some configuration options as you set them last in the component manager. So to make sure you run the configuration you want, use the procedure below and specify the cbworker.exe options you want.*

Or:

`“<worker_install>\cbworker.exe” -host
<Paradise_server_name>:<port>`

where:

`<worker_install>`

Is the worker installation folder.

`<Paradise_server_name>`

Is the computer name found by right-clicking on the Network Neighborhood and then selecting Properties > Identification on the server.

<port>

Is the TCP/IP port number. You should use the number in the WSetup.ini file. For more information on this file, see “Worker setup configuration file” on page 74.

CB Turbo Note: You can add other command line options. For more information on these parameters, see “cbworker command line options” on page 73.

CB Turbo Note: You need to use the same port number for all components for them to communicate with the server.

Starting dynamic workers

To start a dynamic worker, you can use the Windows Start menu by selecting:

Start > Programs > CB Turbo > Dynamic Worker

The dynamic worker starts with the configuration options set in the Component Manager for the CB Turbo Worker > Dynamic Worker. To start multiple dynamic workers with different configuration options, change the options in the Component Manager > CB Turbo Worker > Dynamic Worker before you start the additional workers using this method. For more information, see “Component Manager” on page 61. Starting multiple dynamic workers using this method will not improve performance unless you have multiple processors.

If there is no CB Turbo in the Programs menu, you can:

1. **Open an MS-DOS Prompt window**
2. **At the prompt, enter:**

<winsys>\cbtrunx.exe dynamic

where <winsys> is your Windows System folder.

CB Turbo Note: You cannot start a dynamic worker from the command line any other way.

Setting components to start automatically at reboot

When you install CB Turbo, the installer sets up the installed components to start automatically when you start the server or workstation. CB Turbo has a utility that lets you change which components start automatically when you reboot: Component Manager.

Component Manager

The Component Manager controls which installed CB Turbo components automatically start when you reboot the workstation. You can start the Component Manager two ways:

- From the command line, using the command `cbtman`
- From the Windows Start menu

To start the Component Manager, from the Windows Start menu, select:

Start > Programs > CB Turbo > Component Manager

The Component Manager dialog appears.

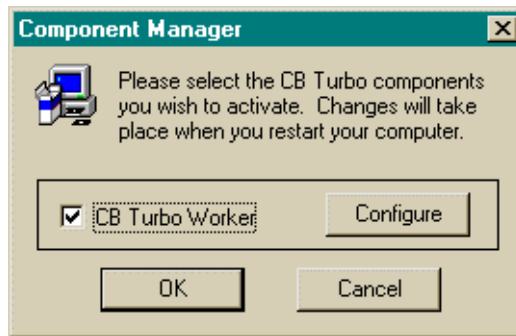


Figure 4.1 Component Manager dialog

The window shows any CB Turbo components currently installed on the local workstation. Usually, a server will have Paradise Server and Worker Initialization, and a typical workstation will have only CB Turbo Worker (or many workers, if the workstation has multiple processors).

CB Turbo Note: The Component Manager CB Turbo Worker configuration options let you control whether the worker type is fixed or dynamic. See “Worker configuration options” on page 62.

The checked components will start automatically when you reboot the workstation. Unchecked components will not.

CB Turbo Note: Checking or unchecking components has no effect on whether a program is currently opened or closed. It only affects which programs start automatically after rebooting the workstation.

Worker configuration options

Next to each component, a Configure button opens a dialog with configuration options for the component. For the worker component, the configuration options let you select whether the worker is dynamic or fixed. If you select fixed, the dialog with fixed worker configuration options appears. These options are:

Verbose mode Displays informational messages in the worker message window. This option slows down the worker.

By default, the worker doesn't display most informational messages.

Very Verbose mode Displays all informational messages, including some not displayed in verbose mode, in the worker message window. This option slows down the worker.

Visible Excel Displays Excel to show the worker calculate its task. This option significantly slows down the worker.

By default, the worker runs Excel invisibly.

If you select a dynamic worker, the dialog with dynamic worker configuration options appears. These options are:

Always Active Lets the Piranha run a worker on the workstation at all times, not only when the screensaver is on.

Verbose mode Displays Piranha informational messages in the worker message window. This option slows down the worker.

By default, the worker doesn't display most informational messages.

Very Verbose mode

Displays all Piranha informational messages, including some not displayed in verbose mode, in the worker message window. This option slows down the worker.

Paradise server configuration options

Next to the Paradise server component, a Configure button opens a dialog with configuration options for the server. These include:

Verbose mode Displays informational messages in the server message window. This option slows down the server.

By default, the server doesn't display most informational messages.

Very Verbose mode

Displays all informational messages, including some not displayed in verbose mode, in the server message window. This option slows down the server.

Worker Initialization configuration options

CB Turbo Note: *When you change the configuration options for the initializing worker, you change them for all the dynamic workers connected to this server. For example, if you change the worker initialization configuration option to start with Excel visible, all dynamic workers connected to this Paradise server will start a worker with Excel visible.*

Next to the Worker Initialization component on the server, the Configure button brings up the configuration options for the initializing worker. These are the same as the options for the fixed worker discussed in “Worker configuration options” above.

Component icons

When you start CB Turbo components, taskbar icons appear.



Indicates a running worker component. One icon appears for each worker running on the workstation, including any initializing workers.



Indicates that the Paradise server is running.

When you hold your cursor over these icons, they display the type of component running, such as:

- CB Turbo Fixed Worker
- CB Turbo Dynamic Worker
- CB Turbo Worker Initialization
- Paradise Server

Double-clicking on these component icons displays the component's message window with the current status. Right-clicking on the component icons displays a pop-up menu with the options:

Show/Hide	Shows or hides the component message window.
-----------	--

CB Turbo Note: *The appearance of the message window has no effect on whether the component is running. In other words, if you either hide the message window or close the message window using the Close Window icon (X), the component continues to run.*

Close	Shuts down the component.
-------	---------------------------

Common issues

The following sections describe setups required for special situations:

- Setting system variables manually
- Repeated host names
- Excel add-ins
- Map translation files
- Multiple worker pools
- System monitoring

For information on responding to error messages, see “Troubleshooting and Error Recovery” on page 83.

Setting system variables manually

There are several system variables that CB Turbo uses:

- TEMP
- PARADISE_HOST
- LINDA_PATH

TEMP

All Windows workstations, with or without CB Turbo, have a TEMP variable, which defines a folder to keep temporary files in. Workers have a specific need for the TEMP variable. Under the folder specified by the TEMP environment variable, CB Turbo creates a folder called cbworker<n> (where <n> is an incrementing unique number that makes sure that multiple workers running at the same time on the same workstation each have their own temporary folder). In this folder, the worker keeps copies of all the open workbooks associated with a particular turbo simulation.

You can change the location of the TEMP folder by changing the TEMP system variable. You should change it if the folder is on a drive without enough free space to keep the temporary copies of the workbooks used for a simulation. If the TEMP variable is in the User Variables list, you must change it for each user on that workstation.

To change the TEMP folder on Windows NT:

1. **Log in as the administrator.**
2. **Select Start > Settings > Control Panel > System.**
The System Properties window appears.
3. **Select the Environment tab.**
4. **In the User Variable field, select the TEMP variable.**
5. **In the Value field, change the path to the new TEMP path.**
6. **Click on Set.**

To change the TEMP folder on Window 95, edit the autoexec.bat file.

PARADISE_HOST

The PARADISE_HOST local variable defines the TCP/IP port number for the Paradise server.

The syntax for setting this variable is:

<server DNS host name>:<port number>

where:

<server DNS host name>

Is the DNS host name of the Paradise server. You can find this by right-clicking on the Network Neighborhood icon in Windows and checking out the TCP/IP protocol properties.

<port number> Is the port number you want the Paradise server to use. The default is 24158.

LINDA_PATH

The Paradise server and dynamic workers use the LINDA_PATH local variable for different purposes.

Server LINDA_PATH

On the Paradise server, this variable points to the parent of the folder with the Paradise.exe file. CB Turbo looks in the LINDA_PATH folder for the \bin folder and in the \bin folder for the file hndlsrv.exe.

For example, on the Paradise server, if the path to the Paradise executable is:

C:\Program Files\CB Turbo\paradise\bin\paradise.exe

And the path to the hndlsrv.exe is:

C:\Program Files\CB Turbo\paradise\bin\hndlsrv.exe

Then the LINDA_PATH variable points to:

C:\Program Files\CB Turbo\paradise

The LINDA_PATH folder must have a \bin folder with both the paradise.exe and hndlsrv.exe files. “paradise” does not need to be a folder in the path.

Dynamic worker and worker initialization LINDA_PATH

On a dynamic worker or a worker initialization, the LINDA_PATH local variable points to the \common folder with a child folder \lib, which contains the tsnet.map file. For example, if the location of the tsnet.map file was:

C:\Program Files\CB Turbo\common\lib\tsnet.map

You would set LINDA_PATH to:

C:\Program Files\CB Turbo\common

Which has a child folder \lib that contains the tsnet.map file. “common” must be the folder that the path points to. For more information on the tsnet.map file, see “Map translation files” on page 68.

Repeated host names

If two workstations connected to the same Paradise server have the same host name, the server will only communicate with one of them correctly. Make sure that all workstations connected to a Paradise server have unique host names.

Excel add-ins

To run a simulation that requires an Excel add-in:

- Install the add-in on all the workers before running the simulation.
- The user must set up the worksheet to automatically load the add-in. For more information, see “Excel add-ins” on page 28.

Map translation files

For dynamic workers, if you install the `piranhad.exe` or `cbworker.exe` files in different folders on different workstations, you need a map translation file.

Map translation is a way of defining equivalencies between local folder and folders on remote workstations. You can have local map translation files on each workstation with a local worker installation, and a server-based map translation file on the server for server-based worker installations and worker initialization.

The CB Turbo installation automatically generates the map translation files you need. You shouldn't have to make any changes to them.

The map translation files are located under the CB Turbo installation folder:

```
<install_drive>:<install_folder>\common\lib
```

A typical file is:

```
map cbworkermappedpath {  
    * : "c:\program files\cbturbo";  
}
```

Which maps the local path `C:\Program Files\CB Turbo` to the global mapping variable `cbworkermappedpath`, and then maps the global mapping variable `cbworkermappedpath` to the local path `C:\Program Files\CB Turbo`.

CB Turbo Note: Contents of map translation files must all be in lower case.

CB Turbo Note: You must use double quotes even for short paths.

Multiple worker pools

If you want different worker pools for different priority simulations or for other reasons, you can set up more than one Paradise server with different groups of workers.

To set up multiple worker pools:

1. **Install CB Turbo server software on more than one computer.**
2. **Install the workers, pointing each worker to one of the Paradise servers.**

For more information on pointing a worker to a server, see “Installing a worker component” on page 43.

3. **On the master workstations, in Crystal Ball, select Run > Run Preferences > Mode.**

The Run Preferences Mode dialog appears.

4. **Change the mode to Turbo.**
5. **If the correct server host name and port number don’t appear in the Server Name field, run the MSetup utility from the corresponding server installation. For more information on this utility, see “Setting up the master component” on page 47.**

***CB Turbo Note:** You can run multiple workers on the same workstation, each pointing to their own Paradise server. To do this, you must start additional workers manually using the command line method and specify different servers using the command line option `-host`. See “Starting fixed workers” on page 59.*

System monitoring

To monitor a server, Piranha, or worker, you can start the component in verbose mode (see “Component Manager” on page 61).

You can also monitor Piranhas, workers, tasks, and the Paradise server using the administrator tools described in the file `monitor.doc`. You can access this file by selecting (in Windows) Start > Programs > CB Turbo > Monitoring Instructions.

Appendix A

*Administrative
Commands, Tools,
and Configuration
files*



In this appendix

This appendix describes commands and configuration files for CB Turbo:

- paradise command
- cbworker command
- piranhad command
- Worker setup configuration file
- Paradise configuration file
- Piranha configuration file

Commands and their options

paradise command line options

You can set Paradise server options in two ways:

- Using command line options when you start Paradise
- Defining the options as resources in a configuration file

All the paradise options are available both ways. For details on the options and resources, see “Paradise configuration file” on page 77. Command line options override configuration file settings.

cbworker command line options

The cbworker program accepts the following command line options:

-host <server> Defines the computer name of the Paradise server, <server>.

The default is to use the host specified by the PARADISE_HOST environment variable, or, if PARADISE_HOST is not defined, the local workstation.

-host <server>:<port>
Defines the computer name of the Paradise server, <server>, and the TCP/IP port number.

The default is to use the host specified by the PARADISE_HOST environment variable, or, if PARADISE_HOST is not defined, the local workstation.

The default port number is 24158, but the number might be different if that port is in use during the server installation.

-verbose Displays informational messages in the worker message window. This option slows down the worker.

By default, the worker doesn't display most informational messages.

-visible	Displays Excel to show the worker calculate its task. This option significantly slows down the worker. By default, the worker runs Excel invisibly.
----------	--

pirahnad command line options

You can set Piranha options in two ways:

- Using command line options when you start the Piranha
- Defining the options as resources in a configuration file

All the pirahnad options are available both ways. For details on the options and resources, see “Piranha configuration file” on page 79. Command line options override configuration file settings.

Configuration files

Worker setup configuration file

The server installation creates a worker workstation setup initialization file called wsetup.ini in the WSetup folder on the server. This text file contains setting information controlling how to install the worker on the workstations.

You can edit this text file directly to change how the worker setup prompts you for information. The variables in this file are:

Location	Controls whether to install only server-based workers, local workers, or to prompt at installation. The possible settings are Server, Local, and Both.
Type	Controls whether to install only dynamic workers, fixed workers, or to prompt at installation. The possible settings are Dynamic, Fixed, and Both.

WorkerNetworkPath

Is the network path where CB Turbo installs server-based worker component files. If you select local workers only, this is used if the local path is unavailable.

The default is

\\<Paradise_server>\<shared>\CBTurbo, where <Paradise_server> is the computer name of the Paradise server and <shared> is the first shared folder on the computer.

WorkerLocalPath

Is a local path where CB Turbo installs the local worker component files. If you select server-based workers only, this is used if the network path is unavailable.

The default is C:\Program Files\CBTurbo.

ConfirmWorkerPath

Indicates whether to confirm the path to install the worker component files (either a network or local path).

The possible settings are Yes (to confirm) and No (to not confirm).

ParadiseHost

Is the computer name of the Paradise server where the Paradise server and worker initialization components are.

To look up the computer name, on the server computer, select Start > Settings > Control Panel > Network > Identification. The name appears in the Computer Name field.

ParadisePort

Is the server port that the master and worker workstations use to communicate with the Paradise server. By default, Paradise uses port number 24158.

If port number 24158 is used by another application during the server installation, the installer increments to the next unused port number.

An example wsetup.ini file looks like:

```
[Worker Configuration]
Location=Both
Type=Both
WorkerNetworkPath=\\HERCULES\out\worker
WorkerLocalPath=C:\Program Files\CBTurbo
ConfirmWorkerPath=Yes
ParadiseHost=HERCULES
ParadisePort=24158
```

Paradise and Piranha configuration files

There are two configuration files you can use for running CB Turbo:

- paradise.config
- piranha.config

These files contain resource settings that customize the behavior of either Paradise or piranhad. The commands look for these configuration files in:

- %SystemRoot% folder
- The user's home folder
- Under <Paradise install>\common\lib where <Paradise install> is the Paradise installation folder on the server

Each command looks first in the %SystemRoot% folder. If the appropriate configuration file isn't there, it looks in the user's home folder. If it isn't there either, it looks for the default configuration file where paradise is installed. Command line options override configuration settings.

Each line in the configuration file is either a comment or a resource definition. Comments begin with an exclamation point (!). All the resource definition lines must use the format:

`<program>.<host name>.<user>.<resource>: <value>`

where:

<code><program></code>	Is either: piranha (for piranha.config) or paradise (for paradise.config).
<code><host name></code>	Is either: Node or the host name of the workstation running the program.
<code><user></code>	Is either: User or a specific user name, such as John.
<code><resource></code>	Is the variable that you want to assign a value.
<code><value></code>	Is an appropriate value for the resource.

CB Turbo Note: *The configuration file is case sensitive.*

If you use an incorrect format or an inappropriate value, the program ignores that line. To use a control character, use a backslash (\) on either side of the character.

CB Turbo Note: *Each backslash in a path name requires four backslashes, such as:*

piranha.Node.User.environment: PATH=C:\\\\Windows\\\\system

Paradise configuration file

The Paradise program has the following options (that you can use at the command line) and corresponding resources (for use in the configuration file).

<i>Resource</i>	<i>Corresponding command option</i>	<i>Meaning</i>	<i>Default value and units</i>
commbufsize	-commbufsize	Defines the size of the communication buffers.	32768 bytes
commretry	-commretry	The number of commtimeout intervals after which the server declares the connection to a particular worker broken.	3

<i>Resource</i>	<i>Corresponding command option</i>	<i>Meaning</i>	<i>Default value and units</i>
commtimeout	-commtimeout	The time a server waits for a response from the worker before it declares a bad connection with the worker.	5 seconds
maxlicense	-n	Maximum number of CB Turbo workers and masters that can be involved in a turbo simulation using this Paradise server.	10
nodelist	-nodelist	Lists the host names that can communicate with the Paradise server.	undefined (universal group-level access)
swapdir	-swapdir	Folder where Paradise keeps swapped-out task pools.	folder where you started Paradise
swapinterval	-swapinterval	Sets the number of minutes a task pool is inactive before Paradise swaps it out to a disk. 0 disables swapping.	60 minutes
verbose	-verbose (on) or +verbose (off)	Displays informational messages in the Paradise message window.	Off
veryverbose	-veryverbose or -vv (on) or +veryverbose or +vv (off)	Displays all the informational status messages in the Paradise message window.	Off

Piranha configuration file

The pirahnad program has the following options (that you can use at the command line) and corresponding resources (for use in the configuration file).

<i>Resource</i>	<i>Corresponding command option</i>	<i>Meaning</i>	<i>Default value and units</i>
advance	-advance	Sets the load average below which Piranha starts its process.	1.9
advancecheck	-advancecheck	Sets the number of seconds <seconds> to wait between checks to advance. Too small a number can annoy the user. The default is 10 seconds.	10 seconds
enabled	-enabled	Sets when Piranhas can use the workstation. Never means the Piranha can never use the workstation. "Check" lets the Piranha check and use the workstation when it is inactive. "Always" lets the Piranha always use the workstation.	check
host	-host	Defines the host name of the Paradise server, <server>.	The host specified by the PARADISE_HOST environment variable, or, if PARADISE_HOST is not defined, the local host.
idle	-idle	The number of seconds a workstation must be idle before the Piranha can use it.	300 seconds

<i>Resource</i>	<i>Corresponding command option</i>	<i>Meaning</i>	<i>Default value and units</i>
jobcheck	-jobcheck <seconds>	Sets the number of seconds, <seconds>, between checking for the next task when the worker is running. Since the workstation is idle, a low value wastes less time between jobs and doesn't annoy the user.	10 seconds
killtimeout	-killtimeout	Sets the number of seconds, <seconds>, to wait for a Piranha to die after stating to kill the Piranha. A value of zero means to never time out, and a value of -1 (or any negative value) means to skip the kill phase.	Skip the kill phase
loadperiod	-loadperiod	Sets the load average computation period. Set to either 1, 5, or 15.	5 minutes
quantum	-quantum	Sets the minimum number of seconds, <seconds>, allotted for each task. After a Piranha process has executed for this period of time, the pirahnad might ask the current Piranha process to retreat, and it will then schedule a new Piranha process to run.	300 seconds
retreat	-retreat	Sets the load average when the Piranha must stop its worker.	3.0
retreatcheck	-retreatcheck	Sets the number of seconds, <seconds>, to wait between checks to retreat. A large number could cause a delay in returning control to the user when necessary.	10 seconds

Resource	Corresponding command option	Meaning	Default value and units
retreattime-out	-retreattimeout	Sets the number of seconds, <seconds>, to wait for the Piranha to retreat. A value of zero means to never time out, but continuously signal a retreat until the Piranha finally dies.	0 seconds
suffixstring	-suffixstring	Defines the extension, <string>, to append to executable file names, when needed.	.win
termtimeout	-termtimeout	Sets the number of seconds, <seconds>, to wait for a Piranha to terminate after starting to terminate the Piranha. 0 never times out, but continuously tries to terminate the Piranha until it finally dies. A negative value skips the terminate step.	-1 (skip the terminate phase)
verbose	-verbose (on) or +verbose (off)	Displays informational messages in the Piranha message window.	Off
veryverbose	-veryverbose or -vv (on) or +veryverbose or +vv (off)	Displays all the informational status messages in the Piranha message window.	Off

Appendix B

Troubleshooting and Error Recovery



In this appendix

This appendix describes how to troubleshoot CB Turbo and also lists some of the common errors and their resolutions.

Troubleshooting the installation

There are several problems that can occur during the installation of one or more of the CB Turbo components. Below is a list for each component. See the *Crystal Ball User Manual* for the list of Crystal Ball error messages.

Troubleshooting the CB Turbo server installation

Some errors that might appear during the Paradise server installation include:

<i>Message</i>	<i>Reason</i>	<i>Solution</i>
CB Turbo software requires a 32-bit Operation System. Installation cancelled.	You are trying to install CB Turbo on a computer without a 32-bit operating system.	Upgrade your operating system to a 32-bit operating system and then try to reinstall CB Turbo. Install CB Turbo on another computer that already has a 32-bit operating system.
Host name and computer name of the server for CB Turbo software must contain no spaces. Please change the identification settings or start the installation on another computer. Setup cancelled.	You cannot use spaces in either the computer host name or the shared folder name of a network path during installation.	You must rename any computer host names or shared folder names that have spaces in them. If you can't rename them, you must install the Paradise server on a computer that doesn't have this problem.
License key you entered is incorrect. Please verify and try again.	You entered an invalid registration number.	Try to enter the license key again. If it still doesn't work, call Decisioneering CB Turbo registration.
Please wait while Setup checks the TCP/IP protocol settings on this server...	This is a normal message. However, if it remains on screen for more than 20 seconds, the network is probably down.	Check your network connections and try to install when the network is up.

<i>Message</i>	<i>Reason</i>	<i>Solution</i>
Setup cancelled. TCP/IP settings on this server are incorrect.	The TCP/IP settings on the server will not support CB Turbo.	Check the TCP/IP configuration on the server. Make sure the configuration supports the “ping” command. Then reinstall CB Turbo.
Setup failed to create the shortcuts on the floppy disk.	There is no floppy disk in the drive. The floppy disk in the drive is write protected.	Insert a floppy disk in the drive. Make sure the floppy disk in the drive is not write protected.
Setup was unable to launch the Worker component installation. You have to restart CB Turbo installation.	The network path you entered during the installation caused a problem. The installation of the initialization worker failed.	Rerun the installation, checking the network path you use for the worker setup files.
Uninstaller setup failed to initialize. This situation won't cause any installation problems. Only the system administrator will be able to uninstall this software.	You are probably installing CB Turbo over a previous version installed by a network administrator.	This won't cause any problems running CB Turbo. The worst thing that might happen is that your network administrator might have to uninstall CB Turbo, if you ever need to uninstall it.
You have no write access to the specified drive, or the path name that you specified contains illegal characters. Please verify and try again.	You don't have permission to create files to the drive or folder. You might be logged on as a user instead of an administrator.	Make sure you log in as an administrator or have your network administrator install CB Turbo for you. Also make sure you have write access to all drives and folders you specify during the server installation.

Troubleshooting the worker installation

Some errors that might appear during the worker installation include:

<i>Message</i>	<i>Reason</i>	<i>Solution</i>
An error occurred during the move data process: <message>	This could be caused by several complicated problems.	Write down all error messages that appear and call technical support.
Installation cancelled. CB Turbo Workstation Setup requires a 32-bit Operation System.	You are trying to install CB Turbo on a 16-bit operating system, such as Windows 3.1.	Upgrade your operating system to a 32-bit one, such as Windows 95 or Windows NT. Then install CB Turbo. Check the “System requirements” on page 34 for other requirements that can keep you from installing or running CB Turbo properly.
Please wait while Setup checks access to specified network resource...	This is a normal message. However, if it remains on screen for more than 20 seconds, the network is probably down.	Check your network connections and try to install when the network is up.
Please wait while Setup establishes the TCP/IP connection with the Paradise server...	This is a normal message that usually appears for at least 20 seconds. It can take up to 10 minutes, but that usually indicates a TCP/IP problem.	If this message displays for longer than a few minutes, have your network administrator check your TCP/IP connections for the worker and server.
Please wait while Setup prepares the system to run CB Turbo Worker software...	This is a normal message that usually appears for 10 seconds per processor on multiprocessor workstations at the end of the worker installation.	Watch your taskbar for starting workers.

<i>Message</i>	<i>Reason</i>	<i>Solution</i>
Setup cancelled. Either the Paradise server on <server> is not running, not connected to port <port>, or TCP/IP settings on this workstation are invalid.	The worker cannot establish a TCP/IP connection with the Paradise server computer.	<p>Make sure there is a Paradise server running on the specified server and connected to the specified server port.</p> <p>Check the TCP/IP connection on the worker workstation (if “ping” works, the connection is fine for CB Turbo).</p> <p>If this doesn’t work, reinstall the Paradise server.</p>
Setup cannot access WSetup.ini initialization file. Installation cancelled. Try to reinstall CB Turbo server-based components or call technical support.	The Wsetup.ini file isn’t in the worker setup folder.	<p>Either reinstall the Paradise server to recreate the worker setup files, or you can create a Wsetup.ini text files using the information in “Worker setup configuration file” on page 74.</p>
Setup failed to start CB Turbo Worker component. Reinstall the Worker component.	The CB Turbo worker won’t start if everything it uses doesn’t start in just the right order.	<p>Close all open programs and reboot your workstation.</p> <p>If the worker still won’t start, reinstall the worker component.</p> <p>If this fails, call technical support.</p>

<i>Message</i>	<i>Reason</i>	<i>Solution</i>
The specified network resource is inaccessible or doesn't contain the CB Turbo Worker component files. Please verify and try again.	<p>CB Turbo can't read or find the server-based worker component files on the server. Either:</p> <ul style="list-style-type: none"> • You don't have read permission for the folder on the server • There is a network problem • The server is down • The files aren't in the server folder any more 	<p>Check the network connection.</p> <p>Make sure you have read permission for the server-based worker component folder.</p> <p>Make sure the files are there. If not, reinstall the Paradise server and worker component files.</p>
Uninstaller setup failed to initialize. This situation won't cause any installation problems. Only the system administrator will be able to uninstall this software.	You are probably installing CB Turbo over a previous version installed by a network administrator.	This won't cause any problems running CB Turbo. The worst thing that might happen is that your network administrator might have to uninstall CB Turbo, if you ever need to uninstall it.
You selected a network drive. For a local installation, you have to choose a local destination drive.	Local installations must be on local drives, not mapped network drives.	Select a local drive (usually C:) for the local installation or back up through the installation and select a server-based installation.

Troubleshooting the master installation

Some errors that might appear during the master installation include:

<i>Message</i>	<i>Reason</i>	<i>Solution</i>
A CB Turbo Worker component or another application is running Microsoft Excel in hidden mode. You cannot install Crystal Ball while Microsoft Excel is running. Please close all CB Turbo Worker components and rerun the installation.	Some applications, such as CB Turbo workers, run Excel in hidden mode. You cannot install Crystal Ball while Excel is running, even in hidden mode.	Shut down any CB Turbo workers and any other applications that might run Excel in hidden mode, and then rerun the installation.
Uninstaller setup failed to initialize. This situation won't cause any installation problems. Only the system administrator will be able to uninstall this software.	You are probably installing Crystal Ball over a previous version installed by a network administrator.	This won't cause any problems running Crystal Ball. The worst thing that might happen is that your network administrator might have to uninstall Crystal Ball, if you ever need to uninstall it.

Troubleshooting runtime errors

CB Turbo Note: *If you have problems running CB Turbo, but have no error messages, you can monitor the system using the information in Start > Programs > CB Turbo > Monitor Instructions.*

This section lists the CB Turbo error messages that you might see when running a turbo simulation. See the *Crystal Ball User Manual* for the list of Crystal Ball error messages.

<i>Message</i>	<i>Reason</i>	<i>Solution</i>
A calculation error has occurred in cell <cell>. Ensure that all functions and macros are supported on all worker machines.	<p>There is a calculation error in the spreadsheet model.</p> <p>The workbook didn't automatically load all the add-ins it required.</p> <p>A required add-in was not installed on at least one worker workstation.</p>	<p>Check your model for calculation errors, such as dividing by 0. You can uncheck the Stop On Calculation Error run preferences option.</p> <p>Make sure any model that requires an add-in has the workbook set up to automatically load the needed add-in. See "Excel add-ins" on page 28.</p> <p>Make sure all required add-ins are installed on all the worker workstations.</p>
All new workbooks must be saved before you can run a simulation in turbo mode. Please save them now.	You can only run a turbo simulation using saved, named workbooks. You must save and name the workbooks so the server can distribute them by name.	Save and name the workbooks and then start the simulation.
Cannot find OLE32.DLL.	Workers running on Windows 95 must have Microsoft DCOM Version 1.1 (or later) installed.	Install the Microsoft Distributed Communication Object Model from the CB Turbo installation CD (using DCOM95.EXE in the server setup folder) or download and install a version from the Microsoft website.

<i>Message</i>	<i>Reason</i>	<i>Solution</i>
Connection to server broken.	<p>The Paradise server has shut down while your simulation was in progress.</p> <p>The TCP/IP connection between the master and the server broke while your simulation was in progress.</p>	<p>Have the network administrator restart the Paradise server. Then select Run > Continue.</p> <p>If you have another server available, change which server you are connected to by having the network administrator run the appropriate MSetup tool.</p> <p>Otherwise, continue in normal mode by selecting Normal in the Run > Run Preferences > Mode dialog. Then select Run > Continue.</p>
Dynamic Cell references are not allowed in turbo mode.	You cannot use dynamic cell references in a turbo simulation. See “Dynamic cell references” on page 27.	Either remove the dynamic cell references or run the simulation in normal mode.
One or more values resulting from calculation errors had to be discarded. Ensure that all functions and macros are supported on all worker machines.	<p>There is a calculation error in the spreadsheet model.</p> <p>The workbook didn’t automatically load all the add-ins it required.</p> <p>A required add-in was not installed on at least one worker workstation.</p>	<p>Check your model for calculation errors, such as dividing by 0.</p> <p>Make sure any model that requires an add-in has the workbook set up to automatically load the needed add-in. See “Excel add-ins” on page 28.</p> <p>Make sure all required add-ins are installed on all the worker workstations.</p>

<i>Message</i>	<i>Reason</i>	<i>Solution</i>
Problems running CB in turbo mode. Cannot connect to the Paradise server.	<p>One or more of the required CB Turbo components isn't running.</p> <p>The Server Name field of the Run Preferences Mode dialog isn't pointing to the correct Paradise computer name or port.</p> <p>The Paradise server is not connected to the expected port.</p>	<p>Start CB Turbo as described in "Starting CB Turbo" on page 56.</p> <p>Have your network administrator run the appropriate MSetup tool to set up the master.</p> <p>From the master workstation with Excel closed, run either MSetup (on the floppy you created during the Paradise server installation) or the MSetup.exe tool (in the server-based WSetup folder).</p>
Problems running CB in turbo mode. There are no CB Turbo workers running.	<p>No workers are running for the Paradise server specified in the Run Preferences Mode dialog.</p> <p>You forgot to start the initializing worker on the Paradise server.</p>	<p>Start workers pointing to the correct Paradise server. If only dynamic workers are running, start fixed workers.</p> <p>Or, point to another Paradise server already started with running workers.</p> <p>Start the initializing worker on the server, by selecting Start > Programs > CB Turbo > Worker Initialization.</p>
To use turbo mode, the ratio of sample size to burst size must be no less than 10.	If the ratio of Sample Size to Burst Size is below 10, it slows CB Turbo. See "Setting turbo simulation run preferences" on page 23.	Change the Burst Size and Sample Size settings to increase the ratio to more than ten. Then restart the simulation.

<i>Message</i>	<i>Reason</i>	<i>Solution</i>
Warning: timeout to <host_name> fd <n> in <code_location_string>, retrying.	There are network performance problems degrading communication between the Paradise server and the workers and masters.	Track down the network traffic problem. Increase the numbers for the Paradise server options commretry and commtimeout. For more information on these options, see “Paradise configuration file” on page 77.

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Glossary



In this glossary

A compilation of terms specific to CB Turbo used in this manual.

Glossary

See the *Crystal Ball User Manual* for terms specific to Crystal Ball.

dynamic worker

A component of CB Turbo that runs part of a turbo simulation only if the workstation is idle. When the workstation is in use (the screen saver is not on), the workstation doesn't participate in any turbo simulations.

fixed worker

A component of CB Turbo that is always available to run part of a turbo simulation. Fixed workers run simulation tasks whether the workstation is active or idle.

job

A group of tasks that comprise a simulation.

master

A component of CB Turbo that starts a turbo simulation. The master does not actually run any simulations—it distributes all the work load except for tallying the results. This is the only component of CB Turbo that must be on the workstation with Crystal Ball.

Paradise server

A component of CB Turbo that enables the distribution of the tasks to complete a turbo simulation. CB Turbo identifies a particular Paradise server using the server computer name and the TCP/IP port number.

piranhad

A process that monitors dynamic worker workstations. Piranhad starts a worker when the workstation is idle (the screen saver starts), and signals the worker to stop when the workstation subsequently becomes busy.

task

Discrete chunks that the CB Turbo master partitions a Crystal Ball simulation into. Tasks are made up of trials, and can run concurrently on a collection of remote workstations.

task duration

The approximate length of time it takes a worker to complete one task. This equals the time to run one trial times the number of trials in a task.

task pool

A space created by a master on the Paradise server to hold simulation tasks and forecast results for that master's turbo simulation.

trail-off effect

The time that a last simulation task can potentially add to the total simulation time.

tuple

(Pronounced two-pull) A generic version of a task. Data moves to and from tuplespaces in user-defined units known as tuples. Tuples are the data structures of tuplespace.

tuplespace

A generic version of a task pool.

worker

Components of CB Turbo that run part of a simulation for the master. There are two types of CB Turbo workers: dynamic and fixed. Worker components don't have to be on the workstation with Crystal Ball.

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A comprehensive index designed to
give you quick access to the
information in this manual.

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Credits



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