BCC SOFTWARE

BCC Presort | Label Studio

Database Prep: Guide to Input and Output Files

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Contents

Introduction

This manual is a training aid and reference document that explains how to prepare your databases for Presort. We assume that you are familiar with your operating system, text editor, and database manager or other list-management program.

Presort

Presorting is the task of sorting mail and preparing it in containers so that it can be transported through the postal system. It's called *pre*sorting because you sort the mail before you submit it to the U.S. Postal Service (USPS) instead of paying them to sort it.

A presort scheme is a set of USPS rules for presorting. There are several schemes for each class of mail and type of mail piece. Each scheme is linked with a particular type of container (trays, sacks, or pallets) and a range of postage rates. When you run Presort, it plans for you how packages and containers are formed, according to the USPS scheme rules. Every package and container has a destination—either a local office or a larger, central facility—and a label or mark that identifies that destination. When it reaches its destination, the package or container is opened and processed—perhaps for further routing, and eventually for delivery.

Label Studio

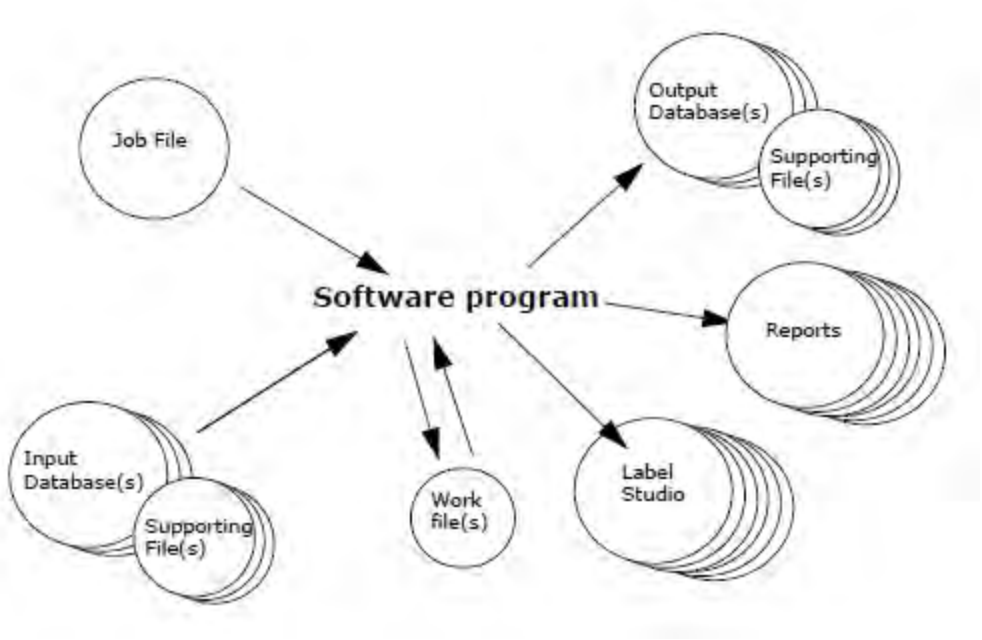
Label Studio is a design tool that takes your input files and outputs customized labels. It is a perfect fit with our other database and mailing-list management and production products.

With Label Studio, you can set up your job file, set up your printers, design and print your labels (address, container, pallet, or generic), and print your reports. In addition, you can split your output into multiple output files by creating unit and/or sub-unit breaks.

Label Studio works with many different Windows and UNIX printer drivers and ink jet printer drivers, or you can use a Generic Text driver.

Input files and input file results

This section provides a brief overview of input, output, and work files, as well as the databases that the software can process and the types of supporting files used by the software.



Input files

The following is a brief overview of the input files.

File	Description
Job File	A job file contains all of your instructions, such as where to find the list(s), what sort of processing to perform, which reports and outputs to create, and where to place them. You'll find information about job files in your program manuals.
Input database	Usually, the input database is a file of names, addresses, and other data. See Databases that the software can process for more information about the types of input databases that the software accepts.
Supporting file	Most of this manual is about the supporting files and how to create them. Supporting files are also known as format files and definition files. By describing the input database, these supporting files help the software to open and read data from the database.

Output files

The following are the output files that result from processing.

File	Description
Output databases	Presort can create output databases—that is, databases of processed names and addresses. Presort creates databases of container and pallet information in addition to arranging your databases into the presort order you have chosen. The format and content of output files is up to you. When the software produces an output database, it automatically creates supporting files to go with it. This makes it easier to prepare the output of one software program for input to the next program.
Reports	All of the software programs prepare plenty of reports, which document your job processing results in many different ways. For example, some reports present statistics for use by your management or your clients; some are facsimiles of USPS forms for submission with mailings. Most users instruct the software to save reports in files. You can then read reports on your screen or send them to your printer. Be sure to check reports from one process and verify good results before generating reports for several processes.
Labels	Label Studio creates address, container, and pallet labels. You can send the output directly to your printer, or save it to a disk for later printing.

Work files

During processing, the software programs create work files, which contain statistics and other information about your job. Most work files are unreadable except by the software. Consider the following points about work files:

- Before processing, make sure that you have enough free disk space for the software to create the work files. In your job file, you can tell the software where to place the work files.
- Sometimes, the software deletes the work files itself after processing. Other times, you must delete the files yourself.

Databases that the software can process

As shown in the following table, the software programs process the following file types; the software also supports file-type conversions. You can input one file type, and output records to a different type of file. For details about conversions, see Convert database types and format.

File type	Supporting files required	For more information, see
dBASE3	Definition (*.def*) only	Definition files (DEF)
delimited	Format (*.dmt*) and Definition (*.def*)	Delimited format files for delimited ASCII Definition files (DEF)
ASCII	Format (*.fmt*) and Definition (*.def*)	Format files for fixed-length ASCII and fixed-length EBCDIC Definition files (DEF)
EBCDIC	Format (*.ebc*) and Definition (*.def*)	Format files for fixed-length ASCII and fixed-length EBCDIC Definition files (DEF)

Note: If you process a database that is not listed above, first consider if the file can be exported or converted (by other software) to one of the file types that the software does support. Many users do this, exporting their special files as fixed-length ASCII text. However, the conversion process takes time and disk space.

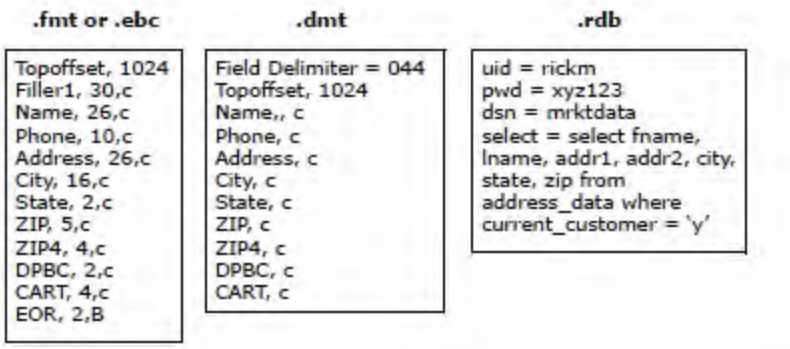
Supporting file types

The software works with two types of supporting files: format files and definition files.

Format files

The format file is a physical description of the input data. In this file, you tell the software some very basic information about each field.

There are three different types of format files that Presort accepts: *.fmt, .ebc,* and *.dmt.* For information about which databases require format files, see Supporting file requirements.



Purposes of definition files

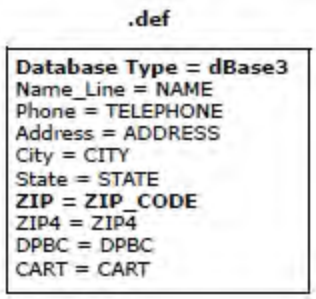
No matter what type of database you are processing, Presort always requires a definition file. Consider the following points regarding definition files:

- You must specify to Presort what type of database you are processing. Presort cannot determine the database type itself.
- Presort does not guess field names, so the definition file sets higher-level information about fields. In this file, you instruct Presort how you want it to interpret and work with your fields.

Definition files contain PW fields mapped to your database; the PW fields act as translators for Presort. In the definition file, you specify the names of your fields and the names Presort uses for those fields.

Note: Refer to the *Quick Reference for Views and Job File Products* for a list of PW fields. This guide provides details about these fields as well as guidelines for use.

For example, suppose that your database includes a field named ZIP_CODE. Presort does not recognize that name or know what to do with that field. So, in your definition file, you link this field to a name that Presort does recognize, such as ZIP.



Now Presort knows your ZIP_CODE field by the alias ZIP, and Presort knows what to do with the field, such as receive a ZIP Code from it or perhaps populate a ZIP Code into it.

Supporting file requirements

The supporting files that you need to create depend on the type of database. The following table describes the file types and their required supporting files.

File type	Supporting files required	For more information, see
dBASE3	Definition (.def) only	Definition files (DEF)
delimited	Format (.dmt) and Definition (.def)	Delimited format files for delimited ASCII Definition files (DEF)
ASCII	Format (.fmt) and Definition (.def)	Format files for fixed-length ASCII and fixed-length EBCDIC Definition files (DEF)
EBCDIC	Format (.ebc) and Definition (.def)	Format files for fixed-length ASCII and fixed-length EBCDIC Definition files (DEF)

Databases that Presort can process

This section provides information about dBASE3 and compatible databases, variable-length, delimited ASCII text files, fixed-length ASCII or EBCDIC text files.

dBASE3 and compatible databases

Presort can process databases produced by dBASE, versions III, III+, and IV. Whenever you must identify your database type, use dBASE3. By convention, dBASE3-compatible files have the filename extension *.dbf.*

The following database programs are claimed by their manufacturers to be compatible with dBASE3. To that extent, they should be compatible with the software. Note that we make no warranty about such compatibility.

- Alpha Three, Alpha Four, and Alpha Five by Alpha Software Corp.
- Clipper by Nantucket Corp.
- FoxBASE and FoxPro by Fox Software
- Quicksilver by Wordtech Systems, Inc.

If you use Microsoft Access, use the Export feature to create a copy of your database that is dBASE3-compatible. Then run the copy through the software.

dBASE3 features that Presort supports

Presort can read input from dBASE3 files. When producing output, Presort can create a new dBASE3 file or append records to the end of an existing database. Another option, referred to as Input Posting, uses Presort results to update the same file that you input. See the *Presort User Guide* for details about Input Posting.

Presort conforms to the file standards of dBASE3. Each record may contain up to 4,000 bytes in up to 128 fields. Numeric fields cannot exceed 19 bytes. Note that some compatible database programs produce non-compatible database files. FoxPro, for example, supports some fields that are not supported by dBASE3. It also allows for more bytes in more fields than dBASE3.

Nondestructive delete markings

Presort supports nondestructive delete markings in any dBASE3 file. Presort automatically ignores deleted records. Label Studio gives you the option of processing deleted records or ignoring them.

Presort does not support Memo fields. Also, Presort does not work with indexes, so Presort processes records in their physical sequence.

dBASE3 input

You do not need to provide Presort with a physical description of the file; in other words, you do not have to create a format file. Presort receives field name, length, and type information from the dBASE3 header. (A header is a section at the top of a dBASE3 file, not normally displayed to users.) However, you are required to provide a supporting definition (DEF) file. For more information, see Definition files (DEF).

dBASE3 output

Presort can create a new dBASE3 file for output or append processed output records to the end of an existing database. When you create a new file, you may specify the name, length, and type of each field, which you will specify in your job file. The following table shows the field type and length rules. Consider the following field name rules:

- The maximum name length is 10 characters.
- The first character must be a letter.
- The only punctuation mark permitted is the underscore (_).

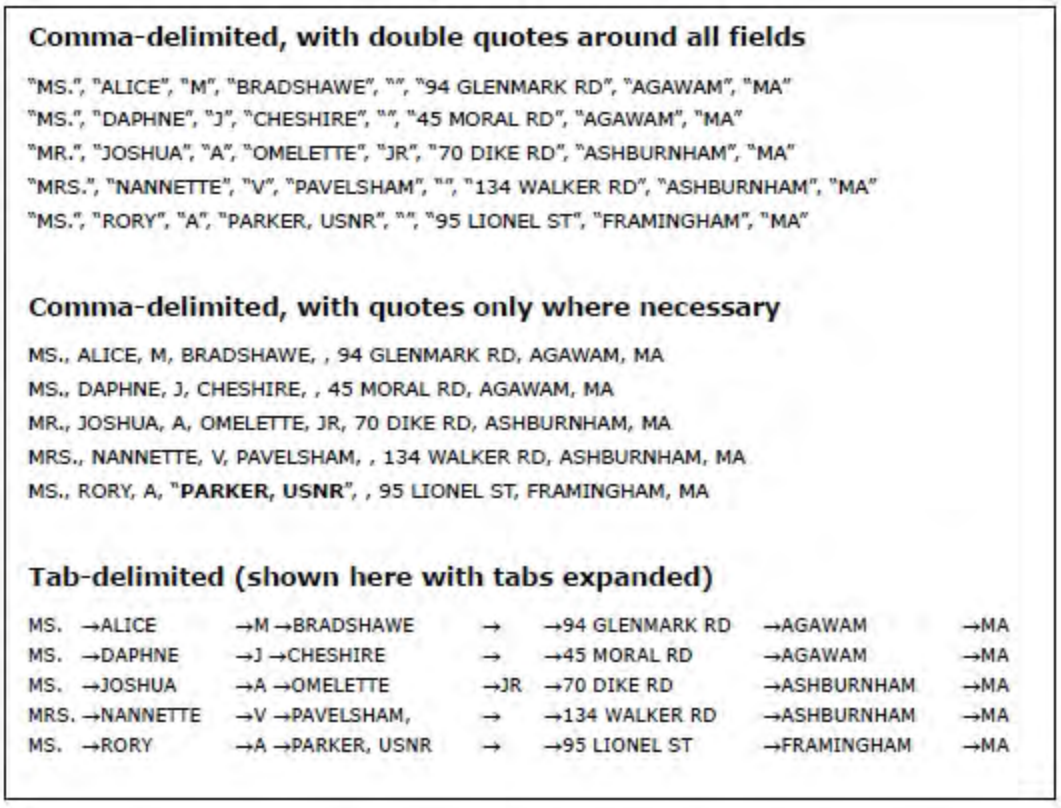
Field type	Length	Comments
Character	1-254	Also called alphanumeric. Data is left aligned and right-filled with spaces.
Numeric	1-19	One byte is reserved for the sign (positive + or minus –), so the field length is actually 19 plus 1 for the sign. Also, if there is a decimal point, it will physically occupy 1 byte, and there must be at least 1 digit to the left of the decimal point. Not suitable for ZIP or ZIP4 fields, because leading zeroes are removed (for example, ZIP 07960 would become _7960.
Date	8	Format is yyyymmdd.
Logical	1	May contain T/F or Y/N.

When Presort creates a dBASE3 file, it enforces dBASE3 rules. If your output-file specifications do not conform to dBASE3 standards, Presort issues an error message.

Presort automatically creates a definition file to go with your new dBASE3 output file; this definition file contains the database type only. If you are going to use the definition file for input to another program, remember to include other information before using it. For more information, see Definition files (DEF).

Variable-length, delimited ASCII text files

In a delimited file, fields or records vary in length. To find where one field or record ends and another begins, Presort looks for special, separating characters called delimiters. The following illustration shows a few of the most common styles.



Comma-delimited, with double quotes around all fields

"MS.", "ALICE", "M", "BRADSHAWE", "", "94 GLENMARK RD", "AGAWAM", "MA"
"MS.", "DAPHNE", "J", "CHESHIRE", "", "45 MORAL RD", "AGAWAM", "MA"
"MR.", "JOSHUA", "A", "OMELETTE", "JR", "70 DIKE RD", "ASHBURNHAM", "MA"
"MRS.", "NANNETTE", "V", "PAVELSHAM", "", "134 WALKER RD", "ASHBURNHAM", "MA"
"MS.", "RORY", "A", "PARKER, USNR", "", "95 LIONEL ST", "FRAMINGHAM", "MA"

Comma-delimited, with quotes only where necessary

MS., ALICE, M, BRADSHAWE, , 94 GLENMARK RD, AGAWAM, MA
MS., DAPHNE, J, CHESHIRE, , 45 MORAL RD, AGAWAM, MA
MR., JOSHUA, A, OMELETTE, JR, 70 DIKE RD, ASHBURNHAM, MA
MRS., NANNETTE, V, PAVELSHAM, , 134 WALKER RD, ASHBURNHAM, MA
MS., RORY, A, "**PARKER, USNR**", , 95 LIONEL ST, FRAMINGHAM, MA

Tab-delimited (shown here with tabs expanded)

MS.	→ALICE	→M	→BRADSHAWE	→	→94 GLENMARK RD	→AGAWAM	→MA
MS.	→DAPHNE	→J	→CHESHIRE	→	→45 MORAL RD	→AGAWAM	→MA
MS.	→JOSHUA	→A	→OMELETTE	→JR	→70 DIKE RD	→ASHBURNHAM	→MA
MRS.	→NANNETTE	→V	→PAVELSHAM,	→	→134 WALKER RD	→ASHBURNHAM	→MA
MS.	→RORY	→A	→PARKER, USNR	→	→95 LIONEL ST	→FRAMINGHAM	→MA

Delimiters

The following table contains descriptions of the three types of delimiters.

Delimiter type	Description
Record	A record delimiter separates one record from another; it is almost always an end-of-line mark. An end-of-line mark may be a linefeed character or carriage-return and line-feed pair.
Field	A field delimiter separates one field from another. The most common characters used are either a comma or a tab.

Framing	Field-framing delimiters are helpful when there is punctuation within a field that might be mistaken for a field delimiter. For example, “Manager, Sales.” The most common framing character is the double-quote. Some programs place quotes around every field; other programs use quotes only where necessary.

Delimited input

Presort can read input from delimited ASCII files. However, some supporting utilities cannot accept delimited input, including ZipCount.

You are required to provide two supporting files: delimited format (DMT) and definition (DEF). These files provide information about how to read the delimited file. The delimited format file is explained in Delimited format files for delimited ASCII and the definition file is explained in Definition files (DEF).

By default, Presort expects the most common types of delimiters: carriage return/line-feed between records, commas between fields, and double-quotes for framing. If your file is different—other characters are used, or one of the delimiter types is not used—then you must inform Presort by specifying the delimiter characters in your delimited format file. For instructions, see Delimited format files for delimited ASCII

Presort limits the number of fields per record and the total number of characters per record to 32,767. In theory, you could have one field of 32,767 characters, or 32,767 fields of 1 character each.

The Input Posting feature is not available for delimited input files; in other words, you cannot write the software results back to a delimited input file. Note that this is possible with all other database types.

Delimited output

When producing output, Presort can create a new delimited file or append records to the end of an existing file. When you choose to create a new file, you specify its format through settings in your job file. You may specify each field, but you may not specify delimiters.

By default, the delimited output file contains carriage return/line feed for record delimiters; commas for field delimiters; and double quotes for field-framing characters. If you want delimiters other than the defaults, see Create a delimited file with nonstandard delimiters for instructions.

Presort automatically creates definition and delimited format, and index (IDX) files to go with your new delimited output file. These supporting files are important if you use the file for input to another software program. The IDX file is an index that enables other programs to process the database much more quickly.

Fixed-length ASCII and EBCDIC text files

In a fixed-length file, each field must be the same length in every record, and all records must be exactly the same length. To find where one field or record ends and another begins, Presort simply counts characters. The following example shows part of a fixed-length file as seen using a text editor.

```
MS. ALICE       MBRADSHAWE              94 GLENMARK RD   AGAWAM         MA
MS. DAPHNE      JCHESHIRE               45 MORAL RD      AGAWAM         MA
MS. JOSHUA      AOMELETTE         JR    70 DIKE RD       ASHBURNHAM     MA
MRS. NANNETTE   VPAVELSHAM,             134 WALKER RD    ASHBURNHAM     MA
MS. RORY        APARKER-JONES           95 LIONEL ST     FRAMINGHAM     MA
```

When the data is shorter than the space allotted for it, Presort inserts extra spaces to fill the gap. Note that in the following example, the dots represent the extra spaces.

```
MS. ALICE.......  MBRADSHAWE.........  94 GLENMARK RD..  AGAWAM......  MA
MS. DAPHNE......  JCHESHIRE..........  45 MORAL RD.....  AGAWAM......  MA
MS. JOSHUA......  AOMELETTE......JR...  70 DIKE RD......  ASHBURNHAM..  MA
MRS. NANNETTE...  VPAVELSHAM,.........  134 WALKER RD...  ASHBURNHAM..  MA
MS. RORY........  APARKER-JONES.......  95 LIONEL ST....  FRAMINGHAM..  MA
```

Whenever you view a fixed-ASCII or EBCDIC file using a text editor, the fields should line up in neat columns. If they don't line up, there may be a flaw in the database itself or an error in the format information (format file). The following example shows a file with an error in the format information; notice that the columns aren't lined up.

```
MS. ALICE          MBRADSHAWE                  94 GLENMARK RD        AGAWAM                  M
AMS. DAPHNE          JCHESHIRE                   45 MORAL RD           AGAWAM
MAMR. JOSHUA           AOMELETTE             JR    70 DIKE RD            ASHBURNHAM
  MAMRS. NANNETTE        VPAVELSHAM,               134 WALKER RD          ASHBURNHAM
  MAMS. RORY               APARKER-JONES           95 LIONEL ST            FRAMINGHAM
     MA
```

Delimited vs. fixed-length

If you have a choice of storing your records in delimited or fixed-length format, consider these points:

- Delimited files require less disk space for the same data, but disk space is relatively inexpensive.
- Delimited files can be much slower to process because Presort must scan for delimiters.
- You cannot post to a delimited input file.
- In a fixed-length file, Presort can simply count characters, which is much faster.
- Some utilities cannot support delimited file types and ASCII files.

Fixed ASCII and EBCDIC input

Presort can read input from fixed-length ASCII and EBCDIC files. You are required to provide two supporting files, called format and definition. These files provide Presort with information about how to read the database. For information about format files, see Format files for fixed-length ASCII and fixed-length EBCDIC. For information about definition files, see Definition files (DEF).

Presort limits the number of fields per record, and the total number of characters per record, to 32,766. In theory, you could have one field of 32,766 characters, or 32,766 fields of one character each.

Presort can read only printable characters. Presort reads any non-printable characters as blanks or converts them to some other character or output rather than a blank. There are exceptions to this, however. For information about these exceptions, see Packed numeric fields and Binary field.

The Input Posting feature is available for fixed-length input files. In other words, you can write Presort results back to an input file. For more information, refer to the *Presort User Guide*.

Fixed ASCII and EBCDIC output

When producing output, Presort can create a new fixed-length ASCII or EBCDIC file, or append records to the end of an existing file. When you choose to create a new file, you may specify the name, length, and data type of each field. You specify this information in your job file.

Presort automatically creates format files and gives you the option to create definition files to go with your new fixed ASCII or EBCDIC output file. These supporting files are important if you are going to use the file for input to another program.

Format files for fixed-length ASCII and fixed-length EBCDIC

This section provides an introduction to format files and guidelines for creating format files. The chapter also provides information about the FirstPrep program and how to define fields in your format file.

Introduction to format files

A format file is a physical description of a database. Format files contain information about the record layout, including each field's name, length, type, and format.

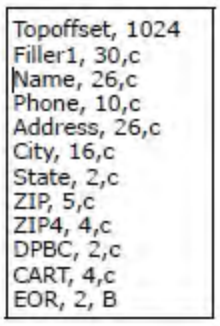
When you process a dBASE3 file, you do not need a format file; Presort can get format information from the header that every dBASE3 file contains. However, a format file is required for most other database types.

Important: In order for the software to correctly read your database, the format file must be accurate. If you do not define and correct errors in format files, they may cause delays in processing.

Matching input with a format file

A format file is external and is a separate file from the database, so you must help Presort match each input database to a format file. There are three ways to do this:

- You can make an individual format file compatible with each database that you process. Based on the name and location of the database, Presort will find the format automatically. Be sure to place the format file in the same directory as the database. For example, for the database *c:\data\myfile.dat*, the format file is *c:\data\myfile.fmt*.



- If all the databases you process are in the same format, then you can save some time by making one master format file and applying it to all of your databases. This feature is called Default ASCII FMT; if the application supports this, look for it in the Auxiliary Files block in your job file.

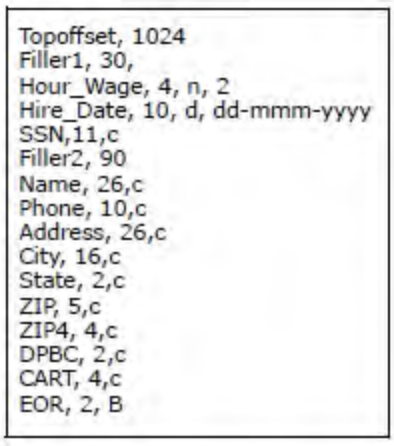
- Perhaps most of your databases are in standard format, but you may process a few exceptions, too. In that case, set up a default format file and apply it to the standardized files. For the others, create individual format files. Where Presort finds an individual format file, it will override the default format file.

Create format files

Follow these guidelines when you create format files.

Lines

As shown in this example, list fields one field per line in the order that they appear in records. On each line, type the name, length, and data type of one field; be sure to place a comma between these items. For more information, see Define fields in your format file.



Spaces and field names

Presort does not require spaces between items; if you use extra spaces, Presort ignores them. Do not use spaces within field names. Consider the following rules regarding field names.

- Make every field name unique.
- Field names must conform to dBASE3 rules. Maximum name length is 10 characters, which refers to name length, not field length. The first character must be a letter. The only punctuation mark that you may use in field names is the underscore (_). You may not use spaces in names.
- Capitalization of field names is optional; however, field names are not case sensitive. For example, no format file should have both zip and ZIP fields because Presort would consider these two to be the same fields.

- For your ZIP+4 field, use the name ZIP4, and leave out the plus sign.
- To prevent confusion, you may find it helpful to use the same names for your fields that we use for PW fields. Definition files use PW fields to translate your database field names and formats into something that Presort can recognize and process. Refer to the *Quick Reference for Views and Job File Products* for a list of field names.

Text files

Format files are small text files. They must contain only ordinary characters, such as printable ASCII. If you use a word processor to type a format file, be sure to save the format file as straight text, not as a word processing document.

File name and location

Place the format file in the same directory as the database. For example, for the database *c:\data\myfile.dat*, the format file would be *c:\data\myfile.fmt*.

Define fields in your format file

This section explains how to type the lines of your format file and applies whether you create format files through the FirstPrep utility or a text editor. To add fields to your fixed-length ASCII or EBCDIC format file, you must first type the name of the field followed by a comma, the length of the field followed by a comma, and the type of field. Note that there may be a fourth element, such as a date format or a number for decimal point position.

Topoffset field for file header

If there is a header at the top of the file, Presort must skip over this to find the first real record. Add a *topoffset* line at the beginning of your format file, along with the length of the header in bytes. Keep in mind that this field is an exception to the format described above for typing the actual lines of your format file.

Topoffset is a special name recognized by Presort, so spelling is important. For example:

```
TOPOFFSET, 1024
```

Character fields

Character fields may contain any printable letters, numbers, or punctuation marks. Mark character fields with a "C". For example:

```
NAME_LINE,30,C
```

```
ADDRESS,30,C
```

```
CITY,20,C
```

Numeric fields

Mark numeric fields with an "N". The fourth element in this example is the number of decimal places. For example:

```
BALANCE,7,N,2
```

Date fields

When you set up a Date field, you must also declare its format. Mark date fields with a "D". For example:

```
HIRE_DATE,11,D,mmm-dd-yyyy
```

The default date format is mm/dd/yy.

Format entry	Example of data
mm/dd/yy	09/13/14 (default)
mm-dd-yy	09-13-14
mmm-dd-yyyy	Sep-13-2014
yyyy-mm-dd	2014-09-13
yy/mm/dd	14/09/13

Consider these points when working with dates in your databases.

- If you have a field that contains a date, use a "D" for date instead of a "C" for character.
- A field that contains a date isn't necessarily a date field unless you use a "D" to set it up as a date

field.

Logical fields

Logical fields represent a True or False, Yes or No value. A logical field should be one byte long. Your format entry might look like this:

```
SUBSCRIBER,1,L
```

Consider these rules regarding Logical fields in ASCII and EBCDIC files:

- When presenting an input file containing a Logical field, that field may contain the letter “T” or the letter “Y” to indicate a Logical value of True. The software interprets any other value in the field as a Logical value of False.
- When an ASCII or EBCDIC output file includes a logical field, the software represents a Logical value of True by placing a character “T” in the output field. The software represents a Logical value of False with the letter “F”.
- If you use a Logical field in a filter or function (see Filter and function expressions), remember that you are manipulating Logical values of True and False, not the letters T, F, Y, or N.

For example, if Subscriber is labeled a Logical field in your format file, then this input filter would work to input only True records:

```
+ Input Filter (to 512 chars)....= DB.Subscriber
```

However, the following filter would not work, because you would be comparing a Logical True/False with the Character-type constant “T”:

```
+ Input Filter (to 512 chars)....= DB.Subscriber = "T"
```

Packed numeric fields

Presort marks packed numeric fields with a "P". When you specify a packed numeric field, be sure to specify the unpacked length. For example:

```
ACCOUNT,8,P,15
```

The fourth element is the number of unpacked digits. If you omit this number, Presort assumes that the number is twice the field length, minus one. A packed numeric field should only contain integers (no hyphens, slashes, or decimals, for example).

Note: Do not confuse this field type with the IBM packed decimal. When Presort unpacks fields, it does not insert a physical decimal point. This treatment is acceptable for integer numbers, such as ZIP Codes; however, do not process any field that contains a true decimal number.

Binary fields

If any field contains unprintable data—characters outside the printable ASCII set—set up that field as binary type. In your format file, mark binary fields with a "B". For example:

```
BIT_MASK,16,B
```

Binary fields do not need to literally contain binary data. Consider the following points about binary fields:

- Binary fields can be passed through Presort —copied from an input to an output file—undisturbed.
- An end of record (EOR) field, which is a mark that may consist of a line-feed character or a carriage-return and line-feed pair, should be binary because EOR characters are unprintable (^CR and ^LF). For example:

  ```
  EOR,2,B
  ```

- Presort cannot process or display a binary field; it can use only printable characters for input data. When Presort reads data from a binary field and converts it to character data, it converts any unprintable characters to blank spaces.

Filler fields

When you want Presort to ignore a field, refer to it as "filler". Presort does not process or display filler fields, so filler is an appropriate field type for confidential fields (salary, for example) or any unused field.

Each filler field must have a unique name. After the word “filler”, add a suffix of up to four letters or numbers—for example, filler1, filler2, and so on. Do not be concerned about getting your filler fields in any particular order; however, be sure to uniquely name each field. For example:

```
FILLER1234,89,B
```

If you omit the data-type letter, Presort will by default handle your filler field as binary-type data.

Important: If you are defining filler or binary fields and you are planning to convert your ASCII input to dBASE3 output, see Binary and filler fields.

End-of-record field (EOR)

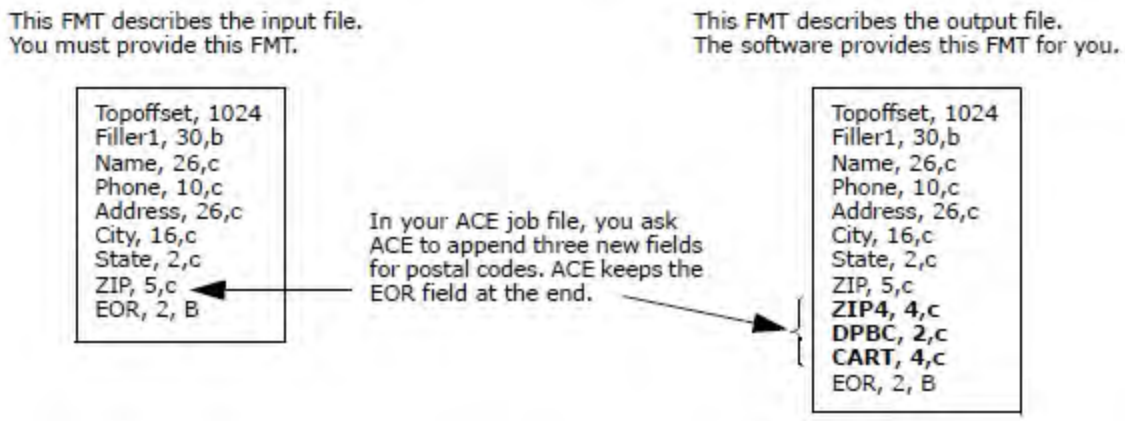
Your ASCII or EBCDIC database may contain end-of-record marks. The mark may consist of a line-feed character, or a carriage-return and line-feed pair. Many ASCII and EBCDIC databases contain these characters, because without them, records would be difficult to display and read.

If your file contains end-of-record marks, set up a field named "EOR". On DOS systems, the field usually should be 2 characters long; on UNIX systems, it should be 1 character long. Be sure to use a "B" for binary when you define the EOR field. For example:

```
DOS: EOR,2,B
```

```
UNIX: EOR,1,B
```

Presort recognizes the field name EOR. This is important if you use the input-file cloning feature, then append more fields.

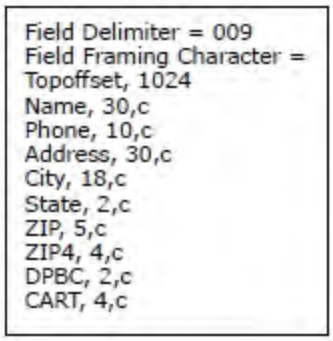


Delimited format files for delimited ASCII

This section provides an introduction to delimited format files and guidelines for creating them. It also provides information about defining fields in your delimited format file and about setting up the delimited characters.

Introduction to delimited format files

When you process a variable-length, delimited (DMT) ASCII database, Presort requires a delimited format file. They are called DMT files because of the file-name extension *.dmt* assigned to them.



The delimited format file is external, meaning that it is separate from the delimited file itself. The delimited format file is a physical description of a delimited file and includes information about the record layout, including each field's name, type, and format.

Important: For Presort to correctly read your delimited file, the file must be accurate. If you do not define and correct errors in delimited format files, they may cause delays in processing.

Delimited format vs. format

A delimited format file is similar to a format file. However, consider the following differences:

- In delimited format files, you may define character, date, and numeric fields. However, you may not use some other field types that are possible in format files, such as: packed numeric, binary, filler, and EOR.
- In a format file, you must provide the length of each field. In a delimited format file, you should specify a length because Presort will run faster; however, this is optional. For more information see Maximum field length.
- In a format file, you can set up a special field called end of record (EOR). In a delimited format

file, it's managed differently, with a parameter called **Record Delimiter**.

- You can create format files using the FirstPrep utility, a text editor, or a word processing program.

Create delimited format files

Follow these guidelines when you create delimited format files.

Lines

As shown in this example, list the fields in the order that they appear in your records, one field per line. On each line, type the name, maximum length (optional), and data type of one field. Sometimes, there is a fourth element, such as a date format or a number for decimal point position. Place a comma between items.

```
Topoffset, 1024
Hour_Wage, 6, n,2
Hire_Date, 10, d, dd-mmm-yyyy
SSN,11,c
Name, 30,c
Phone, 10,c
Address, 30,c
City, 18, c
State, 2, c
ZIP, 5,c
ZIP4, 4,c
DPBC, 2,c
CART, 4,c
```

Spaces and field names

Presort does not require spaces between items; if you use extra spaces, the software ignores them. Also, do not use spaces within field names. Consider these rules regarding field names.

- Make every field name unique.
- Field names must conform to dBASE3 rules. Maximum name length is 10 characters, which refers to name length, not field length. The first character must be a letter. The only punctuation mark that you may use in field names is the underscore (_). Do not use spaces in names.
- Capitalization of field names is optional; however, field names are not case sensitive. For example, no delimited format file should have both zip and ZIP fields.
- For your ZIP+4 field, use the name ZIP4, and leave out the plus sign.

- Use the same names for your fields that we use for PW fields. Definition files use PW fields to translate your database field names and formats into something that Presort can recognize and process. Refer to the *Quick Reference for Views and Job File Products* for a list of Presort field names.

Text

A delimited format file is a small text file. They must contain only ordinary characters, such as printable ASCII. If you use a word processor to type a delimited format file, be sure to save the delimited format file as straight text, not a word processing document.

File name and location

Give your format file the *.dmt* extension and the same base file name as the delimited file that it describes. Place the delimited format file in the same directory as the delimited file. For example, the delimited file *c:\data\myfile.txt* requires the format file *c:\data\myfile.dmt*.

Define fields in your delimited format file

This section explains exactly how to type the lines of your delimited format file.

Topoffset field for file header

If there is a header at the top of the file, Presort must skip over this to find the first real record. Add a *topoffset* line at the beginning of your format file, along with the length of the header in bytes. Keep in mind that this field is an exception to the format described above for typing the actual lines of your format file.

Topoffset is a special name recognized by Presort, so spelling is important. For example:

```
TOPOFFSET, 1024
```

Character fields

Character fields may contain any printable letters, numbers, or punctuation marks. If you wish, you can mark character fields with a "C". If you omit the letter, Presort assumes that the field type is character. Consider the following example:

```
NAME_LINE,30,C
```

```
ADDRESS,30,C
```

```
CITY,18,C
```

The length mentioned in a delimited format file entry is the maximum length. For more information, see Maximum field length.

Numeric fields

A numeric field is marked with an "N". For example:

```
BALANCE,7,N
```

Date fields

When you set up a Date field, you must also declare its format. Mark date fields with a "D". For example:

```
HIRE_DATE,11,D,mmm-dd-yyyy
```

The default date format is mm/dd/yy.

Format entry	Example of data
mm/dd/yy	09/13/14 (default)
mm-dd-yy	09-13-14
mmm-dd-yyyy	Sep-13-2014
yyyy-mm-dd	2014-09-13
yy/mm/dd	14/09/13

Consider these points when working with dates in your databases.

- If you have a field that contains a date, use a "D" for date instead of a "C" for character.
- A field that contains a date isn't necessarily a date field unless you use a "D" to set it up as a date field.

Logical fields

Logical fields represent a True or False, Yes or No value. A logical field should be one byte long. Your format entry might look like this:

```
SUBSCRIBER,1,L
```

Consider these rules regarding Logical fields in ASCII and EBCDIC files:

- When presenting an input file containing a Logical field, that field may contain the letter “T” or the letter “Y” to indicate a Logical value of True. The software interprets any other value in the field as a Logical value of False.
- When an ASCII or EBCDIC output file includes a logical field, the software represents a Logical value of True by placing a character “T” in the output field. The software represents a Logical value of False with the letter “F”.
- If you use a Logical field in a filter or function (see Filter and function expressions), remember that you are manipulating Logical values of True and False, not the letters T, F, Y, or N.

For example, if Subscriber is labeled a Logical field in your format file, then this input filter would work to input only True records:

```
+ Input Filter (to 512 chars)....= DB.Subscriber
```

However, the following filter would not work, because you would be comparing a Logical True/False with the Character-type constant “T”:

```
+ Input Filter (to 512 chars)....= DB.Subscriber = "T"
```

Maximum field length

When you specify length in a delimited format entry, this is the maximum length. Presort stops reading an input field when it reaches your limit or the field delimiter. In effect, excess input data is ignored.

Length is optional in delimited format entries. You may omit it if you would like Presort to read entire fields, regardless of length. However, keep the comma as a placeholder. For example:

```
NAME_LINE, ,C
```

```
BALANCE, ,N,2
```

```
HIRE_DATE, ,D,mmm-dd-yyyy
```

NOTE Be sure to set a maximum field length. If you do not specify a maximum length, Presort takes more time to process the input file because Presort checks each record to determine the maximum length of the field.

Set up the delimiter characters

In a delimited file, there may be up to three types of delimiting characters. These delimiters can be typed as the very first or very last entry in your delimited format file.

Delimiter type	Description
Record	A record delimiter separates one record from another.
Field	A field delimiter separates one field from another.
Framing	Field-framing delimiters are helpful when there is punctuation within a field that might be mistaken for a field delimiter. For example, “Manager, Sales.”

Defaults

Unless you specify otherwise, Presort assumes that delimited files will have the following delimiters:

Delimiter type	Description
Record	A line-feed character (UNIX), or carriage-return and line-feed pair (Windows)
Field	Comma
Framing	Double quotation marks around character-type fields only (no framing around date or numeric fields)

In other words, the software assumes that delimited files will look something like the following example.

```
"MS.", "ALICE", "M", "BRADSHAWE", "", "94 GLENMARK RD", "AGAWAM", "MA"
"MS.", "DAPHNE", "J", "CHESHIRE", "", "45 MORAL RD", "AGAWAM", "MA"
"MR.", "JOSHUA", "A", "OMELETTE", "JR", "70 DIKE RD", "ASHBURNHAM", "MA"
"MRS.", "NANNETTE", "V", "PAVELSHAM", "", "134 WALKER RD", "ASHBURNHAM", "MA"
"MS.", "RORY", "A", "PARKER, USNR", "", "95 LIONEL ST", "FRAMINGHAM", "MA"
```

Custom delimiters

If you use some other character for a delimiter, or don't use a particular delimiter at all, then you must set one or more of the following parameters in your delimited format files: **Record Delimiter, Field Delimiter,** or **Field Framing Character**.

Consider the following points regarding these parameters:

- You do not need all three parameters. Do not insert a parameter in your delimited format file unless you really need it. If you insert a parameter but leave it blank, Presort assumes that your input file does not contain that delimiter. This is explained below.
- In the delimited format file, do not type the delimiting character itself; instead, type its ASCII-code value. We use ASCII-code values because some delimiters are unprintable characters.

For example, the ASCII code for the <Tab> character is 009. So, when you are processing a tab-delimited file, place the following line in your delimited format file: Field Delimiter = 009

A table of printable ASCII-code values is shown after this example. If you need to type more than one code on the same parameter, separate them with a space. The following is an example of a tab-delimited file.

```
MS.  →ALICE      →M →BRADSHAWE    →    →94 GLENMARK RD  →AGAWAM      →MA
MS.  →DAPHNE     →J →CHESHIRE     →    →45 MORAL RD     →AGAWAM      →MA
MS.  →JOSHUA     →A →OMELETTE     →JR  →70 DIKE RD      →ASHBURNHAM  →MA
MRS. →NANNETTE   →V →PAVELSHAM,   →    →134 WALKER RD   →ASHBURNHAM  →MA
MS.  →RORY       →A →PARKER, USNR →    →95 LIONEL ST    →FRAMINGHAM  →MA
```

Turn off a delimiter

You may disable any of the delimiters by leaving the parameter blank. For example, suppose you are processing a file that does not contain any record delimiters. In other words, there is no line-feed at

the end of each record.

In this situation, you must instruct Presort not to expect that character. Insert the Record Delimiter line into your delimited format file, but leave it blank. For example:

```
Record Delimiter =
```

If you do this, Presort separates one record from the next by counting fields. For example, if you define five fields in your delimited format file, Presort assumes that the sixth field is the start of the next record. Do not disable all three delimiters. If you do, Presort will not be able to read your input file.

ASCII code values

The following table lists printable characters in the lower ASCII set (values 032–126) for the United States. We also include three frequently used non-printable characters (009, 010, and 013). You may use other characters in the extended ASCII set. Those characters are not included in this list because they vary from one computer system to another. Refer to your system manuals for information about extended ASCII. A complete list of ASCII characters is included in the *Quick Reference for Views and Job Files Products*.

ASCII value	Description	ASCII value	Description	ASCII value	Description
009	tab	062	> (greater than)	095	_ (underscore)
010	line feed	063	?	096	` (accent)
013	carriage return	064	@	097	a
032	space	065	A	098	b
033	! (exclamation mark)	066	B	099	c
034	" (double quote)	067	C	100	d
035	# (pound sign)	068	D	101	e
036	$	069	E	102	f
037	%	070	F	103	g
038	&	071	G	104	h
039	' (single quote)	072	H	105	i
040	(	073	I	106	j
041	)	074	J	107	k
042	* (asterisk)	075	K	108	l
043	+	076	L	109	m

ASCII value	Description	ASCII value	Description	ASCII value	Description
044	, (comma)	077	M	110	n
045	- (hyphen)	078	N	111	o
046	. (period)	079	O	112	p
047	/ (forward slash)	080	P	113	q
048	0	081	Q	114	r
049	1	082	R	115	s
050	2	083	S	116	t
051	3	084	T	117	u
052	4	085	U	118	v
053	5	086	V	119	w
054	6	087	W	120	x
055	7	088	X	121	y
056	8	089	Y	122	z
057	9	090	Z	123	{
058	: (colon)	091	[	124	| (vertical bar, pipe)
059	; (semicolon)	092	\ (backslash)	125	}
060	< (less than)	093	]	126	~ (tilde)
061	=	094	^ (carat)		

Definition files (DEF)

This section provides an introduction to definition files and presents ways to match input with a definition file. It also provides guidelines for creating definition files and for defining input name format, and explains how to use PW fields for aliasing.

Introduction to definition files

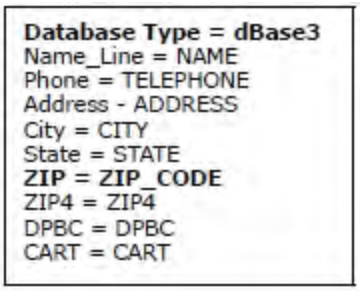
No matter what type of database you are processing, Presort always requires a definition (DEF) file. They are called DEF files because of the file-name extension *.def* assigned to them. Consider the following points regarding DEF files:

- Presort will not guess the database type, so you must tell it what type of database you are processing.
- Presort does not guess the field names, so the DEF file sets higher-level information about fields (you do not need a line for every field that appears in your database file). In this file, you tell Presort how you want it to interpret and work with your fields.

Definition files contain PW fields paired with fields from your database; the PW fields act as translators for Presort. You specify in the definition file the names of your fields and the names that Presort uses for that field.

NOTE Refer to the *Quick Reference for Views and Job File Products* for a list of PW fields. Note that some PW fields are specific to certain software products. This guide provides details about these fields, as well as guidelines for use.

For example, as shown in the example below, suppose that your database includes a field named ZIP_CODE. Presort does not recognize that name or know what to do with that field. So, in your definition file, you link this field to a name that the software does recognize, such as ZIP.



Now Presort knows your ZIP_CODE field by the alias ZIP. And Presort knows what to do with the field—expect a ZIP Code from it, or perhaps write a ZIP Code to it.

Match input with a definition file

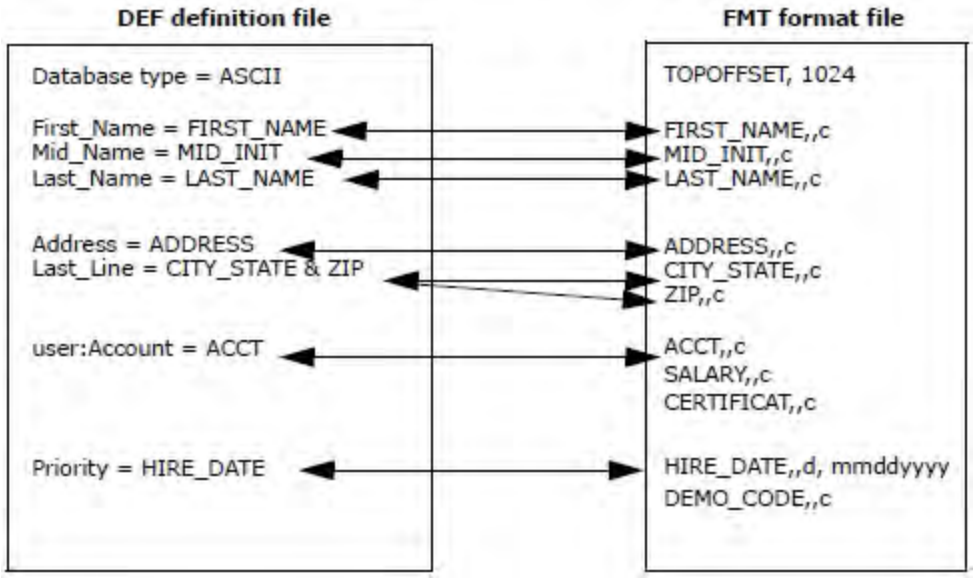
A definition file is an external text file, which is separate from the database itself. There are three ways to help Presort match each input database to a definition file:

- You can make an individual definition file for each database that you process. Presort finds the definition file based on the name and location of the database.

Give your definition file a *.def* extension, and the same base file name as the database it describes. Place the definition file in the same directory as the database. For example, for the database *c:\data\myfile.dbf*, the definition file would be *c:\data\myfile.def*.

- If all the databases you process are in the same format, then use the feature Default DEF to make one master definition file and apply it to all of your standard databases. Look for this parameter in your job file.
- If most of your databases are in standard format, but you process a few exceptions, set up a default definition file and apply it to the standardized files. For the other databases, create individual definition files. Where Presort finds an individual definition file, it overrides the default definition file.

The following example shows a definition file paired with an ASCII format file. Notice how these files are different and how the definition file turns the physical fields in the delimited format file into PW fields. Remember, you do not need a line for each and every field that appears in your database file.



Create definition files

Follow these guidelines when you create definition files.

Database type

The very first line in your definition file is the **Database Type** parameter. Choose the line from the following list that is most appropriate for your database type:

```
Database Type = Dbase3
```

```
Database Type = delimited
```

```
Database Type = ASCII
```

```
Database Type = EBCDIC
```

Next, list the fields from your input file and their corresponding PW field names, one on each line. Note that you do not need a line for each field that appears in your database file.

Field definitions

Field definitions look like parameters with the following format: PW field = Database field (including the prefix “PW.” is optional). For example:

```
PW.ZIP = ZIP_Code
```

Definitions may appear in any order; they do not have to match the physical sequence of fields in the file. However, your definition file may be easier to understand if you keep the name and address fields in the order they appear in the file layout.

Important: There is an important difference between format, delimited format, and definition files. Format and delimited format files must contain a specification for each field in the database. If you omit a field, Presort reads your database incorrectly. In your definition file, you do not need a line for each field.

Select and define PW fields based on these questions:

1. What data fields does the software need for processing? For example, Presort processes address fields, so you should include the address fields in your definition file.

2. What common fields will I need for the output database? For example, Presort outputs address fields such as LOT and LOT_ORDER, so include those fields in your definition file if they exist in your input structure.

Typing

Presort does not require spaces between items. Presort will ignore them if there are any. Do not use spaces within field names. Field names are not case sensitive. Presort ignores case in definition files; however, Presort recognizes casing when defining a field as a constant value, such as `PW.List_ID = "LIST1"`, and when filtering on that value.

Text

Definition files are small text files. They must contain only ordinary characters, such as printable ASCII. If you use a word processor, be sure to save the file as straight text.

Constants

Most of the time, a PW field is based on some database field or perhaps on a combination of fields. However, there are a few situations when you must define a PW field based on a constant value. A constant value will always be between quotation marks, as in this example:

```
PW.List_ID = "RJD"
```

This means that every time Presort reads a record from this database, it assigns the record to an Input List defined in Presort as RJD.

Important: Remember that if you ever base a PW field on a constant, put the constant value inside double quotation marks. If you don't do this, Presort will think that the value is the name of a database field. Consider this example: `PW.List_ID = RJD`. If you do this, Presort issues an error message stating that it can't find the RJD field in your database.

You can, however, use PW.List_ID without quotes by using a valid database field name after the equal sign. This informs Presort to look in that database field and to use the values as List_ID values set up as Input List Definitions in the Presort job.

Remember, putting List_ID in your definition file does not add a List_ID field to your database. Nor does Presort record RJD in any field. This field and this value exist only inside Presort's internal records.

Punctuation

Presort accepts the set of punctuation marks in definition files as shown:

Symbol	Rule

=	Place an equal sign between the PW field name and the database field name:
	`PW.ZIP = DB.ZIP_Code`
	Or between a parameter and its setting, as indicated in the following examples:
	`Database Type = dBASE3`
	`Name Format = FML`

_	The underscore is often used within field names.
“ ”	When you need to set a PW field equal to a constant value, place the constant inside double quotation marks.
*	If you would like to insert comments in your definition file, begin each line with at least one asterisk. This signals the software to ignore the line. For example: `* Use this definition file with all databases`
+	Do not use the plus sign in field names. For example, the ZIP+4 field is named `ZIP4`.

Concatenators

Sometimes, you may need to merge two or more database fields into one PW field. When you concatenate fields, you have a choice of three methods:

Symbol	Rule
&	Most often you should use the ampersand. Presort reads the database fields as if there were exactly one space between them. For example, suppose that you have written this line in your definition file: `last_line = city & state & zip` and in one of your records, the data looks like this (dots represent spaces): LA•CROSSE••••••••WI54601 When Presort reads this data as the PW field Last_Line, Presort actually receives this: LA•CROSSE•WI•54601 If you copy the PW field Last_Line to your output file, or print it on address labels, then this is what your output will look like: LA•CROSSE•WI•54601
+	The plus sign may also be used to merge two or more database fields into one PW field. However, it leaves spaces in place, as they occurred in the input database fields. If you write this line in your definition file: `last_line = city + state + zip` and print the PW field Last_Line on your address labels, you would get this (from the same example record used above): LA•CROSSE••••••••WI54601
-	The minus sign may also be used to merge two or more database fields into one PW field. However, it collects all blank spaces at the end. If you write this line in your definition file: `last_line = city - state - zip` and print the PW field Last_Line on your address labels, you would get this (from the same example record used above): LACROSSEWI54601•••••••••

Use PW fields for aliasing

Your databases may come from different sources and they probably don't call each and every field by the same name because each organization has its own needs and practices. One organization may refer to a field as "Firm", while another uses the name "Company". If you're processing databases from several sources, you may run into problems with field naming. You need a common set of field names when it's time to merge to one output.

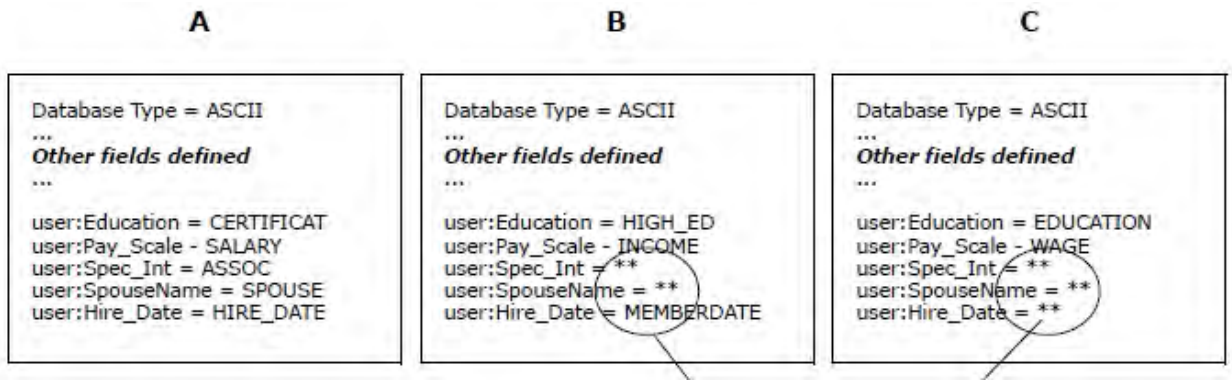
Through proper use of PW fields, you can present your databases to Presort as if they were in a uniform, recognizable format using a method called field-name aliasing. Here are two approaches to using PW fields for field-name aliasing:

- Presort recognizes a set of pre-defined PW fields that you can use for aliasing. For example: PW.Name_Line, PW.Firm, and PW.Address. For a complete list of PW fields, refer to the *Quick Reference for Views and Job File Products*.
- If you need an alias that isn't included in our PW set, you can define your own user PW field. Use the prefix "user:" in your definition file. For example, if you define `user:Hire_Date = Date_of_Hire`, then you can work with PW.Hire_Date as you would any other PW field, in posting or in filters.

The following definition files show how you can use these user-defined PW fields to overcome differences between databases. Using these definition files, you could use the following PW fields for output:

```
     PW.Education, PW.Pay_Scale, PW.Spec_Int, PW.SpouseName,
PW.Hire_Date
```

Note that the following example databases do not include fields for SpouseName, Spec_Int, and Hire_Date, so we set the field equal to a blank constant value.



Changes in definition files

This section explains how to choose contents of definition files and follows an input file through the process. It also illustrates how your choice of PW fields in a definition file changes from application to application.

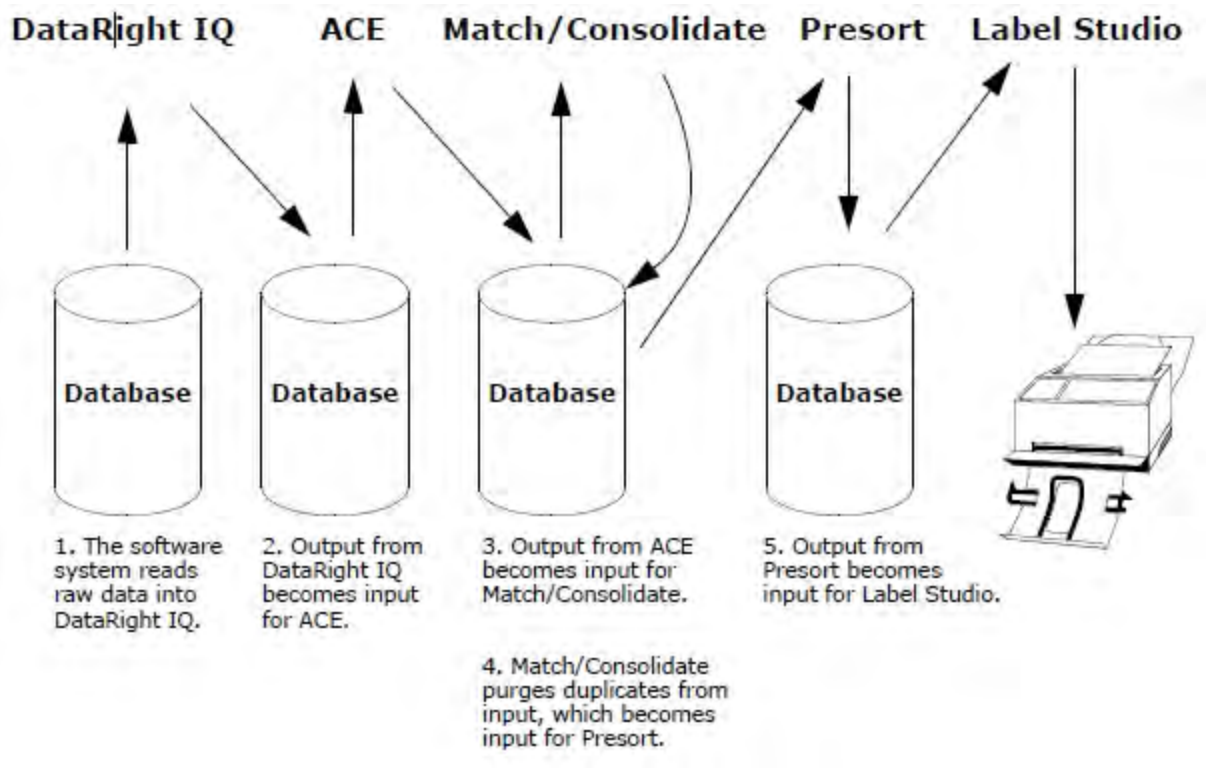
Choose contents of definition files

Definition files may change depending on the program you use. If you use a data quality program, you may need PW fields associated with name information. An address correction program may require address-type PW fields. The key to choosing the contents of your definition file lies in your desired results and the function of the individual application. Refer to the *Quick Reference for Views and Job File Products* for a complete list of PW fields and information about program differences.

This section describes how one database progresses through all of the software programs and how the choice of PW fields in the definition file correlates with the function of the software.

A single database

First, let's look at the software system and how it processes a database file. This example uses the SAP Business Objects products DataRight IQ, ACE, Match/Consolidate, and the BCC Software products Presort and Label Studio for demonstration purposes.



A single record

The following table shows an individual record being processed by the software. Note that the table shows only data quality and address because the record won't physically change in data matching, Presort, and Label Studio. As the file changes, the DEF file also must change.

Before: Data Quality	After: Data Quality	After: Address Correction
PW.Line1 PW.Line2 WILLIAM MCKAY, PW.Line3 PRESIDENT PW.Line4 MCKAY INCORP. PW.Line5 201 N PEARL PW.Line6 LA CROSS, WISC 54601 PW.Line7 PW.Line8		

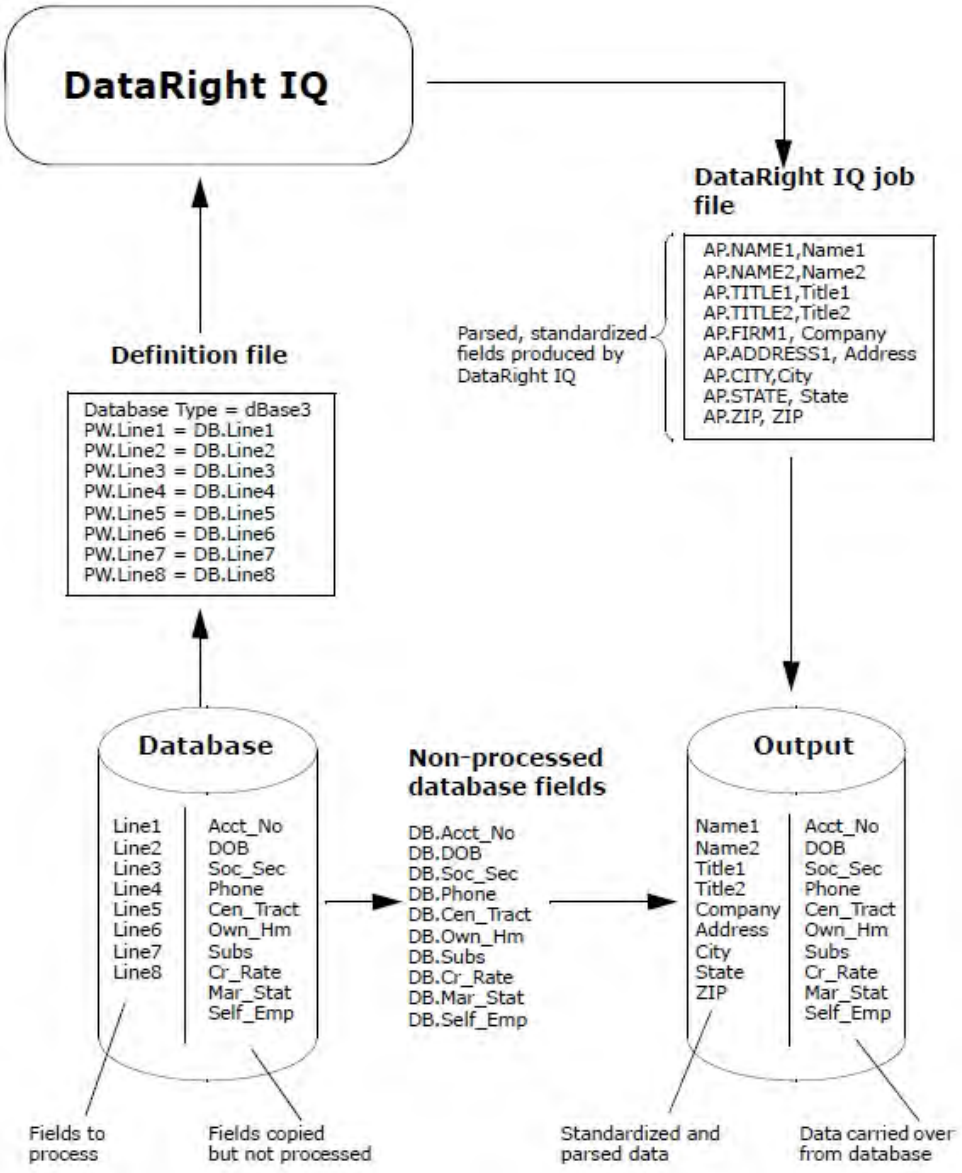
Before: Data Quality	After: Data Quality	After: Address Correction
Acct_No 1595 DOB 06/04/65 Soc_Sec 389-83-3809 Phone 608-839-3821 Cen_Tract 102 Own_Hm Y Subs N Cr_Rate GOOD Mar_Stat M Self_Emp Y	1595 06/04/65 389-83-3809 608-839-3821 102 Y N GOOD M Y	1595 06/04/65 389-83-3809 608-839-3821 102 Y N GOOD M Y
Name1 Name2 Title1 Title2 Company Address City State Zip	Mr. William McKay Pres. McKay Inc. 201 N Pearl La Crosse WI 54601	Mr. William McKay Pres. McKay Inc. 201 N Pearl La Crosse WI 54601
Zip4 DPBC CART LOT Lot_Order		3250 01 C018 1234 A

The next several pages show the structure of a multiline input file, the PW fields that make up the different definition files, and changes to a database as the software processes it.

Follow a database through the software

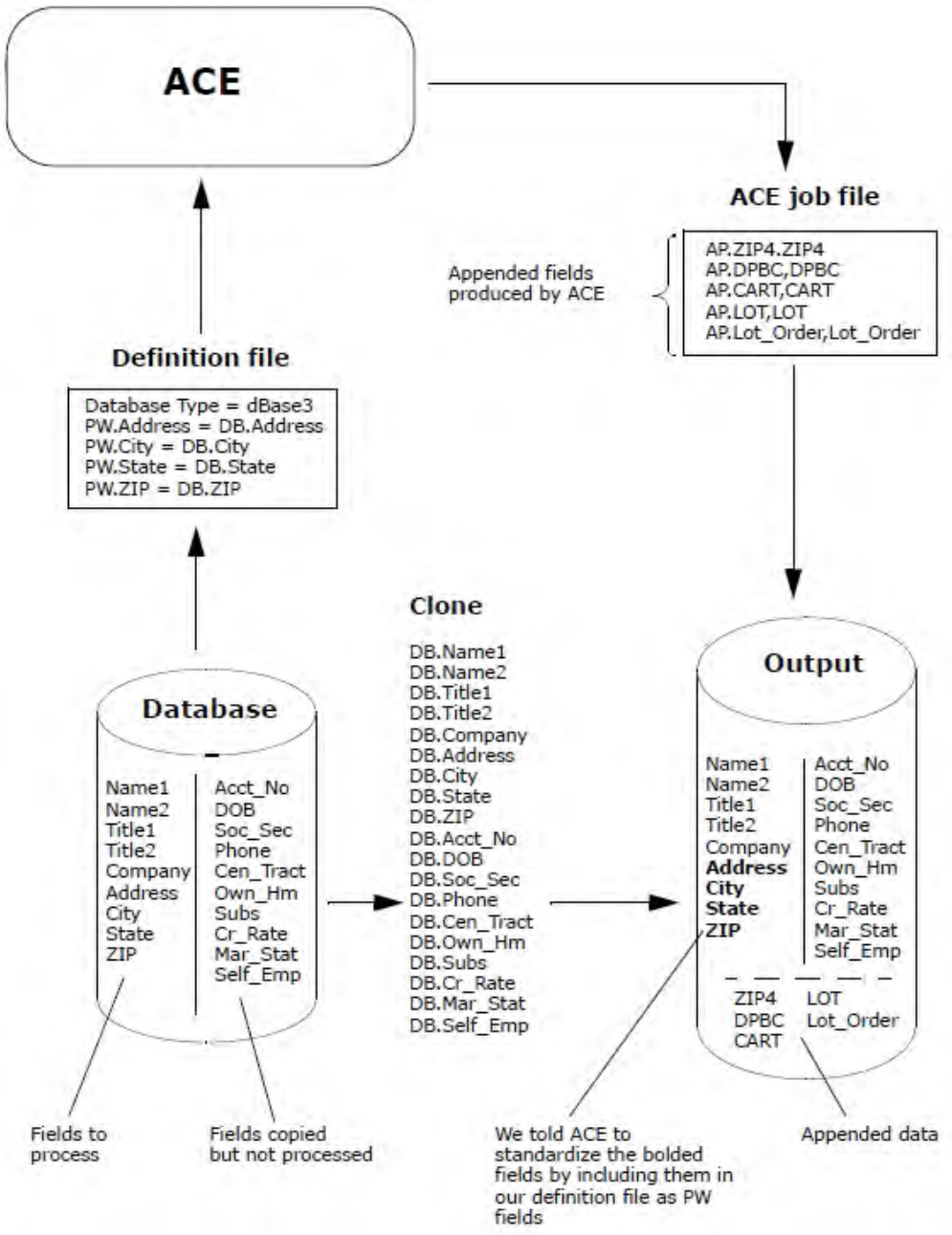
Data quality

Your data quality program should standardize and parse name and address data and convert multiple input files into one uniform output. The following diagram shows a multiline input file organized into a format chosen by the user.



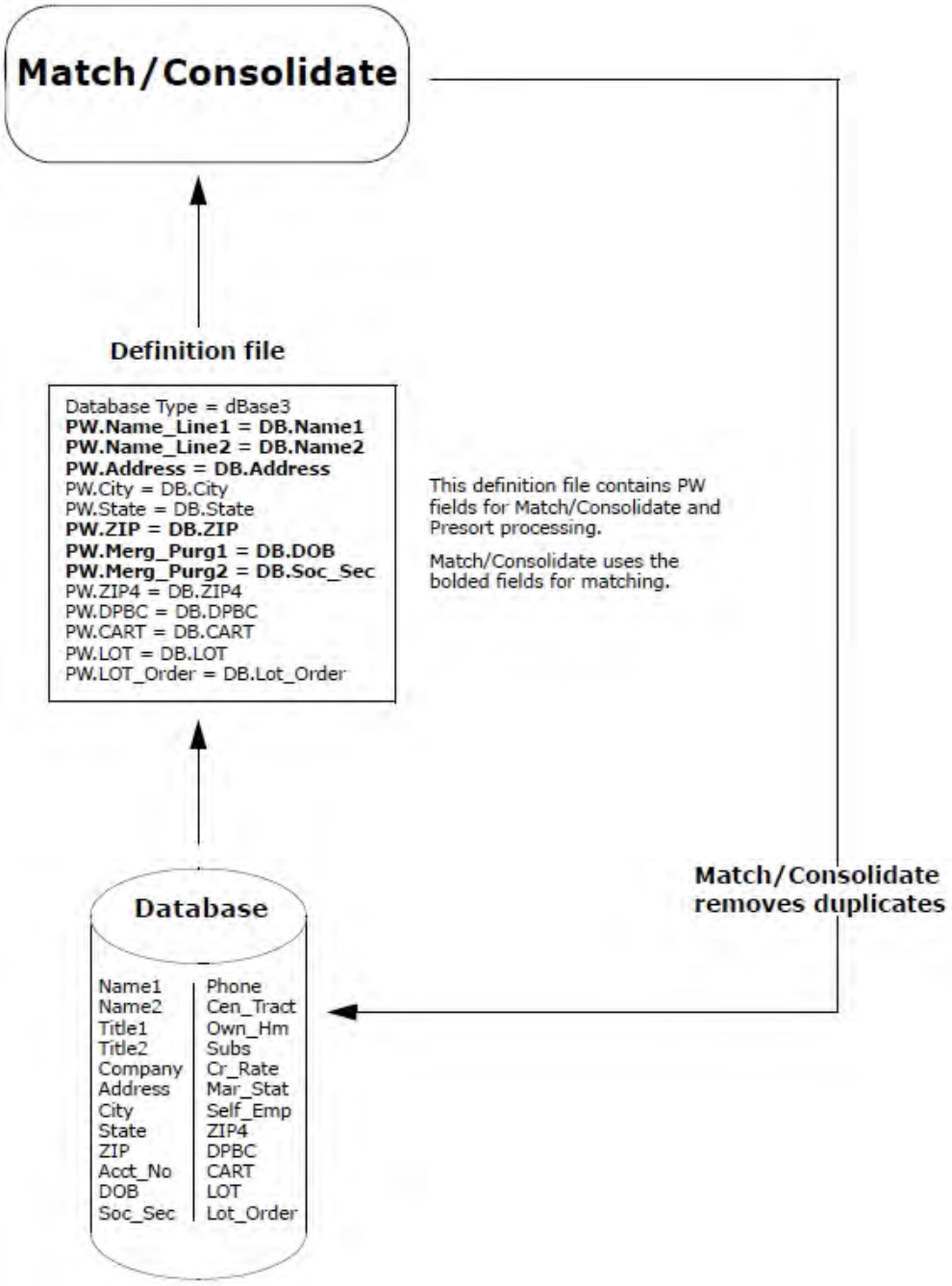
ACE

ACE corrects and standardizes addresses and assigns postal codes. The following illustration shows how we are inputting the output file from DataRight IQ, cloning the file, standardizing the address components, and appending postal codes.



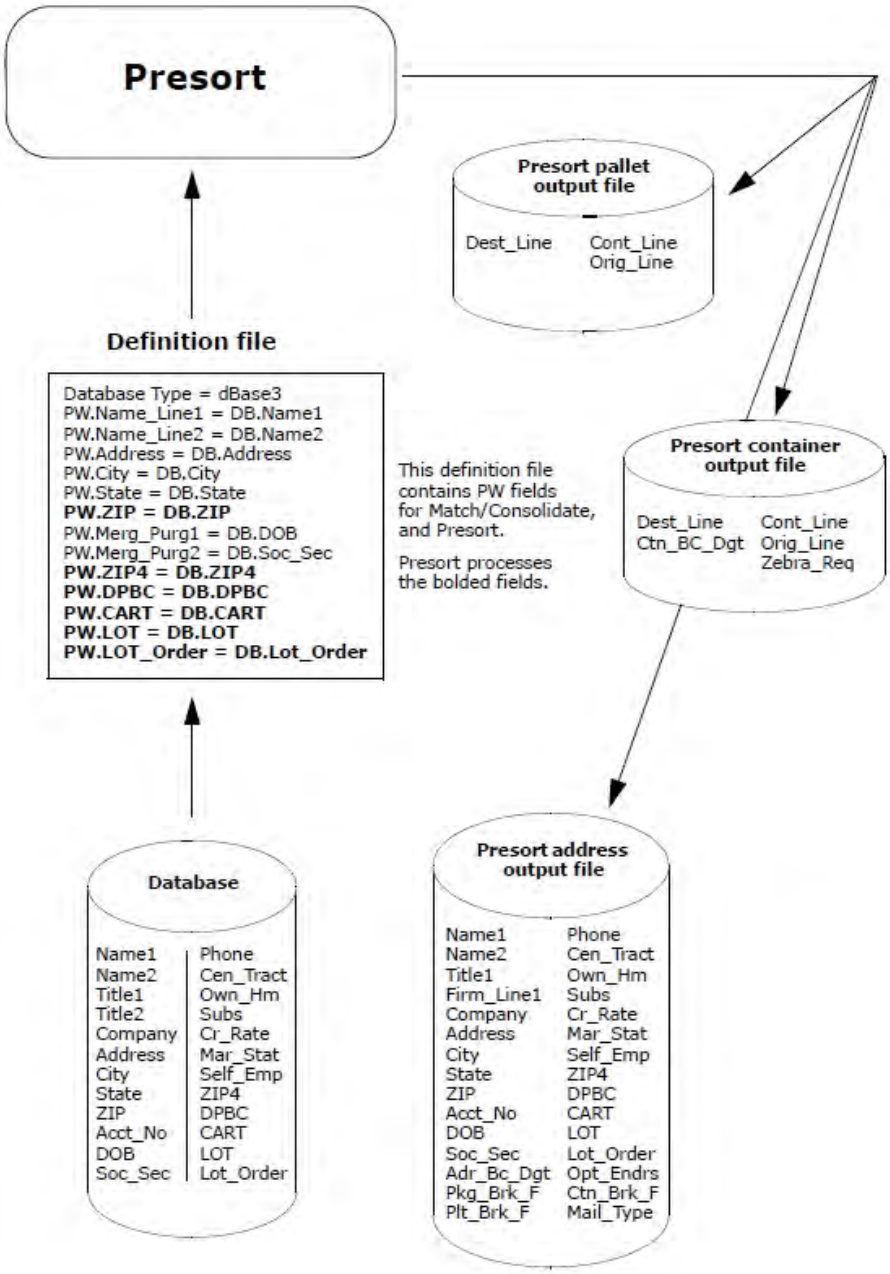
Match/Consolidate

Match/Consolidate searches for and eliminates duplicate records. It can either purge the original input file of duplicates or it can create an entirely new file. The following illustration shows how we choose to purge our input file of duplicates.



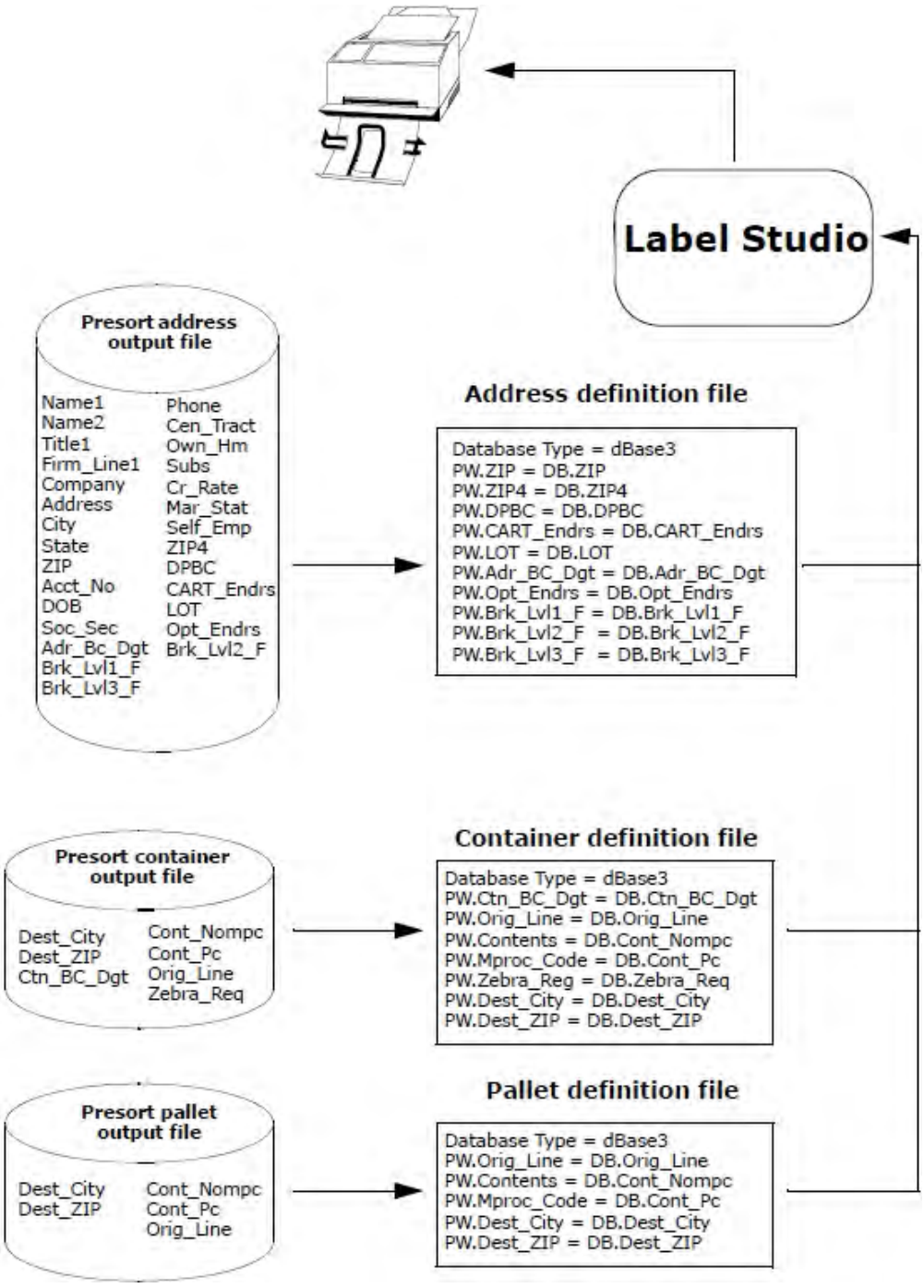
Presort

Presort arranges your database records into packages and containers and produces documentation shipped to post offices with the mail pieces. Presort does not alter your input records; rather it organizes how the software presents your records to label-printing software.



Label Studio

Label Studio takes Presort's output file to create address, container, pallet, or generic labels and prints them in the order specified by Presort.



Output files

This section provides an overview of your output options. Presort offers a lot more output options than we can discuss here; this section provides only an overview of the most crucial points. For detailed information about output options, refer to the *Presort User Guide*.

Set up an output file

Setting up an output file requires you to perform two tasks. The figure in Overview of output file setup shows an example of these two setups.

1. First, through your entries in the Create File for Output block, you define the format of the new file.
2. Second, through your entries in the Posting block, you determine the content of information placed, or posted, in the fields of the output file.

Use one of three methods

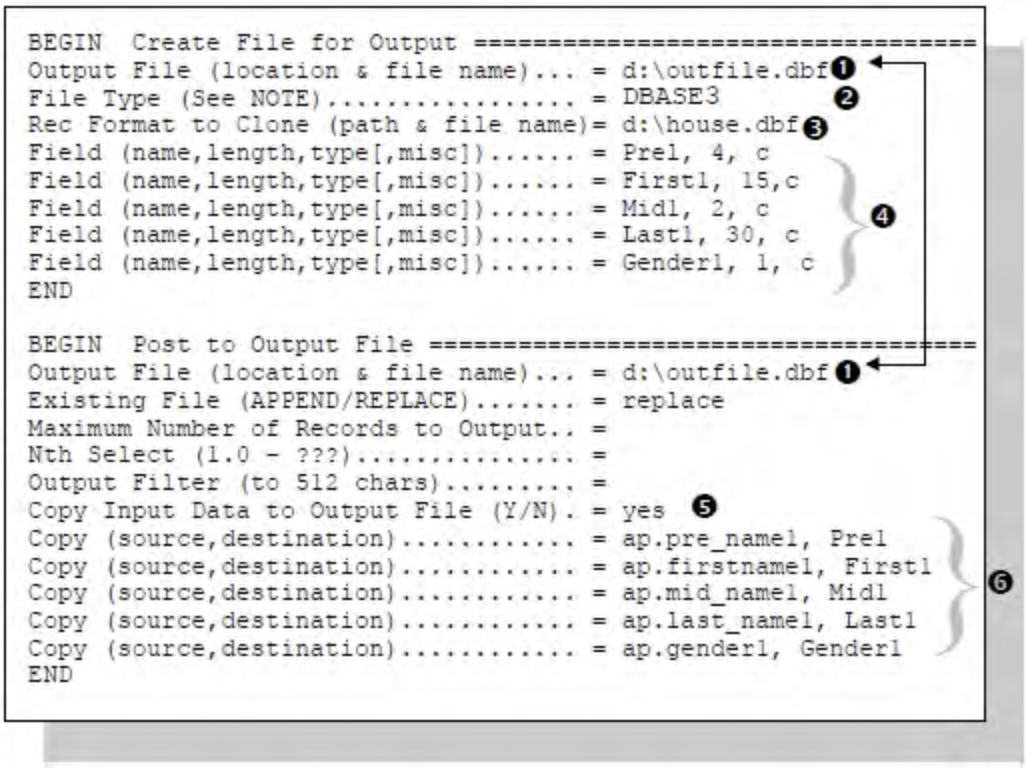
For each task, format and content, you have your choice of three methods:

1. You can instruct Presort to automatically create a basic output file. This file is based on the format and content of another file or files, which is referred to as cloning the format (field lay-out) and automatic posting of the contents (data).
2. You can turn off the cloning feature and manually specify everything.
3. You can set up a combination of these methods by turning on the cloning features, then adding your own manual posting. Your purpose in posting manually might be to augment or override the cloning features.

Setting up an output file is similar to setting up an input file; however, there is a crucial difference. When you describe to Presort the format of your input file(s), you do so in external supporting files. When you specify the format of output files, you do so inside your job file, along with all the other instructions for the job.

Overview of output file setup

The following illustration shows an example job file. For Views users, choose these options in the **View** screen.



The following table describes each of the numbered components.

Component	Description
1 Output file name	Set up the file format in the Create File for Output block and the content in the Post to Output File block. The link between the block files is that they both refer to the same output file name.
2 Database type	This entry serves the same purpose as the database-type parameter that you place in a definition file. It tells Presort which database software to use when creating the file.
3 Cloning	To clone its physical format, type the location and file name of the input file. To save setup time, you can also clone the physical format of the input file by using the input file location and file name. If you need to add more fields, you can specify them manually.

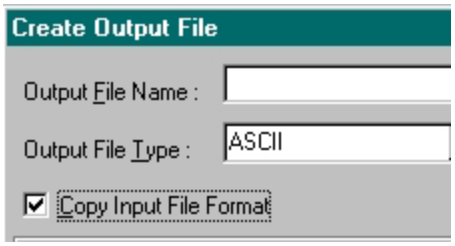
Component	Description
4 Manual formatting	Each parameter specifies the format of one output field; copy and paste the parameter to create as many parameters as you need. Notice that these entries look like format file or delimited format entries. In effect, you're writing a format file for a database that doesn't yet exist.
5 Copy input data	To save setup time, the software can automatically copy the content (data) from an input file to an output file.
6 Manual posting	Each Copy entry places data into an output field. Notice that each Copy parameter in the Posting block corresponds to a Field parameter in the Create File for Output block.

Set the format of an output database

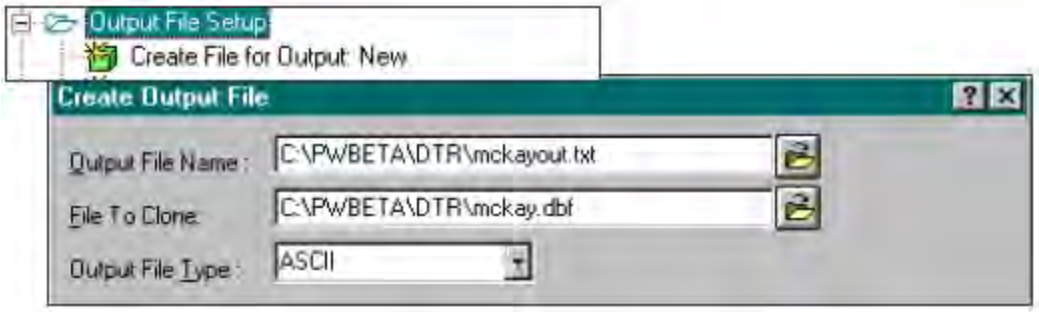
To set the format of an output database, you can either clone, clone and append, or define your own format.

Clone

The cloning feature can save you time by creating an output file with the same fields, lengths, and data types as an existing file. You can clone the format of the (one) input database. To clone, you turn on a parameter in the Create Output File block inside the job file. The **Clone** parameter contains the word "copy" instead of "clone" in Views.



Presort can accept more than one input file, so you must select the database format you want to clone. To clone an existing file's format, enter that file's name and location.



The database named here—the one whose format you clone—does not have to be one of the databases that was input for the job. It could be a master database, some kind of template, or perhaps a file from a previous job. You must provide a definition file and format file for the file to be cloned.

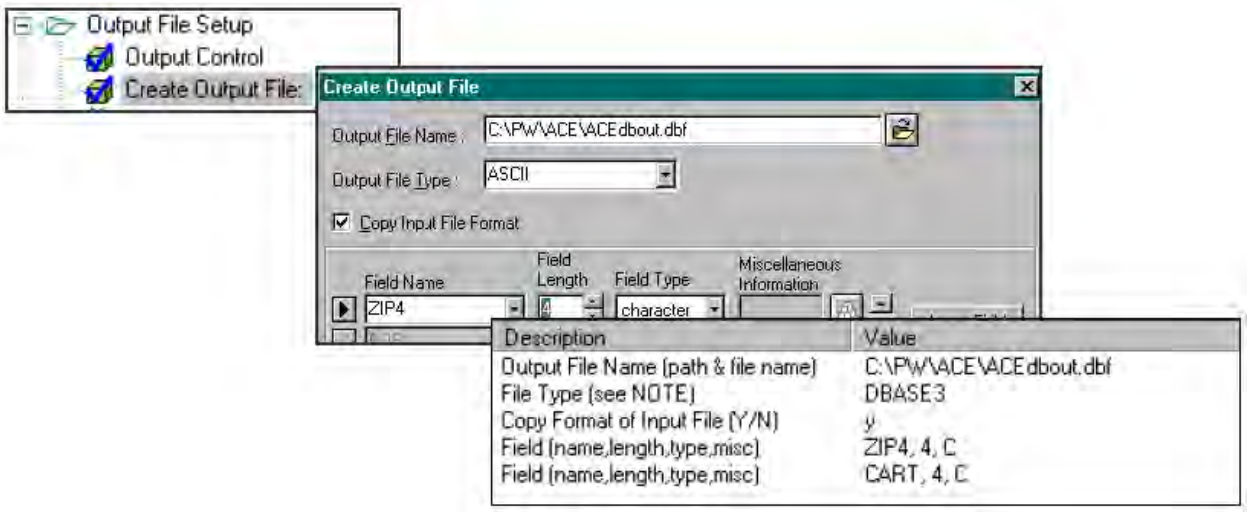
If the master database has a format or file type that is different from the input databases for this job, see Convert database types and format for tips and details on converting database types.

Note: One of the most common formats cloned is the format of your input file. You can clone your input file's format and then add on the fields that you want the software to add to your database (see ACE).

Clone and append

If you clone, you may also append new fields to the end of each record; however, you cannot intersperse new fields among those cloned. Also, the appended fields follow after all fields except the End of Record (EOR) field. For more information, see End-of-record field (EOR).

To append new fields to the end of each record, turn on the cloning previously shown, then repeat the **Field** parameter as many times as necessary to define the added fields. For example, the following ACE job file shows the Create Output File block with both ZIP4 and CART appended to the fields from the input file:



Define your own format

Perhaps you would like to define a new format for your output file. To do this, turn off cloning and define all of the fields manually. Now the ACE job file has the copy format turned off and a list of field names that makes up the complete record in the output file:

Description	Value
Output File Name (path & file name)	C:\PW\ACE\ACEdbout.dbf
File Type (see NOTE)	DBASE3
Copy Format of Input File (Y/N)	n
Field (name,length,type,misc)	NAME_LINE, 30, C
Field (name,length,type,misc)	ADDRESS, 30, C
Field (name,length,type,misc)	CITY, 18, C
Field (name,length,type,misc)	STATE, 2, C
Field (name,length,type,misc)	ZIP, 5, C
Field (name,length,type,misc)	ZIP4, 4, C
Field (name,length,type,misc)	CART, 4, C

Remember, field entries look just like those in an FMT, DMT, or EBC format file. If you want to add extra fields for later use, that's okay. Technically you can create fields and not have a corresponding **Copy** parameter to populate that field.

Place information in an output database

Once you have set up the physical format of your output file, you can place information in the output fields. You can either clone, clone and append, or select the data yourself.

Clone

The cloning feature can save you time copying over input file data to an output file. Using a posting block, set the clone parameter in your job file using the **Output file setup** parameter. The following example shows an ACE job file setup in Views.

Description	Value
Output File Name (path & filename)	C:\PW\ACE\ACEdbout.dbf
Existing File (APPEND/REPLACE)	Replace
+ Output Filter	
Copy Input Data to Output File (Y/N)	Y

Note: In some situations, the clone feature cannot be used. See Convert database types and format.

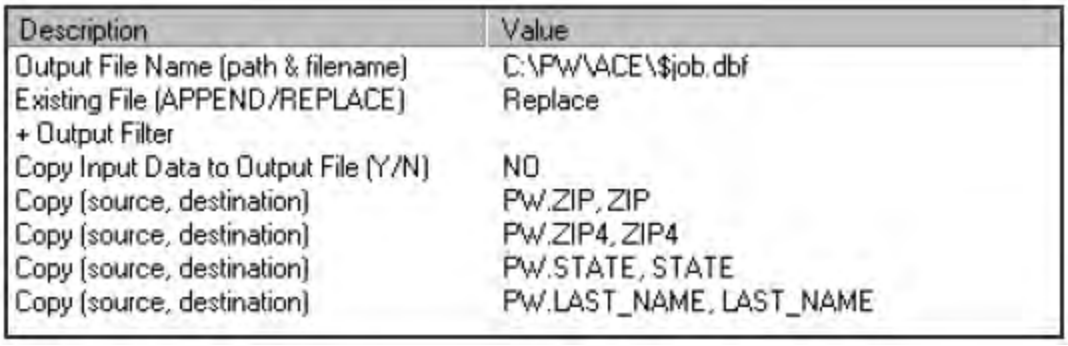
Clone and append

If you clone, you may also post other information. To do this, set the cloning parameter as above, then use the **Copy** parameter to post data manually. For example, as shown in the following example, the same ACE job file from above now has three appended fields:

Description	Value
Output File Name (path & filename)	C:\PW\ACE\ACEdbout.dbf
Existing File (APPEND/REPLACE)	Replace
+ Output Filter	
Copy Input Data to Output File (Y/N)	YES
Copy (source, destination)	AP.ZIP4, ZIP4
Copy (source, destination)	AP.DPBC, DPBC
Copy (source, destination)	AP.CART, CART

Select data yourself

If you would like to take complete control of your output file, turn off cloning and, as shown, use the **Copy** parameter to fill all of the fields. The posting destination is always a database field in the output file. The source may be a field from the input file or data generated during processing.



Description	Value
Output File Name (path & filename)	C:\PW\ACE\$job.dbf
Existing File (APPEND/REPLACE)	Replace
+ Output Filter	
Copy Input Data to Output File (Y/N)	NO
Copy (source, destination)	PW.ZIP, ZIP
Copy (source, destination)	PW.ZIP4, ZIP4
Copy (source, destination)	PW.STATE, STATE
Copy (source, destination)	PW.LAST_NAME, LAST_NAME

Types of data available for output

The software offers several types of output data. For information about PW, AP, and MD fields, refer to the *Quick Reference for Views and Job File Products*.

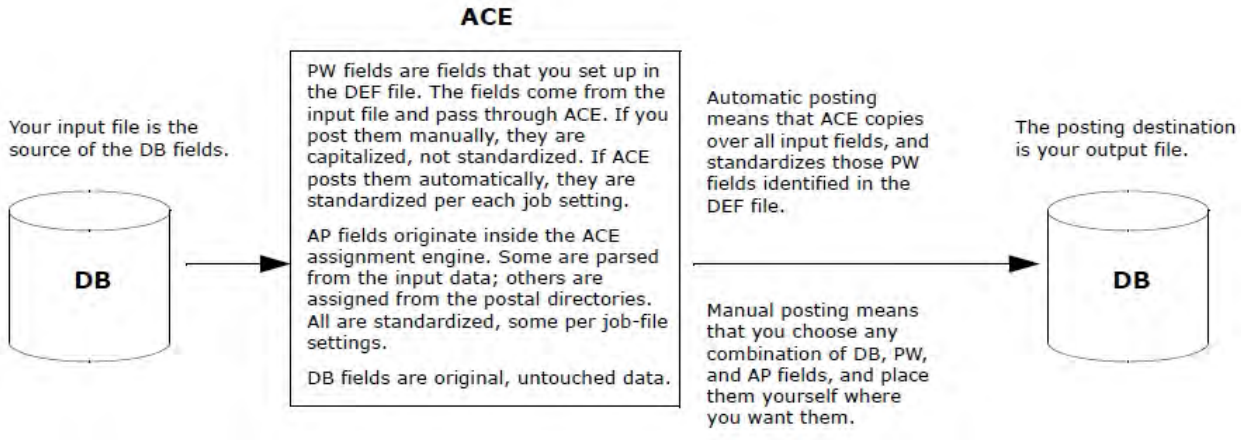
Four options

You can place the following four types of data into an output file.

Option	Description
PW	You can copy over a PW field from the input definition (*.def*) file. Instead of using database fields, you might use PW fields if you are using them to fix a field-naming problem. See Use PW fields for aliasing for examples of field-naming problems. Use the prefix PW. on your field name. For example, if in your input definition file you set up the PW field Address, then you can post PW.Address.
AP	During processing, Presort produces many data fields called application (AP.) fields. For example, when you process a record through Presort, you can save the ZIP+4 code by posting AP.ZIP4 to your output file. Refer to the *Quick Reference for Views and Job File Products* for a complete list of AP fields.

Option	Description
MD	Presort produces MD fields that can be used to populate one or both of the User Information Line fields in the Mail.dat Container Summary Record (CSM). This allows users to automatically print the information of their choice on container labels. For more information about MD fields, see the *Quick Reference for Views and Job File Products* as well as the description of the **Container User Information Lines 1–2** parameters in the *Job File Reference*.
" "	If you want to place the same data in every output record, you can post a constant value. For example, some users like to place a date stamp on processed records. You could post today's date, as a constant value, to a datestamp field. See Convert database types and format for information about converting a field from one data type to another, and what to do if your output file type is different from the input file type.

The diagram below shows an example of how these data types function in ACE. Note that this is an example only; other products work similarly.



Advanced options

Filters and functions are special commands that manipulate and select data or choose records. See Filter and function expressions for a complete list of functions and how to use them.

Supporting files automatically created with an output database

When Presort creates a database for output, it also creates supporting files. This saves time when using output from one program as input for another program.

File type	Supporting files required	For more information, see
dBASE3	Definition (*.def*) only	Definition files (DEF)
delim-ited	Format (*.dmt*) and Definition (*.def*)	Delimited format files for delimited ASCII Definition files (DEF)
ASCII	Format (*.fmt*) and Definition (*.def*)	Format files for fixed-length ASCII and fixed-length EBCDIC Definition files (DEF)
EBCDIC	Format (*.ebc*) and Definition (*.def*)	Format files for fixed-length ASCII and fixed-length EBCDIC Definition files (DEF)

Important: When Presort creates a definition file, it is not complete; the only line that it contains is the **Database Type** parameter. However, the automatic definition file does not contain any definitions of PW fields because Presort does not presume how you will want PW fields set up in your next job.

Before you can use the database as input to another program, you must edit the definition file and add definitions of PW fields. For instructions, refer to the *Quick Reference for Views and Job File Products*.

DEF produced by the software

```
Database Type = dBase3
```

DEF after editing

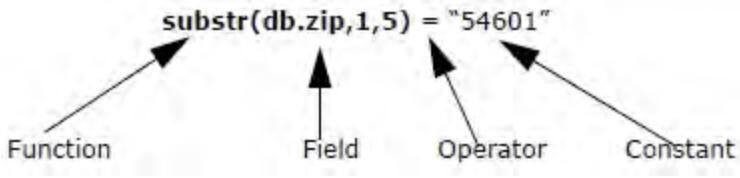
```
Database Type = dBase3
Name Format = FML
Name_Line = Name
Line1 = Address1
Line2 = Address2
City = CITY
State = STATE
ZIP = ZIP_Code
Phone = TELEPHONE
```

Filter and function expressions

This section provides information about filter and function expressions and their purpose in processing.

Expressions

An expression is a sentence that Presort reads. Expressions contain a special language consisting of specific words, punctuation marks, and combinations of data. This illustration is an example of a simple expression:



Presort constructs the elements of an expression so that when it reads the expression, it inserts data where appropriate, processes and evaluates the expression, and derives with some sort of a result. The software does this either in the input file or when writing a record to an output file.

Results of an expression

The result controls how the software functions with respect to an individual record or field: either include or exclude the record in the outcome, or change the record in the manner specified in the expression. Based on the results you want, you determine whether you want to write your expression as a filter or a function.

You are able to enhance the control of the software by including expressions in your job file. However, writing expressions is often very difficult, and the more complicated expressions should be reserved for your programmers and computer specialists.

Filters and functions

Filters includes certain records and excludes others. The results of a filter are either true or false. True results include the record in processing, while false results exclude the record.

For example, assume that you have a database of records that contains a list of magazine subscribers, and each record contains a field called Month. You need to compile a list of those records in which the Month field contains "October." The following example filter includes each record that

contains the value October. Note that the casing of the data is important. OCTOBER is not the same as October or october.

```
alltrim(DB.Month) = "October"
```

To do this, the software looks for the DB.Month field in each record. When found, the alltrim() function trims any leading and trailing spaces from DB.Month and the software determines if its value is equal to the constant October.

If the field has the constant October, the software includes that record in posting (True). If the field does not contain the constant, the software ignores the record and excludes it from posting (False).

Functions

Functions change a record and produce information that can be in the form of mathematical results, converted data, compared data, new data, extracted data, rearranged data, and tests (True/False). The record changes in the way specified in the expression.

For example, assume that you have records in a database that include account balances to the exact penny. You want only even dollar amounts and you want to eliminate the odd cents. The following function takes a numeric expression and rounds it to the number of decimal places specified.

```
Round(DB.Balance,0)
```

To do this, the software looks for the DB.Balance field in each record. When found, the software changes the record and the result is a rounded number. The result is that 5998.03 is rounded to 5998.00.

Use filters to set criteria

You can base filters on constants, PW fields, database (DB) fields, and application (AP) fields. (In the **Report: Mail.dat** block, you can also base them on MD fields.) The following is an example of each filter type.

Constants

When processing a database in which you want to only include names of senior citizens, you might use an input filter like the one below. The year function extracts the year, as numerical data, from a date-type field. The software compares the result with the numerical constant 1944.

For example, if used in 2019, this filter limits the records selected from the input file to contain only records of people aged 75 years and older.

Description	Value
Input File Name (path & file name)	C:\PW\ACE\A_mgpg.txt
+ Input Filter (to 512 chars)	year(db.birth) <= 1944
Starting Record Number	

PW fields

Identify PW fields by adding the prefix PW.; for example, PW.State. This tells the software that it must look in the definition file for State, not in the database itself.

For example, suppose you want to confine an output list to residents of the state of Texas. You might use the input filter below, which means that to be included in processing, a record must contain the character string “TX” in the PW field State.

Description	Value
Input File Name (path & file name)	C:\PW\ACE\A_mgpg.txt
+ Input Filter (to 512 chars)	pw.state = "TX"
Starting Record Number	

Database (DB) fields

Identify database fields with the prefix DB.; for example, DB.INCOME. This tells the software that it must look for the INCOME field in the database itself, not in the definition file. For example, you might limit an output file by setting a minimum income (greater than or equal to $50,000) with the following input filter. Note that the income would have to be a numeric-type field.

Description	Value
Input File Name (path & file name)	C:\PW\ACE\A_mgpg.txt
+ Input Filter (to 512 chars)	db.income >= 50000
Starting Record Number	

Application (AP) fields

A filter based on an application field uses information generated by the software. Identify application fields with the prefix AP.; as in AP.ZIP. In the following example, the filter tells the software not to output records with a specific ACE-generated ZIP Code.

Description	Value
Output File Name (path & filename)	C:\PW\ACE\Numeric_out
Existing File (APPEND/REPLACE)	REPLACE
+ Output Filter	.NOT. AP.ZIP = "54602"
Copy Input Data to Output File (Y/N)	YES

In this example, we base our filter on ZIP Codes that have been processed by ACE. This way you can be sure your ZIP Codes are correct because ACE has processed them first, then included in an output filter using AP.ZIP. Using the AP field ensures that you are using ZIP Codes that are accurate because ACE generated them.

Data types

You can apply filters and functions to the software fields, database fields, application fields, MD fields, and constants. In filters and functions, the software supports four data types:

- Character
- Numeric
- Logical
- Date

DB fields may be any of those four types; PW, AP, and MD fields are always character type. You can type a character, numeric, or logical constant; to create a date-type constant, see the ctod() function in the List of functions.

When you base a PW field on a date-type database field, the data is standardized to a yyyymmdd string. When you base a PW field on a logical-type database field, the software converts the data to a character: T, Y, F, or N.

Operator words for combining functions

You may find that you often need more than one test in your filters. Depending on the product, you can assemble tests up to a total filter length of 512 characters. To combine tests, use the following three operators:

- .AND.
- .OR.
- .NOT.

You can type these words in uppercase or lowercase; however, don't forget the periods at the beginning and the end of the operators.

.And.

When you combine two tests together with .AND., a record must pass both tests to be included, which may reduce the number of records that pass the filter. For example, the following filter would

set both a minimum income and minimum age. The income field must contain a number greater than or equal to $50,000, and the year of birth must be 1957 or earlier.

```
db.income >= 50000 .AND. year(db.birth) <= 1957
```

.Or.

When you combine two tests together with .OR., the software includes a record if it passes either test, which tends to allow more records to pass the filter. For example, the following filter includes residents of both New York and New Jersey.

```
PW.State = "NY" .OR. PW.State = "NJ"
```

.Not.

The .NOT. operator reverses the truth or falsehood of the test that follows it. For example, the following filter would exclude records in which the AP.ZIP field was not equal to 54601. Note that you may prefer to use the exclamation mark (!) instead of .NOT.

```
.NOT. AP.ZIP="54601"
```

Nested functions

Nesting combines more than one function to achieve the results you want on your database. The following example shows a nest of three functions:

```
third_function(second_function(first_function(data)))
```

Reading nested functions

When reading a nested function (or expression), the software begins with the right-most function and goes to the left-most function (starting with the innermost parenthesis and continuing outward). It performs the first function; then it performs the second function on the results of the first, and so on.

When you write a nested function, keep in mind how the software interprets an expression; then examine your objective and divide that objective into separate tasks. Those tasks become the functions that make up the complete nested function.

The following table shows how the software reads this function:

```
left(upper(alltrim(PW.Last_Name)),3)
```

In the table, note that the dots shown in the data represent spaces and are for illustrative purposes only. For more information about reading and writing functions, see Example functions.

Step	Function	Result
First	`alltrim(PW.Last_Name)`	The software eliminates spaces from the left and right of the data: ...Johnson... changed to Johnson.
Second	`upper(result of alltrim)`	The software changes the data from mixed-case to uppercase: JOHNSON
Third	`left(result of upper, 3)`	The software returns the three leftmost characters of the last name: JOH

Example functions

Example 1

Let's assume that you want to select a range of ZIP Codes. Consider the following example data:

Function	`+ Input Filter (to 512 chars) = val(DB.ZIP)>=54600 .and.` `val(DB.ZIP)<54900`
Explan-ation	The function *val( )* will convert character data into numeric data enabling the use of the >= and < operators. The operator *.and.* requires that both tests must be true for the record to be included.
Results	Records with ZIP Codes ranging from 54600 to 54899.

Example 2

To select all ZIP Codes within 546, you could choose one of the following:

Function	`+ Input Filter (to 512 chars) = val(substr (DB.ZIP,1,3))=546`
Explanation	The *substr()* portion tells the software to start in the first position of the DB.ZIP field and go for a length of 3 characters. To make the expression equal to a number (in this example, 546) the DB.ZIP field has to be in numeric form (it is in character form in the database). The *val()* function converts the DB.ZIP into numeric data so that it can be compared to 546. The result would have to be 546 in order to be included in the record.
Results	Records with ZIP Codes starting with 546.

If you didn't want to convert your data into numeric form, you could use this function:

Function	`+ Input Filter (to 512 chars) = substr(DB.ZIP,1,3) ="546"`
Explanation	This function eliminates the requirement for the ZIP data to be in numeric form by making the function equal to the constant "546".
Results	Records with ZIP Codes starting with 546.

Example 3

Let's assume that you want to add a series of zeros to numbers in a character-type field so that each field is the same length. To do so, choose one of the following:

Function	`Copy (source, destination) = right("000000" + alltrim(DB.Account),6),field`
Explanation	The *alltrim()* function will make sure that all spaces are eliminated from the right and left of the field. The right function will take the 6 rightmost characters (spaces, numbers or letters) and return them as a 6-character string.

Results	•••1••• to 000001 •••234• to 000234 •2•••• to 000002 207••• to 000207 ••328•• to 000328 ••20•• to 000020

Or

Function	`Copy (source, destination) = right(" " + alltrim(DB.Account), 6), field`
Explanation	The *right()* function in this example will simply right-align the number taking the rightmost characters. Instead of returning zeros, the function will return blanks.
Results	•••1••• to ••••••1 •••234• to ••••234 •2•••• to ••••••2 207••• to ••••207 ••328•• to ••••328 ••20•• to •••••20

Example 4

This example presents a lengthy nested expression that performs a seemingly simple task. Let's assume that you want to post a name in one field and an 8-digit account number in another when the field contains both on the same line.

This expression extracts the account number from Line1 and places it in the Acct_No field.

Content in Line1 is: `Larry James 10625975`

Function	Copy (source, destination)= iif(isdigit(right(alltrim(DB.Name),1)), right(alltrim(DB.Name),8),""), Acct_No
Explanation	• *alltrim* trims spaces from the DB.Name field. • *right* returns the rightmost character from the trimmed DB.Name field (5). • *isdigit* returns T (True) if the rightmost character is a number. • If True is returned, right extracts the rightmost eight characters from a trimmed DB.Name. If False is returned, Acct_No is left empty.
Result	Acct No 10625975

This expression extracts the name and places it in the Name field.

Content in Line1 is: `Larry James 10625975`

Function	Copy (source, destination)= iif(isdigit(right(alltrim(DB.Name),1)), left(DB.Name,(len(alltrim(DB.Name)-8)),DB.Name), Name

Explanation	• *alltrim* trims spaces from the DB.Name field. • *right* returns the rightmost character from the trimmed DB.Name field (5). • *isdigit* returns T (True) if the rightmost character is a number. • *len* returns the length of a trimmed DB.Name. • –8 subtracts 8 characters from the length. • If True is returned, left extracts the first n left characters (length –8); in other words, everything except the last 8 characters. • If True is not returned, the complete DB.Name field is returned.
True Result	`Name Larry James`

Other operators

Operators are punctuation marks or symbols for arithmetic or testing.

Arithmetic

Symbol	Function	Example
*	Multiplication	3 * 2 = 6
+	Addition	3 + 2 = 5
-	Subtraction	3 - 2 = 1
/	Division (no % modulus available; see mod(number,number).	3 / 2 = 1.5

String concatenation

Symbol	Function	Example
&	Concatenate strings, removing all leading and trailing spaces from both.	“ a “ & “b ” returns “a b”
+	Concatenate strings, leaving leading and trailing blank spaces where they are.	“a ” + “b ” returns “a b ”
-	Concatenate strings, collecting all trailing blank spaces at the end.	“a ” - “b ” returns “ab ”

Comparison

Symbol	Function	Example
<	Less than	3 < 2 returns .F.
<=	Less than or equal to	3 <= 2 returns .F.
>	Greater than	3 > 2 returns .T.
>=	Greater than or equal to	3 >= 2 returns .T.
<>	Not equal to	3 <> 2 returns .T.
=	Is exactly equal to	3 = 2 returns .F. “a “ = “ab” returns .F. “a “ = “a” returns .F.
$	Is contained in or is a subset of	“a” $ “ab” returns .T. “a “ $ “ab” returns .F.

Miscellaneous

Symbol	Function	Example
!	Not	!.T. returns .F.

Symbol	Function	Example
( )	Precedence is the order in which operations are performed	

List of functions

The following functions are listed in alphabetical order and are summarized. Data types are *number*, *char* (for character), *date*, *log* (for logical), or *expr* (expression) when more than one type is valid. Expressions may be field names, constants in double quotation marks, or another function.

abs(number)

This function converts a numeric expression to its absolute value and returns a positive number or a zero. For example, when the BALANCE field contains a lesser value (like 2000) than the LIMIT field (containing 3000), the following expression would still result in a positive number (1000):

```
abs(DB.Balance - DB.Limit)
```

```
abs(2000 - 3000) = 1000
```

alltrim(char)

This function trims leading and trailing spaces from a character expression and returns the remainder as a character string. For example:

```
alltrim(DB.City)
```

When the DB field City contains "...Philadelphia...", the software returns the character string "Philadelphia".

asc(char)

This function returns the ASCII value (a number between 0 and 255) of the leftmost character in a character expression. Use it when you need to do arithmetic on the ASCII value of a character. The subject "character" is case-sensitive. For example, the following expression would result in the number 66:

```
asc("B")
```

For a list of ASCII characters and their numerical values, see ASCII code values.

at(char, char)

This function searches for the first character expression within the second and, if it is found, returns the starting character position as a number. For example, the following would return the number 6 when DB.Name is “Jones, Scott.”

```
at(“,”,DB.Name)
```

If the substring is not found, at returns “0”. If all you need to know is whether or not an expression is present, use the “$” operator listed under Comparison.

at(“,”,DB.Name)

If the substring is not found, at returns “0”. If all you need to know is whether or not an expression is present, use the “$” operator as described in Comparison.

cdow(date)

This function converts a date expression to a day-of-the-week name (DOW) and returns any of the capitalized character strings, (“Sunday,” “Monday,” etc.).

For example, `cdow(DB.Anniv_Date)` is converted to "Monday" when the database field Anniv_Date contains “04/12/04”.

chrtran($char_1$, $char_2$, $char_3$)

This function translates $char_1$ using $char_2$ and $char_3$ as a search-and-replace table and operates only on individual characters. If any character in $char_1$ is found in $char_2$, then the software replaces the $char_1$ character with the character from $char_3$ that is in the same position as the character found in $char_2$. If there is no replacement character in $char_3$, then the software removes the character from $char_1$.

For example, suppose we’re processing a Name field in which a slash character separates names from titles. We want to convert this to a blank space when posting Name to an output file. The output posting would be as follows:

```
Copy(source,destination) = chrtran(DB.Name, “/”, “ ”), Name
```

If there is no replacement character in $char_3$, then the software removes the character from $char_1$. So you can use *chrtran()* to delete a character.

NOTE If one of the characters that you want to remove is a double quotation mark, then you must place it inside *single* quotation marks. You may set up a more complex search-and-replace table by entering more than one character in $char_2$ and $char_3$.

IMPORTANT Remember that *chrtran()* works on individual characters only, so be careful to count character positions within these two strings. For example, if you have a field called DB.Keycode that contains numbers from 1–9, and you want to replace those numbers with letters, your output posting would look like this:

```
Copy(source,destination) = chrtran(DB.Keycode, "123456789",
 "ABCDEFGHI"), keycode
```

This would replace a Key Code number like "5183" with "EAHC".

chr(number)

This function interprets the number as an ASCII value and returns the corresponding character and is opposite of the *asc()* function. For example, the following would post carriage-return and line-feed characters:

```
Copy (source, destination) = chr(13) + chr(10), EOR
```

For a list of ASCII characters and their numerical values, see ASCII code values.

cmonth(date)

This function converts a date to a month name and returns any of the capitalized character strings ("January," "February," etc.). For example, the following would be converted to "October" when the database field Anniv_Date contains "10/04/2004":

```
cmonth(DB. Anniv_Date)
```

ctod(char)

This function converts a character expression in the American format (mm/dd/yyyy or mm/dd/yy) to a date value. For example, if DB. Anniv_Date is a character field, the following returns the field's contents as date-type data:

```
ctod(DB. Anniv_Date)
```

This enables you to compare this date with other date-type data such as the following:

```
date() = ctod(DB.Anniv_Date)
```

date()

This function returns the current date (according to your computer's time-of-day system) as a date-type value. The function accepts no input (argument) from you, so do not type anything between the parentheses. Returns a date with the format: YYYMMDD.

day(date)

This function extracts the day of the month from a date expression and returns it as an integer numeric value. For example, the following example gives the number 17 when Birth_Date contains "07/17/2004":

```
day(DB. Birth_Date)
```

deleted()

This function tests the input record to determine if it is marked to be deleted. The software returns a logical True (.T.) if deleted; otherwise, False (.F.). For example, you could use the following output filter to divert deleted records into a separate output file, based on their delete status in the input file.

```
+ Output Filter (to 512 chars)........ = deleted()
```

NOTE You can use the *deleted()* function in an input filter. However, many programs prefilter deleted records, so a deleted record would never be presented to your filter.

dow(date)

This function extracts the day of the week from a date and returns it as an integer numeric value from 1 to 7 (Sunday = 1, Monday = 2, ... Saturday = 7).

For example, on January 1, 2001, *dow(date())* takes the date from the computer's time-of-day clock, determines the day of the week (Monday), and converts that day to the number 2.

dtoc(date)

This function converts a date-type value to a character string in the American format (mm/dd/yyyy). Note that if the input date does not include the century, the software assumes the current century.

For example, the following expression returns the character string “10/04/2004” when Anniv_Date contains “10/04/04”:

```
dtoc(DB.Anniv_Date)
```

Compare this function with *dtos()*. Note that this function is opposite of *ctod()*.

dtos(date)

This function converts a date-type value to an 8-character string in the format yyyymmdd. Compare this function with *dtoc()*.

If the input date does not include the century, the software assumes the current century. For example, the following expression returns the character string “20041004” when Anniv_Date contains “10/04/04”:

```
dtos(DB. Anniv_Date)
```

empty(char)

This function returns a logical True (.T.) if the character expression (usually a field) is empty or filled with spaces or tabs. This function returns False (.F.) if it contains data. For example, the following expression returns a logical True when the application field AP.Group_No is empty:

```
empty(AP.Group_No)
```

iif(logexpr, $expr_2$, $expr_3$)

With this function, if the logical expression is True, the second expression is returned; otherwise, the third expression is returned. For example, suppose we want to post Occupant to the Name field if that field is empty:

```
Copy (source, destination).. = iif(empty(DB.Name),
“Occupant”,
DB.Name), Name
```

NOTE The returned expressions may be of any data type, and they do not have to be of the same data type.

int(number)

This function converts a numerical expression to an integer by truncating (not rounding) all digits to the right of the decimal point. Compare this function with *round()*.

For example, the number 3 results from:

```
int(3.9)
```

However, the number 4 results from:

```
round(3.9, 0)
```

isalpha(char)

This function returns a logical True (.T.) if the character expression begins with a letter (A to Z or a to z), and returns a logical False (.F.) if it begins with any other character. The following expression should be True:

```
isalpha(PW.First_Name)
```

isdigit(char)

This function returns a logical True (.T.) if the character expression begins with a number (0 to 9) and returns a logical False (.F.) if it begins with any other character. For example, the following filter might be used to exclude Canadian records:

```
+ Filter (to 512 chars)........ = isdigit(DB.Postcode)
```

islower(char)

This function returns a logical True (.T.) if the character expression begins with a lower-case letter (a to z) and returns a logical False (.F.) if it begins with any other character.

For example, the following expression would return a logical False (.F.) if DB.City is Madison because the name begins with an upper case letter:

```
islower(DB.City)
```

isupper(char)

This function returns a logical True (.T.) if the character expression begins with an upper-case letter (A to Z) and returns a logical False (.F.) if it begins with any other character.

For example, the following expression would return a logical True (.T.) if the city is Madison because the name begins with an upper case letter:

```
isupper(DB.City)
```

left(char, number)

This function extracts from a character expression the leftmost number characters, and returns this as a character string. For example, the following expression returns the first 13 characters of the PW field City:

```
left(PW.City, 13)
```

len(char)

This function returns the length of a character expression as a numerical value. For example, the following expression trims leading and trailing spaces before measuring the length of the city name:

```
len(alltrim(PW.City))
```

When the PW field City contains "...Philadelphia.....", the software returns number 12.

lower(char)

This function converts a character expression to lowercase and returns it as a character string. For example, the following expression returns the character string “t.s. eliot”:

```
lower(“T. S. Eliot”)
```

ltrim(char)

This function trims leading spaces from a character expression and returns the remainder as a character string. For example:

```
ltrim(PW.City)
```

When the PW field City contains "...Philadelphia.....", the software returns the character string "Philadelphia.....".

max(number,number)

This function compares two numeric expressions and returns the larger one as a numeric value. Note that this function is the opposite of *min()*.

For example, the following expression compares the numeric database field Cred_Limit with the value 500, and returns whichever is the larger amount:

```
max(DB.Cred_Limit, 500.00)
```

min(number, number)

This function compares two numeric expressions and returns the smaller one as a numeric value. Note that this function is the opposite of *max()*.

For example, the following expression compares the numeric database field Balance with the value 0, and returns whichever is the smaller amount:

```
min(DB.Balance, 0.00)
```

mod(number,number)

This function divides the first number by the second, and returns the remainder (modulus) as a numeric value. For example, the following expression returns the number 2 (44 divided by 3 is 14, with a remainder of 2):

```
mod(44,3)
```

Use this function to give you every x record number. For example, the following expression gives you every 4th record in a database.

```
mod(recno(), 4) = 0
```

month(date)

This function extracts the month from a date expression and returns it as an integer numeric value from 1 to 12; it is useful for staggering output files by months.

For example, the following expression would limit an output to those born in September:

```
month(DB.Birth_Date) = 9
```

proper(char)

This function converts a character expression to mixed-case (also called initial capitals). For example, the following expression returns “Micron Electronics Inc” when the PW field Firm contains “MICRON ELECTRONICS INC”.

```
proper(PW.Firm)
```

NOTE This function does not accept acronyms or other capitalization exceptions. The software coverts all words the same way. For example, *proper()* returns "Ibm Corp" when the input is “IBM Corp”.

recno()

This function returns the current record number as an integer numeric value. Use it to post the input record number to an output file for trace-back and to limit input to a portion of the file.

For example, you could use the following expression to confine an output file to the second 1,000 records:

```
+ Input Filter (to 512 chars)........ = recno() > 1000 .and.
recno() <= 2000
```

Note: This filter is slower to process than using the input range parameters.

replicate (char, number)

This function repeats a character expression a specified number (number) of times and returns it as a character string; the number must be an integer. For example, the following expression would insert 8 spaces in a designated field:

```
replicate(“ ”, 8)
```

right(char, number)

This function extracts the rightmost number characters from a character expression, and returns it as a character string. The number must be an integer.

NOTE This function ignores significant characters and extracts trailing blanks, if any are present. Consider using *rtrim()* first:
`right(rtrim(DB.Suite), 3)`

round (number, number)

This function rounds the first numeric expression to the number of decimal places specified in the second and returns a numeric value. Compare this function with *int()*, which truncates.

For example, the number 4 results from `round(3.992385, 0)`. But the number 3.99 results from `round(3.992385, 2)`. To round before the decimal point, the number must be an integer, but may be negative. For example, the number 120.0 results from `round(123.456, -1)`.

rtrim(char)

This function trims trailing spaces from a character expression and returns the remainder as a character string. For example, when the PW field City contains "...Philadelphia.....", the following expression returns the character string "...Philadelphia":

```
rtrim(PW.City)
```

space(number)

This function returns a character string consisting of a number of blank spaces. For example, the following function would yield 30 blank spaces:

```
space(30)
```

span(char, char)

This function returns, as a numeric value, the index of the last character in string 1 that is present in string 2.

For example, the following expression would return the number 3, because the first three characters of string 1 are also present in string 2. The fourth character of string 1 is the first one that does not exist in string 2.

```
span("edcTbaM","abcdefg")
```

NOTE This function is case-sensitive.

str(number, [len,[decimal]])

This function converts a numeric expression to a character string that is left-aligned and includes decimal digits, decimal point, and minus sign (if any). You can specify the length of the returned string and the number of decimal places (both numeric). If you omit the length, the software assumes 10 characters.

If you specify length, but not decimal, the software rounds the value to an integer. For example, the following expression converts the numeric-type database field “12.85” to a character string 8 characters long, with 5 significant digits, a decimal point, and 2 decimal places (the dots represent spaces):

```
str(DB.Number, 8, 2) returns "…1 2 . 8 5"
```

substr(char, start [,length]

This function extracts a substring from the character expression, beginning at character position start (a number) and continuing to the end, unless you specify a numeric length.

For example, the following expression extracts the exchange “788” from the 10-digit telephone number field 6087888700:

```
substr(DB.Phone, 4, 3)
```

Compare this function with functions *left()* and *right()*.

time()

This function returns the current time (according to the computer’s time-of-day clock) as an 8-character string in the format hh:mm:ss. Hours are in a 24-hour format.

translated()

This expression returns the number of non-Latin-1 characters that are converted to Latin-1 with the Unicode to Latin-1 table.

unassigned()

This expression returns the number of non-Latin-1 characters that are either illegal or unassigned. An unassigned character is one that has a numeric value greater than 255 for which there is no value specified in the Unicode to Latin-1 table.

upper(char)

This function converts a character expression to uppercase and returns it as a character string. For example, the following expression returns “IBM CORP” when the PW field Firm contains “IBM Corp”:

```
upper(PW.Firm)
```

val(char)

This function converts a character expression to a numeric value, and stops when it encounters a second decimal point or a non-numeric character. For example, the following expression converts the character-type field AP.List_Cnt into numeric data:

```
val(AP.List_Cnt) + Output filter = val(AP.List_Cnt) <= 2
```

year(date)

This function extracts the year from a date expression and returns it as an integer numeric value. For example, the following expression extracts the year of graduation:

```
year(DB.Grad_Date)
```

If the date format for DB.Grad_Date is mm/dd/yyyy, the software returns the yyyy portion.

Summary of functions by purpose

The following table lists each of the functions according to its purpose.

Purpose	Description	Function
Arithmetic	Perform division and return the remainder	mod()
Convert data	ASCII value to character	chr()
	Character mm/dd/yy or mm/dd/yyyy to date	ctod()
	Character string to lowercase	lower()
	Character string to UPPERCASE	upper()
	Character string to mixed-case	proper()
	Character to ASCII value	asc()
	Character to numeric	val()
	Date to character mm/dd/yyyy	dtoc()
	Date to character yyyymmdd	dtos()
	Numeric decimal to integer by truncation	int()
	Numeric decimal to n decimal places (or integer) by rounding	round()
	Numeric to absolute value	abs()
	Numeric to character string	str()
Compare	Select the larger of two numbers	max()
	Select the smaller of two numbers	min()

Purpose	Description	Function
Provide data	Character repeated n times	replicate()
	Current date from time-of-day clock	date()
	Current time from time-of-day clock	time()
	n spaces	space()
	Number of current record, from input file	recno()
Extract	Day of the week from date (Sunday, Monday, ... Saturday)	cdow()
	Day-of-the-month numeric from date (1, 2, ... 31)	day()
	Day-of-the-week numeric from date (1, 2, ... 7)	dow()
	Leftmost n characters from string	left()
	Month name from date (January, February, ... December)	cmonth()
	Month numeric from date (1, 2, ... 12)	month()
	Range of characters from string	substr()
	Rightmost n characters from string	right()
	Year numeric from date	year()
Fit and trim	Trim leading and trailing spaces from a character expression	alltrim()
	Trim leading spaces from a character expression	ltrim()
	Trim trailing spaces from a character expression	rtrim()
	Measure the length of a character expression	len()

Purpose	Description	Function
Substrings	Where is character expression 1 located within expression 2?	at()
	Search a string for one character and substitute another	chrtran()
	How many characters in expression 1 are within expression 2?	span()
	Is character expression 1 located within expression 2 (True/False)?	$
Test	Is the input record marked to be deleted?	deleted()
	Does expression contain any data other than spaces?	empty()
	Test, if True, return expression 1; if False, return expression 2	iif()
	Does expression begin with a letter (A–Z or a–z)?	isalpha()
	Does expression begin with a number (0–9)?	isdigit()
	Does expression begin with a lowercase letter (a–z)?	islower()
	Does expression begin with a capital letter (A–Z)?	isupper()

Convert database types and format

This section explains how to convert files from one type or format to another and provides solutions to common problems in database design. It provides information about the following:

- Input and output fields and data types
- How to convert ASCII and EBCDIC input to dBASE3 output
- How to convert dBASE3 input to ASCII output
- How to create a delimited file with nonstandard delimiters

Input files with different formats

Assume that you have rented three lists for an upcoming promotion; we'll call them A, B, and C. Each list comes from a different source, and each one has a different format. Consider the following format files:

A

```
Name, 26, c
Address, 26, c
City, 16, c
State, 2, c
ZIP, 5, c
```

B

```
First_Name, 10, c
Mid_Init, 1, c
Last_Name, 13, c
Address, 26, c
Apt, 12, c
City_State, 20, c
ZIP_Code, 5, c
```

C

```
Name, 26, c
Title, 26, c
Address1, 26, c
Address2, 26, c
C_St_ZIP, 26, c
```

As an example, here's how the same data would look in those three formats:

A

```
John Q. Public, VP Sales
100 Vine St., Suite 55
Shoreview
MN
55126
```

B

```
John
Q.
Public
100 Vine St.
Suite 55
Shoreview MN
55126
```

C

```
John Q. Public
VP Sales
100 Vine St.
Suite 55
Shoreview MN 55126
```

The problem

As you look at the previous examples, notice that the files are different in two ways. First, they break down the data into fields differently. Second, even when they're entering the same information into

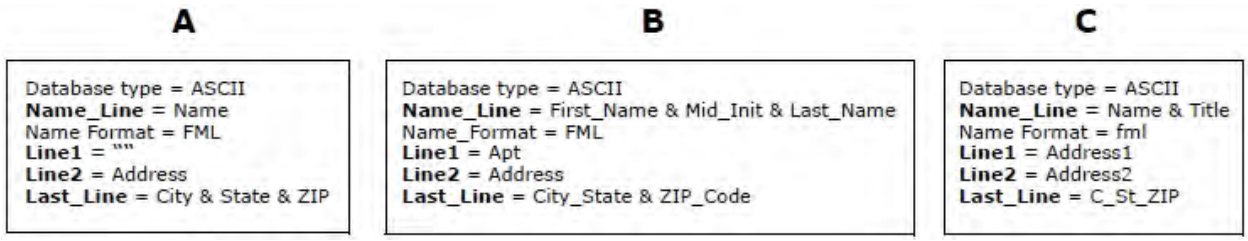
a field, they call it different names (ZIP versus ZIP_Code). This will cause problems when you start designing address labels.

To print information on all labels, the printing labels need common field names; you must present these formats to the software as if they were the same. If the formats are not common, you will receive a warning and get blank lines on your labels. All three files could go through a conversion process by physically converting them to one format; however, there is an easier, faster way.

The solution

By setting up the definition files as shown in the following example, you can make the files appear to the software as though they were in the same format.

Where one file breaks down finer than another, we have to combine the fields; this has been called the “lowest common denominator” approach. And we need to adjust the field names, possibly giving them aliases.



The result

Now the software can work with four PW fields, no matter which input database a record happens to come from: Name_Line, Line1, Line2, and Last_Line.

For example, in Label Studio, it will be the PW fields that we will place on the label layout, not the original database fields. The following table is an example of the label output.

PW fields	Potential output
PW.Name_Line	John Q. Public VP Sales
PW.Line1	Suite 55
PW.Line2	100 Vine St
PW.Last_Line	Shoreview MN 55126

Input and output fields and data types

Preserve the data type

If you want output fields to match the data types of the input, the easiest way is to use the cloning features, as explained in the previous chapter. If for some reason you can't use the cloning features, and you need to specify your output file manually, then you need to be careful about data types.

For example, suppose you input a packed numeric field called ACCT_NUM. If you want to preserve the field as a packed numeric, ensure that your output field is that type. In your job, the setup might look like this:

Description	Value
Output File Name (path & file name)	C:\PW\ACE\ACEdbout.txt
File Type (see NOTE)	ASCII
Copy Format of Input File (Y/N)	n
Field (name,length,type,misc)	ACCT_NUM, 7, P, 13

Then post the field as follows, copying it straight from the input to the output database:

Description	Value
Output File Name (path & filename)	C:\PW\ACE\ACEdbout.txt
Existing File (APPEND/REPLACE)	REPLACE
+ Output Filter	
Copy Input Data to Output File (Y/N)	YES
Copy (source, destination)	DB.ACCT_NUM, ACCT_NUM

Convert the format automatically

Suppose that your input database is dBASE3, but you want an ASCII output file (fixed or delimited). In dBASE3, the format of date fields is yyyymmdd. However, in your ASCII output file, you want the format dd/mmm/yyyy. In other words, 20040720 would become 20/Jul/2004.

In your job, when setting up the format of your output file, you will not be able to use the cloning feature. If you did, the date format of output would be the same as input. Instead, you must tell the software the format you want for all output fields. The setup of the date field might look like this:

```
Field (name,length,type,misc) HIRE_DATE,9,D,dd/mmm/yyyy
```

However, when it comes to posting—placing information into the fields of your output file—then you can use one of two methods:

- Copying from the input file using the cloning feature (ensure that the input and output field names are the same), or
- Manual posting using a posting command in your job. For example: `Copy (source, destination)... = DB.HIRE_DATE, HIRE_DATE`

When the software copies over your HIRE_DATE field, it automatically converts the data to match the format of the output field.

Convert the data type automatically

The software also converts data types in some situations. For example, suppose you're running ACE and you import a packed numeric field called ZIP9. If you use the cloning feature, your output ZIP9 field will also be a packed numeric.

However, the 9-digit ZIP Code assigned by ACE is character-type data. As shown in the following example, ACE converts it automatically if you post it directly to a packed numeric field.

```
Copy (source, destination)... = AP.ZIP9, ZIP9
```

The same is true if the output field is numeric, whether the output file is ASCII or dBASE3.

Convert with a function

Some data-type conversions the software cannot perform automatically (see the examples on the following pages). This is something to consider, especially when you are converting from one file type to another. In these situations, you can use functions to convert your data.

Convert via PW fields

Let's return to the packed-numeric input field called ACCT_NUM. In your output database, you want to expand this data and convert it to be a character-type field. One way to convert it would be to handle it as a PW field:

1. In your definition file, define ACCT_NUM as a user-defined PW field. The software automatically converts the data to character type. The definition entry looks like this:

   ```
   USER.ACCT_NUM = DB.ACCT_NUM
   ```

2. In your job, when you set the format of your output file, include a character-type field named ACCT_NUM:

   ```
   Field (name, length, type, misc)... = ACCT_NUM,13,C
   ```

Note: The length must be the unpacked length. For example, the Acct_Num packed-numeric length is seven. Calculate the unpacked length this way: 2 X 7 – 1 = 13. (The 13 is the length defined in the above field parameter).

For more information, see Packed numeric fields (dbase) and Packed numeric fields (fmt).

3. Then post the field as follows:

```
Copy (source, destination)... = PW.ACCT_NUM, ACCT_NUM
```

Convert ASCII and EBCDIC input to dBASE3 output

For the most part, ASCII-to-dBASE3 conversion is trouble-free. The same holds true for EBCDIC-to-dBASE3. However, some problems are caused by differences in data types.

Packed numeric fields

The software accepts the packed numeric field in your fixed-ASCII or fixed-EBCDIC input file; dBASE3 can handle numeric, but not packed numeric. You should not use format cloning; instead, manually declare a dBASE3 numeric field of adequate length to handle the unpacked numbers. You can easily figure adequate length by using the following:

```
2 (packed field length) – 1
```

If you use format cloning, the software creates a dBASE3 numeric field equal to the packed length of your input. Then, the software copies the unpacked number into this too-short field.

Binary and filler fields

You can use binary and filler fields in fixed-ASCII and fixed-EBCDIC, but not in dBASE3. The software issues an error message if the following three conditions exist:

- Your input file includes any binary or filler fields
- You ask the software to convert your output to a dBASE3 format
- You attempt to use the cloning features

The software issues an error message because it cannot determine what to do with the binary-type input fields. They can't be cloned because they are illegal in the dBASE3 output file. However, there is one exception: If your input fixed-ASCII or fixed-EBCDIC file includes a binary-type EOR field, the

software will not issue an error message. The EOR field is not necessary in a dBASE3 file and is dropped.

One way to preserve your filler fields is to declare them as character-type data in your format file. The format file entry might look like this:

```
Filler1, 28, C
```

Note that filler fields can be character-type. Binary is the default data type for filler fields, but it is not required. If your filler field contains any bytes that are unprintable characters in the ASCII set, the software converts them to spaces in the output file.

Logical fields

Some ASCII and EBCDIC databases contain a character-type field that works like a logical field; the field either contains some special character as the “Yes” or “True” value, or is blank to indicate “No” or “False.”

This situation is common when a database has been exported to ASCII or EBCDIC text. For example, suppose you manage custom databases that the software can’t read directly, so you export to fixed ASCII. When you export, the software converts logical-type fields to 1-byte, character-type fields. An asterisk in this field is equivalent to a logical True, and an empty field equals a logical False.

If you’re in this situation, you have two options: The easier one is to simply carry over the field as a single character. You can do this using the cloning features, if you like.

More effort is required if you want to convert to a true dBASE3 logical-type field because you cannot simply post the field directly from an ASCII-character input field to dBASE3-logical output field. Instead, you must use a function, in your posting, to test the character data and return a logical True or False.

For example, suppose your ASCII input file includes a character-type field called PAID_UP. (This field contains an asterisk if the customer’s subscription is current; or it is blank if the account is expired.) In your dBASE3 output file, you want PAID_UP to be a logical-type field. The following illustration shows how this example might be set up in your job. For more information about functions, see Filter and function expressions.

```
BEGIN    Create Output File = = = = = = = = =
-
File Type (see NOTE) ..... =dBASE3
-
Field (name,length,type,misc) ..... =PAID_UP,1,L
END
BEGIN    Post to Output File = = = = = = = = = =
-
-
-
-
Copy (source, destination)..... =iif(DB.PAID_UP="*",.T.,.F.),PAID_UP
END
```

Delete field

Some ASCII and EBCDIC files contain a 1-byte, character-type, DELETE field to mimic nondestructive delete marking. You can carry over such a field as a character-type field. However, you cannot set the hidden delete byte in dBASE3 output records. It would take some dBASE3 programming and post processing of your output file to delete records based on the value in the character-type DELETE field.

Convert dBASE3 input to ASCII output

If you input dBASE3 and output ASCII (either fixed-length or delimited), consider the following points.

Delete mark

All of the software programs—except ACE—ignore input records that the software marks for deletion. With ACE and Label Studio, you have the option to process and output deleted records.

However, the software does not automatically preserve the dBASE3 delete mark in the ASCII output file. If you want to preserve the deleted status of your output file, you must manually set up an output field (Deleted) and use the following posting expression:

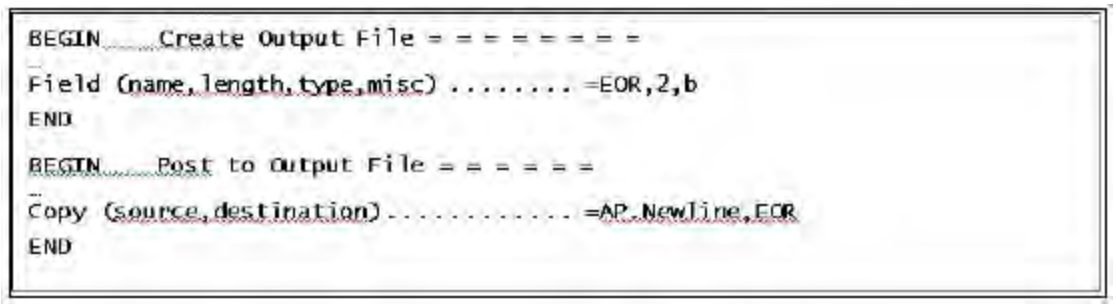
```
Copy (source,destination) = iif(deleted(),"*",""), DELETED
```

Note: To use the non-destructive delete mark in your ASCII file, you must define PW.Delete in the DEF file.

End-of-record mark

The dBASE3 records do not contain an end-of-record field; be sure to add this to your ASCII output records. If you do not, the output file may be hard to work with.

In your job, be sure to append a field named EOR and post to it either a line-feed character (UNIX), or the carriage-return/line-feed pair (Windows). For example, the job setup looks like this:



Create a delimited file with nonstandard delimiters

When you create a delimited output file, you may specify its format through settings in your job file. However, you may not specify delimiters in your job file. The software uses the default delimiters:

- Carriage return/line feed between records
- Commas between fields
- Double quotation marks for framing around character-type fields (no framing on date or numeric fields)

The software uses the default delimiters even if you are cloning a file that contains other delimiters. For example, cloning a tab-delimited file results in a comma-delimited output file. However, there is a different method for those who require delimiters other than the defaults. Perform the following steps before you start the software processing:

1. Go to the directory where you want the software to create the output file.

   Here, you will create supporting files for an output database that does not yet exist. To make this procedure clear, let's suppose that the output file will be named example.dat.

2. Create an empty file named example.dat with a text editor.

   Press the space bar or the enter key, then save and exit the file.

3. Create a definition file named example.def.

   The only line you really need in this file is this: `Database Type = delimited`

4. Create a delimited format file named example.dmt.

   Fill out this file completely, specifying all the fields that you want in your records. You must specify the maximum field length for each field that you list in your delimited format file. For more information, see Delimited format files for delimited ASCII.

   If you want to clone the input, you can copy the input file's .dmt to example.dmt.

5. Add to your delimited format file, as necessary, parameters to select the delimiters:

   ```
   Record Delimiter =

   Field Delimiter =

   Field Framing Character =
   ```

   For example, suppose you want tabs between fields, instead of commas:

   ```
   Field Delimiter = 009
   ```

   Remember, you do not need all three parameters. Do not insert a parameter in your delimited format unless you really need it. If you insert a parameter but leave it blank, the software assumes that you are turning off that delimiter.

6. When you set up your job file, do not include a Create File for Output block for the file. Your specifications for the output file are not contained in the job file, as usual, but in the external files that you created. However, your job file must include the block for posting information to the output file. That posting block will mention the database name example.dat. Be sure to set the **Existing File** parameter to Append.
7. Run the job. The software posts the data to the example.dat file that you created. In the posting block, instruct the software to overwrite/replace the existing file.

Additional Resources

The following resources are available to help you with your software.

Documentation Updates Available Online

Presort documentation is updated on a regular basis and available in PDF format via the BCC Software Customer Portal. Documents are posted in the Manuals & Quick Guides section of the portal—except for release notes, which are available in the Presort section of the Product Downloads page.

You can access the most current versions of Label Studio documentation from the following links:

- *Label Studio User Guide*
- *Label Studio Inkjet Reference*
- *Label Studio Release Notes*
- *System Administrator Guide*
- *Edjob User Guide*
- *Quick Reference for Views and Job Files*
- *Views Quick Start Guide*
- *Database Prep Guide*

Knowledge Base

BCC Software offers tips, tricks, and best practices for using our products. Knowledge Base articles can help empower both experts and new users.

- To learn more, visit the BCC Software Knowledge Base on the BCC Software Customer Portal.

How to Contact Support

- BCC Software Technical Support online: https://bccsoftware.com/customer-center/customer-support/
- Email: support@bccsoftware.com