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**System 480**  
**Formatting Techniques**

**ENTREX**

## PREFACE

System 480 Formatting Techniques is one volume in a set of publications describing System 480. Other publications include the following:

- . System 480 Concepts (Order No. S-2) -- A general description of System 480 operation and use.
- . System 480 Input/Output Operations (Order No. S-7) -- A detailed description of the procedures used to write data to tape, to read data from tape onto the disk, and to control the flow of data through the system.
- . Supervisor's Quick Reference Information (Order No. S-3).
- . Operator's Quick Reference Information (Order No. S-6).

This manual supersedes the System 480 Supervisor's Reference Manual (Order No. S-4) and all System 480 Bulletins with the exception of the following:

- . Using A System 480 Printer (Bulletin #21.1).
- . Operator Statistics (Bulletin #26).

In order to derive full benefit from this manual, the reader should be familiar with the operation of the system and understand the basic concepts of System 480 operation, as described in the publication System 480 Concepts.

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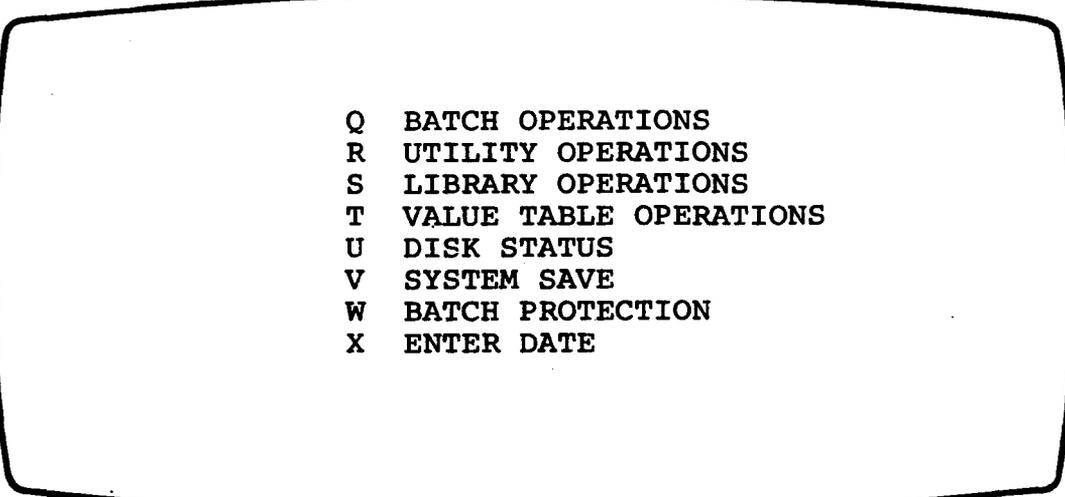
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## SECTION 1

### INTRODUCTION

The supervisor's HELP list, illustrated in Figure 1-1, is used to start all functions restricted to the supervisor. It can be obtained from any keystation by selecting the Supervisor option from the operator's HELP list and entering a nondisplayed password, which is requested by the system. This page, or screen of information, lists the categories for all operations that can be requested by the supervisor.



Q BATCH OPERATIONS  
R UTILITY OPERATIONS  
S LIBRARY OPERATIONS  
T VALUE TABLE OPERATIONS  
U DISK STATUS  
V SYSTEM SAVE  
W BATCH PROTECTION  
X ENTER DATE

Figure 1-1. Supervisor's HELP List

When the letter preceding any of the categories except Disk Status and System Save is selected, a second more detailed list is displayed. The second list contains all the functions for the selected category.

The supervisory functions that control the record format library, standard job library, and the assignment of value tables are detailed in this manual.

When Library Operation is selected from the supervisor's HELP list, the following options are displayed:

- . Operator Statistics Library,\*
- . Record Format Library,
- . Output Format Library
- . Standard Job Library,
- . Write All Libraries,
- . Read All Libraries.

When Operator Statistics Library, Record Format Library, Output Format Library, or Standard Job Library is selected, the system displays a list of the function that can be performed with the specified library.

When Write All Libraries or Read All Libraries is selected, the system prepares to write or read as specified.

#### WRITE ALL LIBRARIES

Select Write All Libraries to write all entries in the record format, output format, and standard job libraries onto magnetic tape in that order. The system automatically writes a tape mark after each library. When Write All Libraries is selected, the system displays the following message.

HIT REL TO PROCEED; OTHERWISE HIT HELP

Depress the REL key to initiate the writing of all libraries onto magnetic tape. Depress HELP to redisplay the supervisor's HELP list without writing the libraries.

---

\* Optional feature. Described in System 480 Bulletin #26

It is also possible to write the libraries individually by selecting the write command from the appropriate library page.

#### READ ALL LIBRARIES

Select Read All Libraries to read record formats, output formats, and standard jobs from tape onto the disk. The system displays the message HIT REL TO PROCEED; OTHERWISE HIT HELP. Depress REL to initiate the reading operation.

It is also possible to read the libraries individually by selecting the read command from the appropriate library page.

## SECTION II

### CREATING A RECORD FORMAT

To create a record format and store it in the record format library on the disk, use the following procedures.

1. Design the DATA/SCOPE display layout for the data record using System 480 Display Layout Forms (Order No. M-1).
2. Define each field in the record by selecting the editing and validity checks that are appropriate for it.
3. Record the field definitions on a System 480 Record Format Layout Form (Order No. M-3). The individual field definitions combine to form the record format.
4. Select Create A Record Format from the Record Format Library list and enter the record format.

### DESIGNING A DISPLAY LAYOUT

The first step in creating an input record format is to design display layouts that correspond to the source documents of the job. The screen layouts provide the visual link between the operator and the data being entered. To design a display layout, use System 480 Display Layout Forms. Each display layout provides 10 lines for data fields and formatting (tag) information. One display layout defines one record on the disk. Normally, each field has a tag. Field tags have two functions:

1. To aid the operator in learning new jobs,
2. To detail the fields of each record so that the operator can see an error easily when it occurs.

Figure 2-1 illustrates a sample screen layout. The use of tags is detailed in Section II of System 480 Concepts (Order No. S-2).

```

(NAME) ----- (#) --
(COMPANY) -----
(ADDRESS) -----
                -----
(STATE) ----- (ZIP) -----

```

Figure 2-1. Sample Screen Layout

RECORD FORMAT FIELD DEFINITIONS

Record formats are created by giving the format a unique name and defining each field in the input record. The individual field definitions combine to form the input record format. Each field has a number, a length, and optionally, a field tag specified for it, in addition to the appropriate editing and validity checks and verification required.

The following is a discussion of the verification, editing, and validity checks that can be specified for a field. Each check is shown below as a question with its legal responses following in parentheses. The legal responses are displayed in alphabetic order.

## Verification Options

### VERIFY (CKSR) -

- K = Key verify the field.
- S = Scan the field (display tags and data, but do not stop on the cursor). The cursor moves automatically past all scan fields to the next key verify field.
- R = Release the current record without any verification of this field and position the cursor at the beginning of the first field that is to be verified in the next record.
- C = Conditional verification. The cursor stops on this field for verification only if zero balancing has been specified and the total for the field is out of balance

## Field Editing and Validity Checks

### FIELD USE (ABLMNSTU) -

FIELD USE indicates the shift of the field or indicates that the record format is to be used to perform a special function. A Field Use must be specified for each field definition.

The shift of a field is specified by one of the following responses:

**L** = Lower shift. On the keypunch keyboard, L indicates an alphabetic shift, but allows the numeric shift (i.e., the NUM key can be used).

On the typewriter keyboard, L indicates an alphanumeric shift, but allows use of the SHIFT key for upper shift characters.

**U** = Upper shift. On the keypunch keyboard, U indicates the numbers and the upper shift symbols. The ALPHA shift key can be used to enter alphabets.

On the typewriter keyboard, U indicates the upper shift characters, but allows use of the SHIFT key to enter alphabets and numbers (lower shift characters). Normally, U is not specified in record formats to be used by typewriter keyboards; either L or M, described below, is specified instead.

**M** = Numeric shift for fields in record formats that are to be used by both keypunch and typewriter-style keyboards. On the keypunch keyboard, M is equivalent to U. The ALPHA key can be used to enter alphabets.

On the typewriter keyboards, M is equivalent to L. The SHIFT key can be used to enter upper shift characters.

**N** = Numeric-only field. Only the digits 0 through 9, the + (plus) and - (minus), and spaces are allowed in the field regardless of the type of keyboard being used.

**A** = Alpha-only field. Any character except 0 through 9 is allowed in the field regardless of keyboard type.

All fields, except numeric-only fields, are automatically filled with spaces in any positions where data is not entered. Numeric-only fields are automatically zero filled. However, if

FIELD RELEASE is depressed when the cursor is positioned on the first character of a right-justified, numeric-only field, the field is automatically space filled.

A special function is specified by one of the following responses to the FIELD USE question.

B = Batch balancing record. B is specified in the first field definition of a format that is to contain fields used for batch balancing or balancing to zero. Because the B is used only to signal the system that the current record contains predetermined total fields used in balancing, no field number is assigned to it and it must have a field length of zero.

See Section V, "Batch Totaling and Balancing" for a more detailed explanation.

T = Subtotaling record. T is specified in the first field definition of a format that is to contain a predetermined subtotal. Because the T is used in a field definition only to signal the system that the current record contains a predetermined subtotal, no field number or length is assigned. See Section VI, "Subtotaling", for a more detailed explanation.

S = Special field. S is specified when a special field function is implemented in a system to provide a customized system feature. Therefore, the meaning of S varies among installations and is ignored in systems that do not have a special meaning installed for it.

#### AUTO FUNCTIONS (DEIS) -

The automatic functions are skipping (S), duplicating (D), incrementing (I), and emitting (E). When specified for a field, these functions operate under control of the AUTO key during data entry; i.e., when AUTO is on, data is automatically duplicated, incremented, or emitted, or the field is automatically skipped.

When AUTO is off, the type of automatic function specified for the field, if any, is displayed on the status line for the operator to see; i.e., SKIP, DUP, INCR, EMIT. When AUTO is off, data can be keyed into the field.

- S = Automatic skip field. If AUTO is on, the field is to be skipped automatically and filled with spaces or zeros depending on the FIELD use specified.
- D = Automatic duplicate field. When AUTO is on, the data in the corresponding field of the previous record is copied into the current field. If the fields are of different lengths, data is duplicated until the end of the smaller of the two fields is reached.
- I = Automatic increment field. Each time an automatic increment field is encountered, the contents of the corresponding field of the previous record are increased by one and inserted in the automatic increment field. To enter an initial value or change the contents of an increment field, the operator turns off the automatic functions and enters the desired contents.
- E = Automatic emit field. When AUTO is on, the data stored in the tag portion of the field definition is automatically inserted into the data record. The emit function is further detailed under the heading, "Coding A Record Format", in this section.

NOTE: The automatic functions are incorporated in the input record formats to facilitate the conversion of existing jobs. However, they also can be accomplished during output reformatting, (usually more effectively, and with significant savings of disk space).

BATCH TOTAL NO. -

System 480 allows totals to be accumulated and fields entered to be balanced against predetermined totals keyed at the beginning of a batch. Subtotals can also be balanced against predetermined subtotals within a batch. A total of 20 batch totals and subtotals can be specified for each batch.

The response to BATCH TOTAL NO indicates which batch total or subtotal this field adds into, or subtracts from, for a balance.

Enter that number to indicate that batch balancing or sub-totaling is to be used for the current field. Enter a minus batch total number or an oversigned batch total number to indicate that the contents of the current field are to be subtracted from the total.

See Section V, "Batch Totaling and Balancing", for a detailed explanation.

FIELD BOUND CHECK (F)

F = Field boundary check. The field boundary check prevents the operator from keying too many characters for a field and, thereby, flowing over into the next field. It is particularly useful for fields that contain data of an undetermined length, such as a name or address. FIELD RELEASE must be depressed in order to exit from the field.

MANDATORY FIELD (ECB) -

System 480 provides three types of mandatory fields: must enter, must complete if entered, and must enter and complete.

- E = At least one character must be entered into the field. If the entry operator depresses FIELD RELEASE when the cursor is in the first position of the field, an error is signaled.
- C = If the field is entered, it must be completed. The operator can either fill all positions in the field or depress FIELD RELEASE and skip the field entirely. C is useful for a field such as a zip code that is often left off the source document, but when included requires that five digits be keyed.
- B = Both. The operator cannot skip the field and must enter all character positions.

RIGHT JUSTIFY (R) -

- R = The data is to be right justified in the field. Unless the FILL CHARACTER question, below, is used to indicate otherwise, unused positions in the field are filled with spaces or zeros according to the FIELD USE specified.

FILL CHARACTER (S/Z) -

The FILL CHARACTER question can be used to indicate that unentered positions in a field are to be filled with either spaces or zeros. It overrides the automatic fill character implied

in FIELD USE. If the field is right justified, the fill character specified applies to the character positions to the left. If it is not right justified, the specification applies to character positions to the right of the data.

S = Fill all unused positions in the field with spaces.

Z = Fill all unused positions in the field with zeros.

If FIELD RELEASE is depressed with the cursor in the first position of a right-justified, numeric-only or upper shift field, the field is space filled regardless of fill specification.

CHECK DIGIT/ASCENDENCY CHECK (1-8,A) -
--

CHECK DIGIT/ASCENDENCY CHECK can be used to indicate that the field is to be validated using one of System 480's check digit algorithms or that an ascendency check is desired for the field.

The use of check digits and their calculation is explained in Appendix A. Available check digit algorithms are as follows:

Code

- 1 = Mod 11 complemented
- 2 = Mod 11
- 3 = Mod 10 complemented
- 4 = Mod 10
- 5 = Mod 7 complemented
- 6 = Mod 7
- 7 = Nonstandard Mod 10
- 8 = Nonstandard Mod 11

As ascendency check insures that the current field contents are equal to or greater than the contents of the same field in the previous record. If it is not, an error message is displayed.

A = Ascendency Check

Ascendency checking can be applied to alphanumeric fields as well as numeric fields.

VALUE TABLE NO.-- INVALID ENTRIES (Y) -

A value table contains all of the valid (or invalid) values that can be entered in a field by the operator. Up to 20 value tables can be in use in System 480 at one time. To indicate that the field currently being defined is to be validated by a value table, enter the number of the value table that is to be used for the field.

A second question, INVALID ENTRIES (Y), is used if the value table contains all entries that are illegal for a field. The operator can enter any value except those contained in the table.

Y = Yes, the table contains a list of invalid entries.

Value Table operations are detailed in Section VII, "Using Value Tables".

LIMITS CHECK (Y) LOWER \_ \_ \_ / \_ UPPER \_ \_ \_ / \_

The limits check (range check) is used to specify lower and upper limits for a field. The number entered by the operator cannot be less than the lower limit or greater than the upper limit.

NOTE: The limit check can be specified only for numeric-only fields.

The lower and upper limits are specified in the form nnn/n. The first three digits are the significant digits of the limit. The digit that follows the slash (/) indicates the number of zeros (0 through 9) that are to follow the significant digits. For example, the number 564000 is entered as 564/3, and the number 387 is specified as 387/0.

Enter the lower limit in response to LOWER \_ \_ \_ / \_.

Enter the upper limit in response to UPPER \_ \_ \_ / \_.

## Combining Editing and Validity Checks

As many field checks as needed can be applied to a field. The following are valid sample field definitions:

- . Must enter, right justified, zero filled, range check field,
- . Must complete, value table field,
- . Must enter, right justified, batch total field with a boundary check.

The only restriction is that only one of the following checks can be selected for a field:

- . Batch total (batch balance or subtotal)
- . Value table lookup
- . Check digit
- . Range check

The ascendancy check cannot be used with batch totals, value table lookup, or check digits.

## CODING A RECORD FORMAT

Once the display layout has been designed and the verification, editing, and validity checks for each field have been selected, the record format is coded on System 480 Record Format Layout sheets. See Figure 2-2. Writing down the record format specification (i.e., the series of field definitions that make a record format) serves two purposes.

1. It makes entering the format essentially a data entry process. The form can be given to an operator for entry if desired.
2. It provides a written document that can be referred to when designing an output format for the data entered under control of that record format.

The first step in coding a record format is to assign a name to it. The name can be from one through eight characters in length



and must not duplicate the name of another record format in the record format library. The name can be any combination of alphanumeric characters or special symbols. After specifying the name, code the individual field definitions.

PGM Number

Three programs are used to enter field definitions. The program selected for a particular field depends on two factors: 1) the length of the field's tag, and 2) the validity checks that are to be used for the field. The three programs are PGM 3, PGM 4, and PGM 5 as illustrated in Figures 2-3, 2-4, and 2-5 respectively.

```
FIELD # --  
FIELD LENGTH --  
TAG -----
```

```
VERIFY (CKRS) -  
FIELD USE (ABLMNSTU) -  
AUTO FUNCTION (DEIS) - BATCH TOTAL NO.--  
FLD BOUND CHK (F) - MAND'RY FLD (ECB) -  
RIGHT JUSTIFY (R) - FILL CHAR (SZ) -  
CHK DIGIT/ASCEND CHK (1-8,A) -
```

NOTE: BATCH TOTAL NO and CHK DIGIT or ASCEND CHK cannot be specified for the same field.

Figure 2-3. PGM 3

```

FIELD # --
FIELD LENGTH --
TAG -----
-----
VERIFY (CKRS) -
FIELD USE (ABLMNSTU) -
AUTO FUNCTION (DEIS) - BATCH TOTAL NO.---
FLD BOUND CHK (F) - MAND'RY FLD (ECB) -
RIGHT JUSTIFY (R) - FILL CHAR (SZ) -
CHK DIGIT/ASCEND CHK (1-8,A) -

```

Figure 2-4. PGM 4 (Long Tag)

```

FIELD # --
FIELD LENGTH --
TAG -----
VERIFY (CKRS) -
FIELD USE (ABLMNSTU) -
AUTO FUNCTION (DEIS) -
FLD BOUND CHK (F) - MAND'RY FLD (ECB) -
RIGHT JUSTIFY (R) - FILL CHAR (SZ) -
VALUE TABLE NO. -- INVALID ENTRIES (Y) -
LIMITS CHK (Y) LOWER ---/- UPPER ---/-

```

NOTE: VALUE TABLE LOOKUP and Limits CHK cannot be specified for the same Field.

Figure 2-5. PGM 5 (Value Table or Range Check)

### Field Number

Number all data fields sequentially. Tag-only fields (fields with a length of zero) are not numbered, because they do not contain data. Tag-only fields are described below.

NOTE: It is important to number fields accurately because the numbers are referred to when writing the output format for this record.

### Field Length

Enter the length of the data field. For tag-only fields, enter 00. For emitted data, enter the length of the emitted constant.

### Tag

If the field is to have a tag, write the tag in the designated portion of the Record Format Layout. The following conventions are used when entering tags.

1. The "not" symbol ( $\neg$ ) is used to start a tag on a new line. Otherwise, the tag starts on the first position after the delimiter of the previous field.
2. The "unequal" symbol ( $\neq$ ) must be used to indicate the end of a tag. This symbol tells the system where the end of the tag occurs and allows the supervisor to see the end of a tag that contains trailing spaces.

It may be useful to enclose tags in parentheses so that the operator can readily distinguish between tags and data. If parentheses are to be used, key them as part of the tag.

If a tag longer than 13 characters, including cursor return ( $\neg$ ) symbol(s), is desired, enter the field definition using PGM 4, which provides space for a tag of up to 76 characters.

When the automatic emit function (E) is being used, the data to be emitted is coded the same way as a tag. That is, it is stored in the tag portion of the Record Format Layout and entered in response to the TAG request when keying the record format. The constant is terminated with  $\neq$ . Either PGM 3 or 4 can be used to define the emitted field depending on the length of the emitted constant.

Because the emitted data is stored in place of a tag, a field tag cannot be coded in the field definition. Therefore, a zero-length (tag-only) field is used to place a tag before emitted data. A tag-only field has the following characteristics.

1. It has no field number because it does not contain data.
2. It has a field length of zero (00) because it does not contain data.
3. A field use must be specified for it.
4. The tag-only field definition is entered just before the field it tags.

NOTE: A tag-only field also can be used to provide additional tag space when a tag longer than 76 characters is required.

### Verification, Editing, and Validity Checks

The remaining columns on the Record Format Layout are used to indicate the type of verification desired, the field use, and the editing and validity checks for each field in the record. These features are defined in this section under the heading, "Record Format Field Definitions", above. Enter the appropriate response for each desired feature; leave the column blank for checks that are not to be applied.

### ENTERING A RECORD FORMAT

To enter a record format and store it in the record format library on disk, display the supervisor's HELP list, select Library Operations and the Record Format Library, and then, from the list of record format library functions, select Create A Record Format.

The system requests the name of the format as follows.

FORMAT NAME -----

Turn on AUTO and enter the name of the record format. If the name is the same as one already in the library, an error message is displayed. Otherwise, the system displays the FIELD # question for the definition of the first field of the record.

NOTE: If AUTO is off, it is necessary to depress REL after entering the name to proceed with the field definitions.

Enter the field definitions specified on the Record Format Layout.

#### Keyboard Conventions for Entering A Record Format

Creating a record format for System 480 is similar to a data entry operation. Each complete field definition is a separate record, entered using a format supplied by the software system. The supervisor enters field definitions by answering requests for information displayed by the system. These requests or questions are tags in the internal formats, PGM 3, 4, and 5. The answers to these questions supply the data which defines each field.

Because creating a record format uses the same conventions as data entry, the cursor is moved and programs are selected in the same manner as in Entry Mode. ← and → can be used by themselves or with the FLD and RCD shift keys to manipulate the cursor to change an entry or to examine the previous field definitions.

To change from one PGM to another, depress the PGM key and key the number of the desired program. PGM 3 is the most frequently used program; therefore, it is automatically used for field definitions unless another program is selected manually. When PGM 4 or 5 is selected to define a field, at the end of that definition the system automatically selects PGM 3 for the next field definition. PGM 4 and 5 can be selected whenever they are needed.

The following additional conventions are used when entering a record format:

1. Depressing FIELD RELEASE as a response to a question indicates that the feature is not to be applied to the field currently being defined.
2. Depressing REL at any point after the FIELD USE is specified indicates that none of the remaining features are to be applied to the field.

#### Terminating a Record Format

Use the following procedures to terminate a record format and store it in the library.

1. Turn off AUTO before entering the last field definition.
2. After specifying all the desired checks for the last field, depress REL unless the last question of the field definition was answered. The cursor is positioned one space to the right of the position used for answering the last question.
3. Hold down the RCD key and depress E. The format is checked and then placed in the library.
4. If the system detects any errors, it displays the message RECORD FORMAT SPECIFICATION ERROR and requires the depression of RESET once for each error detected. Each error is indicated by an error flag. Use Change A Record Format, described in this section, to correct the errors.

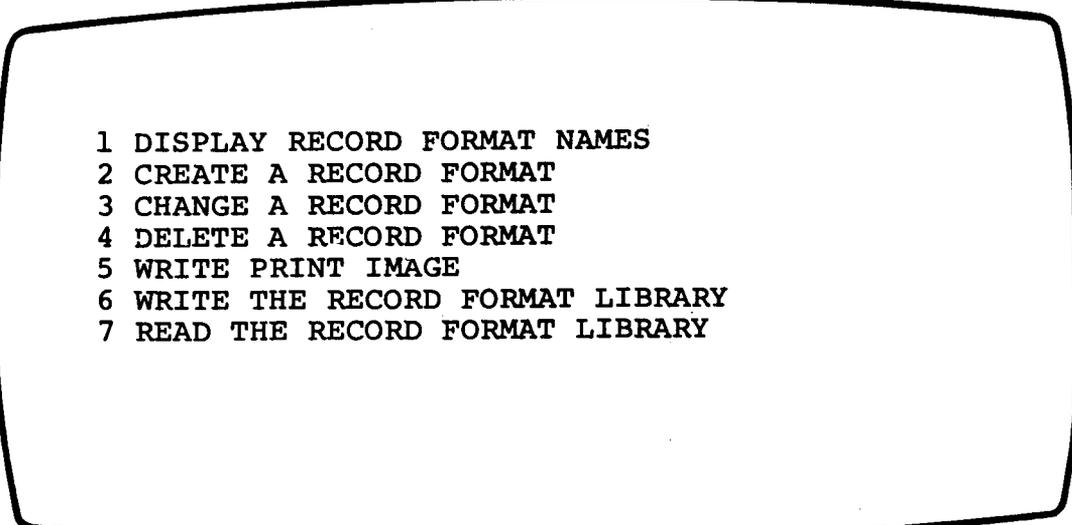
NOTE: Some errors, such as an illegal response to a question, are detected when the format is checked by the system. Other errors, such as incorrect field length or tag placement, are detected when the format is tested by keying sample data.

## RECORD FORMAT LIBRARY FUNCTIONS

In addition to Create A Record Format, System 480 provides the following capabilities for controlling the record format library.

1. Display the names of the record formats in the record format library,
2. Change a record format,
3. Delete a record format from the library,
4. Print a record format on a line or serial printer ,
5. Write the record format library onto magnetic tape,
6. Read the record format library onto the disk.

All of the above selections are contained on the supervisor's Record Format Library display. See Figure 2-6.



- 1 DISPLAY RECORD FORMAT NAMES
- 2 CREATE A RECORD FORMAT
- 3 CHANGE A RECORD FORMAT
- 4 DELETE A RECORD FORMAT
- 5 WRITE PRINT IMAGE
- 6 WRITE THE RECORD FORMAT LIBRARY
- 7 READ THE RECORD FORMAT LIBRARY

Figure 2-6. Record Format Library Selections

## DISPLAY RECORD FORMAT NAMES

Display Record Format Names is used to display the names of specified formats in alphanumeric order. When it is selected, the system displays the following request.

DISPLAY LIBRARY NAMES -----

Using the asterisk convention, enter the name that will cause the desired record format names to be displayed. Enter eight asterisks (\*\*\*\*\*) to display the names of all record formats in the library. The names are displayed in alphanumeric order (A through Z, 0 through 9, and special characters).

## CHANGE A RECORD FORMAT

Change A Record Format is used to correct a newly entered record format or to modify one when an application changes. Formats that are in use cannot be changed. When this function is selected, the system displays the following request.

FORMAT NAME -----

Enter the name of the format to be changed.

The system displays the format in Examine Mode. All of the conventions for displaying and correcting data in Examine Mode apply to the Change A Record Format process. For example, corrections can be made on a character, field, or record basis, and records (i.e., field definitions) can be inserted or deleted.

In addition, any of the System 480 search functions can be used to locate errors to be corrected or field definitions to be altered. To locate an error that was flagged by the system when the format was placed in the library, use the following procedures.

1. Select Change A Record Format and enter the format name. Depress REL.
2. Hold down the RCD key and depress S. The system places the cursor on the first error flag in the format.

3. Repeat the process for each subsequent flag.

Error flags also can be located by depressing HELP and selecting Seek Error Flag from the operator's HELP list.

To perform any of the other search functions, use the following procedures.

1. Select Change A Record Format and enter the format name. Depress REL.
2. Depress HELP and select the Search option from the operator's HELP list.
3. Enter the search key(s) following the rules for searching in a data batch.

When the desired changes have been made to the record format, place the cursor to the right of the last position in the record format by rekeying the answer to the last question. The COR key must be used to permit rekeying. Depress RCD and E. If no errors are detected by the system in the record format, the supervisor's HELP list is displayed. If errors are detected, the message RECORD FORMAT SPECIFICATION ERROR is displayed and RESET must be depressed once for each error. Then the supervisor's HELP list is displayed.

#### DELETE A RECORD FORMAT

Select Delete A Record Format to indicate that a record format is to be removed from the library. The system requests the name of the format to be deleted as follows.

DELETE FORMAT NAME -----

Enter the name of the format. Use the asterisk convention to delete more than one format with one delete statement. Depress FIELD RELEASE. The system displays the message HIT REL TO PROCEED; OTHERWISE HIT HELP. If the record format name entered is correct, depress REL, and if it is not, depress HELP.

After REL is depressed, the system displays the names of the formats designated for deletion in alphanumeric order. If all the formats listed are to be deleted, depress REL. The formats are removed from the library.

If any of the record formats specified for deletion was used to enter a batch that is still on the disk, it is not deleted, and the following error message is displayed.

RECORD FORMAT IN USE

An error message is also displayed if a record format by that name is not in the library.

WRITE PRINT-IMAGE

Select Write Print Image to produce a copy of the record formats using a printer attached to System 480. Printed copies of record formats are the same as the information displayed during Create A Record Format. Printed record formats provide reference information in case of a question about a format and are a good working copy for redesigning formats.

When Write Print Image is selected from the Record Format Library list, the system displays the following.

SELECT DEVICE

M = MAG TAPE  
P = PRINTER

SELECTION: -

Enter a P to indicate that the formats are to be printed.

To facilitate the printing of formats, they are printed using the same mechanism as Standard Job Output, detailed in System 480 Input/Output Operations. The system requests the name of the standard job to be used as follows.

STANDARD JOB NAME -----

Enter RFOUT in response to the request. The system displays the names of the output formats that are to control the printing, and it displays the blocking factor. Either rekey the last digit of the blocking factor or change the blocking factor if a different number of lines per page is desired. Depress REL.

The system displays the following request.

OUTPUT BATCH NAME **0**-----

Rather than entering a batch name, enter the name of the record format to be printed. Use the asterisk convention to print multiple entries. Keying eight asterisks (\*\*\*\*\*) indicates that all entries in the library are to be printed. Depress REL to initiate printing.

The standard job required to print record formats and the output formats associated with the standard job are provided by ENTREX on a separate library tape for each installation that has a printer.

#### WRITE RECORD FORMAT LIBRARY

Select Write Record Format Library to copy the record format library onto magnetic tape. The process of writing the library onto magnetic tape does not delete the formats; after the library is written onto tape, it remains on the disk also.

Depress REL in response to the HIT REL TO PROCEED; OTHERWISE HIT HELP to initiate the writing.

#### READ RECORD FORMAT LIBRARY

Select Read Record Format Library to read record formats contained on magnetic tape onto the disk. If the tape is not positioned at the beginning of a record format library when the request is made, the message IMPROPER LIBRARY SELECTION is displayed. When RESET is depressed, the tape is rewound automatically.

## SECTION III

### CREATING AN OUTPUT FORMAT

Output formats control the reformatting of data records on the disk for output to tape or a printer. Output reformatting provides the following capabilities.

1. Field manipulation -- Reorganizing fields within a record or combining fields from different types of input records to form one output record.
2. Data insertion -- Inserting spaces, zeros, constant data, or special hexadecimal characters as needed and oversigning the low-order position of any numeric field.
3. Record boundary indication.
4. Batch total output -- Writing batch totals and out of balance amounts.
5. Padding of short blocks.
6. Formatting of printed reports -- The output features used in printing are detailed in System 480 Bulletin #21 (Revision 1).

To create an output format, the supervisor needs to know the format of the records on disk (input records) and the format that the records are to have after output reformatting. Because output formats refer to input (disk) records by field numbers, the Record Format Layout that was used in creating the input record format is referred to to obtain field numbers.

The layout of the reformatted output record can be obtained from the installation's systems or operations personnel, if necessary. If the layout of the reformatted record is not documented, use System 480 Output Record Layout Forms (Order No. M-2) or any other desired layout form to illustrate the record contents. Figure 3-1 is a sample tape record layout.

Company \_\_\_\_\_

Application \_\_\_\_\_

Originator \_\_\_\_\_

Output Format Name \_\_\_\_\_

FIELD CONTENTS	NAME		EMPLOYEE #		DEPT. #		SPACES	
RECORD POSITIONS	1	20	21	26	27	31	32	

JOB CODE		ZEROS		TRANSACTION CODE			
41	45	46	79	80			

3-2

--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--

Figure 3-1. Sample Tape Record Layout

Each output format controls the record created under one input record format, and can perform either or both of the following functions:

1. Place the record currently being processed in a copy buffer,
2. Form the record or records to be written to tape or printed.

The copy buffer is a temporary storage area in the computer memory where any or all of the nine record types can be saved and then used by other output formats. Fields from saved records can be combined with fields from each record on the disk to form output records. The availability of copy buffers makes it possible to key often used data fields once and not require that they be duplicated into successive records during Entry Mode operation. The record is placed in the copy buffer at any point in the output format; it does not have to be the first function of the output format. Therefore, it is possible to use the contents of a copy buffer and then save the current record, or vice versa.

Reformatted data is stored in a series of locations in the computer memory called an output buffer. The data may consist of fields from the copy buffer, or from the current disk record being formatted. It may also contain a number of zeros, spaces, or single emitted characters called for by the output format. The data is placed, one character after another into the output buffer until the record(s) defined by the output format are complete.

When the fields that form an output record are placed in the proper sequence in the output buffer, the record is ready to be

written to tape or printed. On a standard System 480, the output buffer has a maximum size of 1,000 characters. Optionally, the buffer can be up to 4,096 characters. The size of the output buffer determines the maximum output record size for the system.

Like the record formats that control data entry, output formats normally are used in sets. For example, consider a batch consisting of two types of records. The first record type contains a salesman's name and employee number. The second is a transaction record showing sales. One name and employee record is followed by several sales records, as illustrated in Figure 3-2. Each output record is to contain the salesman's name and number, and one sales transaction. See Figure 3-3.

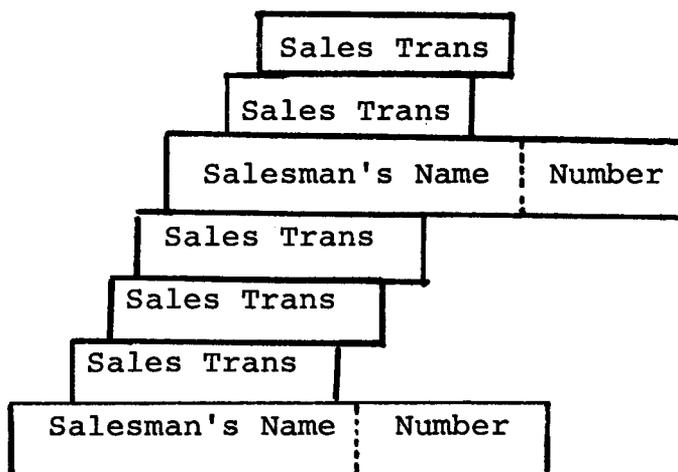


Figure 3-2. Data Records on Disk Before Reformatting

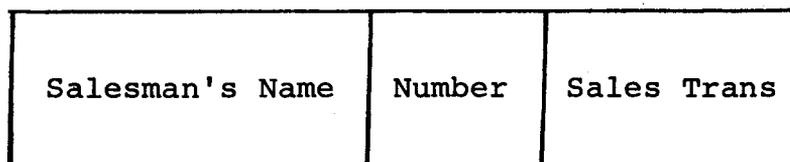


Figure 3-3. Reformatted Output Record Written On Tape

To enter the input file, two record formats were used: PGM 1 controlled entry of the name and number header records and PGM 2 controlled entry of the sales transaction records. To produce the desired output record, two output formats are also needed; one for records created under input record format 1 and the other for records created under input record format 2. Normally, one output format is specified for each record format used to enter the job.

The output format for the first record type moves that record to a copy buffer. In this sample problem, no data is placed directly in the output buffer as each PGM 1 record is processed.

Then the output format for the second record type performs two functions. It inserts the data from the copy buffer as the first data fields in the output record; then, it places data fields from the transaction record after the data from the copy buffer to complete the desired output record. The process of combining records is repeated for each transaction record until the next name and number record is encountered. At this point, the new name and number information overlays the old in the copy buffer. One output record is thus produced for each transaction card.

In addition to fields from the input records, other information and fill characters (e.g., emitted characters, zeros, spaces, pad characters) can be inserted in the record. Twenty operation codes are provided for building output records and controlling their output. These codes are detailed below under the heading, "Operation Codes."

## CODING AN OUTPUT FORMAT

Once the layout of the output record is known, the output format can be coded on System 480 Output Format Layout Sheets (Order No. M-4). The following steps are used to code an output format.

1. Assign a unique name of up to eight alphanumeric characters to the format. The name identifies the output format in the library and cannot, therefore, duplicate the name of any other format in the library.
2. If the record is to be saved in a copy buffer as the first, or only, function of the output format, enter the number of the copy buffer in response to SAVE THIS RECORD AS COPY BUFFER NUMBER-. Records keyed under any input record format can be saved in any one of the nine copy buffers. If the record is to be saved in a copy buffer at any other point in the output format, use operation code C, defined below, to put it there.
3. Select an operation code for each field of the output record.
4. If the operation code selected requires an entry in the Number column, make the appropriate entry.
5. Enter the length of each field in the space provided. The total of FLD LENGTH indicates the length of the output record.

## FIELD MANIPULATION OPERATION CODES

Field manipulation operation codes are the basic System 480 output reformatting codes. They are used to move individual fields or a sequence of fields from the current record to the output buffer and to copy fields from records saved in a copy buffer.

O	SINGLE FIELD OUTPUT
---	---------------------

O indicates that a single field from the record currently being reformatted is to be placed in the output buffer.

It can be any field in the input record; there is no sequence required.

Enter the number of the field in the Number column of the Output Format Layout.

F SEQUENTIAL FIELD OUTPUT
---------------------------

F indicates that a sequence of fields from the record currently being reformatted is to be placed in the output buffer. The fields are taken in sequence from the disk record. The first field in the sequence is the one directly after the field most recently placed in the output buffer. If no field from the record has been placed in the output buffer, the sequence starts with the first field of the input record.

The last field in the sequence is specified in the Number column associated with this operation code on the Output Format Layout. Enter the number of the last field in the sequence. If all the fields of a record are to be written out of sequence, it is not necessary to enter any number.

F, used without an entry in the Number column of the Output Format Layout, indicates that all the fields in the record currently being processed are to be placed in the output buffer.

C PLACE CURRENT RECORD IN A COPY BUFFER
---

C indicates that the current record is to be placed in a copy buffer. C is used instead of the SAVE THIS RECORD AS COPY BUFFER NUMBER - question that is displayed immediately after the output format is named. When C is used, the record is stored in the copy buffer only when that operation code is encountered; when SAVE AS COPY BUFFER - is used, the record is stored in the copy buffer as the first function of the output format.

C is used when information from a previous record is to be retrieved from a particular copy buffer before the current record is placed in that buffer, thereby destroying the previously-saved record.

Enter the number of the copy buffer in the Number column.

1 THROUGH 9 COPY BUFFER NUMBER

Any of the digits 1 through 9 indicates that data is to be taken from the copy buffer of the same number. In order for data to be taken from a copy buffer, a record must have been stored there previously by a different output format. Data is copied into the output buffer from the copy buffer one field at a time.

In the Number column of the Output Format Layout, enter the number of the copy buffer field to be copied into the output buffer.

DATA INSERTION OPERATION CODES

Data insertion operation codes provide the capability to insert one or more characters in the output record. The following can be inserted:

1. Spaces,
2. Zeros,
3. Standard data emitted by the output format,
4. Record and block counts,
5. Any hexadecimal character,
6. A plus or minus oversign on the low order digit of a numeric field.

S INSERT SPACES

S indicates that spaces are to be placed in the output buffer. This function replaces the need for most automatic skip fields in the input record. Because spaces are inserted during output, the entry and verification process is speeded up and maximum use is made of disk area.

Enter the number of spaces to be inserted in the Number column.

Z    INSERT ZEROS

Z indicates that a number of zeros are to be placed in the output buffer. Z provides the same advantages for speed and disk utilization as S.

Enter the number of zeros to be inserted in the Number column.

E    CHARACTER EMIT

E indicates that a character is to be emitted by the output format and placed in the output buffer.

Enter the character to be emitted in the Number column and depress FIELD RELEASE. The character must be right justified (i.e., in the rightmost position of the Number column).

If more than one character is to be emitted, use an E operation code once for each character.

I    INITIALIZE RECORD AND BLOCK COUNT

I indicates that the decimal record and block count maintained by the system are to be set to zero.

The utility operations, Write A Tape Mark and Rewind and Rewind Tape, also reset the block count. They do not reset the record count. There is no entry in the Number column.

N    INSERT RECORD COUNT

N indicates that a field containing the number of output records created is to be placed in the output buffer. The system maintains a count of output records automatically. Operation code I is used to reset the count.

If the records are blocked during output to tape, N inserts the number of logical records written rather than the number of blocks on tape.

Enter the length of the field to contain the count in the Number column. The field can be no greater than five characters in length.

V    INSERT BLOCK COUNT

V indicates that a field containing the number of blocks written on magnetic tape is to be placed in the output buffer. This count is the same as the block count displayed in the status line during all data output operations. Operation code I is used to reset the count. Write A Tape Mark And Rewind or Rewind Tape also reset the block count.

Enter the length of the field to contain the count in the Number column. The field can be no greater than five characters in length.

H    SET SPECIAL HEXADECIMAL CHARACTER

H indicates that the 8-bit binary configuration (specified by the two hexadecimal characters in the Number column associated with H) is to be emitted as a special character in the data record. H is used to emit a binary code that is not generated by the System 480 character set. For example, H can specify a record mark.

The following table shows the binary code and the hexadecimal equivalents.

Binary Code	Hexadecimal Equivalent
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	A
1011	B
1100	C
1101	D
1110	E
1111	F

Table 3-1. Hexadecimal Characters

In the Number column of the Output Format Layout, enter the two hexadecimal characters that form the desired 8-bit binary code.

If more than one character is to be emitted, use H once for each character.

M    OVERSIGN
---------------

M indicates that an oversign is to be placed on the low-order digit of the previous field. The field that is to contain the oversign must be numeric.

Depress FIELD RELEASE in the Number column if the oversign is to be negative. Key a + if the oversign is to be positive.

RECORD BOUNDARY

R    RECORD BOUNDARY
----------------------

R indicates that the current output record is finished; all the necessary fields of the current record have been placed in the output buffer. When R is encountered, the output record is written to tape unless blocking is specified in the standard job or in Reformat And Write A Batch.

When a blocking factor is specified, a record is added to the records already in the output buffer each time R is encountered. When the number of records reaches the blocking factor specified, the block is written onto magnetic tape.

NOTE: An error message is displayed if an attempt is made to transfer too much data to the output buffer before the blocking factor signifies the block is to be written.

BATCH TOTAL OPERATION CODES

Batch total operation codes are used to write to tape or print totals and out-of-balance amounts associated with a batch.

The length of the field to contain the total, the left-fill character to be used, and the type of sign (leading or oversign) to be used for minus totals and differences also can be specified.

L    FIELD LENGTH
-------------------

L indicates the length of the total or difference field. When L is not specified, 15 positions are used; a space for positive totals and differences or a minus (-) for negative ones and 14 digits.

Enter the length of the total or difference field in the Number column. Totals cannot exceed 14 digits and a sign; therefore, a length of more than 14 results in a 14-character total.

NOTE: The length must be specified in an output format before the operation code that writes the total or difference. Because the system saves the last-specified length, L should be specified once for each job that writes totals.

If several totals are to be written from one batch, L can be used to specify different lengths for each total, if desired.

K    CONSTANT CHARACTER
-------------------------

K indicates that a fill character is to be used when the batch total or difference contains fewer digits than the field length specified by L.

In the Number column, enter either of the following to specify the desired fill character:

1. The 2-digit hexadecimal equivalent of the 8-bit binary configuration that is to be used as the constant,
2. A minus sign (-) followed by a character from the System 480 character set that is to be used as the constant. For example, if the field is to be filled out with 9's, enter -9.

NOTE: K must be specified in the output format before the operation code that places the total or difference in the output buffer.

If K is not specified, spaces are used as the fill character. If a total is in balance, and K is not used, batch total differences appear as spaces.

J    MINUS TOTALS AND DIFFERENCES
-----------------------------------

J specifies the placement of the minus indication in a negative batch total or difference field. The indication can be either a leading minus sign (-) or an oversign on the low-order digit. When oversigning is specified, the oversign combines with the digit to form the alphabetic equivalent of the number.

To indicate that a leading minus sign is to be used when a negative total or difference is encountered, key a J in the Operation Code column and 00 in the Number column.

To indicate that an oversign is to be placed on the low-order digit of a negative total or difference, key a J in the Operation Code column and 01 in the Number column.

NOTE: J must be specified in an output format before the operation code that prints the batch total. Because the system saves the last-specified type of signing, J should be specified once for each job that writes batch totals and differences.

A    WRITE BATCH TOTALS
-------------------------

A indicates that a batch total is to be written to tape or printed. When A is encountered in the output format, the system refers to the most recently specified length (L), left-fill constant (K), and sign placement (J), and uses that information to write the total.

To write batch totals, enter A in the Operation Code column.

Enter the number of the total that is to be written in the Number column. It is the same number that appears to the left of the total when Display Batch Totals is selected.

Use the code A once for each total to be printed.

**D WRITE BATCH TOTAL DIFFERENCES**

D indicates that batch total differences are to be written. Batch total difference is the result of subtracting the total entered by the operator from the corresponding pre-determined total. D is used in the same manner as A, above.

PADDING BLOCKED RECORDS

**P INSERT PAD CHARACTERS TO FILL CURRENT BLOCK**

P indicates that when a short block is created at the end of an output operation, the block is to be filled out to the standard size with pad characters. A block is a fixed number of records that are written as one long record on magnetic tape; i.e., each block consists of the specified number of output records.

If at the end of an output operation, there are not enough records to create a full block, the character specified by P as the pad character is used to fill the block to the standard size.

The pad character can be specified in either of the following ways:

1. Enter the 2-digit hexadecimal equivalent of the 8-bit binary configuration that is to be used as the pad character. See Table 3-1 above.
2. Enter a minus sign (-) followed by a character from the System 480 character set that is to be used as a pad character. For example, if blocks are to be filled out with all 9's, enter -9.

Regardless of the method used, the pad character is specified in the Number column of the Output Format Layout.

**NOTE:** The system saves the most recently specified pad character. Therefore, P should be specified once in each set of output formats for jobs that are to be blocked.

## ENTERING AN OUTPUT FORMAT

Once the output format is coded, it is ready for entry into the output format library. From the supervisor's HELP list, select Library Operations, and then select Output Format Library. The Create An Output Format function is used to enter the output format. When it is selected, the system displays the following request for the name of the output format.

OUTPUT FORMAT NAME -----

Turn on AUTO and enter the format name.

The system then displays the following.

SAVE THIS RECORD AS COPY BUFFER NUMBER

If the record is to be saved in a copy buffer as the first function of the output format, enter the number of the copy buffer. Otherwise, depress FIELD RELEASE. If AUTO is not on, it is necessary to depress REL to continue entering the format.

The system displays the first page used to enter output operation codes. See Figure 3-4. There are two columns used for entry; the first is for operation codes and the second is for the entries in the Number column of the Output Format Layout. The cursor is positioned for entry of the first operation code.

OP-CODE	NUMBER
-	-
-	-
-	-
-	-
-	-
-	-
-	-

Figure 3-4. Entering Operation Codes

Start entering the output format from the Output Format Layout. After seven operation codes have been entered, space for seven more operation codes and their respective Number column entries appears. If AUTO is off, REL must be depressed before additional operation codes can be entered. Continue keying in this manner until all of the desired operation codes are entered.

## TERMINATING AN OUTPUT FORMAT

When all entries have been made, turn off AUTO (if it is on), and depress REL. The cursor is positioned to the right of the last Number column entry on the page. Depress RCD and E. The output format is stored in the library.

If a format is created that only saves a record in a copy buffer, no operation codes are needed. After specifying the copy buffer number, turn off AUTO, depress REL, and then depress RCD and E.

If the system detects any errors in the output format, the following message is displayed.

### OUTPUT FORMAT SPECIFICATION ERROR

Depress RESET once for each occurrence of the message. A System 480 error flag is inserted to denote each error. Use Change An Output Format to correct the errors. When Change An Output Format is being used, holding down the RCD key and depressing S causes the system to search for the next error flag in the format. Alternatively, HELP and Seek Error Flag can be used to locate errors.

## OUTPUT FORMAT LIBRARY FUNCTIONS

In addition to Create An Output Format, System 480 provides the following functions to control the output format library:

1. List the names of the output formats in the library,
2. Change an output format,

3. Delete an output format,
4. Print output formats using a printer attached to System 480,
5. Write the output format library onto magnetic tape,
6. Read the output format library onto the disk.

Figure 3-6 shows the output format library functions.

All of the output format library functions listed above operate in the same manner as the corresponding record format library functions, described in Section II under the heading "Record Format Library Functions." The only exception is printing output formats: OFOUT is the name of the standard job used to print output formats.

SECTION IV  
DEFINING A STANDARD JOB

Most data entry jobs that are performed frequently (e.g., payroll) use the same record formats for entry and the same output formats for output each time the job is entered. Frequently used jobs are referred to as standard jobs. A standard job definition is an accumulation of the characteristics of a standard job, e.g., the names of the record formats and output formats required by the job.

When standard job definitions are not being used, the entry operator starts each batch in the following manner:

1. Names the batch,
2. Enters the name of each record format needed for entry and specifies the linkages among formats.

When the batch is ready for output, the supervisor initiates output in the following manner:

1. Enters the name of an output format for each record format used to enter the batch,
2. Specifies the number of output records that are to form one block on magnetic tape (blocking factor),
3. Names the batch that is to be written to tape or printed.

When standard job definitions are used, the system provides the operator with all of the record formats needed for entering the batch and their proper linkages. When the batch is ready

For output the system provides the supervisor with the output formats used to reformat records entered under each of the record formats and provides the blocking factor.

The result is that to start a standard job, the operator has only to specify the library name of the desired standard job and name the batch. Likewise, when the batch is ready for output, the supervisor has only to name the standard job desired and enter the name of the batch. Once begun, standard job entry is no different from entering any other batch. Standard job output is detailed in the Batch Operations section of System 480 Input/Output Operations.

All standard job definitions have a unique name and are stored in the standard job library.

#### CREATING A STANDARD JOB

To create a standard job definition and store it in the library, display the supervisor's HELP list, and select Library Operations and Standard Job Library. Use Create A Standard Job to enter the standard job definition.

When create A Standard Job is selected, the system requests the name to be assigned to the job definition as follows.

STANDARD JOB NAME -----

Turn on AUTO and enter the job name and depress FIELD RELEASE. The name is eight characters or less. The system then asks the

normal batch start questions as illustrated in Figure 4-1.

```
BATCH NAME PAYROLL
BATCH TOTALS (Y/N) Y
REC FMT NAMES
# NAME      LINKS TO  # NAME      LINKS TO
1 HDRPAY    2           2 PAY1      3
3 PAY2      3           4 U
```

Figure 4-1. Specifying Batch Start for a Standard Job.

First, the system asks whether batch totaling, zero balancing, or subtotaling is to be used for the batch.

BATCH TOTAL (Y/N)? \_

Enter Y to indicate that totaling, balancing, or subtotaling is required; otherwise, enter N.

The system then requests the names of the record formats that are to be used to enter the standard job. Enter the record format names and the desired linking among formats. Because this information is stored as part of the standard job definition, the entry operator is not asked to specify it when the job is started.

Next, the standard information for batch output is specified. The system requests the names of up to 10 output formats, as illustrated in Figure 4-2. Name one output format for each record format specified in this job's standard batch start information. However, if the records entered under a particular record format are neither written to tape nor saved in a copy buffer, depress FIELD RELEASE instead of entering the name of an output format. For example, when zero balancing is used, the zero balance record that is entered under program 1 normally is not written to tape. Therefore, FIELD RELEASE is depressed when the system requests the name of the output format for entry PROG 1.

OUTPUT FORMAT NAMES	
PROG 1 OUTHDR	PROG 2 OUTPAY
PROG 3 OUTPAY2	PROG 4
PROG 5	PROG 6
PROG 7	PROG 8
PROG 9	PROG 0

Figure 4-2. Specifying Batch Output for a Standard Job.

When all the necessary output formats are named, the system requests the number of output records that are to form a block on magnetic tape; i.e., the number of records between interrecord gaps, as follows.

#### BLOCKING FACTOR--

Enter the number if records are to be blocked; otherwise, depress FIELD RELEASE to signify unblocked record output. After releasing from the BLOCKING FACTOR question, depress REL. The standard job definition is complete and stored in library. RCD and E are not used to terminate the definition.

System 480 Standard Job Definition Forms (Order No. M-6) can be used to document the standard job definition. See Figure 4-3.

#### STANDARD JOB LIBRARY FUNCTIONS

In addition to Create A Standard Job, the standard job library has the following functions:

1. List the names of the standard job definitions in the last library,
2. Change a standard job definition,
3. Delete a standard job definition from the library,
4. Print standard jobs using a printer attached to System 480,
5. Write the standard job library onto magnetic tape,
6. Read the library from magnetic tape onto the disk.

All of the features listed above operate in the same manner as the corresponding record format library functions, described

Standard Job Definition

Originator \_\_\_\_\_ Date \_\_\_\_\_

BATCH START DEFINITION

STANDARD JOB NAME _____			
BATCH TOTALS (Y) _			
REC FMT NAMES			
# NAME	LINKS TO	# NAME	LINKS TO
1 _____	—	2 _____	—
3 _____	—	4 _____	—
5 _____	—	6 _____	—
7 _____	—	8 _____	—
9 _____	—		

After entering the batch start information, depress REL.

RECORD FORMAT USE (For documentation only)

(The type of record entered under each format; e.g., Detail record)

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 0. \_\_\_\_\_

OUTPUT DEFINITION

OUTPUT FORMAT NAMES	
PROG 1 _____	PROG 2 _____
PROG 3 _____	PROG 4 _____
PROG 5 _____	PROG 6 _____
PROG 7 _____	PROG 8 _____
PROG 9 _____	PROG 0 _____
BLOCKING FACTOR _ _	

After entering the blocking factor, depress REL to terminate the standard job definition.

Figure 4-3. Standard Job Definition Form

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in Section II under the heading, "Record Format Library Functions". The only exception is printing standard job definitions; SJOUT is the name of the standard job used to print standard jobs. It contains the required output formats.

## SECTION V

### BATCH TOTALING AND BALANCING

Three types of batch totaling and balancing are available with System 480.

1. Batch Totaling -- The system adds the contents of designated fields to produce a total.
2. Batch Balancing Using Predetermined Totals -- Enter a predetermined total in the first data record of the batch. When the batch is terminated, the fields of each batch balance operation are subtracted from the corresponding predetermined total. A nonzero remainder signals an out-of-balance condition.
3. Balancing to Zero -- Enter zeros as the predetermined total. The content of the fields using this total are added or subtracted. If all fields are entered correctly, the remainder is zero.

To develop a total or balance, one or more fields in a record format are designated for use in calculating the total. Data entered in these fields is used to form the total. Similarly, fields from records entered under different formats can be added together to form one total.

The batch totals and the differences from balancing operations can be displayed by the supervisor any time after the batch is terminated in Entry Mode. The Display Batch Totals option on the Batch Operations list is selected to display totals and differences. Display Batch Totals is described in System 480 Input/Output Operations.

Up to 20 totals and/or balances can be calculated for each batch.

SPECIFYING BATCH TOTALS

To perform a batch total operation on a batch, the first step is to assign a batch total number to the field or fields that are to form each total. The total number assigned corresponds to one of the 20 totals that can be displayed for each batch by the supervisor using Display Batch Totals. Figure 5-1 illustrates the batch total display. If two or more fields (either within a record or in different records) are to be added together to form one total, they are all assigned the same batch total number.

TOTAL #	TOTAL	DIFFERENCE
1	-----	-----
2	-----	-----
3	-----	-----
4	-----	-----
5	-----	-----
6	-----	-----
7	-----	-----
8	-----	-----
9	-----	-----
10	-----	-----

Figure 5-1. Display Batch Totals

To assign a total number to a field, enter that number in response to the BATCH TOTAL NO. question in the record

format definition of that field. The number entered associates the field with the corresponding TOTAL # in the batch total display.

#### BATCH BALANCING USING PREDETERMINED TOTALS

When batch balancing using predetermined totals is desired, a format to contain the predetermined total(s) is required in addition to the formats that define the field to be totaled. It is called the batch balance format and is always the first format used to enter the batch. The batch balancing format has the following characteristics.

1. The first field definition in the record format for the batch balancing record has B (balancing) specified for the FIELD USE, as described in Section II, "Creating A Record Format." When B is specified, it is the only entry in that field definition; the definition must have a field number of zero and a field length of zero.

Because the B is a batch balancing indicator used by the system, it is not data and, therefore, is not displayed on the screen.

2. The remaining definitions in the balance record define fields to contain predetermined totals, and normal data fields, if desired.

If a field is to contain a predetermined total, it must be assigned a batch total number. The number is the same one assigned to the field or fields that are to be balanced against this total.

To assign the number to the predetermined total field, enter the desired number in response to the BATCH TOTAL NO. question in the record format field definition for that field.

A batch balance format that contains data fields in addition to predetermined total fields can be used for data entry as many times as needed in the batch. This feature provides a place to enter fields that are to be copied into output records. However, the system uses only the first record of the batch to obtain the predetermined totals. Predetermined total fields in all other records entered under PGM 1 are treated as normal data fields.

NOTE: When batch balancing or balancing to zero is specified, a point system is applied to record formats. This system is detailed in Appendix C.

#### BALANCING TO ZERO

When balancing to zero is used, data is added or subtracted to obtain a final total of zero if all fields are entered correctly. For example, debits and credits can be balanced against each other. One or more data fields can be used when balancing to zero. Fields that are to be added to the total are handled in the same manner as other batch total fields. Either of the following methods can be used to indicate that fields are to be subtracted:

1. During entry, the operator can key a minus sign as part of the data field, or the field can be oversigned,
2. The supervisor can key a negative number in response to the BATCH TOTAL NO. question in the field definition of the data field to be subtracted. Either a leading sign or an oversight can be used. For batch total numbers 10 through 20, an oversight must be used because BATCH TOTAL NO. allows room for a 2-digit response.

When method number 1, above, is used, the field is subtracted from the total only if a negative number is entered.

When method number 2 is specified in the record format, the contents of the field are always subtracted; no minus or oversign is used.

NOTE: Method 2 uses a true algebraic subtraction; positive numbers are subtracted and negative numbers are added to the total.

When balancing to zero is desired, a batch balance format is required. It has the same characteristics as the format used with predetermined totals. For balancing to zero, the operator enters all zeros as the predetermined total.

#### BATCH BALANCING IN ENTRY MODE

When the operator starts a batch or a standard job on which balancing is to be performed, the batch balance format is specified as the first format (PGM 1). If batch balancing using a predetermined total is used, the operator enters the predetermined total in the appropriate field.

If balancing to zero is used, the operator keys one zero and then depresses FIELD RELEASE in the appropriate fields so that they are filled with zeros. Because fields are added and subtracted to form a zero result when balancing to zero, the predetermined total is zero.

When a balance batch is terminated in any of the three operating modes, the system displays the message BATCH DOES NOT BALANCE if there is an error in any balance fields. The

operator depresses RESET to clear the message. The supervisor can select the Display Batch Totals from the list of batch operations to see both the totals and the difference between each actual total and the corresponding predetermined total.

NOTE: Because the Terminate Batch function on the operator's HELP list initiates the batch total routines, operators should be trained to distinguish between Interrupt Batch and Terminate Batch. Batches should be terminated only when all data for the batch is entered.

#### BATCH BALANCING IN VERIFY MODE

Any of System 480's verification types can be specified in the record format for the fields that are used for balancing:

- K = key verification,
- S = scan (no verification),
- R = do not verify the field and release the current record,
- C = conditional verification.

Conditional verification is used only for batch balance fields. When C is specified for a batch balance field, that field in each record is key verified only if it is out of balance. If it is in balance, conditional verify fields become scan fields and are automatically skipped during verification.

Because the system calculates batch balances when the batch is terminated, the verify operator will terminate the batch

and then resume it if a correction is made to an out of balance field. If the correction puts the batch in balance, the message BATCH DOES NOT BALANCE is not displayed and conditional verification fields become scan fields. If some fields are in balance and others are out of balance, only the out-of-balance fields require key verification.

When conditional verification is specified and the batch is being entered and verified concurrently, the entry operator must terminate the batch, depress RESET in response to BATCH TOTAL DOES NOT BALANCE, and then resume the batch before verification is started. Terminating the batch causes the out-of-balance indicator to be set which results in the key verification of batch balance fields. If the batch is not terminated, scan verification is applied.

## SECTION VI

### SUBTOTALING

In addition to accumulating batch totals (major totals) and balancing them against predetermined amounts entered by the operator, System 480 provides the capability to balance subtotals (minor totals) within a batch. This capability can be used to validate document subtotals (e.g., crossfooting) or it can be used to validate subtotals entered from more than one source document.

When entering a batch that uses subtotaling, the operator keys the fields that are added to form the subtotal and then keys the actual subtotal. When the batch is terminated, System 480 computes each subtotal and compares it with the subtotal entered by the operator. If a miscompare is detected, an error flag is placed in the low-order position of the incorrect subtotal and the operator is notified that the batch is out of balance.

The record format mechanism used to specify subtotaling is similar to that used to specify batch balancing. At least two record formats are required for subtotaling: one (or more) to contain the data fields that form the subtotal, and one to contain the subtotal keyed by the operator.

### DATA FIELD FORMAT

The first type of record format required contains the data fields that are to be added to form the subtotal. One or more formats can be used depending on the requirements of the application. The field definition of each field to be subtotaled must contain a batch total number entered in response to the BATCH TOTAL NO. question. The number must be in the range 1 through 20 and the same as the number assigned to the corresponding subtotal in the record format containing the T field definition, defined below.

If a field is always to be subtracted, rather than added, enter a minus number in response to the BATCH TOTAL NO. question. Either a leading minus sign or an oversign can be used.

### SUBTOTAL FORMAT

The second type of record format required for subtotalling controls entry of the subtotal. It has a FIELD USE of T specified for the first field definition of the format. The field definition must have the following format.

FIELD # 00  
FIELD LENGTH 00  
TAG ≠  
VERIFY (CKRS)  
FIELD USE (ABLMNSTU) T Depress REL at this point.

Once the field definition containing the T is entered, the data fields for the subtotal record can be entered. The field that is to contain the subtotal is assigned the same batch total number as the fields being subtotaled. The number is entered in response to the BATCH TOTAL NO. question in the field definition.

NOTE: When subtotaling is specified, a point system is applied to record formats. This system is detailed in Appendix C.

#### SUBTOTALING IN ENTRY MODE

When the operator is entering data, the format for the fields to be totaled is always used before the format used to key the associated subtotal.

NOTE: This is opposite to the approach taken in batch balancing where the format that contains the predetermined total must be used to enter the first record of the batch.

Figure 1 illustrates a sample keying sequence for subtotaling. PGM 1 is used to key the fields that are accumulated (Field 1, Field 2, and Field 3) and PGM 2 is used to key the subtotal.

PGM 1	Field 1
	Field 2
	Field 3
PGM 2	Subtotal
PGM 1	Field 1
	Field 2
	Field 3
PGM 2	Subtotal
PGM 1	Field 1
	.
	..
	.
PGM 2	Subtotal

Figure 1. Subtotaling

### MULTIPLE SUBTOTALS

Like batch totaling, more than one subtotaling operation can be specified for a batch. For example, fields 3 and 5 of PGM 2 can be balanced against a subtotal entered in PGM 3, and fields 7 and 9 of PGM 4 can be balanced against a subtotal entered in PGM 5. Each set of fields to be subtotaled must have a unique batch total number in the range 1 through 20.

In the example above, fields 3 and 5 from PGM 2 and their associated subtotal in PGM 3 could have a batch total number of 02, while fields 7 and 9 from PGM 4 and their associated subtotal could have a batch total number of 03.

## BATCH BALANCING WITH SUBTOTALS

When subtotalling is specified, it is often desirable to know the total of the subtotals. Therefore, System 480 accumulates a batch total (major total) for each different subtotal operation; i.e., for each different number entered in response to the BATCH TOTAL NO. question during record format generation. These totals can be displayed by selecting Display Batch Totals from the Batch Operations list.

Because the system automatically accumulates a batch total for subtotals, it is also possible to batch balance the major total. The mechanism is identical with that for batch balancing using predetermined totals. The following procedures are used.

1. A batch balance format with a FIELD USE of B must be the first format used to enter the batch.
2. Each predetermined total in the batch balance format must have the same batch total number as the corresponding subtotal that is to be balanced against it.

Appendix B provides an example of batch balancing and subtotalling.

SECTION VII  
USING VALUE TABLES

Using the value table lookup feature, System 480 can validate data fields by comparing them with entries in a table of values stored on the disk. The table can contain all the valid entries for a field or all the invalid entries, depending on the requirements of the application.

When a table contains all the valid entries for a field, an error message is displayed if the operator enters data that does not compare exactly with one of the table entries; i.e., the data entered by the operator is invalid. When a table contains all the invalid entries, a message is displayed if the operator enters data that does compare exactly with one of the table entries.

To use value table lookup, the supervisor does the following:

1. Enters a table as a data batch on the disk, either by keying it or by using a tape input operation.
2. Assigns a table number to the data batch.
3. Writes a record format defining the record that contains fields designated for value table lookup. Value table fields are defined using PGM 5, described in Section II, "Creating a Record Format".

These three steps are detailed below.

## ENTERING A VALUE TABLE

A value table can be entered in the same manner as any other data batch that is to reside on the disk. That is, it can be keyed by an operator or read from a tape. The tape can be one created previously on System 480 or one created or revised in a computer run.

Each field in the value table batch is one table entry; each table entry is defined as a field in the record format describing the table batch. Records can contain one field or many fields. The only rule is that fields in the value table batch must be the same length as the fields keyed in the entry operation that uses value table lookup to validate data. e.g., 0025 is not equivalent to 25.

NOTE: If the value table is to be written onto magnetic tape (e.g., for updating in a computer run), records in the table must be at least four characters in length or they will be ignored by the tape drive. Define the table as a series of multiple-field records or use the BLOCKING FACTOR question with reformatted output to create records that are long enough for output.

If it is known that certain table entries are keyed more than others, enter the most frequently used entries at the beginning of the value table batch. Listing entries in order of decreasing frequency increases the speed of table lookup substantially.

Because the value table is a batch, the table can easily be modified. Entries can be inserted, changed, or deleted as needed.

NOTE: If a batch has been assigned a value table number, it cannot be written out to tape or deleted until disassigned.

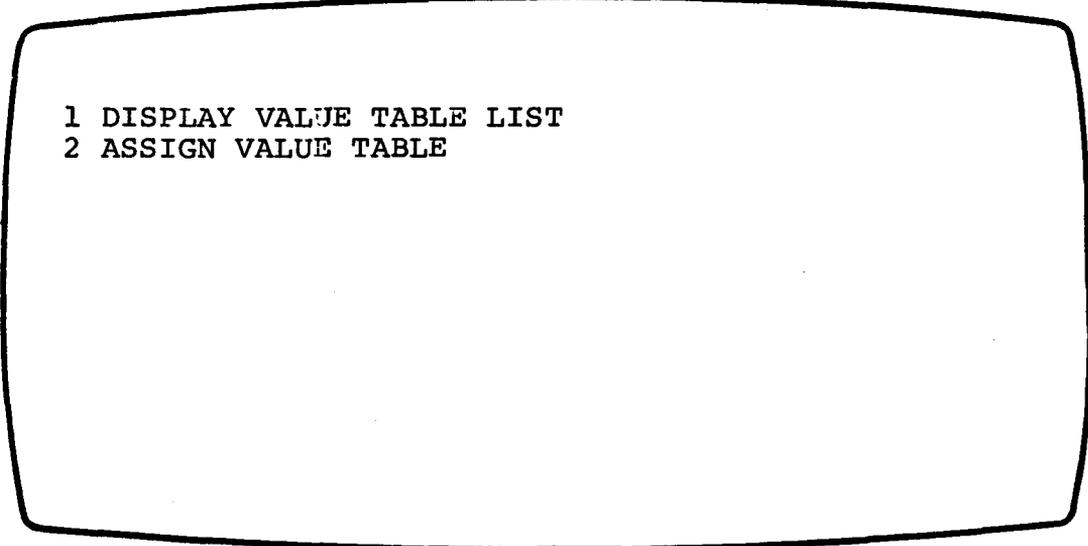
Up to twenty value tables can be used at one time. Each table is assigned a number in the range from 1 through 20.

#### VALUE TABLE OPERATIONS

To provide supervisory control of value tables, the function, Value Table Operations, appears on the supervisor's HELP list. Depressing the indicated letter causes the list of value table operations to be displayed. See Figure 7-1.

The two value table operations are:

1. Display Value Table List,
2. Assign Value Table.

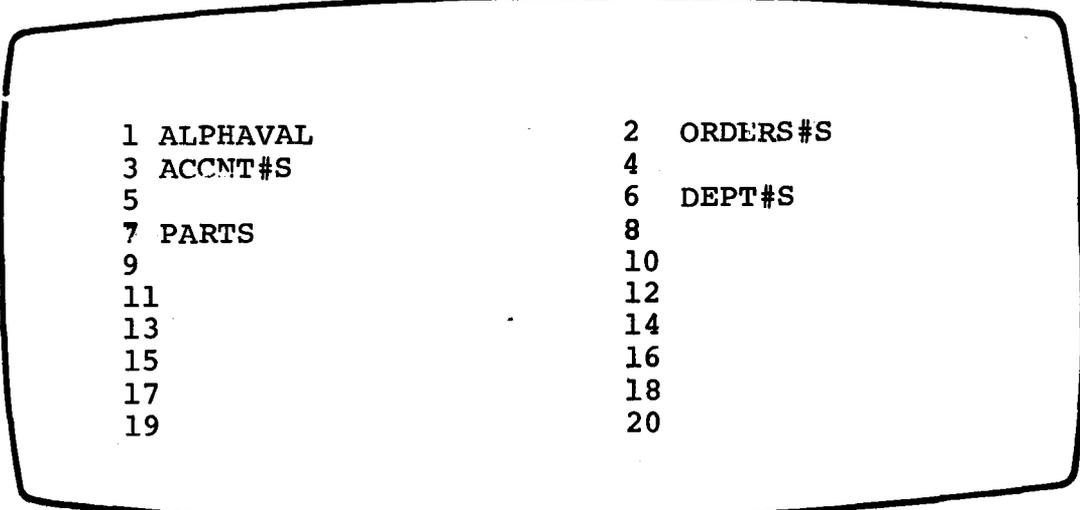


```
1 DISPLAY VALUE TABLE LIST
2 ASSIGN VALUE TABLE
```

Figure 7-1. Value Table Operations

## Display Value Table List

As explained below, each value table is assigned a number. Selecting Display Value Table causes the name of each value table to be displayed with its assigned number. The names are displayed in numeric order. Figure 7-2 is an example.



1	ALPHAVAL	2	ORDERS#S
3	ACCNT#S	4	
5		6	DEPT#S
7	PARTS	8	
9		10	
11		12	
13		14	
15		16	
17		18	
19		20	

Figure 7-2. Displaying the Value Table List.

## Assign Value Table

After a value table has been entered as a batch, it remains on the disk. The next step is to assign a unique number between 1 and 20 to the table. To assign a number to a value table, select Assign Value Table from the value table operations display. The system then requests the number that is to be assigned to the value table batch in the following manner.

VALUE TABLE NO. (1-20) --

Enter the number. The system then requests the name of the batch to which the number is to be assigned as follows:

VALUE TABLE BATCH NAME -----

Enter the name of the table (batch) and depress FIELD RELEASE. The table is now ready to be used to validate data entry. An error message is displayed if the batch does not exist.

Assign Value Table is also used to remove a table from the value table list (but not from the disk) or to assign a table a new number. To remove a value table name from the list, use the following procedures.

1. Select Assign Value Table from the list of value table operations.
2. When the system requests it, enter the number assigned to the table.
3. When the name of the batch (table) is requested, enter all spaces.

The table can then be assigned a new number, if desired, or allowed to remain on the disk. Even though no more than 20 value tables can be assigned a number at one time, as many tables as desired can be stored on the disk.

## SPECIFYING TABLE LOOKUP IN A RECORD FORMAT

Once the value table is entered and assigned a number, it can be used by any record format that specifies value table lookup for one or more of its fields. To specify table lookup in a record format field definition, select PGM 5 and respond to the questions as they are displayed. When the following request for the value table information is displayed, enter the number (1 through 20) of the value table to be assigned to the field.

VALUE TABLE NO. \_\_ \_\_            INVALID ENTRIES (Y) \_

Depress FIELD RELEASE in response to the INVALID ENTRIES question if the table contains the valid entries for the field. Enter Y if the table contains the invalid entries.

Do not respond to the LIMIT CHECK questions; value table lookup and limit checking cannot be applied to the same field.

## COMBINING VALUE TABLES

Up to 20 value tables can be assigned at one time. However, if additional tables are desired, it is often possible to combine two or more value tables into one value table batch. The only requirement is that each table have a different length value or a different field use. For example, if a lookup is in progress in a table for a field of three digits

the system automatically ignores all entries that are not three digits. Or, alphabetic-only and numeric-only tables can be combined.

Value tables that are combined can be used by the same batch, as illustrated in Figure 7-3, or they can be used by different standard jobs.

When combining value tables, it is advantageous to combine short tables rather than long ones.

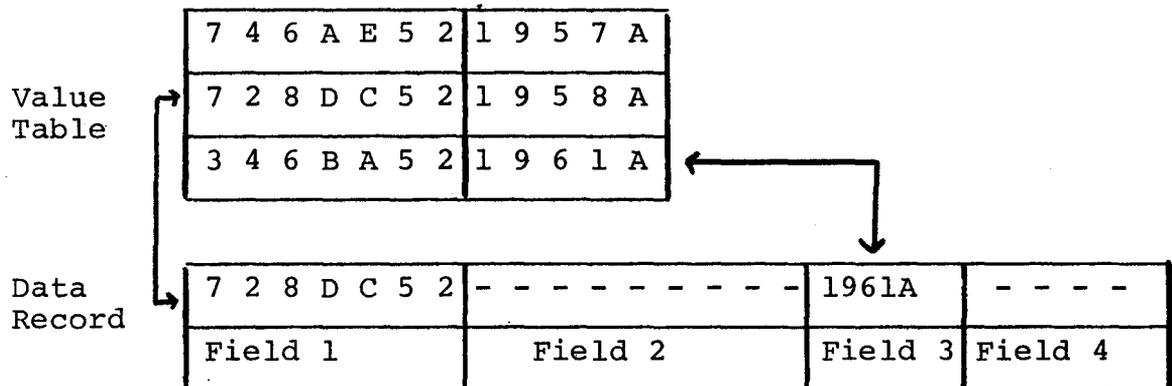


Figure 7-3. Comparing Field Contents with Value Table Entries

APPENDIX A  
CHECK DIGITS

A check digit is used to insure that a field containing vital numeric data is correctly keyed. It is normally the last digit of a numeric data field, and is arithmetically related to the rest of the field.

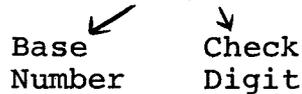
If the system is to validate a check digit, at some point prior to dataentry the check digit must be calculated for its data field (e.g., an account number). Thereafter, the check digit is always used as part of the number. As the entry operator keys the number containing the check digit, the system computes a check digit for the keyed field. If the computed and keyed check digits are the same, the field is validated. Using check digits makes the verification of the field unnecessary and guarantees the accuracy of the field for further processing.

System 480 provides three check digit versions: modulo 7, modulo 10, and modulo 11. The system can validate a check digit of any of the three moduli keyed by the operator.

MODULO 7 CHECK DIGITS

A modulo 7 check digit field consists of a base number with an appended check digit. To calculate the check digit, the base number is divided by 7. The remainder is the check digit complement. As a result, the legal check digits for modulo 7 are 0 through 6. The following is an example.

1. The check digit field is 12725.

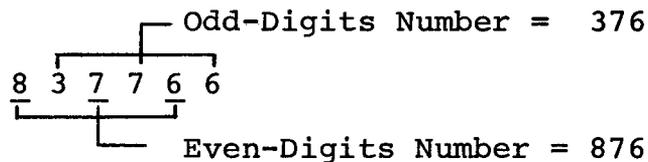


2.  $\frac{1272}{7} = 181$  with a remainder of 5.
3. The complemented check digit is 5.
4. If the uncomplemented check digit is desired, subtract 5 from 7.  
 $7 - 5 = 2$ , the check digit.

MODULO 10 CHECK DIGITS

A modulo 10 check digit field also consists of a base number with an appended check digit. The legal modulo 10 check digits are 0 through 9. The following steps are taken to calculate a modulo 10 check digit.

1. The base number is separated into odd and even digit positions, counting from the righthand (low-order) end of the number, as follows.



2. Multiply the odd digits by 2.  
 $2.376 = 752$
3. Add the individual digits of the product of step 2, above.  
 $7 + 5 + 2 = 14$
4. Add the individual digits of the even-digits number.  
 $8 + 7 + 6 = 21$
5. Add the results of steps 3 and 4.  
 $14 + 21 = 35$

6. Subtract the sum obtained in step 5 from the next higher number ending in zero.

$$40 - 35 = 5$$

5 is the complemented check digit.

The check digit field is 8377665.

7. If the uncomplement is desired, subtract 5 from 10.

$$10 - 5 = 5. \text{ The check digit.}$$

### MODULO 11 CHECK DIGITS

A modulo 11 check digit field consists of a base number with an appended check digit. The check digit can be either the uncomplemented or the complemented remainder of the steps described below. The legal check digits are 0 through 9.

1. Starting with the rightmost (low-order) digits of the base number, assign a weight to each digit of the base number. The legal weights are 2 through 7. They must be assigned sequentially. After the number 7 is assigned, the series (2 through 7) is repeated until each of the digits of the base number is given a weight.

$$\begin{aligned} \text{Base Number} &= 26985898 \\ \text{Weight} &= 32765432 \end{aligned}$$

2. Multiply each digit of the base number by its weight.

$$\begin{aligned} 2 \cdot 3 = 6; \quad 6 \cdot 2 = 12; \quad 9 \cdot 7 = 63; \quad 8 \cdot 6 = 48; \quad 5 \cdot 5 = 25; \\ 9 \cdot 3 = 27; \quad 8 \cdot 2 = 16 \end{aligned}$$

3. Add the products obtained in step 2, above.

$$6 + 12 + 63 + 48 + 25 + 32 + 27 + 16 = 229$$

4. Divide the sum obtained in step 3 by 11.

$$\frac{229}{11} = 20 \text{ with a remainder of } 9.$$

If a complemented check digit is to be used, 9 is the check digit. The check digit field is 269858989. Otherwise, step 5 is used to compute the uncomplemented check digit.

5. Subtract the remainder obtained in step 4 from 11.

$$11 - 9 = 2$$

2 is the check digit, and the check digit field contains  
269858982.

#### NONSTANDARD MOD 10

1. Starting with the rightmost (low-order) digits of the base number, assign a weight to each digit of the base number. The weighting digits are 4, 2, 8, 5, 7, 4, 2, 8, 5, 7, repeated as many times as needed.

Given a base number of 223344556, the following weights are assigned.

$$\text{Base Number} = 223344554$$

$$582475824$$

2. Multiply each of the base number digits by its weight.

$$2 \cdot 5 = 10; 2 \cdot 8 = 16; 3 \cdot 2 = 6; 3 \cdot 4 = 12; 4 \cdot 7 = 28;$$

$$4 \cdot 5 = 20; 5 \cdot 8 = 40; 5 \cdot 2 = 10; 4 \cdot 4 = 16$$

3. Add the individual digits of all the products.

$$1+0+1+6+6+1+2+2+8+2+0+4+0+1+0+1+6 = 41$$

4. Divide 10 into 41. The remainder is the complemented check digit. To complement it, subtract the remainder from 10. The result is the complemented check digit.

$$\frac{41}{10} = 4 \text{ with a remainder of } 1. \quad 1 \text{ is the check digit.}$$

$$10 - 1 = 9 = \text{check digit.}$$

#### NONSTANDARD MOD 11

1. Assign the same weights to the base number as done in step 1 for the nonstandard Mod 10 check digit.
2. Multiply each digit by its weight as done above for the

nonstandard Mod 10 check digit.

3. Add the products produced in step 2. Do not add the individual digits as was done for Mod 10.
4. Divide the sum of the products by 11. The remainder is the complemented check digit. Subtract the remainder from 11. The result is the uncomplemented check digit.

NOTE: In the event a check digit or complemented check digit is generated whose value is greater than 9 (i.e., not a single digit), only the units position of the result is used to represent the check digit. This is possible only for Mod 10 and 11.

APPENDIX B

EXAMPLE OF BATCH BALANCING AND SUBTOTALING

The following example contains two subtotaling operations, the first of which is also batch balanced. Screen displays of the corresponding record formats are included.

(BATCH BAL TOT) -----

PGM 1

(FLD 1) ---- (Adds to SUBTOT 1)  
(FLD 2) ----- (Adds to SUBTOT 1)  
(FLD 3) --- (Adds to SUBTOT 2)  
(FLD 4) ---- (Adds to SUBTOT 2)

PGM 2

(SUBTOT 1) ----- (Balances against BATCH BAL TOT)  
(SUBTOT 2) -----

PGM 3

FORMAT NAME PGM1

PGM3/4

FIELD NO. .  
FIELD LENGTH  
TAG ≠  
VERIFY (CKRS)  
FIELD USE (ABLMNSTU) B  
AUTO FUNCTION (DEIS) BATCH TOTAL NO.  
FLD BOUND CHK (F) MAND'Y FLD (ECB)  
RIGHT JUSTIFY (R) FILL CHAR (SZ)  
CHECK DIGIT 0

PGM3/4

FIELD NO. 01  
FIELD LENGTH 08  
TAG (BATCH BAL TOT) ≠  
VERIFY (CKRS) C  
FIELD USE (ABLMNSTU) N  
AUTO FUNCTION (DEIS) BATCH TOTAL NO. 01  
FLD BOUND CHK (F) MAND'Y FLD (ECB) F  
RIGHT JUSTIFY (R) R FILL CHAR (SZ)  
CHECK DIGIT 0

FORMAT NAME PGM2

PGM3/4

FIELD NO. 01  
FIELD LENGTH 04  
TAG (FLD 1) ≠  
VERIFY (CKRS) C  
FIELD USE (ABLMNSTU) N  
AUTO FUNCTION (DEIS) BATCH TOTAL NO. 01  
FLD BOUND CHK (F) MAND'Y FLD (ECB)  
RIGHT JUSTIFY (R) R FILL CHAR (SZ)  
CHECK DIGIT 0

PGM3/4

FIELD NO. 02  
FIELD LENGTH 05  
TAG (FLD 2) ≠  
VERIFY (CKRS) C  
FIELD USE (ABLMNSTU) N  
AUTO FUNCTION (DEIS) BATCH TOTAL NO. 01  
FLD BOUND CHK (F) MAND'Y FLD (ECB)  
RIGHT JUSTIFY (R) R FILL CHAR (SZ)  
CHECK DIGIT 0

PGM3/4

FIELD NO. 03  
FIELD LENGTH 03  
TAG (FLD 3) ≠  
VERIFY (CKRS) C  
FIELD USE (ABLMNSTU) N  
AUTO FUNCTION (DEIS) BATCH TOTAL NO. 02  
FLD BOUND CHK (F) MAND'Y FLD (ECB)  
RIGHT JUSTIFY (R) R FILL CHAR (SZ)  
CHECK DIGIT 0

PGM3/4

FIELD NO. 04  
FIELD LENGTH 04  
TAG (FLD 4) ≠  
VERIFY (CKRS) C  
FIELD USE (ABLMNSTU) N  
AUTO FUNCTION (DEIS) BATCH TOTAL NO. 02  
FLD BOUND CHK (F) MAND'Y FLD (ECB)  
RIGHT JUSTIFY (R) R FILL CHAR (SZ)  
CHECK DIGIT 0

FORMAT NAME PGM3

PGM3/4

FIELD NO.	
FIELD LENGTH	
TAG #	
VERIFY (CKRS)	
FIELD USE (ABLMNSTU)	1
AUTO FUNCTION (DEIS)	BATCH TOTAL NO.
FLD BOUND. CHK (F)	MAND'Y FLD (ECB)
RIGHT JUSTIFY (R)	FILL CHAR (SE)
CHECK DIGIT (0)	

PGM3/4

FIELD NO.	01
FIELD LENGTH	06
TAG (SUBTOT 1) #	
VERIFY (CKRS)	C
FIELD USE (ABLMNSTU)	N
AUTO FUNCTION (DEIS)	BATCH TOTAL NO. 01
FLD BOUND. CHK (F)	MAND'Y FLD (ECB)
RIGHT JUSTIFY (R)	R
CHECK DIGIT (0)	FILL CHAR (SE)

PGM3/4

FIELD NO.	02
FIELD LENGTH	06
TAG (SUBTOT 2) #	
VERIFY (CKRS)	C
FIELD USE (ABLMNSTU)	N
AUTO FUNCTION (DEIS)	BATCH TOTAL NO. 02
FLD BOUND. CHK (F)	MAND'Y FLD (ECB)
RIGHT JUSTIFY (R)	R
CHECK DIGIT (0)	FILL CHAR (SE)

## APPENDIX C

### RECORD FORMAT POINT SYSTEM

When batch balancing and/or subtotalling are used, a point system is applied to record formats to insure that any given set of formats (standard job) do not exceed the core memory allocated for their use. A maximum of 112 points is allowed for each standard job or batch start operation. Points are assigned according to the following rules.

1. In a batch balance format (FIELD USE of B), each batch total number specified counts as five points. That is, each predetermined total is five points.
2. In a subtotal format (FIELD USE of T), each batch total number counts as five points.
3. Each batch total number specified in a format that is not a batch balance or subtotal format counts as two points.
4. Each format in the job counts as one point.

The number of times that a format is used in the job has no affect on the count.

# **ENTREX**

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