

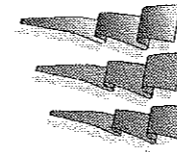
EXHIBIT A
PART 1 OF 2

CBR2

CBR Express[®]
for Windows

User's Guide

Inference[®]



CBR Express[®] 2.0 for Windows

User's Guide

CPW20-000118

YAH0021146

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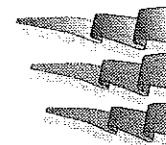
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Preface

This is the *CBR Express* User's Guide. It is a general introduction to *CBR Express* and to the principles and techniques of case-base authorship.

The reader of this manual is assumed to be a novice case-base author who is not necessarily a professional programmer. Some sections of the manual, particularly relating to installation and networking, may require the involvement of your network administrator.

The topics covered in this manual include:

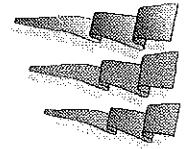
Introduction to CBR Express: Background on case-base reasoning. Requirements. Installation instructions. Creating new databases. How to reach technical support.

Call Tracking: Using the *CBR Express* call tracking panel.

Searching a Case Base: Using the Search Panel to retrieve cases from a case base.

Building a Case Base: Manipulating the Case Panel, Question Panel, and Action Panel to create case-base records.

Importing and Exporting: Moving case bases from one platform to another.



Introduction to CBR Express

CBR Express is an exciting new tool for *case-based reasoning*. *CBR Express* makes it easy to store and retrieve cases that represent customer problems, mechanical parts, legal precedents, corporate policies, or any other type of discrete objects you would like to be able to store and find again quickly.

CBR Express is particularly strong at finding cases that the operator cannot easily describe. The program accepts a natural language sentence as its initial input, and then presents a menu of questions to the operator to elicit more specific information about the desired object. Since the program takes the initiative in this dialog, untrained operators can learn to perform searches in *CBR Express* in a matter of minutes.

CBR Express employs a selection of sophisticated matching algorithms to find all cases that are *similar* but not necessarily identical to the search description. *CBR Express* is particularly powerful at measuring the similarity of text strings and of numeric values, giving the case-base author the full range of expression required for writing natural cases.

In addition, *CBR Express* is an application of ART-IM, the Automated Reasoning Tool for Information Management from Inference Corporation. ART-IM is the most advanced artificial intelligence programming tool on the market, providing unlimited potential for expansion of the case base into a full expert system or policy-management program.

What is a Case-Base Search?

Suppose you were to go to a library to research some topic for a class you are taking (or teaching!) The best way to find the material quickly is to ask a librarian for help.

You might begin by describing your request in general terms. The librarian would lead you to an area where books generally meeting your needs are shelved. Then he might ask you a few pertinent questions to get your request in better focus.

Finally, the librarian would take down three or four books and hand them to you. "Look through these," he might say, "and see if they answer your question." You would go off to a nearby table to browse through the books.

Alternately, the librarian might say, "We have an interesting videotape on that subject. Would you like me to run it for you?" If you agree, you would get to watch a movie for a few minutes.

If things don't work out, though, the librarian might tell you that the library's holdings don't include the subject you have requested. In that case, he might help you request an interlibrary loan, or he might even send you to another library.

Visiting the library is very much like using *CasePoint* or the *CBR Express* Search Panel to perform a case-base search.

The screenshot shows the CasePoint application window with the following content:

Description:
white streaks

Questions:	Answer (Yes/No):
Are you having print quality problems?	Not Answered
What does the print quality look like?...	Not Answered
Are you printing on transparencies?	Not Answered
Are you printing on right side of paper?	Not Answered
Does cleaning the printer with cleaning paper remove...	Not Answered
Is an extra blank page being output by the printer?	Not Answered
Are all pages being printed completely blank?	Not Answered
Is sealing tape still on the toner cartridge?	Not Answered

Cases:

- 20 Ink cartridge low on toner causes faded print area.
- 20 Ink cartridge low on toner causes white streaks.
- 15 Using bad transparency stock.
- 13 Printing on wrong side of paper.

Type the initial description here, then press the Enter key.

Answer questions here.

Browse results here.

When you begin a case-base search, all you do is type in a description of the thing you are looking for. Plain old human language is good enough. Just write a sentence or two telling the program what you would like to find.

The system will search the case base for a moment and then display a list of questions for you to answer. You don't have to answer them all; just answer the questions that seem pertinent to your interests. The system searches the case base again, coming up with more and more appropriate results as you answer each question.

Finally it is time to stop searching and to browse the results. The system presents a number of matching cases, usually five, for you to examine. You can read additional information about each case, or in some situations there may be an informative program of some kind associated with each case. On a multimedia machine you may even get to watch a movie!

If the case base cannot meet your needs, it may ask you to submit an "unresolved search" report so the case-base author can see if another case is needed. It is also possible for a case base to refer you to another case base for further searching.

There is nothing particularly exotic or frightening about searching a case base. It is just like searching a standard database except that a case base uses "fuzzy matching" techniques to help you find records that are almost, but not exactly, the thing you asked for. Most of us can use this kind of help when dealing with computers!

You can even misspell some of the words in the search description, and still find the right cases. The whole point is to make it easy to find the information you need, even if you don't know exactly what it looks like. The user does not have to be an expert to get results.

Types of Case-Base Applications

In the simplest sense case bases are just databases that tolerate imprecise requests and guide the user to appropriate records. In real life, however, case bases take on a variety of interesting roles. Here are a few of them, purely for your information:

Customer Service

CBR Express has enjoyed substantial success as a resource for customer support hotlines. The support analyst uses the case base to diagnose a problem while the customer is still on the phone.

Even better is the case base that is shipped with a computer software product. The case base helps the end user solve problems without calling the hotline. This strategy, *call avoidance*, has been very successful in reducing the cost of providing customer support in several companies.

Human Resources

Case bases are used for matching applicants to available jobs, for accessing policy and procedure manuals, and for helping employees understand their benefit packages. The case base is not just a filing system; it is a means of matching up needs and resources quickly and efficiently.

- Product Sales** A case base is a natural vehicle for a product catalog, particularly if customers will use the system directly. For complex manufactured products (computer systems), a case base serves as a index to existing systems, whose features can be recombined to create new ones. Case bases are a natural way to index sales documents, collateral information and competitive intelligence.
- Real Estate** Are you looking for special programs to finance houses for single-parent families? Case bases can also index into a wilderness of government programs and regulations, and may also be used to match up a client with an appropriate finance package.
- Transportation** A case base can help you find an appropriate combination of carrier and route for shipments. They are particularly useful for indexing hazardous materials regulations to discover what precautions and restrictions apply to a particular package.
- Information Retrieval** A case base is a natural librarian. It helps the user focus a general search into specific channels. This is particularly useful for on-line information access (when no human librarian is present) such as dial-up information services and CD-ROM libraries.
- Engineering** Didn't we get a variance for something like this last year? What are the building code exceptions for clearance behind pellet stoves? Which carriage lamps in our inventory support 200 watt bulbs? Why are we getting morning and evening power surges in our new building? Case bases can address just such questions. The ones that store local experience are especially valuable.

Software Development

Case bases can be used to index existing software objects to make them more accessible for reuse. They are a natural way to index technical documents and especially troubleshooting manuals. Case bases can be used to index into existing on-line help documents.

CBR Express Family

The *CBR Express* family of products from Inference Corporation includes two major products: *CBR Express* itself and the *CasePoint* end-user search environment.

CBR Express

CBR Express is the tool for creating and maintaining case bases. It lets you define cases, questions, and actions to define the structure and behavior of your case base.

CasePoint

CasePoint is the light-weight deployment vehicle for *CBR Express* case bases. It is very small and very fast. With release 2.0, *CasePoint* supports automatic question-answering through rules, which greatly increases throughput for the search operator.

Requirements

CBR Express runs on any IBM-compatible PC that will run Microsoft Windows 3.x and DOS 3.1 or better. The minimal configuration is a 286 processor with four megabytes of memory, but a 386 with eight megabytes is recommended. A hard drive, a mouse and a VGA display are required.

CBR Express runs under Microsoft Windows 3.x, in either standard or 386 enhanced mode. The latter is preferred.

CBR Express's unique case-retrieval facility is provided by ART-IM/Windows, the Automated Reasoning Tool for Information Management from Inference Corporation. The ART-IM inference engine is provided as a part of the *CBR Express* package in the form of a Dynamic Link Library (DLL).

The software packages required for user modification of *CBR Express* and its databases are described in the *CBR Express Reference Manual*.

Database support for *CBR Express* and *CasePoint* may be derived from any of the following database products:

- Raima Data Manager 3.21A (RDM) from Raima Corporation
- Microsoft SQL Server 4.2
- Sybase SQL Server 4.x or 10.0
- Oracle 6.0 or 7.0
- Intersolv (formerly Pioneer) Q+E Database Library 1.1.5

RDM is supplied with *CBR Express* and *CasePoint*. The other database packages must be purchased separately.

CBR Express requires no special alteration of the PC environment beyond those required by Windows, with the following exceptions:

- *CBR Express* requires ToolBook 3.0 from Asymetrix Corporation. A ToolBook runtime distribution diskette is included with *CBR Express*.
- If database support for *CBR Express* or *CasePoint* will depend on the Raima Data Manager (RDM) database package from Raima Corporation, then the DOS utility program SHARE must be run before Windows is started. This is explained in detail in the next few pages. Note that Windows for Workgroups runs its own version of SHARE automatically.

- If the Raima Data Manager is used for multi-user operation on a local-area network that uses NetBIOS, the Lock Manager program from Raima Corporation must be running on one of the machines on the net. The Lock Manager is supplied with *CBR Express* and *CasePoint*. Use of this program is described in Appendix 2 of this manual.

Installation Strategies

The setup program for *CBR Express* offers three different strategies for installing *CBR Express* on your local machine(s). These strategies are presented as three radio buttons on the first dialog box presented by the setup program. The options are local installation, network workstation installation, and network distribution installation.

Local Installation

This option installs *CBR Express* for use on an isolated machine. All *CBR Express* and case base files will reside directly on this machine, and will be used by a single user.

The installation is described in the section "RDM Stand-Alone Installation" in this chapter.

Network Workstation Installations

This option installs *CBR Express* for use on a Network File Server (e.g. Novell). The *CBR Express* files reside in a network directory, where they can be run by multiple users at network workstations. This permits one *CBR Express* installation and one central case base to service multiple network users.

The initial Network Installation will not make the product directly usable to the distributed workstations. It will, however, create a new SETUP.EXE in the network installation directory. Workstation users must run this second SETUP.EXE from their machines. The secondary installation creates the directories and files that must be local

to each workstation. It also creates the Program Manager group containing the *CBR Express* icons.

Network Distribution Installations

In this option, SETUP.EXE copies itself and all installation data to the specified network directory. Users can then execute the SETUP.EXE from the network directory.

This option simply provides a convenient means of making "Local" installations without the necessity of carrying diskettes from machine to machine. This option eases this task. Note that this option makes "local" installations only and is not appropriate if any of the *CBR Express* users will share a case base on the network.

RDM Stand-Alone Installation

These are the instructions for installing *CBR Express* on a single machine using RDM database support.

The stand-alone installation procedure consists of running SETUP.EXE. Note that when the installation is complete, it may be necessary to reboot the machine to initialize the environment properly.

1. **Create free disk space:** To install *CBR Express* on your machine, you will need approximately four megabytes of free space on your hard disk. The exact amount depends on which program modules you install.
2. **Insert *CBR Express* diskette #1 in a floppy drive.**
3. **Run Windows.**
4. **Run SETUP.EXE.** You can do this easily from the File menu of the Program Manager or the File Manager. Pull down the File menu and select the Run . . . command. Type this command into the Run dialog box:

```
a:\setup
```

or

b:\setup

depending on which drive you have the *CBR Express* diskette in. Click on the OK button to begin the installation.

5. SETUP will ask you which type of program installation you prefer. Select the "Local Installation" option.
6. SETUP will prompt you for the drive and directory into which *CBR Express* should be installed. Type the path into the field provided for this purpose. When it is correct, click the mouse on the Continue button.
7. SETUP will offer you a selection of program modules to install. Most *CBR Express* users should select *CBR Express* and *Example Database* modules as a minimum.
8. SETUP will also offer you database support options. Select the *RDM Database Support* option.
9. At the end of the installation dialog, SETUP will check your environment to see if the DOS SHARE program should be added to your AUTOEXEC.BAT file. If so, it will offer to modify your AUTOEXEC.BAT file to run SHARE. You should permit this. (Note that this step does not take place under Windows for Workgroups, which automatically runs its own version of SHARE.)
10. At this point SETUP will automatically create an *Inference CBR2* program group in the Program Manager. It contains these program items:
 - **CBR Express:** The case-base search environment.
 - **Example Printer Case Base:** Loads a demonstration.
 - **Example Adhesive Case Base:** Loads a demonstration.
 - **CBR Express Release Notes:** Last-minute technical

notes.

- **CBR Express Help:** The on-line help file.

11. **Install ToolBook:** If ToolBook 3.0 is not already installed on your machine, you may install it at this time.

If SETUP detects that ToolBook 3.0 is not present on your system, it will ask if you want to install the ToolBook 3.0 Runtime Files. To do so select the "Install" button. SETUP then asks you to insert the ToolBook Runtime Disk into your floppy drive, then select the "Continue" button to install the runtime modules.

You will have an option to perform a full or custom installation. This Toolbook installation consists of installing the standard Asymetrix Toolbook 3.0 runtime component, plus an additional Inference-specific toolbook runtime component. We recommend that you select the "full installation" option to install both components into the default directory. If for some reason you wish to change the directory where the standard Toolbook component is installed, select "custom installation." You might want to do this if you are updating an existing Toolbook 3.0 runtime installation on your system.

Once the ToolBook Runtime installation has been completed, your .TBK files will automatically be associated with ToolBook 3.0.

12. **Reboot the machine:** If there have been any changes to your AUTOEXEC.BAT file, it will be necessary to reboot your machine before running *CBR Express*.

Network Operation

CBR Express may be used as a stand-alone program or it may be configured to run over a network, allowing many users to access the same central case base.

For stand-alone operation, we assume that the user and the case-base author are likely to be the same person, building and using the case base on one machine. In this case, the case-base author would probably use *CBR Express* both for creating cases and for searching. As a variation, the user(s) and the case-base author may each have their own machines, and the case base files would be updated periodically by loading files on the various machines. In this situation, the case-base author would use *CBR Express* while the users would use *CasePoint*.

In the network configuration, we assume that there is one machine that is unlikely to be rebooted. This machine serves as the server of the case-base files and the *CBR Express* interface. Client machines on the net can access the case bases remotely.

In operation, the users log into the net to access the central case-base library. Opening a case base automatically downloads the case base's index file into the local copy of *CBR Express*, so searches occur locally and independently on each machine. The database files containing the text of the cases, questions and actions, however, are not downloaded. These files are reached across the network as needed.

There may be one or more case-base authors involved in the network configuration. The case-base authors operate on a separate copy of the case base index, releasing a new "public" copy only when desired.

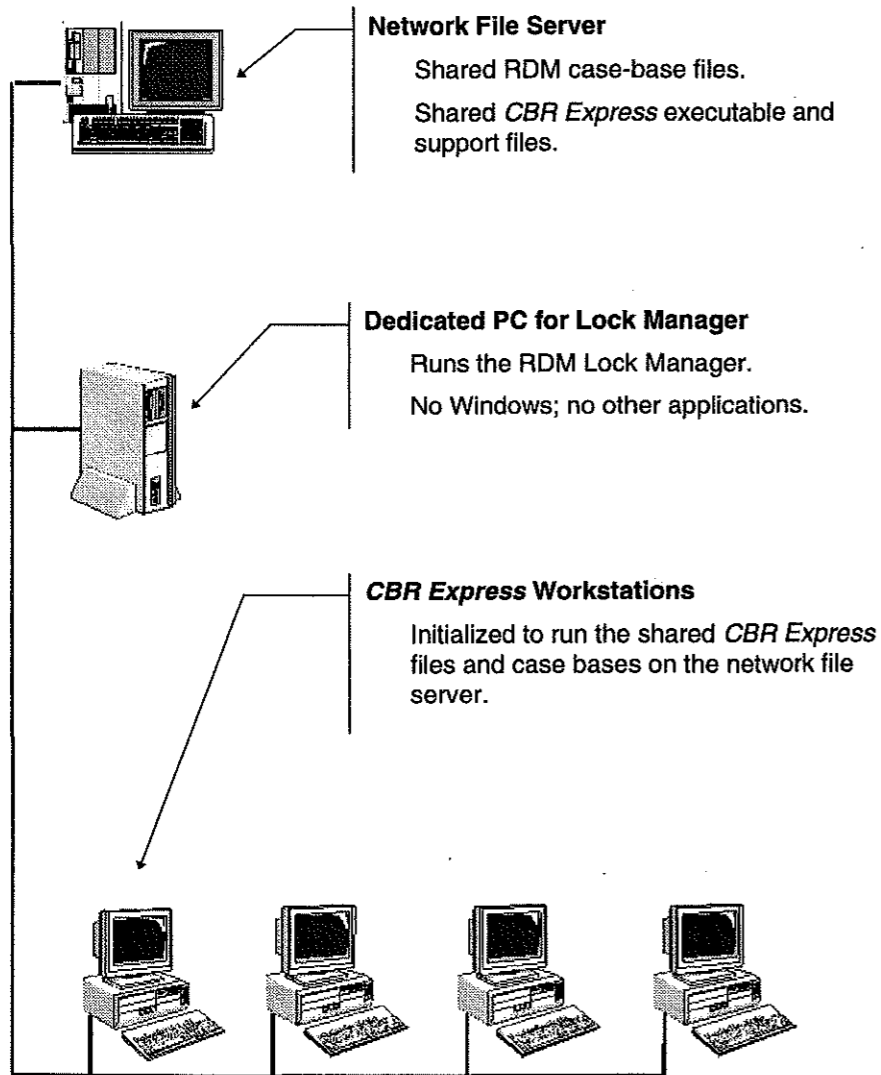
At the beginning of each case-base search *CBR Express* polls the central library to be sure it still has the most up-to-date version of the case index. If not, it pauses for only a few seconds to download the current index. In this manner all changes to the case base are quickly distributed to all of the users and also to multiple case-base authors.

RDM Network Operation

These are the instructions for installing *CBR Express* on a network using RDM database support.

Network installation involves many pieces of interacting hardware and software. Our approach is to recommend a procedure that will work in most instances, followed by a discussion of the various exceptions and special circumstances that sometimes occur. Some of the special software required for network installation of *CBR Express* is more fully documented in the appendices of this manual.

It is convenient to divide the installation instructions into three parts: the *Network Installation* (when initial installation takes place), the *Lock Manager Installation* (when the Lock Manager is set up on its dedicated machine), and the *Workstation Installations* (which enables individual network machines to run the network copy of *CBR Express*).



Recommended RDM Lock Manager Installation

Network File Server Installation

The installation is similar to that for a non-network machine, except that the files will be installed to a network drive.

1. **Log on to the network from any workstation.**
2. **Run Windows.**
3. **Install *CBR Express*.** Follow the installation procedure described in the previous section, but use the *Network Installation* option to install the *CBR Express* and ToolBook files on a network drive. All *CBR Express* files will be installed in one network directory. Install the ToolBook files in another network directory.

This procedure will set up the current machine to run *CBR Express* from the network directory, including creating a CBR2 program group with *CBR Express* icons.

4. **Make all ToolBook files read-only:** Use the File Manager to select all of the *.TBK files in the *CBR Express* network directory. Use the Properties command in the File menu to set all of these files to *read-only*.
5. **Install NETBIOS.EXE.** Be sure that NETBIOS.EXE is run as part of the normal network initialization for this machine.
6. **Edit SYSTEM.INI:** *If you are running Windows for Workgroups*, you must add the following line to the [network] section of your SYSTEM.INI file:

```
exclude=0
```

This entry will prevent Windows for Workgroups from interfering with NetBIOS.

If you are running Windows for Workgroups you must also add the following line to the [386Enh] section of your SYSTEM.INI file:

```
V86ModeLANas=0
```

This entry defines the real-mode LANAs that are in use by NetBIOS.

- Edit CBRX.INI:** It is essential to edit the CBRX.INI file in order to share network case bases with other users. First, identify the Lock Manager in use on this network:

```
lockmgr=NETBIOS
```

Second, change the tafpath to point to the network directory where you installed *CBR Express*:

```
tafpath=<path to network directory>
```



Warning: Failing to edit CBRX.INI to set these two parameters may result in RDM database corruption.

Lock Manager Installation

In order to coordinate competing database requests from multiple users, one of the machines on the network must be dedicated to running the RDM Lock Manager. This section of the network installation instructions relates to this machine. It can be a DOS machine as there is no need to run Windows.

- Boot the Lock Manager machine.**
- Install NETBIOS.EXE.** Be sure that NETBIOS.EXE is run as part of the normal network initialization for this machine.
- Log on to the network.**
- Install LM.EXE:** LM.EXE (the Lock Manager program) will be found in the RDMUTILS subdirectory of the network *CBR Express* directory. *On this machine alone*, arrange for the Lock Manager to be run immediately following NETBIOS.EXE (for instance, by placing the appropriate commands in your AUTOEXEC .BAT file). Use this command to run LM.EXE:

```
LM -u 23
```

The value 23 initializes the Lock Manager for up to ten *CBR Express* users at a time, or a maximum of 3 to 23 *CasePoint* users.

CBR Express needs three "users". Each open case base or tracking database needs one "user". Therefore if eight actual people need to operate *CBR Express*, each with a tracking base and a case base open simultaneously, the total number of "users" required is:

$$3 + (2 * 8) = 19$$

The maximum is 128. See the documentation for LM.EXE in the appendices of this manual for further information on setting the number of users.

- Reboot and log back into the network.** If you arranged to run LM.EXE from your AUTOEXEC .BAT file, you will need to reboot at this time.



Warning: Do not try to run the Lock Manager as a background process on a machine that is used for other purposes. This degrades network performance for all users, and risks interrupting all of your *CBR Express* users if the Lock Manager machine should crash or reboot unexpectedly.

**CBR Express
Workstation
Installations**

The *CBR Express* network directory contains a special version of SETUP.EXE that is used to prepare individual workstations to run *CBR Express*. Perform this procedure on every machine that will be used to run *CBR Express*.

1. **Boot the machine.**
2. **Install NETBIOS.EXE.** Be sure that NETBIOS.EXE is run as part of the normal network initialization for this machine.
3. **Edit SYSTEM.INI:** *If you are running Windows for Workgroups, you must add the following line to the [network] section of your SYSTEM.INI file:*

```
exclude=0
```

This entry will prevent Windows for Workgroups from interfering with NetBIOS.

If you are running Windows for Workgroups you must also add the following line to the [386Enh] section of your SYSTEM.INI file:

```
V86ModeLANAs=0
```

This entry defines the real-mode LANAs that are in use by NetBIOS.
4. **Log on to the network.**
5. **Run SHARE.EXE.** Modify the machine's AUTOEXEC.BAT file to run SHARE.EXE. This is a DOS utility that assists in database management. It should be present already on any machine that runs DOS. Simply add this command to the AUTOEXEC.BAT file:

```
SHARE
```

Note that this step is not necessary if you are running Windows for Workgroups.

6. **Change the PATH variable:** Modify the PATH variable in AUTOEXEC.BAT to include the network ToolBook directory.
7. **Create the ToolBook file association:** Use the File Manager to associate *.TBK files with TB30RUN.EXE in the directory where you installed the ToolBook runtime. Use the Associate... command in the File menu.
8. **Reboot, restart Windows, and log back into the network:** If you made any changes to your AUTOEXEC.BAT file, you must reboot at this point.
9. **Run SETUP.EXE** from the *CBR Express* network directory (not from the *CBR Express* diskettes!) This will initialize the workstation by creating an *Inference CBR2* program group in the Program Manager (if there is not already one there).
10. **Run CBR Express**, using the *Inference CBR2* program group in the Program Manager. Open the PRINTER demo case base. This initializes the VISTA.TAF file, which is used by the Lock Manager.
11. **Make VISTA.TAF sharable:** If you are on a Novell network, you must use the FILER utility to make VISTA.TAF *sharable*. On other networks it is sharable by default, and no action is required.
12. **Set the user ID symbol:** While *CBR Express* is running, use the Preferences option of the Options menu to set the local user's database ID symbol. *Each machine on the net must use a different ID symbol*, which may be up to seven alphanumeric characters. Use the SAVE button on the Preferences dialog box to store the information in the local WIN.INI file.
13. **Exit from CBR Express.**

14. **Repeat for each machine:** Repeat these steps for each workstation that will be used to run *CBR Express*.

Miscellaneous Exceptions

Due to the many combinations of hardware and software that may be encountered in the field, there are numerous special circumstances and exceptions that may impact your installation. We have presented a number of these in the list below. Please see the appendices of this manual which contain documentation for some of the utility programs, initialization files, and environment variables required for network operation.

- As of RDM 3.21a there is a new version of the Lock Manager that does not require a dedicated machine. This General Lock Manager uses file-based record locking and has the advantage of operating across network bridges and subnetworks. It is, however, slower than the Netbios Lock Manager which we recommend for standard installations of *CBR Express* and *CasePoint*.

For further information about using the General Lock Manager with *CasePoint* and *CBR Express* please contact Inference's Technical Support Center.

- We have suggested installing ToolBook in a network directory to make the installation process simpler and easier to perform. It does not really matter to *CBR Express* where the ToolBook files reside, so you may wish to install a copy of ToolBook on each machine rather than pay the price of increased network traffic. Be sure to change the AUTOEXEC.BAT file to include the ToolBook directory in the PATH variable, and then reboot the machine.
- The usual modes of *CBR Express* installation (assumed above) are single-user (non-network) installation and multi-user (network) installation. However, it is possible to perform a network installation for a single user. In this case the *CBR Express* files may be installed and run from a network directory, but it is not necessary to dedicate a second machine to run the Lock Manager. A single user

does not need the services of the Lock Manager. To permit this, you must edit the CBRX.INI file in the *CBR Express* network directory and change the LOCKCOMM value to INTERNAL. This simply gives *CBR Express* permission to operate on a network without the Lock Manager.



Warning: In this mode, multi-user access to the case base is still possible, but the safeguards against simultaneous writing of case-base records have been removed. If two *CBR Express* users were to both save an unresolved case to the same case base at the same moment, the case-base files could become seriously corrupted and unusable.

- To lessen the chances of the Lock Manager going down unexpectedly, do not run LM.EXE from Windows. Run LM.EXE on a dedicated DOS machine instead.
- If you *must* run the Lock Manager from Windows, which we discourage, it will be necessary to make the following additions to the Windows SYSTEM.INI file:

```
IdleVMWakeUpTime=1
TimerCriticalSection=500
ReflectDosInt2A=true
NetHeapSize=28
```

Restart Windows and run LM.PIF from the File/Run menu or LM.EXE from a Windows MS-DOS prompt (the "DOS Box.")

- *CBR Express* includes LM_TSR.EXE in addition to LM.EXE. We recommend that LM.EXE be run on a dedicated DOS machine. If your only available DOS machine *must* run other DOS applications, you can substitute LM_TSR.EXE for LM.EXE. This is discouraged, however, due to the risk of crashing or rebooting the machine. If the Lock Manager machine crashes it will interrupt all *CBR Express* activity, and

current transactions may be lost. See the appendices of this manual for more information on both Lock Manager programs. Never run LM_TSR with Windows.

- To recover from a Lock Manager crash, first reboot the dedicated Lock Manager machine and get the Lock Manager running again. Then reboot the remaining machines and restart *CBR Express* on each of them.
- If a machine running *CBR Express* crashes it will be necessary to reboot the machine, log back into the net, and restart *CBR Express* to inform the Lock Manager that the task died. It is necessary to reboot quickly, because the Lock Manager may be holding a lock on the database, in which case other *CBR Express* users will be locked out.
- The Lock Manager recognizes two databases as being the same if both the database name and the path from the root directory of the drive are the same. Many networks allow you to substitute a drive specifier in place of a long path, essentially allowing a directory to masquerade as a drive as a matter of convenience. For example, two users could see the same database on a network as:

```
User 1:      e:\cbrx\casebase.cbd
User 2:      f:\users\cbrx\casebase.cbd
```

CBR Express cannot be used in this way. All users of a given database must see the *full path* of database files in the same way. The drive specifier is not significant and need not be the same for all users.

- On Novell 3.11, the maximum number of NetBIOS sessions the Lock Manager will handle is set in the NETBIOS SESSIONS=XX line of the file SHELL.CFG. The default of 32 sessions is sufficient to support fourteen *CBR Express* users simultaneously, or five to 32 *CasePoint* users. *CBR Express* requires three NetBIOS sessions for itself, plus two for each of the multiple users.

CasePoint requires only one session per open case base per user.

- Novell implements the equivalent of a DOS APPEND on all of its search drives, adding new directories to your path. This can cause unpredictable results because the sequence of directories in the path differs depending on whether the "current" directory is out on the network. We recommend modifying the SHELL.CFG file to include "search mode=2" specifying that Novell default to the same search mode as DOS.

- If you are on a 3COM network, the NetBIOS command should be

```
NETBIOS /C /M /W2
```

- There is an incompatibility among *CBR Express*, the Raima Data Manager (RDM), Novell networks, SHARE.EXE, and Windows 3.0 that leads to database corruption. The cure is to upgrade to Windows 3.1.
- If you are running multiple versions of *CBR Express* and/or *CasePoint* on the same machine, make sure that you alter the CBRX.INI file for each product so that the *tafpath* variables are all pointing to the same directory. This will coordinate the database activity among the different applications.

Note that the *tafpath* string cannot be longer than 35 characters.

- Under Windows 3.1, if you make any changes in CBRX.INI (as suggested above), you will have to exit and restart *CBR Express* before they will take effect.

Installation for SQL Server, Oracle and Q+E Databases

These are the instructions for installing *CBR Express* using SQL database support (for SQL Server, Oracle and/or Q+E databases).

We presume that the appropriate database package is installed and available, either on the local machine or on the local network. The database package should be installed and initialized before the *CBR Express* installation. There is additional information on database initialization available in the *CBR Express Reference Manual*. Utilities for initializing database tables will be found on the *SQL Enabling Module* diskette, available from Inference.

The installation procedure consists of running SETUP.EXE, using the style of installation that is most appropriate to your situation, either *Local Installation*, *Network Installation*, or *Network Distribution Installation*. Note that when the installation is complete, it may be necessary to reboot the machine to initialize the environment properly.

1. **Create free disk space:** To install *CBR Express* you will need approximately four megabytes of free space on a hard disk. The exact amount depends on which program modules you install.
2. **Insert *CBR Express* diskette #1 in a floppy drive.**
3. **Run Windows.**
4. **Run SETUP.EXE.** You can do this easily from the File menu of the Program Manager or the File Manager. Pull down the File menu and select the Run... command. Type this command into the Run dialog box:

a:\setup

or

b:\setup

depending on which drive you have the *CBR Express* diskette in. Click on the OK button to begin the installation.

5. SETUP will ask you which type of installation you prefer. These instructions apply best to a Local Installation, but any of the three installation modes (Local, Network, Network Distribution) may be appropriate.
6. SETUP will prompt you for the drive and directory into which *CBR Express* should be installed.
7. After designating the installation directory SETUP will offer you a selection of program modules. Most *CBR Express* users should select *CBR Express* and *Example Database* modules as a minimum.
8. SETUP will also offer you database support options. Select the *SQL Database Support* radio button. Then use the checkboxes to select *one or more* of the following database packages:
 - **SQL Server / Sybase**
 - **Oracle**
 - **Q+E**

If the combination of SQL database packages changes at a later date (because you remove or acquire one) you must run SETUP again or *CBR Express* and *CasePoint* will not operate properly.

9. At this point SETUP will automatically create an *Inference CBR2* program group in the Program Manager. It contains these program items:
 - ***CBR Express*:** The case-base search environment.
 - ***CBR Express Release Notes*:** Last-minute technical notes.
 - ***CBR Express Help*:** On-line help.
10. **Install ToolBook:** If ToolBook 3.0 is not already installed on your machine, you may install it at this time.

If SETUP detects that ToolBook 3.0 is not present on your system, it will ask if you want to install the ToolBook 3.0 Runtime Files. To do so select the "Install" button. SETUP then asks you to insert the ToolBook Runtime Disk into your floppy drive, then select the "Continue" button to install the runtime modules.

You will have an option to perform a full or custom installation. This Toolbook installation consists of installing the standard Asymetrix Toolbook 3.0 runtime component, plus an additional Inference-specific toolbook runtime component. We recommend that you select the "full installation" option to install both components into the default directory. If for some reason you wish to change the directory where the standard Toolbook component is installed, select "custom installation." You might want to do this if you are updating an existing Toolbook 3.0 runtime installation on your system.

Once the ToolBook Runtime installation has been completed, your .TBK files will automatically be associated with TookBook 3.0.

11. **Reboot the machine:** If there have been any changes to your AUTOEXEC.BAT file, it will be necessary to reboot your machine before running *CBR Express*.
12. **Create demonstration case bases:** It is not possible for us to provide you with ready-to-run demo case bases for SQL databases. We provide exported case-base definition files that can be easily imported into a new case base using *CBR Express*.

To create the demo case base, use *CBR Express* to import the files PRINTER.CDF and ADHESIVE.CDF into newly-opened SQL case bases. Use the `Import` option under the Files menu in *CBR Express*.

Miscellaneous Exceptions

CBR Express and *CasePoint*, when configured for SQL databases, must discover appropriate dynamic link libraries in their installation directory or in the path. Each of the following files must be present:

w3dblib.dll for SQL Server/Sybase.
ora7win.dll for Oracle
qelib.dll for Q+E.

The installation program copies stubbed libraries into the installation directory, omitting those for the databases you have indicated that you wish to use. If you subsequently install a new database, the stubbed library will need to be deleted to achieve proper access. If you subsequently remove a database product from the environment, the appropriate stubbed library will have to be added. In either case, simply run the installation program again and indicate the new, current database configuration.



Note: Most *CBR Express* users do not select the Q+E option. It represents a path for customization and development for the convenience of Inference's Professional Services department. One may not expect turnkey-convenient database support to all of the database engines supported by Q+E.

Password Encryption Program

There is a stand-alone utility used in conjunction with the SQL versions of *CasePoint* and *CBR Express*. It permits the bypassing of the user password prompt when opening case bases residing in RDBMS tables such as DB2/2, SYBASE, or Oracle. This is accomplished by storing an encrypted version of the password in the *CasePoint* initialization file, CBRX.INI.

When *CasePoint* opens a case base, it first checks the initialization file for a DBPASSWORD entry, which, if found, will be decrypted and use to log into the database. If the

password found is not valid, *CasePoint* will present the usual dialog box to the user for entry of a different password. This accommodates sites where there are multiple servers with multiple passwords.

The supplied password encryption program is *PASSWD.EXE*. To run the program, exit from Windows and change to the directory where *CBRX.INI* is located. This is normally the *CasePoint* installation directory. Then type

PASSWD

at the DOS prompt and you will be asked to enter the database password. If a password entry already exists in *CBRX.INI*, you will be first prompted to enter the existing password, before the utility will allow you to overwrite this with the new password.

Passwords accepted by this utility consist solely of alphanumeric characters and may range in length from one to thirty-one characters. Control characters and all characters greater than 'X'7F' are ignored.

Running CBR Express

To run *CBR Express*, select the *Inference CBR2* program group from the Windows Program Manager and double-click the mouse on the *CBR Express* program item.

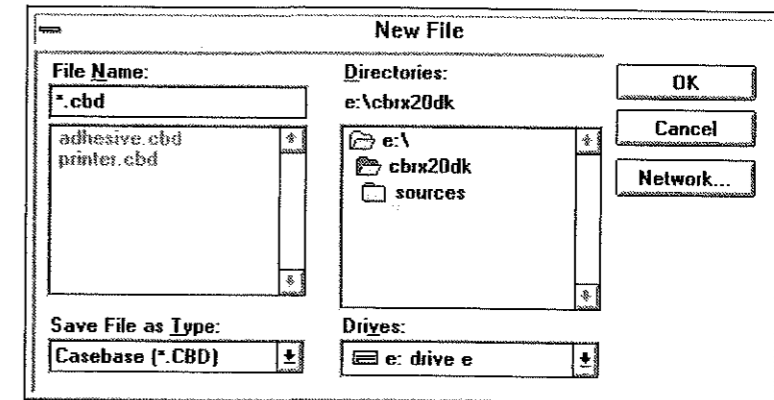
Creating New Case Bases and Tracking Bases

This section explains how to create new case bases and tracking bases for *CBR Express*. It covers both the RDM and SQL database options.

Under the RDM option, *CBR Express* will actually create new RDM database files to accommodate the new case base or tracking base. Under the SQL database option, *CBR*

Express will add a new case base or tracking base to the existing SQL database.

New RDM Files Opening new case-base and customer-tracking databases under RDM is very simple. First select the *New* option from the *File* menu. This presents you with the *New File* dialog box:



New File Dialog Box

Simply indicate which type of file you want to create and name it. The options are a case base file, a tracking base file, or a special empty ToolBook file suitable for graphic browsing of case-base objects. Then just click on the *OK* button and you are done.

New SQL Case Bases and Tracking Bases

To create a new case-base or call-tracking file using SQL database support begin by pulling down the *File* menu and selecting *New*. This gets you the *New File* dialog box.

This is a Windows Common Dialog box. Use the *Drives* and *Directories* controls to identify the directory where want to create the new database. (We put a header file with the extension *.CBS* or *.TBS* in this directory. This file stores database access information.) Use the *File Type* drop box to select the kind of database you want to create. Use the

File Name field to name the database header file. Click on the OK button when you are finished.

For SQL database support, you must designate several parameters depending on exactly which databases are available to you. You will be presented with the Connect to SQL Database dialog box to enter this information.

Connect to SQL Database Dialog Box

The six fields of this dialog box are used to set up the database connection to *CBR Express*. The fields are:

- **Database Type:** Which type of database are you using? The choices are SQL Server, Oracle and Q+E.
- **Database Login ID:** Your login name as a user of this database.
- **Database Server:** This is the network host name of the database file server.

- **Database Name:** The name of the database. Note that one database may contain several case bases.
- **Q+E Connection String:** Q+E requires additional parameters in the form of a string, which may be entered here.

Note: Most of these values have default settings that can be set in the CBRX.INI file (see page 113). *Database server* is the only database parameter that does not have a preset default.

Note: Most *CBR Express* users do not select the Q+E option. It represents a path for customization and development for the convenience of Inference's Professional Services department. One may not expect turnkey-convenient database support to all of the database engines supported by Q+E.

Enter Database Password Dialog Box

When *CBR Express* opens a case base for the first time, it will ask you for your user ID and a database password. The password can only be set *once* from *CBR Express*, so be careful. We provide a default password for users who prefer

to bypass this level of protection (simply press the Enter key when you see the Enter Database Password dialog box).

Sample Search

To properly appreciate *CBR Express*, you will need to get your hands on it and see what it can do. We suggest the following short procedure to get oriented and to verify that the product has been installed correctly:

1. When you run *CBR Express* for the first time it will require a few seconds to initialize ToolBook and establish the database connection. Then you will see the *CBR Express* title page, and a moment later it will automatically present you with the Search Panel.
2. The first thing to do is to pull down the File menu and select Open. Select the PRINTER case base and open it.
3. Type this sentence into the Description field:

The printer won't work.

Press the Enter key.

CBR Express will immediately search its case base for cases that have descriptions similar to the one you typed. The search will return a list of five cases that might be the one you want, plus a longer list of clarifying questions for you to answer.

4. Look for this question:

Can your printer print a self test?...

When this question first appears, it will have Not Answered next to it in the answer column. Click the mouse on Not Answered and use the resulting dialog box to answer the question YES.

This will initiate a second search, resulting in a more accurate list of potential cases, and a new set of questions.

5. Look for this question:

Is the ON LINE indicator lit?...

Use the mouse, as before, to answer this question NO.

This initiates a third and final search, which identifies one case as having a very strong match with your search.

6. Look for this case in the list of matching cases:

Printer is not on-line...

To browse additional information about this case, click the mouse on it and then on the Browse Case button.

This will pop up a ToolBook window containing a graphic browse book. It will show you a picture of the printer console and will indicate the location of the on-line light. Dismiss the browse book by clicking the mouse on the button labeled "Cancel and Return to *CBR Express*."

At this point you have seen a typical *CBR Express* case-base search. The operator types a simple, natural-language description, and the software asks clarifying questions. One can quickly zero in on the interesting case(s).

7. Click the mouse on the New Search button at the bottom of the panel. This will clear the fields for another try. This time assume that your printer is having print quality problems involving "white streaks" and "faded letters." Try typing this search description (exactly as shown here):

Whitew streaks and faded letters in output.

Press ENTER to start the new search. Notice that two of

the nominated cases are quite appropriate to the problem! *CBR Express* is very forgiving of typing and spelling errors!

8. Look for this question:

Are you having print quality problems?

Use the mouse to answer this question YES.

9. Look for this question:

What does the print quality look like?

This is a multiple-choice question. Click the mouse on Not Answered, and then use the resulting dialog box to select White Streaks as the answer.

This is the conclusion of the second demo search. Note that even with a very poor search description, *CBR Express* has determined that your printer is probably low on toner.

Now, what should you do about that?

10. Click the mouse on the Show Actions button. This shifts the lower field of the screen from case mode to actions mode. Instead of nominating cases, it now nominates possible ways to fix the problem.

Look for this action:

Check the toner cartridge to see if it is low on toner...

To browse this action, click the mouse on it and then on the Browse Action button. You will be rewarded with an animated tutorial of how to extend the life of your toner cartridge. The animation repeats automatically, so to terminate it simply click the mouse on the button labeled "Cancel and Return to *CBR Express*."

11. This concludes our brief introduction to searching with *CBR Express*.

Exiting CBR Express

To end a *CBR Express* session, pull down the File menu and click the mouse on the Exit option.

Navigating the Interface

Getting around in *CBR Express* is very simple. For the most part, *CBR Express* itself will escort you from one panel to another as required. There is no need to move from one panel to another at random.

But in real life there are exceptions. *CBR Express* provides a Panels menu for these situations. It permits direct access to the set of panels that are appropriate to the user mode, plus a Go Back option that makes it easy to backtrack to recently-visited panels.

How to Use Help

CBR Express includes helpful on-line documentation on the function and meaning of the interface fields and controls.

To use this facility, select *CBR Express Help* from the Help menu. This runs the *CBR Express* help facility, which is a hypertext-like on-line documentation program.

Technical Support

Inference Technical Support is available to answer your questions and help with any problems you may encounter using your Inference products. There are several options for contacting Inference Technical Support:¹

Voice

The Inference Technical Support Hotline is available to customers with current Support Agreements. See the terms of your agreement for Hotline hours and rates. An emergency paging system allows our support personnel to be available 24 hours a day, seven days a week. Some plans offer unlimited support without extra charge. The phone numbers are:

US: 1-800-322-5590
(toll-free from within the United States)

US: +1 310-322-5530²

UK: +44 (0)1753 811855

BBS

The Inference Technical Support Bulletin Board System is available to all customers 24 hours a day, seven days a week. The phone number is:

+1 310-322-8087

Set your communications software for no parity, 8 data bits, and one stop bit (N-8-1). The BBS supports transfer rates of up to 14.4 kbs.

¹ (For more information on contacting Inference Technical Support from other countries, consult with your local distributor of Inference products.)

² (This notation conforms to the generally accepted international standard for indicating telephone numbers. In the U.S. dial 1-310-322-5530 if you are outside of the 310 area code, or 322-5530 if you are within the 310 area code.)

E-Mail

Inference Technical Support can be reached via the Internet, or any service that provides Internet access.

Our world-wide electronic mail address is:

hotline@inference.com

FAX

You may also send facsimiles (FAX documents) to Inference Technical Support at the following numbers:

US: +1 310-322-3431

UK: +44 (0)1753 811860

Be prepared to provide your copy/license number whenever contacting Inference Technical Support.

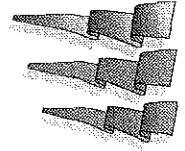
World-Wide Web

Information about Inference, its products, and its services (including Technical Support) is available on the World-Wide Web via any Web (HTML) browser connected to the Internet.

Our World-Wide Web home page address is:

<http://www.inference.com>

Contact Inference Technical Support for further information about getting started on the World-Wide Web.



Call Tracking

To support help-desk applications, *CBR Express* includes a Tracking Panel. When tracking is in use, *CBR Express* supports database access to customer and call records with automatic logging of search activity.

When tracking is in use, you may bring up the program with either the Search Panel or the Tracking Panel as the first screen. This feature is controlled from the Set Preferences dialog box. You may also use this box to automatically open a particular tracking database each time you run *CBR Express*.

If you attempt to operate the Tracking Panel without opening a tracking database first, *CBR Express* will politely but firmly insist on correcting this oversight.

Note: We have included a sample call tracking database called `50STATE.CTD`. It contains numerous customer and call records for you to explore and experiment with. (This sample tracking base is available for the RDM database only.)

Customer Dialog

This section addresses the operation of the Tracking Panel interface to customer records. This includes the creation of new customer records as well as locating and maintaining previous records.

Creating or Opening Tracking Databases

The procedures for creating new databases differ depending on whether you are using RDM database support or one of the SQL databases. Please refer to page 28 for a discussion of this subject.

New Customer Dialog

To create a new customer record, simply click the mouse on the `New Customer` button. *CBR Express* will automatically clear the customer fields and supply a new-customer identification number.

Type the customer's personal information into the appropriate fields. Due to the database formatting requirements, some of the fields are limited to a fixed number of characters.

Since *CBR Express* uses proportional fonts (variable-width letters) for readability, the apparent width of the fields on the panel is for guidance only. When the field is full, *CBR Express* will stop accepting text. Further keystrokes produce a warning "beep."

When the customer record is complete, click the mouse on the `Save Customer` button. This will store the customer record permanently in the tracking database.

You may display a customer record, edit it, and save it again at any time.

The screenshot shows the 'Tracking' window with the following data:

Customer Record:

- Last Name: Claire
- First Name: Eau
- MI: d
- Title: Dairy Master
- Company: Wisconsin Cheese & Dairy Farm
- Address: 123 Green Pastures
- City: Madison
- State (CA): WI
- Zip: 53700
- Phone: 608-748-9875
- Customer ID: 49

Call Record:

- Date: August 20, 1991
- Call ID: 69
- Assigned To: Ginder
- Call Status: Waiting
- Level: 0
- Call received at 5:22 PM by Test User.
- PROBLEM: transparencies don't work
- QUESTIONS: Are you printing on transparencies? Yes
- CASES: 45 Using bad transparency stock, 14 Incorrect paper size in paper trays.

Buttons at the bottom: Search Case Base >, Browse Customers..., Browse Pending Calls...

Tracking Panel

Search for Customer (RDM)

Using RDM database support, there are three ways to locate a previous customer record:

- **By Customer Name, Company, and Zip Code:** *CBR Express* can search an RDM database for the customer's first and last name, the company name, and the zip code, in any combination. Just fill in the information you know, and click the mouse on the `Search` button to the right of the personal information fields. (Note that the search field labels are underlined to distinguish them from unindexed fields.) You can use the `New Customer` button to clear the fields and try again, if necessary.
- **By Customer List:** If the database is relatively small, it may be faster to click on the `Browse Customers` button. This will pop up a browse dialog box containing

the alphabetical list of customers. Note that you can narrow the list quickly by using the box's search facility. If you type "Smith" and press the `Search` button, the list of all customers will collapse into the list of Smiths only. A second search on "Bill" narrows the list to people named "Bill Smith."³

- **By Record Number:** In addition, you may request specific customer records by entering their serial numbers in the `Customer ID` field. Click the mouse on the magnifying glass icon next to the field to retrieve the record.

Search for Customer (SQL)

Using SQL database support, there are three ways to locate a previous customer record. The methods are generally similar to those described for the RDM version, but differ in certain critical ways.

- **By Customer Information:** *CBR Express* can search an SQL database for matches to any combination of the personal information fields. Just fill in the information you know, and click the mouse on the `Search` button to the right of the personal information fields.

CBR Express automatically prepends and appends the SQL wildcard character '%' to each of the fields. For instance, if you type

Sm

into the Last Name field, the SQL database search actually looks for

%Sm%

automatically. This produces a search for all customers

³ Or "Smith Bill." The list would be the intersection of all Smiths and all Bills.

with the string "Sm" in their last names. Note that in most SQL databases, this search is case-sensitive.

A search returns a set of customers who match the search criteria. Use the >> and << buttons to cycle from one record to another within this set. The size of the set is shown by the `Count` field at the lower right corner of the `Customer Record` area.

- **By Customer List:** Following a search using customer information (name, company, etc.) the set of matching customer records may be examined by clicking on the `Browse Customers` button. This will pop up a browse dialog box containing the alphabetical list of *matching* customers. Note that you can narrow the list quickly by using the box's search facility. In some circumstances this can be much more efficient than launching repeated searches of the SQL database.
- **By Record Number:** In addition, you may request specific customer records by entering their serial numbers in the `Customer ID` field. Click the mouse on the magnifying glass icon next to the field to retrieve the record.

Call Dialog

This section describes the techniques for creating and updating customer call records.

New Call Dialog

Whenever you display a customer record, *CBR Express* automatically sets up a new call record in case you need it. The new call appears with an automatic header declaring the time, date and current operator name. The `Call Record` field is editable, so you can click the mouse on any part of it and begin to type. The standard editing features (from the Edit menu) all operate in this field.

You can also initialize a call record at any time simply by clicking the mouse on the `New Call` button at the top of the `Call Record` field. This appends a new call record to the history of the current customer.

To save a call record, click the mouse on the `Save Call` button.

You may view, modify and save call records at any time.

Search for Call

There are two ways to locate previous call records for a customer:

- **By Call ID:** First, you may type in the call record number directly and search for it in the database. Just type the number into the `Call ID` field and click the mouse on the adjacent magnifying-glass icon. *CBR Express* will find the record and display it, along with the appropriate customer record.
- **By Browsing History:** The second approach assumes that you have identified the customer and have displayed the appropriate customer record. In this case, clicking the mouse on the << and >> buttons above the `Call Record` field lets you move back and forth through the customer's previous calls in chronological order.

If you are using SQL database support for call tracking, you will note a `Count` field in the upper right corner of the `Call Record` area. This tells you how many call records are logged for that customer.

CBR Express Search

The Tracking Panel and the Search Panel are integrated to permit an easy flow of information from one to the other.

The help-desk operator normally remains in the Tracking Panel while handling customer inquiries. Many inquiries may be handled without case-base searches particularly by experienced operators who have become trained by running previous searches.

When a search is required, however, simply call up the customer record and the appropriate call record (old or new). Then click the mouse on the `Search Case Base >` button at the bottom of the panel. *CBR Express* will take you to the Search Panel.

The technique for conducting a case-base search is described in the next chapter, and involves writing an initial description, answering various questions, and evaluating the results. When the search is complete, click the mouse on the `End Search >` button. *CBR Express* will shift back to the Tracking Panel, and will bring the entire text of the search with it. You will find the text on display in the `Call Record` field.

This text is for the operator's convenience, in that it copies the customer's complaint, the questions and their answers, the matching cases and their scores, and the recommended

actions. The text in this field may be annotated and edited in any way.⁴

Click the mouse on the *Save Call* button to make a permanent record of the search.

Call Status

Customer calls are not always resolved easily. Sometimes it is necessary to keep a call record "open" for some period of time.

When you save a call record, *CBR Express* attaches a status code to it based on the setting of the *Call Status* field next to the *Call Record* field. There are four status values:

- **Resolved:** This transaction is presumed to be closed. This is the final status of all calls, and is also the default setting for new calls.
- **Waiting:** If a call is listed as *waiting*, it means that the customer is waiting for someone to call back.
- **Follow Up:** Use this status when it is important to check on a customer's progress to be sure the advice was actually helpful.
- **Referred:** This status is for calls that have been referred to higher authority or to more expert operators for resolution. The Tracking Panel offers an additional field next to this button for the name of the person or department now responsible for resolving the call.

⁴ The *CBR Express* Reference Manual contains a section on how to customize this text to include only the information of use in your environment.

"Resolved" calls are presumed to be finished. Calls marked "waiting," "follow up," or "referred" are placed on the list of pending calls. To view the list of pending calls, click the mouse on the *Browse Pending Calls* button at the bottom of the panel. This feature allows you to review the backlog of open calls and to select a call to browse or edit. Remember the search feature and use it to narrow the list to those calls from a particular customer or those for a particular operator.

Tracking Report

The Tracking Report option pops up a dialog box for generating text reports about the current tracking base.

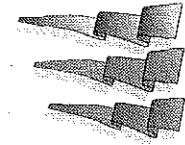
Tracking Report Dialog Box

If you are familiar with the Tracking Panel and its controls, the features of the Tracking Report dialog box will be self-explanatory, with minor exceptions:

- You may generate reports containing customer records only, or reports with customer records combined with call

records. Check the `Include Call Records` checkbox for the latter behavior.

- Every report is written out as a text file. The `Display in Notepad` checkbox allows you to edit the report in a Notepad window after it is written to disk.
- The `Search For` field and the adjacent `In Field` list box let you screen the customer and call records for particular strings. For instance, you could find all callers from a particular company or city. If you leave the `Search For` field blank, no screening is performed.



Searching the Case Base

This chapter presents an overview of the search process, and then delves more deeply into the techniques of performing effective searches.

We supply a selection of example case bases with *CBR Express* for you to experiment with. Go ahead and load them at any time to try out the search and case-definition features described here.

Search Overview

The object of a case-base search is to locate a case or set of cases that closely resembles the case described by the operator. This process requires several steps.

First, the operator types in a natural-language description of the current case. For a help desk, this would be a description of the customer's complaint or difficulty. *CBR Express* runs an initial search on this description alone, looking for cases whose descriptions are similar to it.

CBR Express typically returns the five closest cases and lists them in order on the Search Panel. Each case is displayed with its match score, a number between 0 and 100 that shows how nearly that case matched the search description. *CBR Express* also retrieves a set of questions for each of the five cases, and displays the combined set of questions on the panel. The questions serve to sharpen the focus of the search, and to help differentiate among the competing cases.

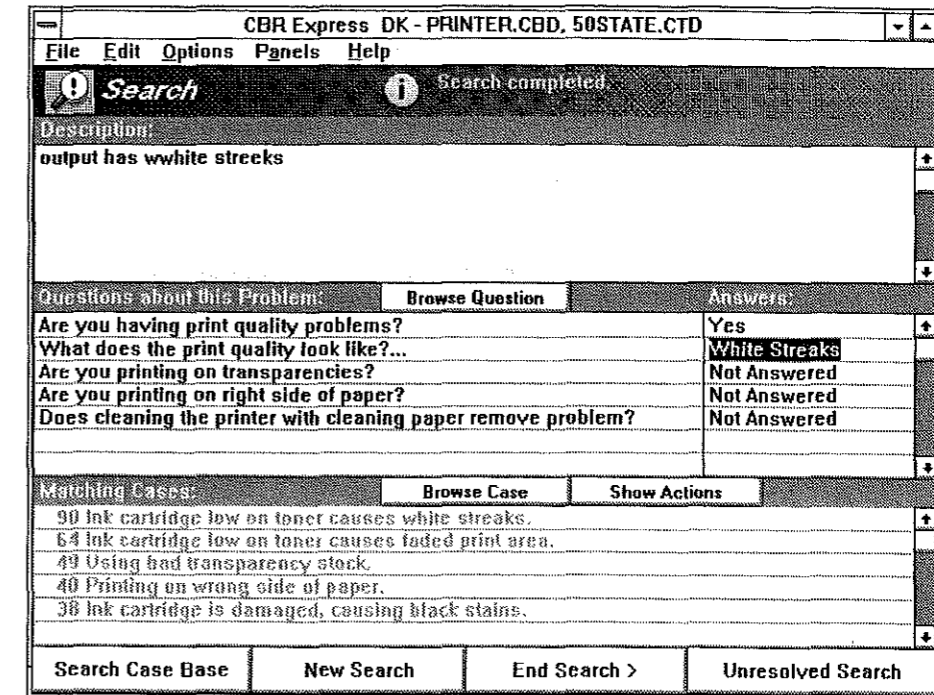
The operator then answers one or more of the questions. Each time a question is answered, *CBR Express* updates the search. The questions may be answered in any order, and it is not necessary to answer them all. The operator simply supplies the information that is readily available.

Some *CBR Express* applications naturally display the list of cases as the output of the search. Other applications emphasize recommended actions. The Search Panel accommodates both perspectives by letting you toggle between a display of cases and a display of actions associated with those cases.

During the second search, *CBR Express* finds the five cases that have the best match to the combined description and questions, and returns these to the Search Panel. As before, *CBR Express* augments the existing list of questions with additional questions drawn from the current list of matching cases.

Following each search, the list of matching cases is usually very similar to the previous list but with revised match scores. Typically, one or more of the cases will show an increased score, while the scores of other cases may have diminished. Some cases may have been eliminated entirely, permitting other cases to take their place in the "top five." This results in a new mix of questions to answer.

The operator continues to answer questions and search until one of the cases shows an acceptably high score, or until all pertinent questions have been answered. Then the operator browses the "winning" case(s) and their recommended actions. In a help-desk application, this information would then be relayed back to the customer. In more general applications, the "winning" cases might all be of interest to the operator, who might examine each case in turn to see how it could contribute to the current situation.



Search Panel

Writing the Description

The first task in performing a *CBR Express* search is to write a natural-language description of the current case. How do you write a description that will quickly locate the correct matches in the case base?

CBR Express uses a sophisticated text-matching algorithm to compare the description of the current case with the descriptions of the cases stored in the case base. This algorithm ignores most common words and concentrates on the more substantive and informative words in the description. *CBR Express* is configured for matching on

English (really American) text, but may be modified to accommodate other languages.

To write a good description, *use specific language*. For best results, there should be a well-understood set of terms and phrases that are used consistently throughout the case base and in the search descriptions. This standard does not need to be uncomfortably strict, but it helps if everyone uses the same words for the same things. For example, an application that identifies blood diseases should use a standard set of medical and biochemical terms known to the search operators.

It is also important to write a *full* description. State the situation completely and clearly, and resist the temptation to write descriptions that are extremely short. A two-word description, for instance, is likely to produce false matches because of insufficient information.

Searching

There are three ways to have *CBR Express* to conduct a case-base search:

- Simply type in the search description and then press the Enter key.
- Answer any question.⁵
- Click the mouse on the Search Case Base button.

The rest is automatic. *CBR Express* updates the list of five best-matching cases from the case base. In the process, it

⁵ This feature may be turned off from the Set Preferences dialog box if you would prefer to answer several questions between searches.

may replace some of the unanswered questions, and there may also be some new questions to examine.

Answering the Questions

After the initial search on the current case description, *CBR Express* will supply you with a list of questions to answer. These questions are collected from the current list of matching cases, and serve to differentiate these cases from one another. By answering some of the questions and searching again, you can quickly narrow down the field of possibilities.

The question list contains all of the questions associated with the five best-matching cases. Each question appears only once (no duplication), and with the most promising questions listed first.

Sometimes you will see questions in the list that don't seem pertinent to the current case. Just ignore them. The matching algorithm can produce false hits in certain cases, particularly if the search description was vague or very short, or if the case base happens to be very small. There is no penalty associated with leaving a question unanswered.

What if you don't understand the question? *CBR Express* provides a means to browse additional information about a question simply by double-clicking the mouse on it. This pops up either a scrolling text field to display a full explanation of the question or a graphic presentation about how to answer it.

Now, how do you answer a question? To change an answer, click the mouse on it. The Answers field will respond in one of four ways, depending on what type of answer is expected:

- **Yes or No** questions are answered by means of a dialog box containing buttons for Yes, No, and Not

Answered. Alternately, a faster method is to simply highlight the answer using the arrow keys, then set the answer in one step using Y for yes, N for no, and T for not answered. This method bypasses the dialog box for faster throughput.

- **List** answers pop up a dialog box containing a scrolling field of legal answers. Simply click the mouse on the answer you prefer, and click on the *Answer* button to confirm. This selects the answer and dismisses the box.
- **Numeric** answers pop up a dialog box for user input. This box accepts numeric values only, and enforces a maximum and minimum value limit on each question. Just type in the number and press the Enter key to dismiss the box. The numeric answer will appear in the scrolling answer field.
- **Text** answers pop up a dialog box containing an editable field. You may type unconstrained text in this field.⁶ When you are finished, press the Enter key to dismiss the box.

Notice that it is always possible to mark a question "Not Answered."

⁶ We have set a size limit of 4096 characters on the answer.

Interpreting the Results

A typical search session (multiple searches) takes less than a minute to perform. It consists of the initial search (on the description alone), followed by subsequent searches that include answered questions. Usually the best match is obvious almost immediately.



Note: Due to the case-matching algorithms, a match score of 100 (perfect match) is possible but unlikely. Although you can set an "acceptance threshold" at any arbitrary score, it is more appropriate to look for a case with a score that stands out from the others. A score of 50 may seem low, but if the competing cases have scores in the 20's and 30's then a score of 50 is well worth exploring. This is called "looking for the spike" by experienced *CBR Express* users.

CBR Express permits the operator some latitude in evaluating the results of the search. Both the matching cases and their recommended actions may be browsed from the Search Panel to be sure that they really apply well to the current case. This "browsing" may take the form of executing virtually any type of program, not just a text display or animation. A browse may bring up a spreadsheet, a word processor, an electronic mail program or just about anything.

Unresolved Searches

Sometimes the search operator cannot quite come to a resolution while searching the case base. In the early stages of case base development this is normal and to be expected. Case bases go through a "learning curve" just like people do, and at first there may be many practical situations that the case-base author was not able to predict.

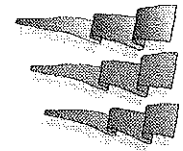
The search operator will be the one who finds these overlooked situations, and it is very valuable to be able to take a "snapshot" of the search panel for subsequent discussion. This is the purpose of the **Unresolved Search** button at the bottom of the Search Panel.

When the operator clicks the mouse on the **Unresolved Search** button, *CBR Express* makes a copy of the current state of the Search Panel and stores it. Depending on the preference of the case-base author, these copies may be stored directly in the case base or as local text files.⁷



Timesaver: Several *CBR Express* users have established a policy of submitting unresolved search reports *only* when the search operator knows what the correct answer should have been. Just type the answer into the search description field before sending in the unresolved search. This provides the case author with an incoming stream of prototype cases instead of a far larger volume of less-useful "mystery" reports.

⁷ When the case-base author clicks on this button in maintenance mode, *CBR Express* simply copies the Search Panel into the Case Panel for editing.



Building a Case Base

Before we can perform case-base searches, we must build a case base to search.

The mechanics of case definition are simple and easily mastered. It is a more subtle matter to correctly identify and describe the cases themselves. We address both subjects in this chapter.

On a higher level, case bases tend to conform to various styles of structure and behavior depending on their intended use. We will consider case base style later in this manual.



Note: See *Designing CBR Express Case Bases* from Inference Corporation for the advanced course in case-base design and maintenance. The current volume addresses the use of the case-building environment rather than design issues.

What is a Case?

First it is important to understand exactly what a case really is. In the mechanical sense, a case is a data object that has certain associated features. When we describe these

Identifying a Case

features on the Search Panel, *CBR Express* is able to retrieve the case for us.

If we don't put the right kind of information into that data object, it won't be very useful. How do we identify a case?

What is a case, and how do you recognize it?

Although *CBR Express* can be used to search any kind of case base, it is easiest to understand the basic principles of case definition in terms of a case-based help desk. We'll extend this discussion for more general applications in a moment.

Imagine a help-desk program to assist customers who have complaints about a small mechanical appliance, like a television or toaster. The customer phones in to speak to a help-desk operator and describes the symptoms of the problem. "The lights don't come on." It is the job of the operator (and *CBR Express*) to identify the problem, and to prescribe a solution. This is accomplished by recognizing the problem as a case that has been solved before.

For a help desk, it is best to regard the case as the *cause of a problem*. Each of the things that might go wrong with the device should be broken out to form a unique case. For instance, if the device fails to operate at all, there might be several different reasons. The power switch might be faulty. The device might not be plugged in. The fuse inside the machine may have blown. The circuit breaker in the building might have tripped. Each of these possibilities should be written up as a distinct case.

In a more general type of case base, a "case" is simply anything that you want the operator to be able to find. A case might correspond to a law, a legal precedent, a building permit, a chemical formula, or a criminal's *modus operandi*. The key is that a case is something that is useful to the operator. If it isn't going to be useful, don't put it in. There is no point in slowing down the search with "cases" that have no utility.

We stress this point, that a case must be useful to the operator, because we sometimes see new users filling the

case base with case definitions that have no special significance, and that often overlap and duplicate the same information. Here is a useful rule of thumb:



Timesaver: *Try out your case as a search first.*⁸ If the case base finds a very close match to your proposed case, don't enter it. There is no sense filling the case base with duplicate cases.

The Case Title

The case title is a one-line phrase that uniquely identifies the case. It is very similar to the title of a book or a report.

The title should be carefully chosen. It should accurately identify the case by emphasizing the unique feature that makes the case important. The title will be on display on the Search Panel, and that single line of text must communicate effectively to the search operator. It is also important to edit the title carefully for spelling and grammatical errors. Textual irregularities really stand out when a list of case titles flashes up on the Search Panel.



Timesaver: The title of a case becomes part of the case description for purposes of searching. This means that it is not necessary to retype information in the Description field if it is already present in the case title. In some cases, the title alone might be sufficient and no further description would be required.

⁸ The Test Case> button on the Case Panel is there explicitly for this purpose.