

Logic Block Data Entry

MC11-500

**Implementation
Hiway Gateway - 2**

***Logic Block
Data Entry***

**MC11-500
9/95**

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About This Publication

This publication provides a guide for entering, compiling, and loading logic block data into a Multifunction Controller.

This publication supports Release 500.

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INTRODUCTION

Section 1

This section explains the purpose of this publication, the prerequisites for logic-block configuration, and a list of related publications that can be used for reference.

1.1 PURPOSE

This publication provides information for entering logic-block configuration data into a TDC 3000 Universal Station^X, compiling the data entered, and then down-line loading that data into a Multifunction Controller. This information is intended for process engineers, control systems engineers, application engineers, and others who do similar work.

1.2 SCOPE

This publication describes the methods by which configuration data, previously recorded in configuration forms, is entered into the TDC 3000^X System through a Universal Station. The configuration forms provided for logic-block data entry include two types:

- MC88-501 Logic Block Configuration Form, and
- MC88-502 Logic Block Comments Entry Form

This publication details the entry of logic-block definitions, but does not detail the entry of comment lines. For information regarding comments entry, refer to the *Text Editor Operation* manual in the *Implementation/Engineering Operations - 1* binder.

1.3 REMOVABLE MEDIA

The term “removable media” as used in this manual means either “floppy diskettes” or “cartridge disks.” A floppy holds approximately 1 MB of data and a cartridge holds from 20 to 150 MB. Honeywell software is provided on cartridge media.

1.4 PREREQUISITES

Logic-block configuration data entry requires that the following items are available:

- A Universal Station, equipped with an Operator's keyboard, an Engineer's keyboard, and two cartridge drives (floppy drives are optional).
 - A TDC 3000^X System with
 - a Local Control Network
 - a Hiway Gateway
 - a Multifunction Controller (MC)
- The Compile, Compare, and Load Data functions require that the HG and MC be available for card configuration. Other functions (including syntax check of the compiler) do not require the HG and the MC.

- The following volumes/directories:
 - &ENG (Engineering Personality)
 - &OV1 (Overlay 1, containing the Logic Block Configurator, File Utilities, and other functions)
 - &DSY (System Abstracts)
- Network Configuration File
- Removable media, formatted and including file identifiers as described in *Command Processor Operation* in the *Implementation/Engineering Operations - 1* binder
- Configuration forms (MC88-501 and MC88-502), filled out according to *Logic Block Form Instructions* in the *Implementation/Hiway Gateway -2* binder.

1.5 RELATED DOCUMENTS

The following publications should be available for reference while using this publication:

Title	Publication No.	Binder
Logic Block Form Instructions	MC12-500	Implementation/Hiway Gateway - 2
Configuration Data Collection Guide	SW12-500	Implementation/Startup & Reconfiguration - 2
Text Editor Operation	SW11-506	Implementation/Engineering Operations - 1
Utilities Operation	SW11-507	Implementation/Engineering Operations - 1

OVERVIEW Section 2

This section describes the logic-block configuration procedure and defines the various file types that will be encountered during this procedure.

Logic Block Configuration Data Entry consists of entering logic-block definitions into databases on Multifunction Controllers. Logic blocks are functional entities such as gates (AND, OR, XOR), Flip-Flops, Delays, and Pulse (generators) that are used in Multifunction Controllers for interlocks and other control functions. Each logic block is defined in terms of block number, algorithm (e.g., AND, OR), and parameter inputs and outputs. Up to 128 logic blocks can be defined for each Multifunction Controller. These definitions, which are collected on the Logic Block Configuration Form (MC88-501), are entered into the TDC 3000^X system using the Logic Block Configurator.

2.1 CONFIGURATION STEPS

Entry of Logic Block Configuration Data consists of the following steps:

Primary Steps

1. Load the Engineering Personality and the Logic Block Configurator (contained on floppy diskettes) into a Universal Station.
2. Select the appropriate Multifunction Controller and configuration function.
3. Use the Text Builder function to create the data to define the logic blocks. Up to 128 logic blocks can be defined for a Multifunction Controller. The keyed in data is called the Source Text File.
4. Use the Compile function to convert the source code into a form which can be loaded into the Multifunction Controller. During the compilation, the Source Text File is checked for validity. If errors are detected, a Listing File that contains text lines and error messages is generated. If there are no errors, the Listing File, which consists of source-text lines, and an Object File is generated. The Object File is the compiled logic-block data-base image which will be down-line loaded to the Multifunction Controller which was selected.
5. Down-Line Load the Object File image to the Multifunction Controller from a floppy diskette, cartridge disk or History Module.

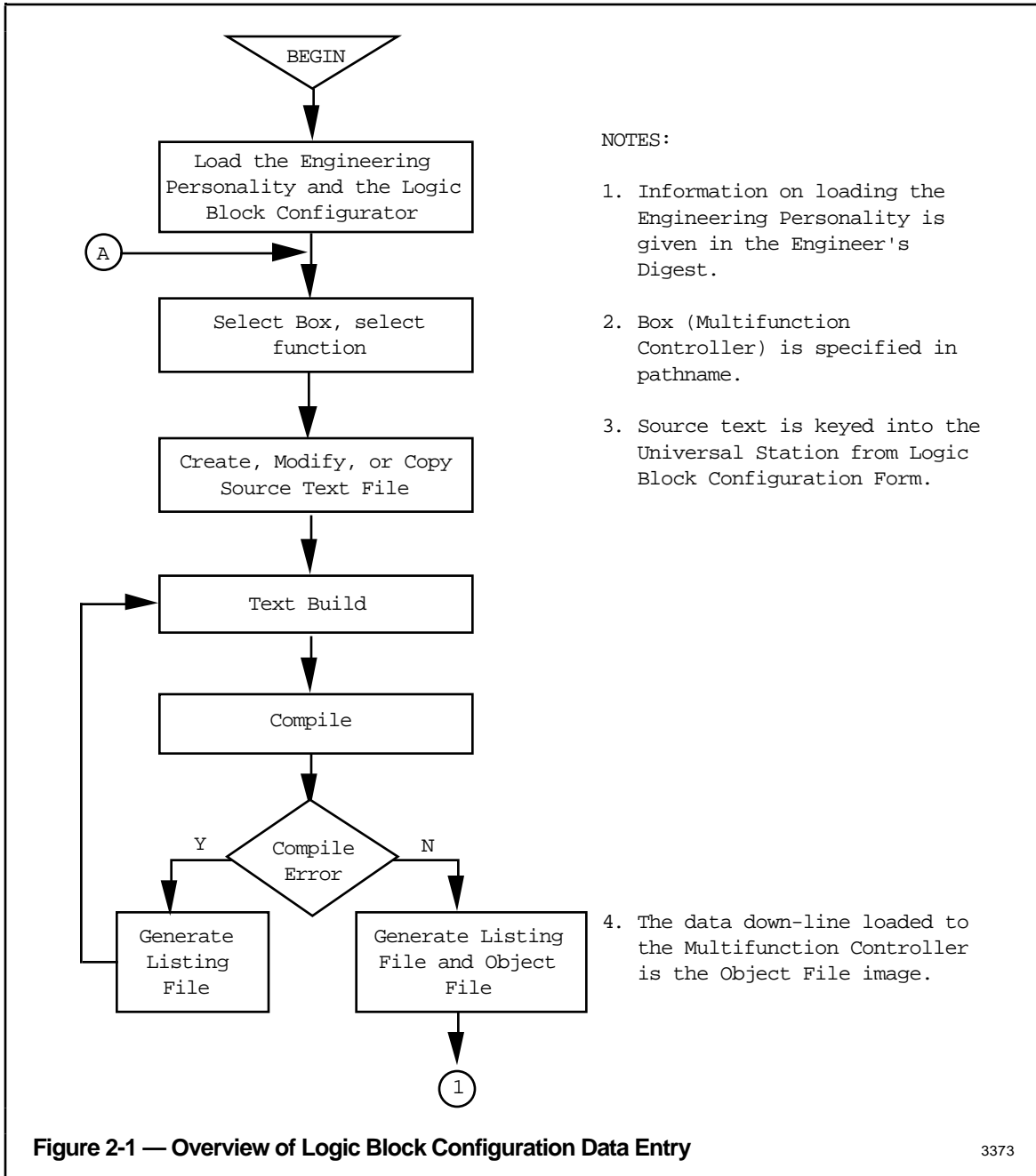
Ancillary Steps

- A1. Compare an Object File to the logic-block database of a Multifunction Controller to verify correct down-line loading. If differences exist, the numbers of the logic blocks that differ are displayed at the Universal Station.
- A2. Display block usage, which shows which of the 128 blocks for a given Multifunction Controller have been configured in the Source Text File.

A3. Add comment lines to the Source file, using the Text Editor function.

A4. Display or print the Source and Listing files, using the File Utility functions.

The sequence in which the primary and ancillary steps are used is variable. An overview of the logic block data entry process, showing some of the conditions on which the variations depend, is illustrated in Figure 2-1. For additional information, refer to the scenarios given in Section 7.



(continued next page)

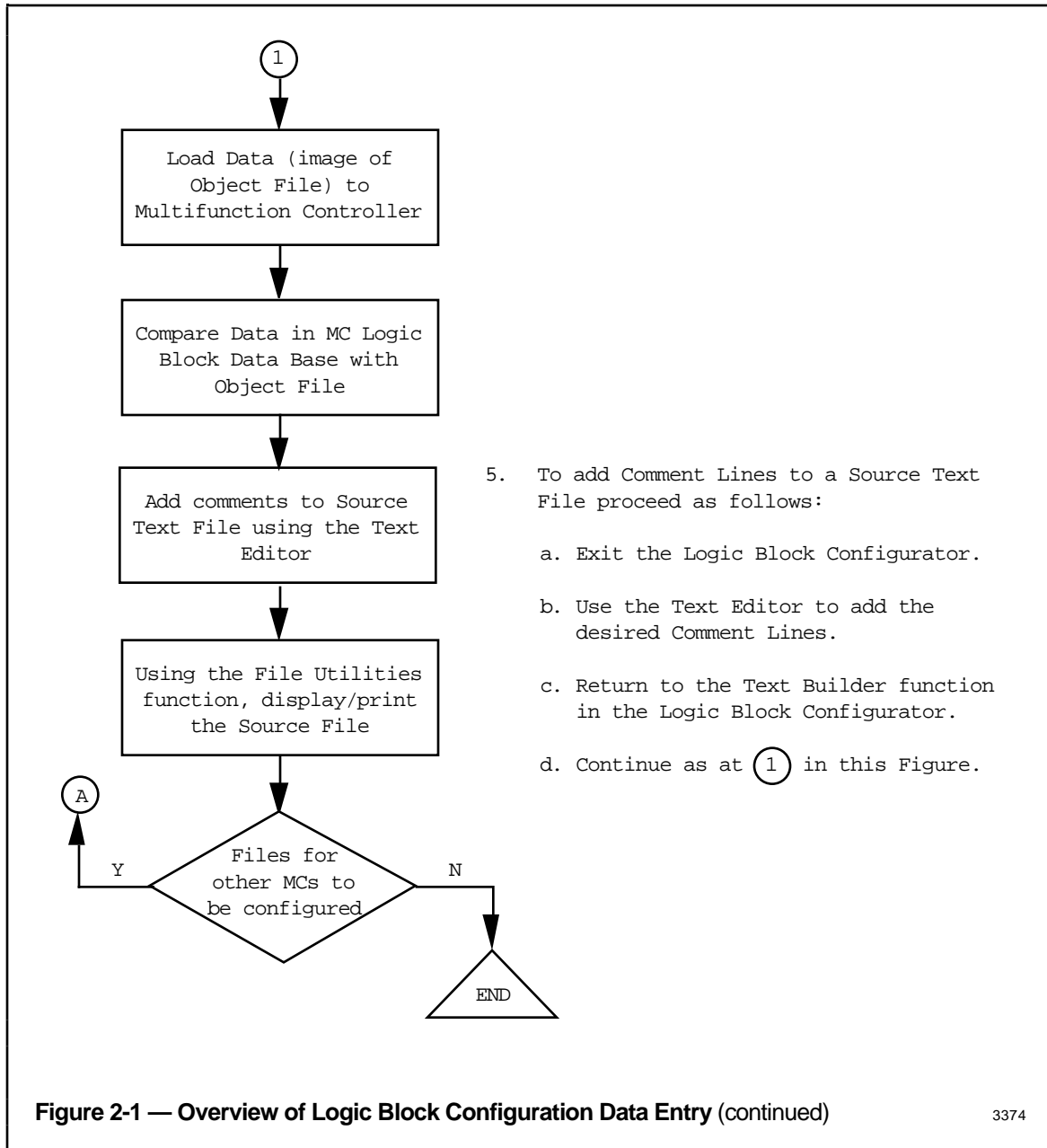


Figure 2-1 — Overview of Logic Block Configuration Data Entry (continued)

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2.2 CONFIGURATION FUNCTIONS

The functions (such as interactive displays) that are required to configure logic blocks are provided by Honeywell with each system. These functions are contained in the system software files that are provided on cartridge media in "volumes" or "directories". For logic-block data entry, the following volumes/directories/files are required:

- &ENG—Engineering Personality, which provides the basis for all configuration data entry.
- &DSY—System Abstracts.
- &OV1—Overlay 1, which includes

The Logic Block Configurator, which includes the displays/functions specific to logic-block data entry.

Utilities, which provides the capability to create files for the Network (History Module), removable media, and to display and print Source Text Files.

The Text Editor, which enables generation and modification of files.

- NCF—Network Configuration File, which consists of displays and other functions supplied by Honeywell and of configuration data supplied by the user.

For systems that include a History Module, the above software is loaded from removable media into the History Module during system startup. (Refer to the *System Startup Guide* in the *Implementation/Startup & Reconfiguration - I* binder.) After these volumes are loaded into the History Module, the functions they include are available for use as described in this publication. The logic-block configuration data that is entered into the system is written into an Intermediate Data File (IDF), which is either in the User volume on the History Module or on removable media that has been formatted for logic-block files using the Utilities' Create command.

For systems that do not include a History Module, &ENG, &DSY and the NCF are loaded into a Universal Station from removable media which is then removed from the drives. Then, &OV1 is inserted into drive number 1 and the removable medium that has been formatted to receive the logic-block configuration data is loaded into drive number 2.

For information regarding the displays/functions included in the Logic Block Configurator, refer to Figure 3-1 in Section 3 of this manual.

2.3 FILES AND FILENAMES

The Logic Block Configurator uses a separate set of files (four types) that corresponds to the logic-block database configured for each Multifunction Controller. Each file has a filename that uniquely identifies it system-wide, as follows:

- Source Text File LBxxyyzz.JS
- Object File LBxxyyzz.JO
- Listing File LBxxyyzz.JL
- Temporary File LBxxyyzz.JT

where LB = logic-block file
 xx = Hiway Number (01 to 20)
 yy = Box Number (01 to 31)
 zz = index Number (00 to 99)

There are five Command Processor functions which can be executed using Logic Block Configurator files. Table 2-1 shows which functions are applicable to each file type.

Table 2-1 — Applicability of Utility Functions by File Type

File Type (.Suffix)	Copy	Delete	Print	Rename	Edit
LB Source Text (.JS)	Yes	Yes	Yes	Yes	Yes
LB Object (.JO)	Yes	Yes	No	No	No
LB Listing (.JL)	Yes	Yes	Yes	No	Yes
LB Temporary (.JT)	Yes	Yes	No	No	No

Note: The Edit function shown in the above table refers to the one in the Text Editor.

2.3.1 Source Text File

The Source Text (.JS) File is either created by the Logic Block Configurator from the data entered or is copied from an existing file. A Source Text File can include up to 999 lines of text, with each line consisting of up to 75 characters. Excess characters (on each line) or excess lines (in each file) are truncated when Logic Block Configurator functions are executed. A warning message is displayed when truncation occurs.

A Source Text File contains two types of lines:

- Configuration lines—which consist of the elements that define logic blocks. These elements include the Block Number (1 to 128), the Algorithm (12 types), and Parameters (variable for each algorithm). Configuration lines are built initially using the Text Builder display of the Logic Block Configurator. You can use the Text Editor to modify configuration lines once the Source Text File is created.

- **Comment Line**—which consists of a 2-hyphen prefix (--) and up to 73 characters (any characters in the Text Editor). Comment Lines can only be generated by the Text Editor. (Refer to the *Text Editor Operation* manual in the *Implementation/Engineering Operations - 1* binder). They can be inserted anywhere in the Source Text File. The total number of lines (configuration and comment) cannot exceed 999. Comment lines exist only in the Source Text File, and have no effect on logic-block execution in the Multifunction Controller.

2.3.2 Object File

An Object (.JO) File is generated by the error-free compilation of a Source Text File. It is an image of the Object File that will be down-line loaded to a Multifunction Controller. The Object File is retained in the system for subsequent use (reloading the database or comparing with the database currently residing in a Multifunction Controller). The Object File will be deleted if the associated Source Text File is saved using the Write File function. See subsection 7.2.4 for details.

2.3.3 Listing File

A Listing (.JL) File is automatically generated during compilation whether or not any errors are detected. It is essentially the same as the Source Text File but also includes line numbers (001 up to 999) at the left margin of each line. If the compilation produced validity errors, error messages will also be included, following the text. The Listing File will be automatically deleted if the associated Source Text File is saved using the Write File function. See subsection 7.2.4 for details.

2.3.4 Temporary File

A Temporary (.JT) File is created when the Data-Base Compare function is initiated and deleted when the function has been completed. It is used to hold the logic block database image that is up-line loaded.

2.4 PATHNAMES

Pathnames are identifiers that enable files to be stored into areas within the TDC 3000X system and then retrieved. The Logic Block Configurator uses two pathname formats:

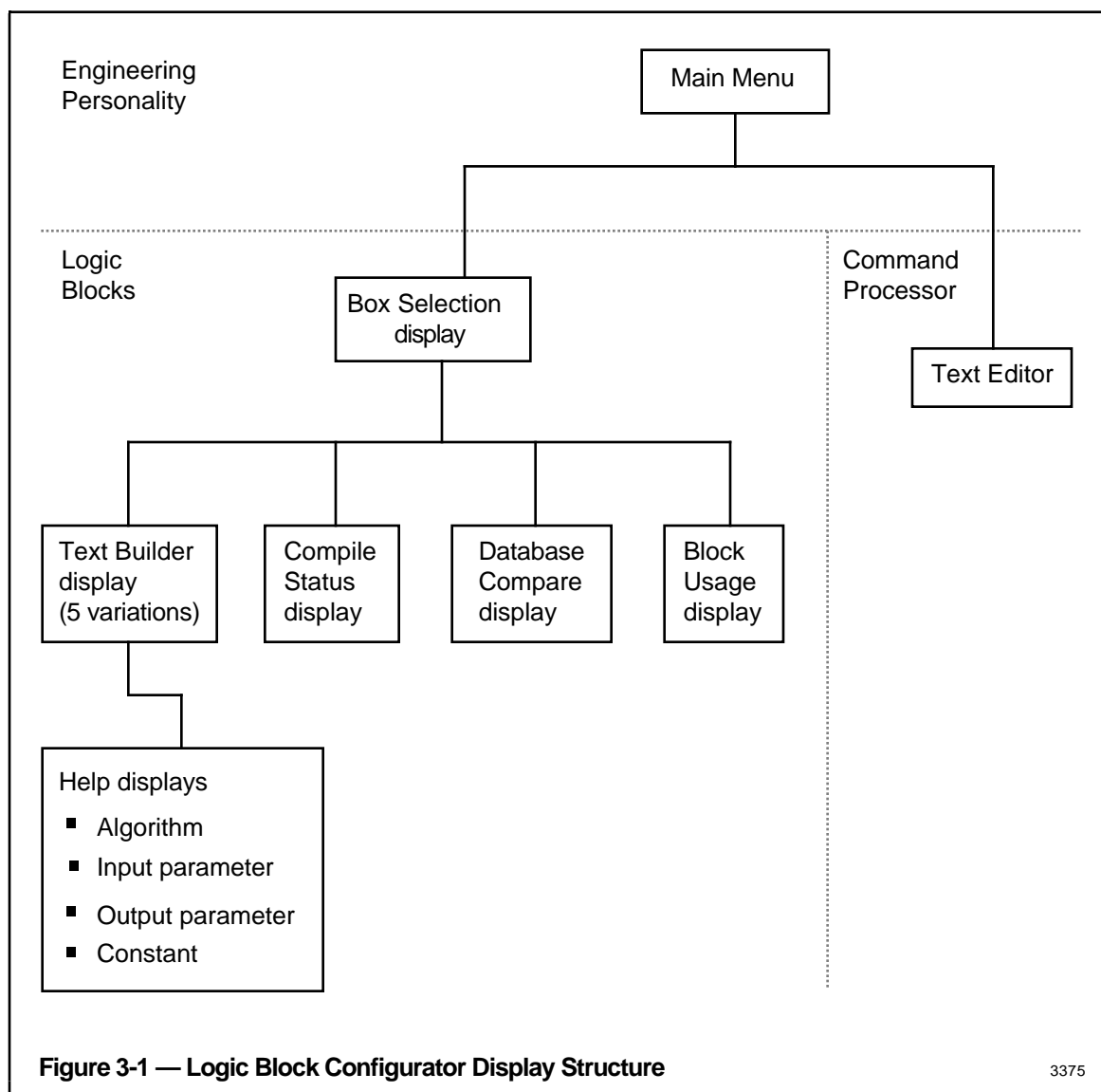
Storage Area	Pathname Format	Example
Virtual Volume (for History Modules)	NET>volm>filename	NET>V100>LB011301
Logical Device (for removable media)	ldid>volm>filename	\$F2>V080>LB011327

- Notes:**
- NET = network; files reside in the History Module.
 - ldid = logical device identifier (up to 10 characters that specify the floppy/cartridge drive that contains the floppy/cartridge to which logic-block files are written or from which they are read).
 - filename = up to 8 characters that specify a particular logic-block file by Hiway Number, Box Number, and serial number of the file. The extension that identifies the type of file (.XX) is not included.
 - > = greater-than symbol used as a delimiter to separate pathname elements.

DISPLAY HIERARCHY Section 3

This section describes the Universal Station displays used during the configuration procedure and includes representations of actual displays.

The hierarchy of displays used for entry of logic-block configuration data is shown in Figure 3-1. Descriptions of each of the Logic Block displays are given in subsections 3.1 through 3.5 in this manual.



3.1 BOX SELECTION DISPLAY

The Box Selection Display appears on the CRT when the LOGIC BLOCK function is selected on the Main Menu of the Engineering Personality or when generic-function key F1=BOX SELECT is used on an Logic Block Configurator display. This display, shown in Figure 3-2 below, provides the following capabilities:

- Enables selection of files for the desired Multifunction Controller by entering the appropriate pathname. See subsection 2.4 for information on pathnames.
- Enables selection of the Text Builder, Compiler, Database Compare, Block Usage, or Write configuration functions.
- If the Text Builder is selected from this display, the Box Selection display enables the further selection of one of the following three functions: modify an existing file, create a new file, or copy from an existing file.

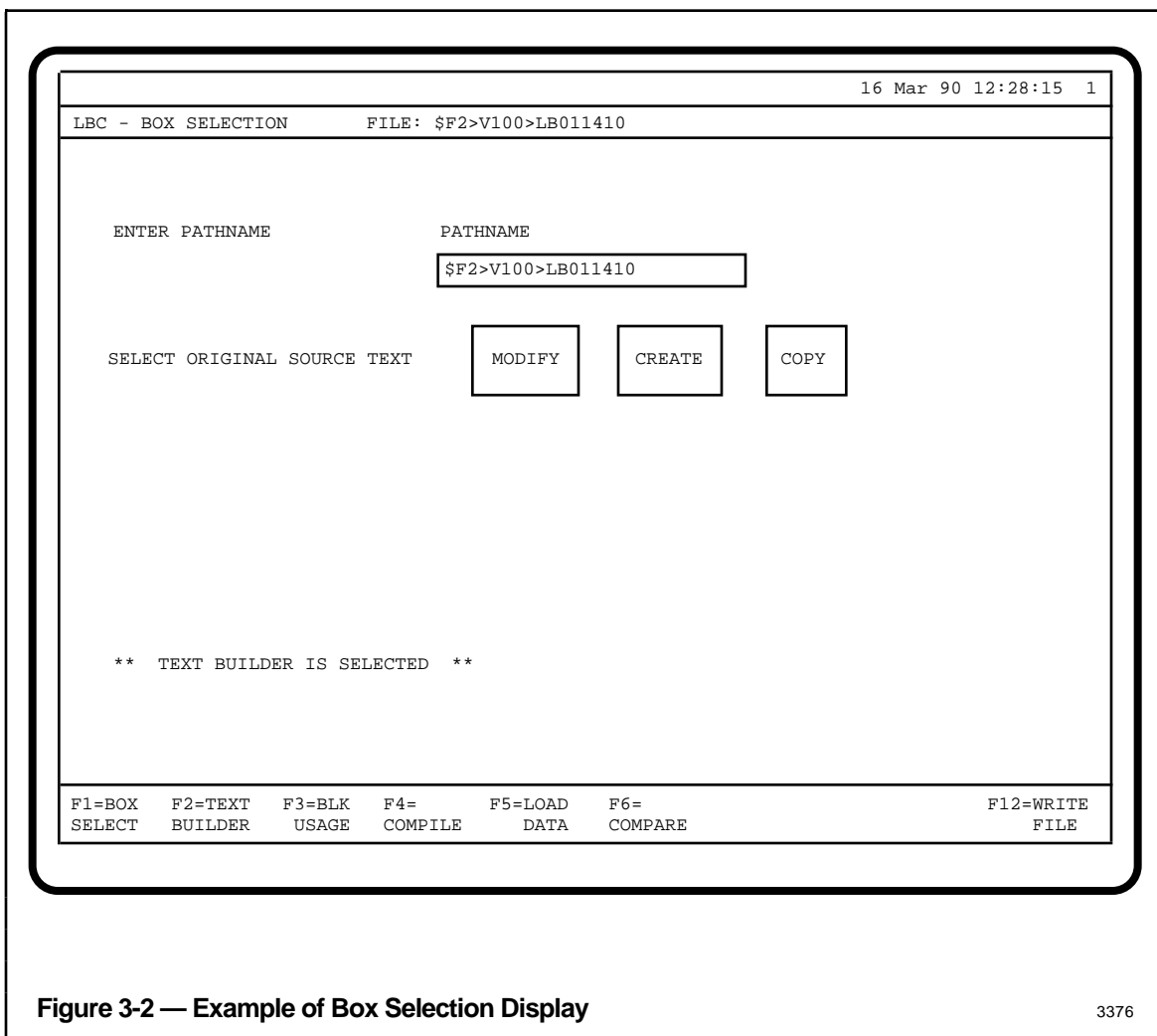
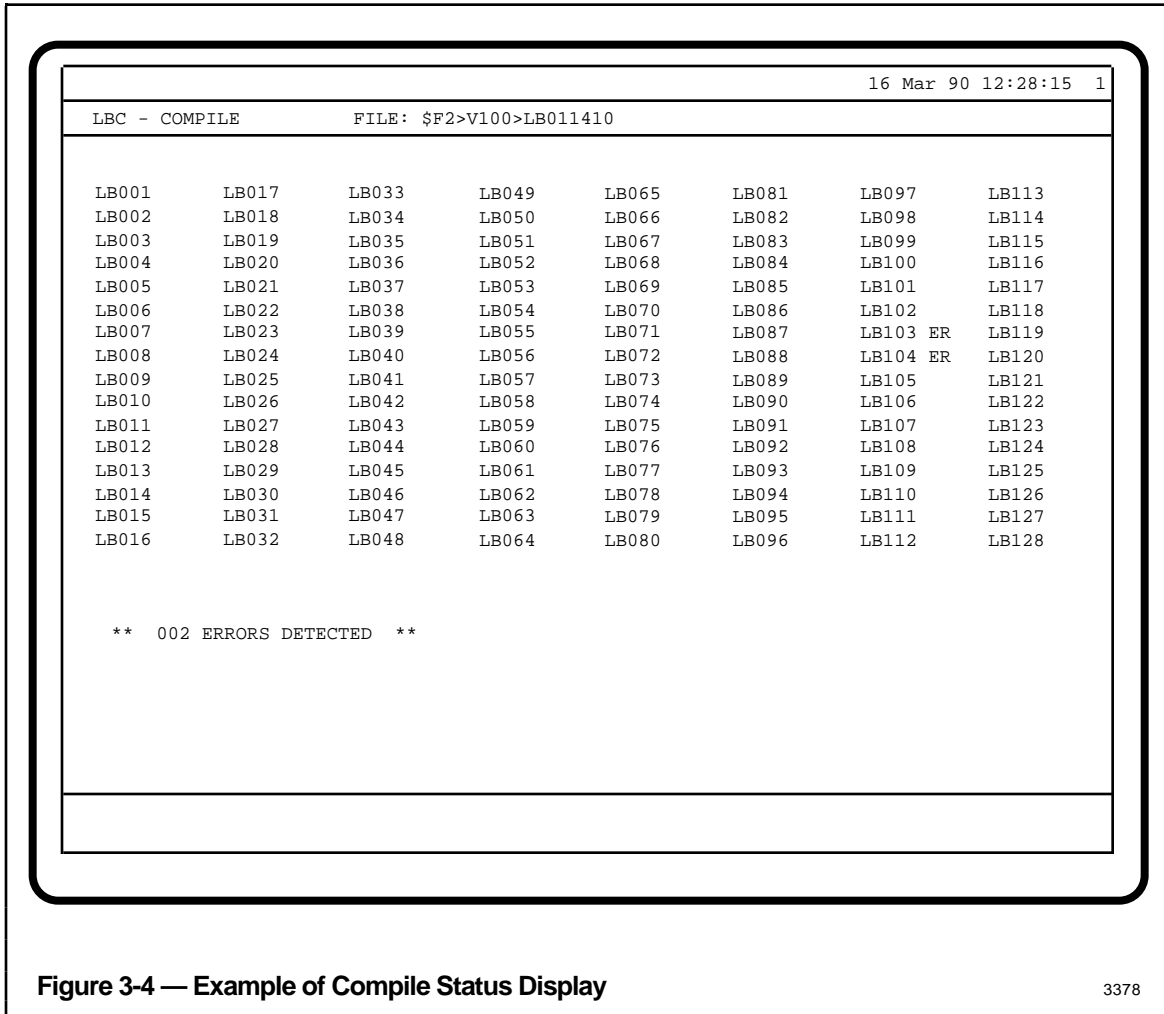


Figure 3-2 — Example of Box Selection Display

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3.3 COMPILE STATUS DISPLAY

The Compile Status display (Figure 3-4) is invoked by pressing function-key F4=COMPILE on another Logic Block Configurator display. The Compile Status display shows the compile status of each block (error or no error) and the total number of errors (if any). The notation "ER" next to the logic block indicates the presence of an error.



3.4 DATABASE COMPARE DISPLAY

The Database Compare display (Figure 3-5) is invoked by pressing function-key F6=COMPARE on another Logic Block Configurator display. This display shows whether an Object File stored in an Intermediate Data File (either on a removable medium or on the History Module) has been changed since it was down-line loaded as a database for the selected Multifunction Controller.

The display includes the notation "CE" next to the logic block in which differences have been found, and a message listing the total count of blocks that differ. An example of the Database Compare display is shown in Figure 3-5.

```

16 Mar 90 12:28:15 1
LBC - COMPARE FILE: $F2>V100>LB011410
LB001 LB017 LB033 LB049 LB065 LB081 LB097 LB113
LB002 LB018 LB034 LB050 LB066 LB082 LB098 LB114
LB003 LB019 LB035 LB051 LB067 LB083 LB099 LB115
LB004 LB020 LB036 LB052 LB068 LB084 LB100 LB116
LB005 LB021 LB037 LB053 LB069 LB085 LB101 LB117
LB006 LB022 LB038 LB054 LB070 LB086 LB102 LB118
LB007 LB023 LB039 LB055 LB071 LB087 LB103 LB119
LB008 LB024 LB040 LB056 LB072 LB088 LB104 LB120
LB009 LB025 LB041 LB057 LB073 LB089 LB105 LB121
LB010 LB026 LB042 LB058 LB074 LB090 LB106 LB122
LB011 LB027 LB043 CE LB059 LB075 LB091 LB107 LB123
LB012 LB028 CE LB044 LB060 LB076 LB092 LB108 LB124
LB013 LB029 LB045 LB061 LB077 LB093 LB109 LB125
LB014 LB030 LB046 LB062 LB078 LB094 LB110 LB126
LB015 LB031 LB047 LB063 LB079 LB095 LB111 LB127
LB016 LB032 LB048 LB064 LB080 LB096 LB112 LB128

** 002 DIFFERENCES FOUND **

```

Figure 3-5 — Example of Database Compare Display

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3.5 BLOCK USAGE DISPLAY

The Block Usage display is invoked by pressing function-key F3=BLK USAGE from another Logic Block Configurator display. This display lists the numbers of 128 logic blocks for the specified file in numerical order. If a block has either not been configured or has been configured with a NOP (No Operation) algorithm, the notation “NO” appears next to the block number. An example of a Block Usage display is shown in Figure 3-6.

```

16 Mar 90 12:28:15 1
LBC - BLOCK USAGE FILE: $F2>V100>LB011410
LB001 NO LB017 NO LB033 NO LB049 NO LB065 NO LB081 NO LB097 NO LB113 NO
LB002 NO LB018 NO LB034 NO LB050 NO LB066 NO LB082 NO LB098 NO LB114 NO
LB003 NO LB019 NO LB035 NO LB051 NO LB067 NO LB083 NO LB099 NO LB115 NO
LB004 NO LB020 NO LB036 NO LB052 NO LB068 NO LB084 NO LB100 NO LB116 NO
LB005 NO LB021 NO LB037 NO LB053 NO LB069 NO LB085 NO LB101 NO LB117 NO
LB006 NO LB022 NO LB038 NO LB054 NO LB070 NO LB086 NO LB102 NO LB118 NO
LB007 NO LB023 NO LB039 NO LB055 NO LB071 NO LB087 NO LB103 NO LB119 NO
LB008 NO LB024 NO LB040 NO LB056 NO LB072 NO LB088 NO LB104 NO LB120 NO
LB009 NO LB025 NO LB041 NO LB057 NO LB073 NO LB089 NO LB105 NO LB121 NO
LB010 NO LB026 NO LB042 NO LB058 NO LB074 NO LB090 NO LB106 NO LB122 NO
LB011 NO LB027 NO LB043 NO LB059 NO LB075 NO LB091 NO LB107 NO LB123 NO
LB012 NO LB028 NO LB044 NO LB060 NO LB076 NO LB092 NO LB108 NO LB124 NO
LB013 NO LB029 NO LB045 NO LB061 NO LB077 NO LB093 NO LB109 NO LB125 NO
LB014 NO LB030 NO LB046 NO LB062 NO LB078 NO LB094 NO LB110 NO LB126 NO
LB015 NO LB031 NO LB047 NO LB063 NO LB079 NO LB095 NO LB111 NO LB127 NO
LB016 NO LB032 NO LB048 NO LB064 NO LB080 NO LB096 NO LB112 NO LB128 NO

** 006 BLOCKS ARE IN USE **

** THERE IS NO OBJECT FILE **

```

Figure 3-6 — Example of Block Usage Display

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3.6 HELP DISPLAYS

Help displays are invoked by tabbing the cursor to the appropriate port and pressing the HELP key. They can only be called up from the Text Builder display. Four Help displays are provided — Algorithm, Input Parameters, Output Parameters, and Constant. Each display shows the legal codes that can be entered for a given item to be defined for a logic block. Help displays are deleted by pressing the CANCEL key. Refer to Section 6 for additional information. The four Help displays are shown in Figure 3-7.

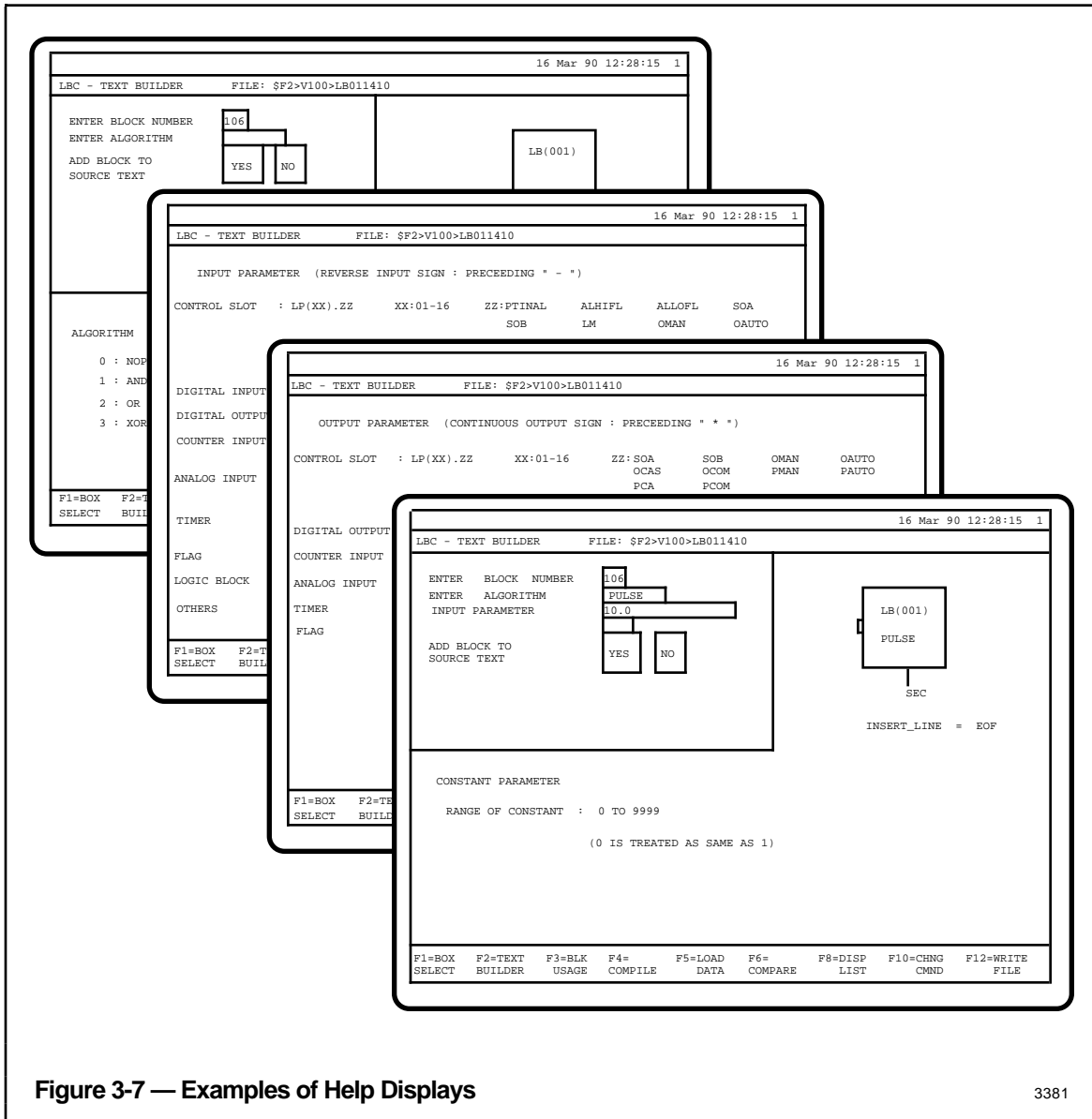


Figure 3-7 — Examples of Help Displays

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DATA SOURCES Section 4

This section shows how the information entered on the configuration forms is reflected in the Universal Station displays.

The principal source of data to be entered into logic-block files is filled-in configuration forms. It is possible to slightly modify a file without reference to the forms, but it is recommended that the forms be used throughout the data entry process, and that any modification entered is reflected on the forms. It is also recommended that a printed listing of the modified files is obtained for verification and subsequent reference. The applicable forms and configuration form instructions are listed under subsection 1.4 in this publication.

Figure 4-1 illustrates the relationship between configuration forms and the Text Builder display, which is used for keying-in data from the forms. Figure 4-2 illustrates the relationship between the logic-block comments form and the Text Editor, which is used for keying comments into the source text after it has been written into the files using generic-function key F12=WRITE FILE.

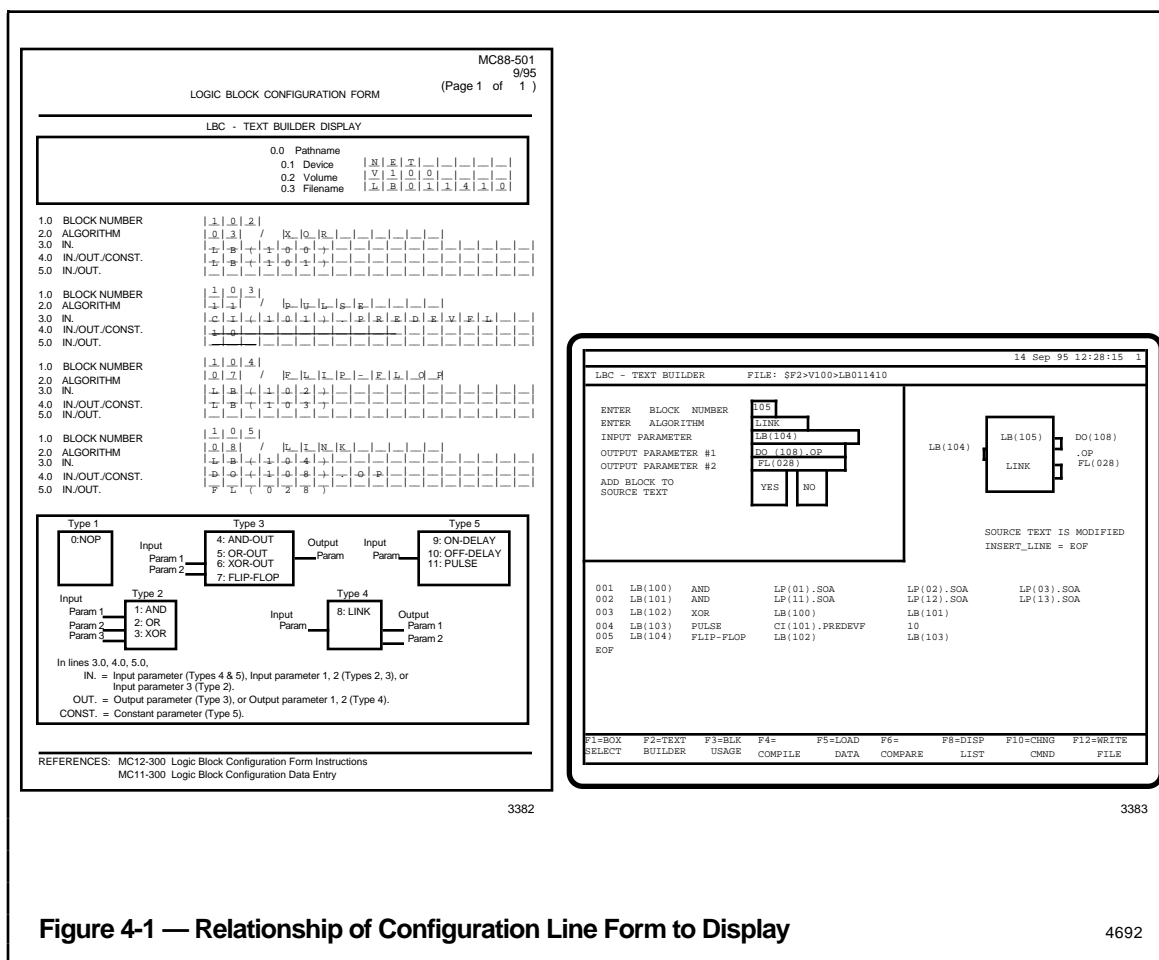


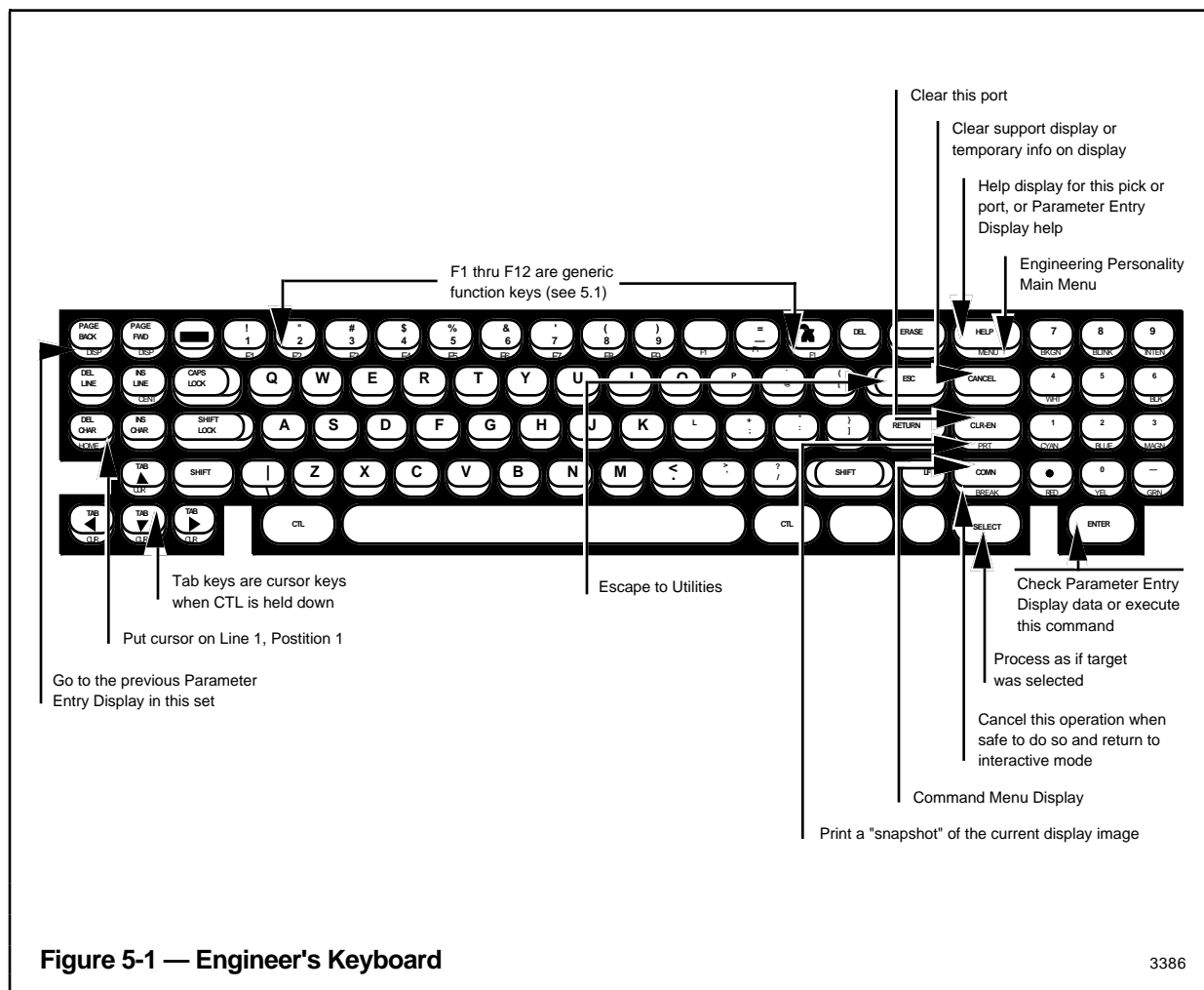
Figure 4-1 — Relationship of Configuration Line Form to Display

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ENGINEER'S KEYBOARD Section 5

This section describes the keys on the engineer's keyboard and explains how they are used to configure logic blocks.

The engineer's keyboard, illustrated in Figure 5-1, is required for logic-block building. This keyboard provides two types of functions: generic functions that apply to the selected configuration function (in this case, the Logic Block Configurator), and other functions that are common to most configuration functions.



Some keys have dual functions. These have dual markings—a symbol or symbols on the top of the key and another symbol or symbols on the front edge. The secondary function indicated on the front edge of these keys is obtained when one of the two control keys (CTL) is held down while the generic-function key is pressed.

5.1 GENERIC-FUNCTION KEYS

The generic-function keys are located on the top tier of keys on the engineer's keyboard. They are dual-function keys, and the generic functions, which are marked F1 through F12 on the front edge of the keys, are obtained by holding one of the CTL keys down and pressing the appropriate generic-function key.

The Logic Block Configurator gives the generic-function keys two sets of generic functions. The set of functions that apply at any point in the configuration process is displayed as key labels at the bottom of the display. These labels appear in the prompter region, except when the prompter region is needed for prompters or for error messages.

The two sets of labels are shown in Figure 5-2. Note that Keys F1 through F6 provide distinctly different functions and that keys F8, F10, and F12 provide the same function in both sets. The set shown under part B of Figure 5-2 applies only for handling of the source text when the Text Builder display is on the CRT.

A. Display Selection Functions					
F1=BOX SELECT	F2=TEXT BUILDER	F3=BLK USAGE	F4= COMPILE	F5=LOAD DATA	F6= COMPARE
F8=DISP LIST	F10=CHNG CMND	F12=WRITE FILE			
Note: F8 and F10 are available only on the Text Builder Display.					
B. Text Building/Display Selection Functions					
F1=ROLL UP	F2=ROLL DOWN	F3=DEL LINE	F4=INS LINE	F5=DEL BLK	F6=INS BLK
F8=DISP LIST	F10=CHNG CMND	F12=WRITE FILE			
Figure 5-2 — Generic-Function Key Labels					

NOTE

The functions of keys F1 through F6 are changed by holding the CTL key down and pressing F10=CHNG CMND (Change Command). Repeating this action will restore the original set of functions.

The function of each of these generic-function keys is as follows:

A. Display-Selection Keys

F1=BOX SELECT invokes the Box Selection display.

F2=TEXT BUILDER invokes the Text Builder display and initiates reading of specified files, if Modify or Copy was selected on the Box Select display.

F3=BLK USAGE invokes the Block Usage display.

F4=COMPILE invokes the Compile Status display and initiates the Compile operation.

F5=LOAD DATA initiates the down-line loading of the Object File image to a Multifunction Controller.

F6=COMPARE calls up the Database Compare display and initiates a comparison between the database in the selected Multifunction Controller and the Object File image in the Universal Station.

F8=DISP LIST enables the text lines displayed in the Text Builder to be selected by specifying the line number. (The specified line appears in the middle of the displayed text).

F10=CHNG CMND changes the functions of keys F1 through F6 (and the corresponding labels shown in the displays) to the alternate set. (This key is effective only when the Text Builder display is on the CRT).

F12=WRITE FILE causes the Source Text File in the Universal Station to be written into the file specified in the pathname entered into the Box Selection display. The destination file is in a volume on either a floppy, a cartridge, or in a History Module. The Object File and the Listing File are deleted.

B. Text Building/Display Selection Functions

F1=ROLL UP causes source text displayed in the Text Builder display to scroll up one line. That is, all lines are shifted up and the next-higher-numbered line is displayed at the bottom of the CRT. If the last line is displayed, F1 has no further effect.

F2=ROLL DOWN causes source text displayed in the Text Builder display to scroll down one line. That is, all lines are shifted down and the next-lower-numbered line is displayed at the bottom of the CRT. If the first (top) line is displayed, F1 has no further effect.

F3=DEL LINE enables deletion of a line of text from the Source Text File. The point at which the line is to be deleted is specified by entering the line number in the Text Builder display.

F4=INS LINE enables insertion of a line of text into the Source Text File. The point at which the line is to be inserted is specified by entering the line number in the Text Builder display.

F5=DEL BLK causes a logic block whose number is entered into the Text Builder display to be deleted from the Source Text File. Logic blocks with numbers higher than that of the logic block that is deleted are renumbered (each number is reduced by one).

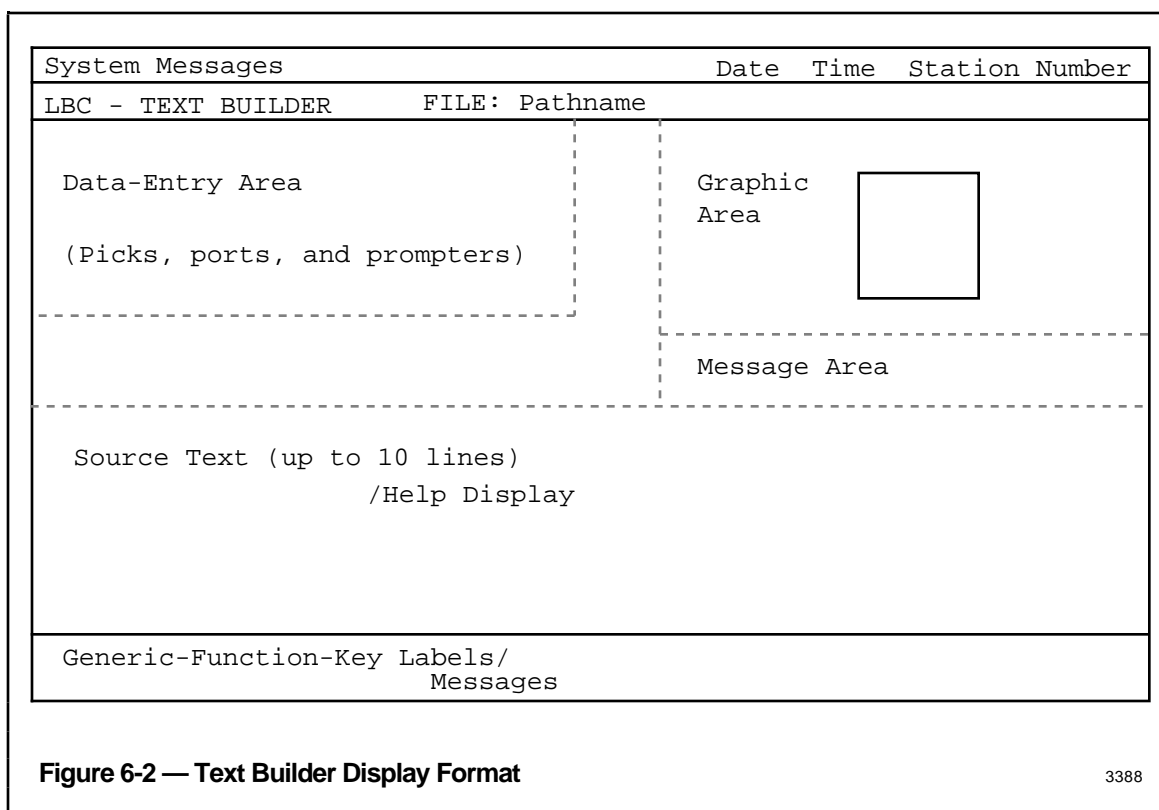
F6=INS BLK causes a logic block, whose definition is entered in the Text Builder display, to be inserted into a Source Text File. All logic blocks with numbers higher than that of the block inserted are increased by one.

F8 Through F12 (same as under A. Display Selection Keys).

5.2 FUNCTION KEYS

The functions of the function keys other than the generic-function keys are as follows:

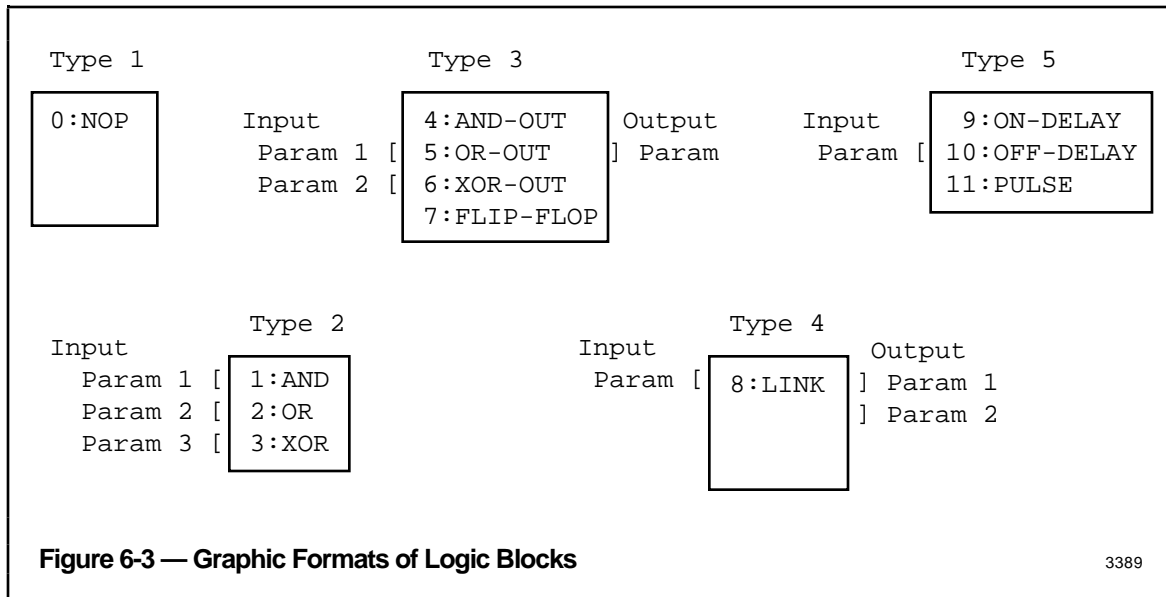
- HOME—Moves the cursor to the upper-right corner of the screen (line 1, character position 1).
- TAB (up, left, down, right)—If the cursor is not in a pick or a port, these keys move the cursor in the direction indicated to the upper-left corner of the next pick or port. If the cursor is in a pick or a port, and if the CTL key is held down, these keys move the cursor within the pick or port in the direction indicated, one character-position at a time.
- CUR (up, left, down, right)—When one of the CTL keys is held down, the TAB keys become cursor-movement keys. The cursor moves from character-position to character-position in the direction indicated. Combinations of up-and-down or right-and-left move the cursor diagonally.
- CLR-ENT—Clears all values in the port that the cursor is in. If the cursor isn't in a port, the station "beeps".
- CANCEL—Clears help information from the CRT.
- HELP—Requests the display of help information for the port the cursor is in.
- ENTER—Requests that data keyed into a display is checked and processed. If the check is o.k., the cursor is tabbed to the next port.
- PRT SCN—Requests that the present screen image be copied and printed on a matrix printer. The printer must be connected to this Universal Station.
- MENU—Requests the Engineering Personality's Main Menu. If data or selections have been entered but not yet filed, the following prompter appears:
SOURCE TEXT MODIFIED. HIT AGAIN FOR REAL.
- SELECT—Selects the pick the cursor is in. This is equivalent to touching a target (pick) with the touch-button outline. The SELECT key is also used for inserting logic-block definition lines into the Source Text display area of the Text Builder display.



The format of the Text Builder display is illustrated in Figure 6-2. As shown in this figure, the data entry region (lines 3 through 26) includes four distinct areas. The type of information displayed in each area is as follows:

- Data entry area—This area contains data entry prompters and appropriate ports and picks for entry of logic-block definition items,
 - block number
 - algorithm number
 - parameters 1,2,3 (input/output parameters and constant)
 - handling of source text (entering line number for inserting lines, deleting lines, etc.)
- Graphic area—This area contains a "logic box," which depicts a logical element that corresponds to the algorithm entered into the data entry area. The logic-block definition items that appear in the graphic area are automatically copied from the ports in the data-input area when the ENTER key is pressed after the item is keyed in.

The graphic format of the logic boxes is shown in Figure 6-3.



- Message area—contains messages that help to handle source text. Messages show operational status (e.g., SOURCE TEXT IS MODIFIED) or give directives (e.g., INSERT LINE =).

NOTE

The data entry area, the graphic area, and the message are over-written when the Help display for Input Parameters or Output Parameters is called up.

- Source text area—contains either source text or Help displays.
 - Source text (up to 10 lines) can be selected by scrolling up or down or by specifying a line number.
 - Help displays are available for algorithms, input parameters, output parameters and constants. Help displays are invoked by positioning the cursor in a port and pressing the HELP key. They are cleared from the CRT by pressing the CANCEL key. The Help display for output parameters or for input parameters occupies the entire data entry region (lines 3 - 26). The top half of the Help displays overwrites the data entry area, the graphic area, and the message area.

6.2 USE OF PICKS AND PORTS

There are two ways to enter data into displays:

- Picks—These are targets in the data entry area that indicate options that can be selected that can be selected from a set of functional or data elements. For example, in the Text Builder display, the prompt/picks appear like this.

```
ADD BLOCK TO      | YES |      | NO |
SOURCE TEXT
```

Selecting YES adds the block in the data entry area of the display to the source text and increments the next block number for configuring the next block. Selecting NO causes a prompt for entry of a block number other than the next-higher number.

- Ports—These are outlined areas into which character strings are entered. The data that is entered into each port must be in the format for the data type defined by the prompter associated with the port. If the format for Text Builder display ports is not known, a Help display that shows the format for all legal codes for a given port can be called up by positioning the cursor in a port and pressing the Help key. The Help displays for Algorithm and Constant entries occupy only the lower half of the screen, and do not preclude entry into the respective ports. The Help displays for Input Parameters and Output Parameters over-write the data entry area, so that the Help display must be CANCELED to permit data entry.

```
ENTER BLOCK NUMBER      [ 3  ]
ENTER ALGORITHM         [ ON-DELAY ]
INPUT PARAMETER         [           ]
```

As data is keyed in, it appears in white. As it is ENTERed, it appears in red if it is in error. If it is correct, the white changes to blue in the port and the same data is automatically copied into the graphic area. After all the data necessary to define a logic block has been ENTERed, selecting the NEXT BLOCK pick causes the logic block to appear as a line of source text in the bottom half of the CRT.

6.3 DISPOSITION OF ENTERED DATA

The phrase "disposition of entered data" refers to transfer of the Source Text File and the Object File image to storage areas in the system where it is used for control functions and/or where it can be stored for subsequent recall and use. If the Source Text File that was entered into the Universal Station is not disposed of before recalling the Main Menu, all the data that was entered is lost.

The F12=WRITE FILE function or the F4=COMPILE function can be used to write the Source Text File to a removable medium or a system file (History Module). The Box Selection display can be used to recall the source text from the diskette or from the system file. The F5=LOAD DATA function is used to down-line load the Object File image from the Universal Station to the Multifunction Controller.

LOGIC-BLOCK BUILDING FUNCTIONS Section 7

The Logic Block Configurator consists of a number of functions that provide flexibility for entering logic blocks under various circumstances. These functions can be used in various sequences. This section provides examples that show the functions that are available and the circumstances and methods in which they may be used. The examples are listed in the sequence in which the overall configuration procedure is done.

7.1 BOX/FUNCTION SELECTION

Box/function selection includes the selection of a particular Multifunction Controller (box) and the selection of a logic-block configuration function for that box. The following is an example of how box/function selection is done:

1. On the Engineering Main Menu select LOGIC BLOCKS.

Note: If a Logic Block Configuration menu is currently on display, just select the generic-function key F1=BOX SELECT and go to Step 3.

2. Key in the Pathname. See subsection 2.4 for information on pathnames.
Example: \$F2>V100>LB050101

The following message is displayed:

```
** SELECT FUNCTION **
```

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3. Select the function desired. Hold the CTL Key down and press the appropriate generic-function key. A message that identifies the selected function appears on the CRT. Here is a list of the messages displayed for each function:

F2=TEXT BUILDER	** TEXT BUILDER IS SELECTED **
F3=BLK USAGE	** BLOCK USAGE IS SELECTED **
F4=COMPILE	** COMPILE IS SELECTED **
F5=LOAD DATA	** LOAD DATA IS SELECTED **
F6=COMPARE	** COMPARE IS SELECTED **
F12=WRITE FILE	** WRITE FILE IS SELECTED **

Then, the Source Text File or Object File specified in the Pathname is either read from or written into and one of the following messages is displayed:

```
** READING FILE <Pathname> **
      or
** WRITING FILE <Pathname> **
```

If the volume is not found on the floppy disk specified in the pathname, this message appears:

```
MOUNT dddddddddd>vvvv FLOPPY
```

If the volume is not found on the History Module specified in the pathname, this message appears:

```
** VOLUME IS NOT FOUND **
```

If the Text Builder, Block Usage, or Compile function is selected and the Source Text File is not found, the following message appears:

```
** SOURCE TEXT FILE IS NOT FOUND **
```

If the Load Data or Compare function is selected and the Object File is not found, the following message appears:

```
** OBJECT FILE IS NOT FOUND **
```

When the pathname is changed and the source text has been modified, the following message appears:

```
** SOURCE TEXT MODIFIED, HIT AGAIN FOR REAL **
```

4. If the TEXT BUILDER was selected, choose the original text file by selecting the pick:

MODIFY if the source text for the Multifunction Controller specified in the pathname exists, and is to be modified, or

CREATE if the source text for Multifunction Controller specified in the pathname does not exist, and is to be entered for the first time, or

COPY if the source text for the Multifunction Controller specified in the pathname is to be copied from a file for another Multifunction Controller.

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The following prompt and data entry port appears on the CRT:

```
COPY FROM          PATHNAME
```

or

```
** SOURCE TEXT FILE IS NOT FOUND **
```

Enter the pathname of the file that is to be copied into the file for this Multifunction Controller. The following message appears on the CRT:

```
** READING FILE (pathname) **
```

Refer to subsection 7.2 for an example of the Text Building function.

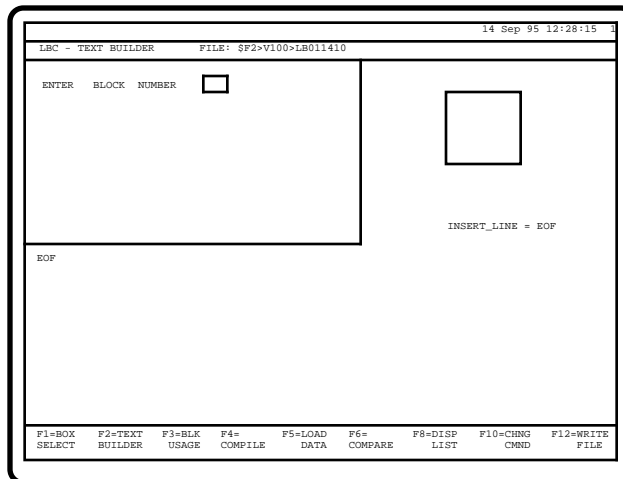
7.2 TEXT BUILDING

Text building is enabled when the Text Builder display is on the CRT. The Text Builder display, which can be called up from other displays included with the Logic Block Configurator, enables three types of interaction:

- Logic-block building, which includes
 - specifying the number of the block to be configured, and
 - entry of other items required to completely define a block (and call up Help displays)
- Source text handling functions, which include
 - selecting the lines of source text to be displayed (Roll Up, Roll Down, Display List)
 - inserting and deleting logic blocks
 - inserting and deleting lines of source text
 - writing the source file into volumes on removable media or system volumes.
- Calling up other displays or functions (Box Select, Text Builder, Block Usage, Compile, Load Data, Compare)

The following is an example of text building activity:

1. Call up the Text Builder display from another display, by holding the CTL key down and pressing generic-function-key F2=TEXT BUILDER. The Text Builder display that appears is for the Multifunction Controller and file specified by the pathnames entered into the Box Select display.
2. Key the block number into the ENTER BLOCK NUMBER port in the data entry area of the CRT. Press ENTER. The keyed in block number appears in the graphic area of the CRT.



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Note: If the block number keyed in in Step 2 is the same as for a block that has already been configured, the data for that block will appear in the data entry area of the display.

3. Key the number or name of the algorithm into the ALGORITHM port in the data entry areas of the CRT and press ENTER. If the algorithm was incorrectly entered, it appears in red; re-enter as required.

The algorithm name appears in the graphic area of the CRT. Also, entry ports for the items required to define a logic block for the Algorithm entered appears in the data entry area on the CRT.

If 0 or NOP was entered (No Operation algorithm), definition of this logic block is complete; proceed to Step 5. If other than no operation, proceed at Step 4.

Note: To display algorithm numbers and names, press the Help key. Press CANCEL to delete the Help display.

4. Key in parameter #1 through parameter #3, (input, output, and constant, as applicable). Press ENTER; the keyed in data appears in the graphic area of the CRT.

Note: To display the valid codes for each item to be entered, tab the cursor to the appropriate port and press the HELP key. Press CANCEL to delete the Help display.

5. For ADD BLOCK TO SOURCE TEXT, select:

- YES if the next block to be configured is to have a block number one greater than the number of the block just configured. Press ENTER.
- NO if the next block to be configured is to have a number other than one higher than the one just configured. In this case, enter the appropriate number (from 1 to 128), then press ENTER. The line number specified in the message area of the display (INSERT LINE = nnn or EOF, where nnn is the line number and EOF is the end of file).

Note: If the block number keyed in in Step 2 was already in the Source Text File, pressing ENTER causes the modified block to be entered into the Source Text File at the same place in the listing. If it was a new block number, the new block will be placed in the Source Text File at the line number specified in the display (INSERT LINE = nnn or EOF, where nnn is 1 to 128 and EOF is End Of File).

6. Repeat Steps 2 through 5 as required to complete building of a Source Text File.

To view a part of the source text that has been configured, but doesn't appear on the CRT, hold the CTL key down and press the

- F1=ROLL UP key to view the next-higher line number
- F2=ROLL DOWN key to view the next-lower line number
- F8=DISP LIST key to enable entry of the desired line number. Key in the number and press ENTER.

To insert or delete lines of source text, refer to subsection 7.2.1.
To insert or delete logic blocks, refer to subsection 7.2.2.

7.2.1 Delete Line/Insert Line Functions

The Insert Line/Delete Line functions along with the Insert Block/Delete Block functions (see 7.2.1) provide for modification of a Source Text File. These functions can be used to modify text being created for the first time, or to modify existing text. A description of these functions follows:

A. Delete Line Function

1. With the Text Builder display on the CRT, hold the CTL key down and press generic-function-key F3=DEL LINE. The ENTER DELETE LINE NUMBER message appears in the operating-message area of the CRT.
2. Enter the number of the line to be deleted, then press ENTER. The specified line is deleted from the Source Text File.

Note: Entering all spaces will, in effect, cancel the DEL LINE function.

B. Insert Line Function

1. With the Text Builder display on the CRT, hold the CTL key down and press generic-function key F4=INS LINE. The ENTER INSERT LINE NUMBER message appears on the CRT.
2. Enter the number at which the line is to be inserted:
 - 1 to max for the list (The new line is inserted before the line specified)
 - EOF (End-Of-File; default)
 - All spaces; this effectively cancels the INS LINE function

The INSERT LINE NUMBER message in the Message Area is changed.

3. Enter the line to be inserted, as described in subsection 7.2.
4. Press SELECT. The new line appears at the specified line position in the source-text display and the INSERT LINE number is incremented by one.

7.2.2 Delete Block/Insert Block Functions

The Delete Block/Insert Block functions provide for modification of existing source text, and can be used to modify text being created for the first time, or to modify existing text.

Unlike the Delete Line/Insert Line Functions (refer to subsection 7.2.1), the Insert/Delete Block functions cause logic blocks to be renumbered.

A. Delete Block Function

1. With the Text Builder display on the CRT, hold the CTL key down and press the F5=DEL BLK key. The messages `BLOCKS WILL BE RENUMBERED` and `ENTER BLOCK NUMBER TO BE DELETED` appear on the CRT.
2. Enter the number of the block to be deleted, in the range of 1 to 128, then press ENTER (entering all spaces cancels the DELETE BLOCK function).

The logic block specified is deleted from the source file and all logic blocks with higher numbers are renumbered with numbers reduced by one.

Note: If the block to be deleted is used as an input to other blocks, the following message is displayed:

```
LB(xxx) IS FOUND nnn TIMES, HIT ENTER FOR REAL.
```

See Figure 7-1 for an example of the Delete Block Function.

B. Insert Block Function

1. With the Text Builder display on the CRT, hold the CTL key down and press the F6=INS BLK key. The messages `BLOCKS WILL BE RENUMBERED` and `ENTER BLOCK NUMBER TO BE INSERTED` appear on the CRT.
2. Enter the number of the block to be inserted:
 - 1 to 128 (If block nnn is already configured, the message `LB(nnn) IS FOUND nnn TIMES, HIT ENTER FOR REAL` is displayed)
 - All spaces (This effectively cancels the insert-line function.)
3. Press ENTER. The block keyed in appears as a NOP algorithm in the source-text display on the line immediately preceding the line in which the logic block with the specified number previously appeared. All logic blocks that had consecutive numbers higher than that of the inserted block are renumbered.

See Figure 7-2 for an example of the Insert Block Function.

Before the Deletion

LB(010)	AND	FL(023)	LB(004)	
LB(011)	LINK	LB(010)	FL(032)	*FL(080)
LB(012)	AND	LB(002)	CI(013), STRTSTOP	DI(0305), PV
LB(013)	XOR	LB(011)	LB(027)	
LB(014)	ON-DELAY	LB(013)	10	

After the Deletion of LB(012)

LB(010)	AND	FL(023)	LB(004)	
LB(011)	LINK	LB(010)	FL(031)	*FL(080)
LB(012)	XOR	LB(011)	LB(026)	
LB(013)	ON-DELAY	LB(012)	10	
LB(014)	PULSE	LB(013)	6	

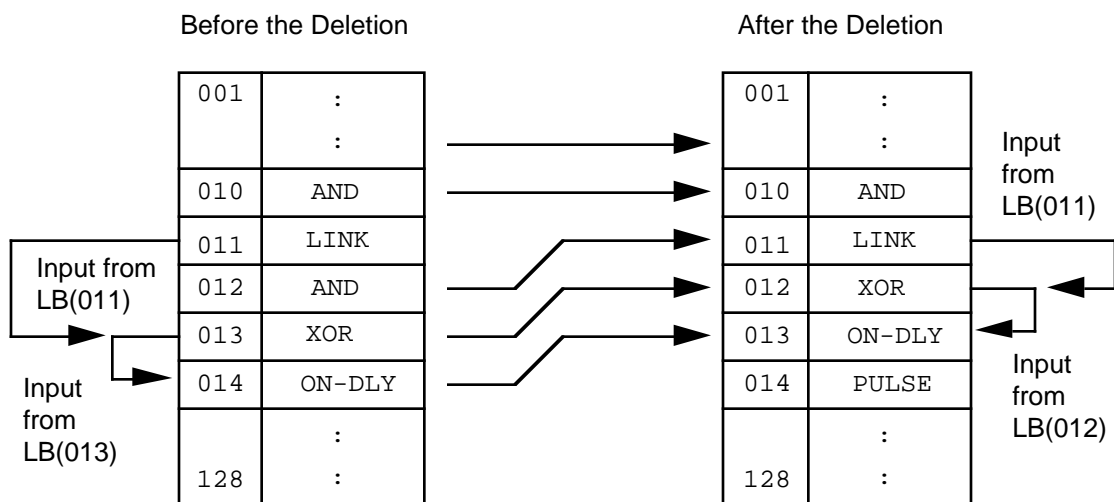


Figure 7-1 — Example of Block Deletion

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Before the Insertion

LB(010)	AND	FL(023)	LB(004)	
LB(011)	LINK	LB(010)	FL(032)	*FL(080)
LB(012)	AND	LB(002)	CI(013), STRTSTOP	DI(0305), PV
LB(013)	XOR	LB(011)	LB(027)	
LB(014)	ON-DELAY	LB(013)	10	

After the Insertion of LB(012)

LB(010)	AND	FL(023)	LB(004)	
LB(011)	LINK	LB(010)	FL(031)	*FL(080)
LB(012)	NO			
LB(013)	AND	LB(002)	CI(013). STRTSTOP	DI(0305). PV
LB(014)	XOR	LB(011)	LB(026)	
LB(015)	ON-DELAY	LB(012)	10	

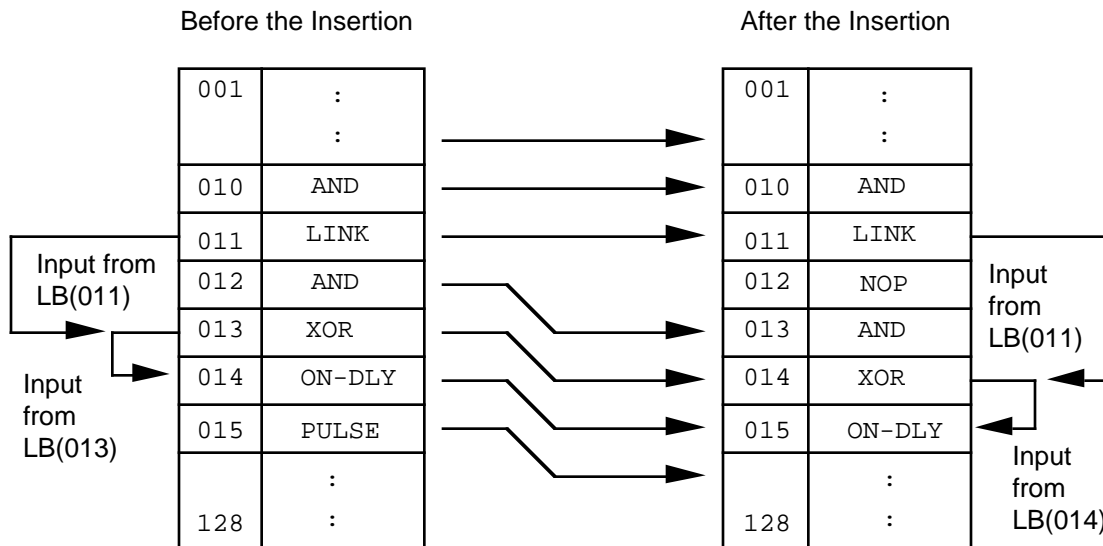


Figure 7-2 — Example of Block Insertion

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7.2.3 Display Line Function

1. With the Text Builder display on the CRT, hold the CTL key down and press the generic-function key F8=DISP LIST. The ENTER DISPLAY LINE NUMBER message appears on the CRT.
2. Enter the number of the line to be viewed or EOF. The display is adjusted so that the line selected is centered in the source-text area.
3. To cancel this function and return to the previous display, just press ENTER (enter all spaces).

7.2.4 Write File Function

This function is initiated by pressing generic-function key F12=WRITE FILE. It is used to save the created or modified Source Text File on the removable medium or History Module in the specified file.

7.3 COMPILING

Compiling is the process that converts source code into a format (object code) that can be executed by a Multifunction Controller. The following functions are performed:

- Validity checking of the box type, source-text syntax, and input/output board type
- If no errors are detected, an Object File and a Listing File are created. If there were errors, source text is modified to correct the errors and the source code recompiled.
- The status of the compilation is displayed.

The following is a description of how compiling is done:

1. With any display on the CRT that includes the F4=COMPILE label, hold the CTL key down and press generic-function key F4.

If the source text is available, the Compile Status display appears on the CRT, and the following messages are displayed:

```
** WAIT **
** LBC COMPILE STARTED **
```

If the source text had not been read from files or had not been created, the following error message is displayed:

```
** THERE IS NO SOURCE TEXT **
```

```

16 Mar 90 12:28:15 1
LBC - COMPILE      FILE: SF2-V100-LB011410
LB001  LB017  LB033  LB049  LB065  LB081  LB097  LB113
LB002  LB018  LB034  LB050  LB066  LB082  LB098  LB114
LB003  LB019  LB035  LB051  LB067  LB083  LB099  LB115
LB004  LB020  LB036  LB052  LB068  LB084  LB100  LB116
LB005  LB021  LB037  LB053  LB069  LB085  LB101  LB117
LB006  LB022  LB038  LB054  LB070  LB086  LB102  LB118
LB007  LB023  LB039  LB055  LB071  LB087  LB103 ER  LB119
LB008  LB024  LB040  LB056  LB072  LB088  LB104 ER  LB120
LB009  LB025  LB041  LB057  LB073  LB089  LB105  LB121
LB010  LB026  LB042  LB058  LB074  LB090  LB106  LB122
LB011  LB027  LB043  LB059  LB075  LB091  LB107  LB123
LB012  LB028  LB044  LB060  LB076  LB092  LB108  LB124
LB013  LB029  LB045  LB061  LB077  LB093  LB109  LB125
LB014  LB030  LB046  LB062  LB078  LB094  LB110  LB126
LB015  LB031  LB047  LB063  LB079  LB095  LB111  LB127
LB016  LB032  LB048  LB064  LB080  LB096  LB112  LB128

** 002 ERRORS DETECTED **

```

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If errors are detected, an appropriate error message is displayed, such as

```
** BOX TYPE IS NOT MULTIFUNCTION CONTROLLER **
** FILE ACCESS ERROR, FILES ARE NOT CREATED **
** DATA ACCESS ERROR **
```

If an error occurs, only a syntax check is executed. If compile errors are found, the following appears on the Compile Status display:

- ER (in red) beside each logic-block number in which an error was found
- ** xxx ERRORS DETECTED ** (in red), where xxx is the total number of errors found.

If no errors are found, the message ** COMPILE COMPLETED** appears.

2. Select the next function (using CTL and generic-function key) as appropriate:

- If errors were found, return to the Text Builder display to correct the errors then recompile.
- If no errors were found, load the data into the Multifunction Controller (refer to subsection 7.4).

7.4 LOADING DATA (DOWN-LINE LOADING)

Down-line loading is an automatic process, initiated by the operator, in which the compiled object image is loaded into the database of the Multifunction Controller specified in the pathname that appears in the display.

A separate display is not used for the down-line loading operation. The appropriate messages appear on the display from which the loading function was initiated. The following is a description of how data loading is done.

With the Box Selection display, the Compile Status display, the Text Builder display, or the Database Compare display on the CRT, hold the CTL key down and press the generic-function key F5=LOAD DATA.

If any of the following messages appear, correct the error before proceeding.

```
** THERE IS NO OBJECT FILE **
** BOX TYPE IS NOT MULTIFUNCTION CONTROLLER **
** MULTIFUNCTION CONTROLLER IS NOT IN IDLE STATE **
** DATA ACCESS ERROR **
```

When loading is started, the following message appears:

```
** LBC DATA LOAD STARTED **
```

If an error is detected, the following message is displayed:

```
** LOAD DATA NOT COMPLETED **
```

If the source text has been modified, the following message is displayed:

```
** SOURCE TEXT MODIFIED, COMPILE BEFORE LOADING **
```

When the load operation is completed, an appropriate message is entered in the journal in the History Module:

```
<Time><File Name>: LOAD DATA SUCCESS
or
<Time><File Name>: LOAD DATA FAILURE
```

7.5 DATABASE COMPARE

The database Compare function enables you to determine if and how an Object File differs from the database in a Multifunction Controller. The following is an example of how this function is used:

1. With the Box Select display, the Text Builder display, the Block Usage display, or the Compile Status display on the CRT, hold the CTL key down and press the generic-function key F6=COMPARE. The Compare display appears on the CRT and the comparison is executed.

LBC - COMPARE								FILE: SF2>V100>LB011410							
LB001	LB017	LB033	LB049	LB065	LB081	LB097	LB113								
LB002	LB018	LB034	LB050	LB066	LB082	LB098	LB114								
LB003	LB019	LB035	LB051	LB067	LB083	LB099	LB115								
LB004	LB020	LB036	LB052	LB068	LB084	LB100	LB116								
LB005	LB021	LB037	LB053	LB069	LB085	LB101	LB117								
LB006	LB022	LB038	LB054	LB070	LB086	LB102	LB118								
LB007	LB023	LB039	LB055	LB071	LB087	LB103	LB119								
LB008	LB024	LB040	LB056	LB072	LB088	LB104	LB120								
LB009	LB025	LB041	LB057	LB073	LB089	LB105	LB121								
LB010	LB026	LB042	LB058	LB074	LB090	LB106	LB122								
LB011	LB027	LB043 CE	LB059	LB075	LB091	LB107	LB123								
LB012	LB028 CE	LB044	LB060	LB076	LB092	LB108	LB124								
LB013	LB029	LB045	LB061	LB077	LB093	LB109	LB125								
LB014	LB030	LB046	LB062	LB078	LB094	LB110	LB126								
LB015	LB031	LB047	LB063	LB079	LB095	LB111	LB127								
LB016	LB032	LB048	LB064	LB080	LB096	LB112	LB128								

** 002 DIFFERENCES FOUND **

Note: If the source text is not in the Universal Station, it is read from the Object File (removable medium or HM). Wait until the reading has been completed.

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The sequence of messages as this function is being processed is as follows:

```
** WAIT ** and ** READING DATABASE ** appear.
```

If no differences are found, the following message appears:

```
** NO DIFFERENCES FOUND **
```

If differences were found, the following appear on the display:

CE appears beside each logic block number in which an error was found

```
** xxx DIFFERENCES FOUND **, where xxx is the total number of
differences found.
```

If the Object File was not read or was not compiled, the following message appears in red:

```
** THERE IS NO OBJECT FILE **
```

If the source text has been modified, the warning

```
** SOURCE TEXT MODIFIED, HIT AGAIN FOR REAL ** appears.
```

If an error condition is detected, an appropriate message is displayed; for example:

```
** DATABASE READ NOT COMPLETED **
** BOX TYPE IS NOT MULTIFUNCTION CONTROLLER **
```

2. Use The CTL key and the appropriate generic-function key to select the next function.

7.6 DISPLAYING BLOCK USAGE

The logic blocks that were configured in a given file are displayed as follows:

1. With the Text Builder display, the Compile Status display, or the Compare display on the CRT, hold the CTL key down and press the generic-function key F3=BLK USAGE.

The Block Usage display appears on the CRT. This display is a listing of the numbers of blocks in the file specified by the pathname. NO appears beside the number of any unconfigured logic block, or for which the algorithm NOP (No Operation) has been defined.

LBC - BLOCK USAGE																FILE: \$F2-V100-LB011410		14 Sep 95 12:28:15		1
LB001 NO	LB017 NO	LB033 NO	LB049 NO	LB065 NO	LB081 NO	LB097 NO	LB113 NO													
LB002 NO	LB018 NO	LB034 NO	LB050 NO	LB066 NO	LB082 NO	LB098 NO	LB114 NO													
LB003 NO	LB019 NO	LB035 NO	LB051 NO	LB067 NO	LB083 NO	LB099 NO	LB115 NO													
LB004 NO	LB020 NO	LB036 NO	LB052 NO	LB068 NO	LB084 NO	LB100 NO	LB116 NO													
LB005 NO	LB021 NO	LB037 NO	LB053 NO	LB069 NO	LB085 NO	LB101 NO	LB117 NO													
LB006 NO	LB022 NO	LB038 NO	LB054 NO	LB070 NO	LB086 NO	LB102 NO	LB118 NO													
LB007 NO	LB023 NO	LB039 NO	LB055 NO	LB071 NO	LB087 NO	LB103 NO	LB119 NO													
LB008 NO	LB024 NO	LB040 NO	LB056 NO	LB072 NO	LB088 NO	LB104 NO	LB120 NO													
LB009 NO	LB025 NO	LB041 NO	LB057 NO	LB073 NO	LB089 NO	LB105 NO	LB121 NO													
LB010 NO	LB026 NO	LB042 NO	LB058 NO	LB074 NO	LB090 NO	LB106 NO	LB122 NO													
LB011 NO	LB027 NO	LB043 NO	LB059 NO	LB075 NO	LB091 NO	LB107 NO	LB123 NO													
LB012 NO	LB028 NO	LB044 NO	LB060 NO	LB076 NO	LB092 NO	LB108 NO	LB124 NO													
LB013 NO	LB029 NO	LB045 NO	LB061 NO	LB077 NO	LB093 NO	LB109 NO	LB125 NO													
LB014 NO	LB030 NO	LB046 NO	LB062 NO	LB078 NO	LB094 NO	LB110 NO	LB126 NO													
LB015 NO	LB031 NO	LB047 NO	LB063 NO	LB079 NO	LB095 NO	LB111 NO	LB127 NO													
LB016 NO	LB032 NO	LB048 NO	LB064 NO	LB080 NO	LB096 NO	LB112 NO	LB128 NO													
** 006 BLOCKS ARE IN USE **																				
** THERE IS NO OBJECT FILE **																				

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The message **** xxx BLOCKS ARE IN USE **** is also displayed, where xxx is the total number of blocks defined with algorithms other than No Operation.

2. Use The CTL key and the appropriate generic-function key to select the next function.

OPERATION MESSAGES Appendix A

A.1 ALL DISPLAYS

** MOUNT VOLUME ERROR **	An error was detected at mount-volume (removable medium) operation.
** FILE NOT FOUND **	In read or write operation, the specified file could not be found.
** FILE ERROR (<file type>: <operation> **	File I/O error was found during <operation> of <file type>.

A.2 BOX SELECT DISPLAY

** FILE NAME SYNTAX ERROR (LBHHBBNN) **	The file specification doesn't begin with 'LB'.
** HIWAY NUMBER SYNTAX ERROR **	The Hiway number in the filename includes a nonnumeric character.
** HIWAY NUMBER OUT OF BOUNDS (01 TO 20) **	The Hiway specified was 0 or greater than 20.
** BOX NUMBER SYNTAX ERROR **	The Box Number in the filename includes a nonnumeric character.
** BOX NUMBER OUT OF BOUNDS (01 TO 31) **	The Box Number specified was 0 or greater than 31.
** REVISION NUMBER SYNTAX ERROR **	The revision designation of a file name includes a nonnumeric character.
** REVISION NUMBER OUT OF BOUNDS (00 TO 99) **	Specified Revision designator was greater than 99.
** VOLUME ID SYNTAX ERROR **	The form of the volume specification was not correct.
** LOGICAL DEVICE SYNTAX ERROR **	The device name was not correct.
** UNDEFINED LOGICAL DEVICE **	The logical device specified was not defined.
** VOLUME IS NOT FOUND **	The specified volume was not found in the History Module.

** SOURCE TEXT FILE IS NOT FOUND **	The Source Text File was not found when the file was read.
** OBJECT FILE IS NOT FOUND **	The Object File was not found when the file was read.
** READING FILE <pathname> **	Reading of <pathname> is in process.

A.3 TEXT BUILDER DISPLAY

** BLOCK NUMBER SYNTAX ERROR **	A nonnumeric character was entered in the Block number port.
** ILLEGAL ALGORITHM **	The Algorithm entered is not defined.
** LB(XXX) IS FOUND nnn TIMES, HIT ENTER FOR REAL **	Block xxx is found by insert/delete function. This block is deleted from source text by the operation.
** BLOCK NUMBER OUT OF BOUNDS **	The specified block number was not in the range of 1 to 128.
** LINE NUMBER SYNTAX ERROR **	The line number (except EOF) includes a nonnumeric character.
** LINE NUMBER OUT OF BOUNDS **	The line number is 0 or greater than XXX, where XXX = the maximum line number configured.
** nnn LINES ARE TRUNCATED **	In the source code, nnn lines exceed 75 characters, and are truncated.
** TEXT FILE EXCEEDS 999 LINES **	Lines of source text exceeding 999 have been truncated.

A.4 COMPILE DISPLAY

** LBC COMPILE STARTED **	Compilation is executing.
** FILE ACCESS ERROR, FILES ARE NOT CREATED **	Error occurred in accessing the Object and Listing Files.
** SOURCE TEXT FILE EXISTS, HIT F4 TO WRITE FILES **	When the source text is written into the file, source-text file already exists.

A.5 DATABASE COMPARE DISPLAY

** READING DATABASE ** MC Logic Block database is being read.

** DATABASE READ NOT COMPLETED ** Up-Line Loading error was detected.

** WRITING FILE <pathname> ** File of <pathname> is writing.

A.6 LOAD DATA FUNCTION

** LBC DATA LOAD STARTED ** The Load Data function is executing.

** MULTIFUNCTION CONTROLLER IS NOT IN IDLE STATE ** The Box State of the Multifunction Controller is not IDLE.

** SOURCE TEXT MODIFIED, COMPILER BEFORE LOADING ** Modified Source Text was not compiled when Load-Data function was selected.

** LOAD DATA NOT COMPLETED ** A down-line loading error was detected.

A.7 COMPILE AND BLOCK USAGE DISPLAYS

** THERE IS NO SOURCE TEXT ** Source text was not read or not created.

A.8 DATABASE COMPARE DISPLAY AND LOAD DATA FUNCTION

** THERE IS NO OBJECT FILE ** The Object File was not read or was not generated by compilation.

A.9 COMPILE AND DATABASE COMPARE DISPLAYS AND LOAD DATA FUNCTION

** BOX TYPE IS NOT MULTIFUNCTION CONTROLLER ** The box type specified in the file-name is not a Multifunction Controller.

A.10 WRITE FILE FUNCTION

- | | |
|----------------------------------------------------------|-------------------------------------------------------------------------------|
| ** SOURCE TEXT FILE EXISTS,
HIT F12 TO WRITE FILES ** | When the source text is written into the
file, source text already exists. |
| ** WRITING FILE <pathname> ** | The <pathname> file is being written. |
-

A.11 DATABASE COMPARE DISPLAY AND MENU SELECTION

- | | |
|---------------------------------------------------|-----------------------------------------------------------------------------|
| ** SOURCE TEXT MODIFIED, HIT
AGAIN FOR REAL ** | A function is selected that would
change or delete the Source Text File. |
|---------------------------------------------------|-----------------------------------------------------------------------------|

SYNTAX ERROR MESSAGES Appendix B

B.1 TEXT BUILDER AND COMPILER	
Error Number	Message
001	ILLEGAL CHARACTER
010	ILLEGAL ALGORITHM TYPE
020	ILLEGAL PARAMETER NAME
021	ILLEGAL VARIABLE CODE
022	PARENTHESIS IS MISSING
023	PERIOD IS MISSING
024	DELIMITER IS MISSING
025	ILLEGAL OUTPUT PARAMETER CODE
026	ILLEGAL OUTPUT VARIABLE CODE
027	ILLEGAL REVERSE INPUT SIGN POSITION
028	ILLEGAL CONTINUOUS OUTPUT SIGN POSITION
030	SLOT NUMBER MUST BE 01 TO 16
031	DI SUBSLOT NUMBER MUST BE 01 TO 16
032	DO SUBSLOT NUMBER MUST BE 1 TO 8
033	CI SUBSLOT NUMBER MUST BE 1 TO 4
034	AI POINT NUMBER MUST BE 1 TO 16
035	TIMER NUMBER MUST BE 1 TO 32
036	FLAG NUMBER MUST BE 001 TO 256
038	CONSTANT NUMBER MUST BE 1 TO 9999 SEC

B.2 COMPILER	
Error Number	Message
100	LINE EXCEED 75 CHARACTERS
101	TEXT EXCEEDS 999 CHARACTERS
102	LB NUMBER IS MISSING
103	ALGORITHM IS MISSING
104	PARAMETER IS MISSING
105	MULTIDEFINED LB NUMBER
106	ILLEGAL LOGIC BLOCK NAME
107	ILLEGAL COMMENT - MISSING DELIMITER
110	CARD xx IS NOT DI CARD
111	CARD xx IS NOT DO CARD
112	CARD xx IS NOT CI CARD
113	CARD xx IS NOT AI CARD

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