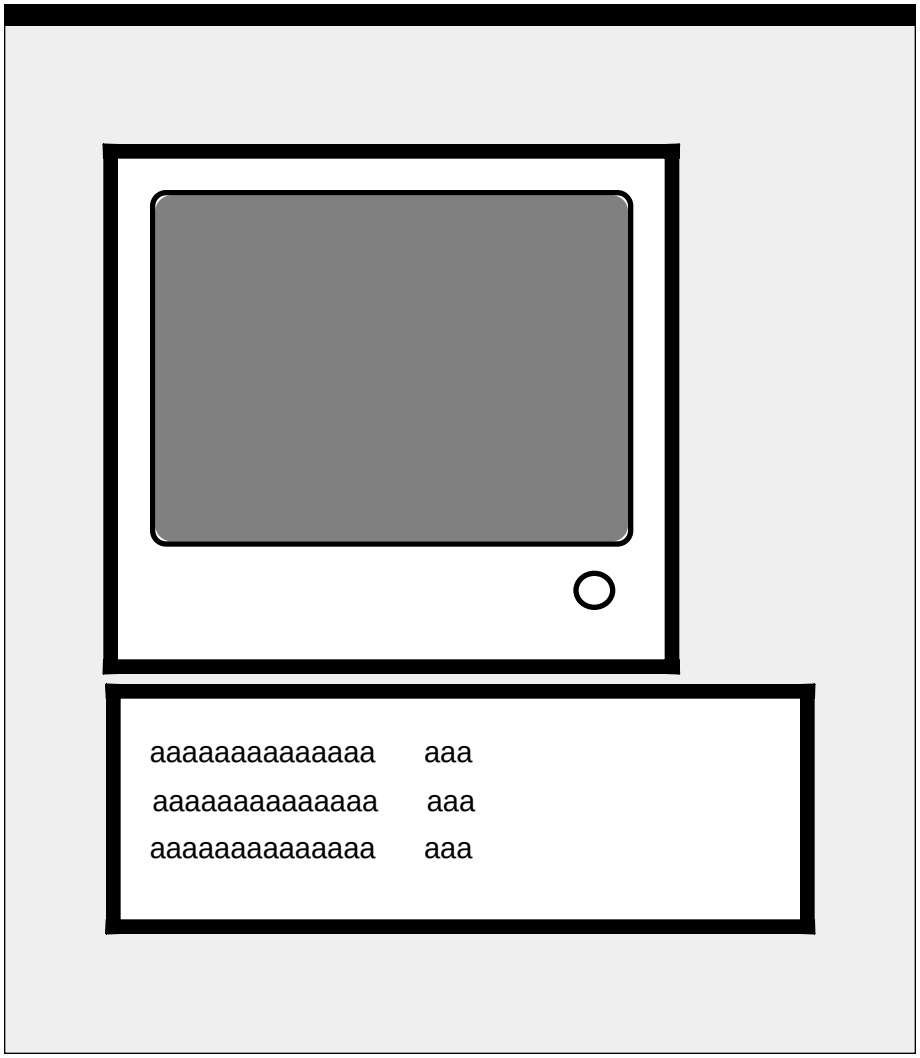
CRISP®

Basic Workstation

User's

Guide

SQUARE D COMPANY
CRISP AUTOMATION SYSTEMS



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Basic Workstation User's Guide

Dedicated to Growth
Committed to Quality

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Document number: 500 001 - 002, Rev. 1

Document History

Revision	Date	Pages affected/Description of change
1	9/15/90	Initial release. ECN 3759

Software Version: CRISP/32 Rev. 2.7 and later

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Introduction

This manual defines the functions of the CRISP Basic Workstation. The approach of this User's Guide is to describe each of the functions of the workstation, then describing the predictable response.

This User's Guide is organized into sections: based on operating modes as shown below.

Section	Description
Operation *(page 3)*	This section of the manual contains general information concerning the basic operation of the Basic Workstation.
Command Mode *(page 7)*	This section of the manual describes commands that take you into the other operating modes and allow privileged users to monitor and control CRISP system activities.
Edit Mode *(page 35)*	This section of the manual describes the methods used to create graphic displays (e.g., pictures of the process elements, graphic representations of the process, tables of critical data, etc.).
Edit Link Mode *(page 45)*	This section of the manual describes the methods used to link to database variables. This is where the graphic displays are 'animated' by linking the graphics and the process variables.
Display Mode *(page 71)*	This section of the manual describes a mode of operation used to observe the process. From this mode, all links are functional but no interaction with variable value is possible.
DD Mode *(page 73)*	This section of the manual describes the Dynamic Display (DD) mode. From this mode, the operator can interact with the process, changing variable values directly from the Basic Workstation.

Introduction (cont)

Each operating mode supports a specific type of activity: creating, editing, linking, or displaying of color images. For all practical purposes, the Basic Workstation is a different device in each mode; it performs differently, special keys do different things, and displays look different.

Some users will operate the workstation in certain modes and not others. In some cases, access to certain features will be restricted and information about these features will be withheld. The organization of this manual supports this by presenting each mode individually. You can remove sections and distribute copies to the various users since the information within each section stands alone.

How to Begin

This User's Guide was designed primarily as a reference document, not an instruction manual. Because of this, all users are encouraged to begin the CRISP experience by enrolling in training courses offered by CRISP Automation. Well-designed 'survey' courses in both hardware and software are available which introduce the system elements in a logical progression. This allows for question and answer interaction with an expert instructor and gives you adequate time for 'hands-on' experience.

For those of you who have not had the benefit of training from CRISP Automation, and are looking at this manual for the first time, we recommend that you do not begin by reading this document from cover to cover. It is far better to proceed one mode at a time, beginning with the Edit mode.

Once you understand that the objective of the Edit mode is basically to draw pictures, you should read through that section, noting the operations performed by the special keys. Then, practice for a while in this mode before moving on to the Edit Link mode. The Edit Link mode can be best understood by learning the 'switches' described with the ENTER (E) command. These switches are used to specify the nature of the links. Also, the difference between a BIT and a ATM link should be firmly understood before you go on. You can practice by creating links to 'dummy' variables, but you must create an actual CRISP program (logic file) before you can really begin to see the effects of your links.

When you're comfortable with the Edit and the Edit Link modes and have begun to create a CRISP/32 application program, you should browse through these sections again, carefully looking for other useful features.

We welcome first-time users to the world of CRISP. We are sure that, after a little practice, you will agree that the features and functionality offered by the CRISP Basic Workstation are designed with real practicality in mind.

Command Format Conventions

Throughout this reference manual, command formats are shown using a type of shorthand to present the command syntax. The following rules define the conventions used in the format statements.

Keyword required UPPERCASE letters and words indicate a command keyword that must be entered exactly as shown.

Substitute a value lower case letters and words indicate that you must substitute a word or value where the lowercase letters appear. These substitutions are always explained in the text that accompanies the command format statement.

Optional Optional arguments and characters are outlined or, enclosed in ⟦outlined brackets⟧.

Choose One Outlined braces ({ }) are used to indicate a choice of required arguments. You must substitute one, and only one of the arguments enclosed in the braces and separated by vertical bars (|).

Repeat Ellipsis (…) indicate that the previous argument may be repeated as necessary. Refer to the accompanying text for details when ellipsis are used.

Spaces Spaces are ignored by the CRISP/32 compiler and may be included between arguments to enhance readability.

The command format will be documented in this manual as follows.

KEYWORD**; argument ⟦:n⟧ ⟦,⟧…**

KEYWORD Here we are showing that the Keyword must be typed exactly as shown, except that the last four letters (WORD) may be omitted.

argument Here you must substitute the appropriate word. Acceptable arguments will always be documented in this section of the page.

:n Here another optional argument is shown. In this case, the colon might be a required part of the optional argument and would be explained fully in this part of the documentation.

, The comma is optional and the ellipsis indicate that more arguments could follow, each separated by a comma.

The following examples show the use of format shorthand conventions in command format statements.

Command Format Statement	Valid forms of the command
KEYWORD**;** ⟦ **name** ⟧ ⟦**:age**⟧ ⟦**,**⟧**...**	KEYWORD; ELIZABETH:4,RAY:12 KEY;:4 key; elizabeth, ray:12 KEY; elizabeth:4 KEY; , KEY;,RAY,LIZA:3,,:5,,,JAKE
KEYWORD**;** { **name** **|** **color** **|** **tree** }	keyword; betty KEY; RED KEY; oak

Intro to the Basic Workstation

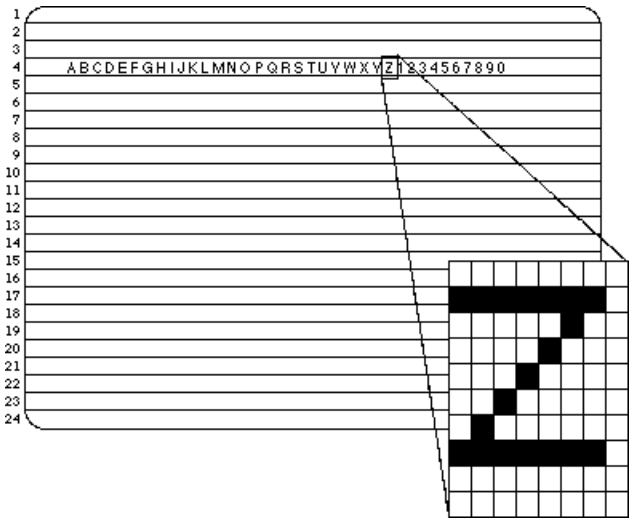
The CRISP Basic Workstation allows an operator to monitor and control a process running under the control of the CRISP system language.

As CRISP logic runs, its database is in a constant state of change. Typically hundreds of variables, each with its own value, are changing in response to conditions in the process and in the logic. Some of these variables contain input/output values from the process while others, perhaps most, provide some form of functional support to the primary function of data acquisition and control.

In the most common application, a graphic representation of the process is created and displayed on the CRISP Basic Workstation. Then, certain database variables are selected whose values control and 'animate' the CRT graphics in real time. For example, when the bit variable controlling a valve changes from zero to one, the image of the valve on the screen changes from green to red.

The Screen Image

Many display screens can be created. Each screen is numbered, stored in its own file, and can be recalled for display at any time. Display screens are composed of 24 lines of 80 characters across each line.



Each character is actually an 8 x 10 grid of dots, or pixels, which as a group, creates a character. When a character is displayed on the screen, a pattern is formed because some of the pixels are illuminated in one color (the foreground color), and others in another color (the background color). The letter Z shown here is a typical example, but characters of your own design can be created and combined on the screen with adjacent characters to create large images. Eight colors: red, yellow, green, cyan, blue, magenta, white, and black may be selected as foreground colors, with less intense versions of the same available as background colors.

Two screens can also be displayed simultaneously with a keyboard command that 'squeezes' two full-screen images into a single screen where each screen is compressed to half its normal height. Once two screens have been associated into a pair this way, the dual screen image is automatically displayed when the 'top' screen is accessed. This enables you to create higher resolution images because of the resulting screen is 48 lines by 80 characters.

Character Sets

Each display screen has access to a set of 256 characters for use in creating images on the screen. These characters are typed onto the screen from the keyboard. Half of the 256 characters (128) make up the reserved character set. The reserved character set is created in a special screen (display screen zero) and all display screens share this character set. The reserved characters consists primarily of standard characters such as: letters, numbers, lines of all varieties, and some common ISA symbols. The remaining 128 characters are unique within each numbered display screen. These characters are created and modified when you edit the display to create patterns not available in the default character set.

The Keyboard

The CRISP Basic Workstation keyboard consists of the standard typewriter keyboard and a number of other special keys. The special keys are labeled to indicate their functions, but it must be recognized that many of these special keys have multiple functions; what the key does depends on which operating mode the workstation is in when the key is pressed. This User's Guide helps you identify the many functions of these keys.

The alphabetic keys are also multi-functioned. In order to type 256 characters from 64 keys, a method is provided to select among four distinct character sets: F0, F1, F2, and F3.

- The F1 key selects the character set that is labeled on the key caps.
- Keys F0, F2, and F3 allow you access to the other character sets from the same keyboard.

Character sets F0 and F1 access the reserved character set, as defined in Display 0 but F2 and F3 are unique within each display screen. When you are editing a screen, the entire set of 256 characters can be displayed (via the SHOW key) to allow you to see which key corresponds to which character.

Array Support

Support of CRISP array variables is limited to a constant integer subscript of the form 'n'. The total length at a variable specification including the constant subscript is limited to 31 characters.

Command Mode

Introduction

The Command mode is the initial operating mode of the Basic Workstation. In this mode, commands are issued that allow you to enter the other operating modes and to perform system-wide operations. Commands can be issued when the prompt CRISP/32 is displayed.

Commands

Refer to the chart below for a short description of each command and an index to the page where complete details are located.

Command	Description
AL *(page 9)*	Auto link
CL *(page 10)*	Clear key links
D *(page 11)*	Enter Display mode
DD *(page 12)*	Enter DD mode
DEF *(page 13)*	Define key links
DI *(page 16)*	Disable communications
DIR SA *(page 17)*	Directory of saved screens
DS *(page 18)*	Display saved screen
ED *(page 19)*	Enter Edit mode
EL *(page 20)*	Enter Edit Link mode
EN *(page 21)*	Enable communications
EX *(page 22)*	Exit CRT process

(Continued on next page.)

Command	Description
L *(page 23)*	Lock workstation
P *(page 24)*	Open patch utility
RD *(page 27)*	Force remote display
S *(page 28)*	Set directory, database, or logging
SH *(page 30)*	Show status information
U *(page 34)*	Unlock workstation

Format Statement Conventions

Each command has a specific format that is described in detail in the text accompanying the command. In addition, a format statement accompanies the text that uses a type of 'shorthand' to present the command syntax.

To make certain operations easier, special uses are assigned to some of the function keys in the Command mode. These are described in detail on the page(s) labeled FUNCTION KEYS at the end of this section.

AL - Auto Link

The AL (Auto Link) command rapidly pages through all system display pages, relinking each one.

This command is designed to relink all display pages with a newly restructured database. Without the AL command, the message `*** FINDING SYMBOLS ***` would be displayed when each screen was first accessed by the operator. This command allows you to relink all display pages at once, prior to releasing the system back into production.

Format

This command has the following format:

AL ⟦x⟧⟦-y⟧

Where 'x' and 'y' are display page numbers.

A starting display page number 'x', or both starting and ending display page numbers 'x-y' may be specified. Specifying only a starting page number causes the system to relink display pages beginning with 'x' and continue in sequence to the last display page. If no page numbers are specified all display pages will be relinked in sequence, beginning with display page 0.

The AL command can be interrupted by pressing the EXIT key.

Examples

The following examples show valid command syntax.

Example	Description
`AL`	This relinks all display screens
`AL 7`	This relinks display screen 7.
`AL 7-17`	This relinks all displays from Display 7 to Display 17, inclusive.

CL - Clear Key

This command removes the temporary functionality assigned to a key via the DEFINE command.

Format

The CL command has the following format:

CLEAR KEY n [/SYS]

The CLEAR KEY command negates the effect of a previous DEFINE command, causing key 'n' to revert to its default functionality.

The /SYS switch is used, to negate the effect of a previous `DEFINE n /SYS` command issued against key 'n'.

For more information, refer to the DEFINE command.

Examples

The following examples show typical usage of the CL command

```
CRISP/32
DEFINE KEY 12  "DD 12" /SYS

CRISP/32
CL K 12  /SYS
```

D - Enter Display Mode

The D command causes the specified display page to be accessed in the Display mode. The Display mode is the mode in which display screens can be viewed and linked areas will change in response to the value of the variables. All links to the database will be operational, with the exception of those that allow a variable to be modified from the Basic Workstation. Operator interaction with the Database can only be accomplished in the Dynamic Display (DD) mode.

Refer to the Display Mode section of this manual for complete information.

Format

This command has the following format:

D ⟦t⟧⟦,b⟧

Where 't' and 'b' are display page numbers. If no screen number is specified, the screen (or pair) most recently accessed is re-accessed in the Display mode. If 't' and 'b' are both specified, 't' will be the top half and 'b' will be the bottom half of a 48-line display.

If the pair 't,b' has been previously accessed by the ED command, 't' will access the 48-line pair with this command; 't,0' will access 't' only as a 24-line display.

If 't' is specified and is not the top half of a 48-line pair, it will be accessed and displayed as a 24-line display.

Examples

The following examples show valid command syntax.

Example	Description
D	This command accesses, in the Display mode, the page or pair most recently accessed.
D 12	This command accesses display page 12, in the Display mode. If display page 12 is the top half of a 48-line pair, both displays will be accessed.
D 12,13	This command accesses display page 12 (top) and 13 (bottom), in the Display mode.
D 12,0	This command accesses, in the Display mode, only the top half (12) of the 48-line pair made up of 12 and 13.

DD - Enter DD Mode

This command causes the specified display page to be accessed in the Dynamic Display (DD) mode.

The DD mode allows all linked screen locations to operate according to their linked conditions. This means that all data fields that have been created, allowing operator interaction from the Basic Workstation, will accept entered values.

Refer to the Dynamic Display mode section of this manual for complete information.

Format

This command has the following format:

DD ⟦**t**⟧⟦**,b**⟧

Where 't' and 'b' are display page numbers. If no screen number is specified, the screen (or pair) most recently accessed is re-accessed in the DD mode. If 't' and 'b' are both specified, 't' will be the top half and 'b' will be the bottom half of a 48-line display.

If the pair 't,b' has been previously accessed by the ED command, 't' will access the 48-line pair with this command; 't,0' will access 't' only as a 24-line display.

If 't' is specified and is not the top half of a 48-line pair, it will be accessed and displayed as a 24-line display.

Examples

The following examples show valid command syntax.

Example	Description
DD	This command accesses, in the DD mode, the page or pair most recently accessed.
DD 12	This command accesses display page 12, in the DD mode. If 12 is the top half of a 48-line pair, both screens are accessed.
DD 12,13	This command accesses display page 12 (top) and 13 (bottom), in the DD mode.
DD 12, 0	This command accesses, in the DD mode, only the top half (12) of the 48-line pair (12, 13).

DEF - Define Command

The DEFINE command allows you to redefine certain keys on the Basic Workstation keypad. The DEFINE command affects the key's functionality only when in the Command mode. The effects of this command can be removed via the CL command. They are also lost when the CRISP process is terminated.

Format

The DEFINE command has the following format:

DEFINE KEYLINKS [<ALTx>] n "text" [/qualifier]

<ALTx> This indicates that the specified ALT key (ALT1, ALT2, or ALT3), followed by the 'n' key, in sequence, will cause the command "text" to be issued.

n The key number 'n' identifies the key whose functionality is being affected. Refer to the keyboard illustration for the location and numbering of user-defineable keys.

"text" Text string "text" is the command which will be issued when key 'n' is pressed. When key 'n' is pressed the text, followed by a carriage return will be issued. It must be enclosed in quotes (") as shown.

Entering a null string (i.e. "") causes a previous DEFINE to be ignored and the key to revert to its original functionality.

/qualifier The following optional switches can be used with the DEFINE command:

Switch	Description
/SYS	Redefines key 'n' for all workstations in the system. Omitting the /SYS qualifier causes this key definition to affect only the Basic Workstation on which the command is issued. A key may be defined locally and system-wide with different values and qualifiers.
/TERM	Causes the user-defined string "text" to be issued, followed by a carriage return. This is the default condition.
/NOTERM	Causes the user-defined string "text" to be issued without a carriage return.

(Continued on next page.)

Format (cont)

Switch	Description
/ECHO	Causes the user-defined string "text" to be displayed when key 'n' is pressed. This is the default condition.
/NOECHO	Prevents the user-defined string "text" from being displayed when key 'n' is pressed.
/SHOW	Allows the user-defined string "text" to be displayed, on locked workstations, when the SHOW command is issued. This is the default condition.
/NOSHOW	Prevents the user-defined string "text" from being displayed, on locked workstations, when key 'n' is pressed.

Examples

The following examples show typical usage of the DEFINE command.

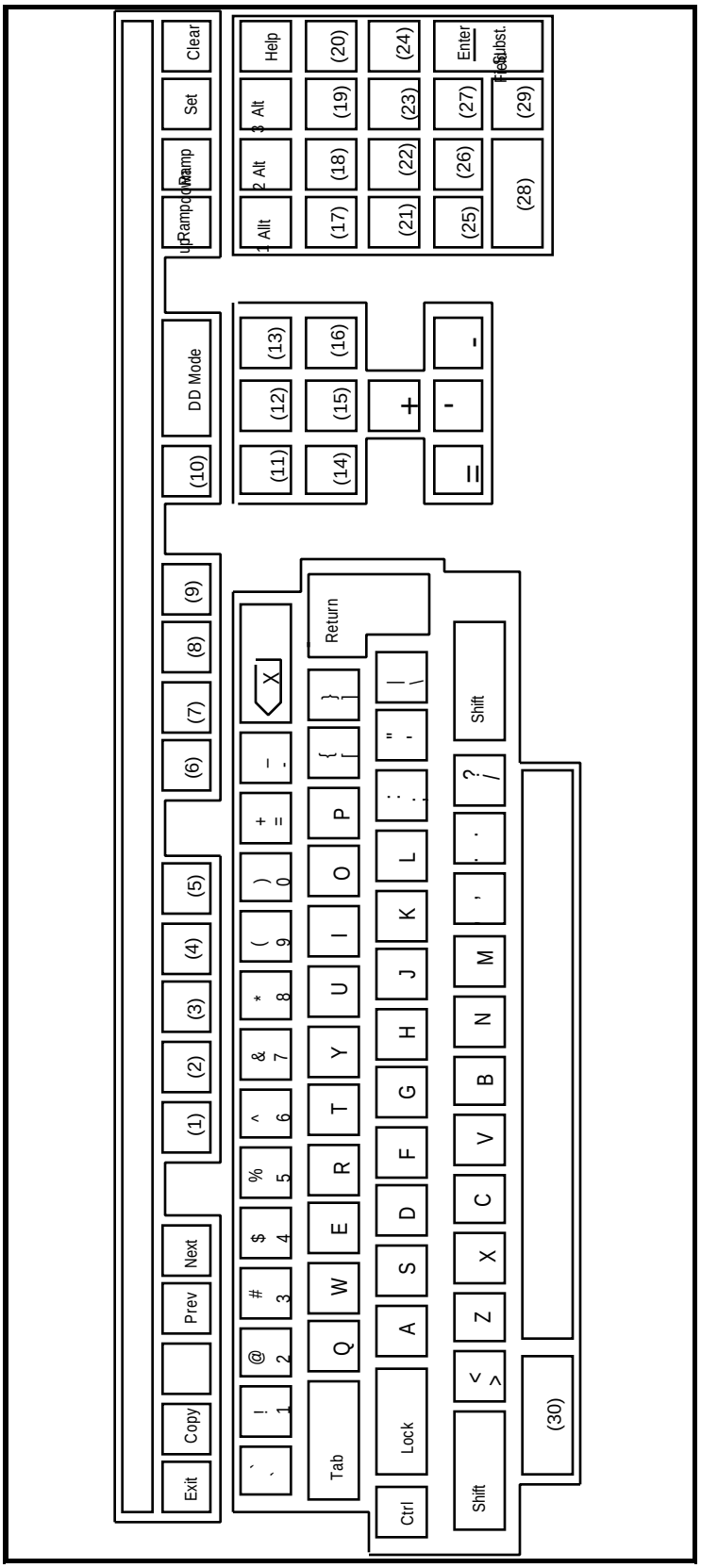
Command	Description
CRISP/32 def ke 24 "DD 12" /sys /noe	System prompt. Command - Define key 24 for all workstations, no echo.
CRISP/32 DEF Define what: KE Define which key: 24 Definition string: ""	This shows the dialog generated by CRISP in response to 'DEF'. CRISP prompts you for values. This clears all user-defined values (including qualifiers).
CRISP/32 def ke 24 "" /sys	This clears all user-defined values for the system-wide definition of this key. Does not affect any local definition of this key.
CRISP/32 def ke alt2 24 "AL 7-34"	This cause the key combination ALT2 & key 24 to issue the 'AL 7-34' command.
CRISP/32 define key 24 "dd 13" /e /t /nos	/e and /t should only be necessary when reinstating defaults. /nos prevents display when this workstation is locked.

Keyboard Illustration

Refer to the keyboard illustration on the next page for the location and numbering of the user-defineable keys.

CRISP Basic Workstation Keyboard

Showing location of user-definable keys (in parentheses)



DI - Disable Communications

This command disables communications between this processor and another node on CRISPlink.

Format

The command has the following format:

DI n

Where 'n' is the node number.

DIR SA - Display Saved Directory

This command is used to check the directory of saved displays to determine which files are used and, conversely, which files are available.

Format

This command has the following format:

DIRECTORY **SA**VE [**x**][**-y**]

Where ‘x’ and ‘y’ are files in the SAVED DISPLAY.

With no arguments, the command causes the entire SAVED DISPLAY directory to be displayed. Specify only ‘x’ to find out if file number ‘x’ is currently used. Specify ‘x-y’ to find out if files ‘x’ through ‘y’ are used.

Examples

The following examples show the use of the DIR SA command.

```
CRISP/32
DIR SA
0 1 10 13 2 3 4 5 6 7 8 9

CRISP/32
DIR SA 12
 File not found.

CRISP/32
DIR SA 13
13

CRISP/32
DIR SA 7-13
10 13 7 8 9
```

DS - Display Saved Screen

This command is used to display previously saved screens. These screens were saved in the DD Mode by pressing the ALT 2 and COPY keys or by entering '≠ SAVE' on the BLUE Command Line (the '≠' character is a <Shift><6> on the keyboard).

Format

The command has the following format:

DS t [,b]

Where 't' and 'b' identify the screen files. When file 't' is specified alone, it is displayed in the 24-line mode. When 't' and 'b' are both specified, 't' is the top and 'b' is the bottom half of a 48-line display.

When screens are saved, they are written to files in the .EXE directory and named Sx.CRT, where 'x' is a sequence number assigned by the CRISP system. Use this sequence number when specifying the saved screen file in the DS command.

ED - Enter Edit Mode

This command causes the specified display page to be accessed in the Edit mode.

The Edit mode is used to create or change the image of a display page.

Refer to the Edit Mode section of this manual for complete information.

Format

This command has the following format:

ED ⟦t⟧⟦,b⟧

Where 't' and 'b' are display page numbers. If no screen number is specified, the screen (or pair) most recently accessed is re-accessed in the Edit mode.

If 't' and 'b' are both specified, 't' will be the top half and 'b' will be the bottom half of a 48-line display. Specifying both screens establishes a 48-line pair. Once established, this pair is linked so that it is accessed any time the upper image is specified in a mode-access command (D, DD, ED, and EL).

If 't,0' is specified, any 48-line display link of 't' and a bottom half will be terminated and 't' will be accessed as a 24-line display.

If 't' is specified and is not the top half of a 48-line pair, it will be accessed and displayed as a 24-line display.

Examples

The following examples show valid command syntax.

Example	Description
ED	This command accesses, in the Edit mode, the page or pair most recently accessed.
ED 12	This command accesses display page 12, in the Edit mode. If display page 12 is the top half of a 48-line display, both screens are accessed.
ED 12,13	This command accesses display page 12 (top) and 13 (bottom), in the Edit mode and creates 48-line display using these two pages. This 48-line display remains linked until specifically unlinked.
ED 12,0	This command unlinks the 48-line pair created above.

EL - Enter Edit Link Mode

This command causes the specified display page to be accessed in the Edit Link mode.

The Edit Link mode is used to 'link' portions of the display screen to database variables so that the condition of the variable affects the display image.

For complete details, refer to the Edit Link Mode section of this manual.

Format

This command has the following format:

EL ⟦t⟧⟦,b⟧

Where 't' and 'b' are display page numbers. If no screen number is specified, the screen (or pair) most recently accessed is re-accessed in the Edit Link mode. If 't' and 'b' are both specified, 't' will be the top half and 'b' will be the bottom half of a 48-line display.

If the pair 't,b' has been previously accessed by the ED command, 't' will access the 48-line pair with this command; 't,0' will access 't' only as a 24-line display.

If 't' is specified and is not the top half of a 48-line pair, it will be accessed and displayed as a 24-line display.

Examples

The following examples show valid command syntax.

Example	Description
EL	This command accesses, in the Edit Link mode, the page or pair most recently accessed.
EL 12	This command accesses display page 12, in the Edit Link mode. If 12 is the top half of a 48-line pair, both screens are accessed.
EL 12,13	This command accesses display page 12 (top) and 13 (bottom), in the Edit Link mode.
EL 12,0	This command cause only the top half (12) of the 48-line pair (12,13) to be displayed.

EN - Enable Communications

This command causes the local processor to begin communicating, over CRISPlink with the specified node.

Format

This command has the following format:

EN n

Where 'n' is the node number.

Communications is automatically established when CRISP is started. The EN command is used to re-establish communications between the local processor and the other nodes when communications has been disabled.

EXIT - Exit CRT Process

This command terminates the VMS process which is controlling the specified Basic Workstation, removing the workstation from the CRISP system.

The EXIT command is the only approved method of aborting a CRT task. Use of the STOP command may cause a conflict between the abandoned video generator and the remaining active ones.

Format

This command has the following format:

EXIT n

Where, 'n' is the number of the workstation process to be aborted. If no number is specified, the workstation issuing the command is aborted.

Workstation processes are displayed on the Process Directory as CRT1, CRT2, etc. Refer to the PDMON command in the CRISP/32 Utilities Reference Manual for complete information.

+ **Note:**

You must press a key on the keyboard to clear the screen once the workstation has been stopped.

L - Lock Workstation

The lock command is used to lock this Basic Workstation from certain types of activities. These include:

- Changing values via the Patch command.
- Access to the edit modes (ED and EL).
- DD mode access to variables linked with the /L switch.
- Copy key function.
- User-defined key SHOW capability (refer to DEF command for complete information).

Format

This command has the format:

LOCKpassword

Where 'password' can be any group of zero to six characters followed by the RETURN key. When this password is repeated following the U (unlock) command, the lock is removed.

P - Open Patch Utility

The PATCH command causes the Patch utility to be accessed. The Patch utility presents a specially-formatted screen from which database variables can be displayed and values modified.

The Patch utility is also used to establish the numbering system (decimal or hexadecimal) to be used when variables are linked to display screens (see SET, below).

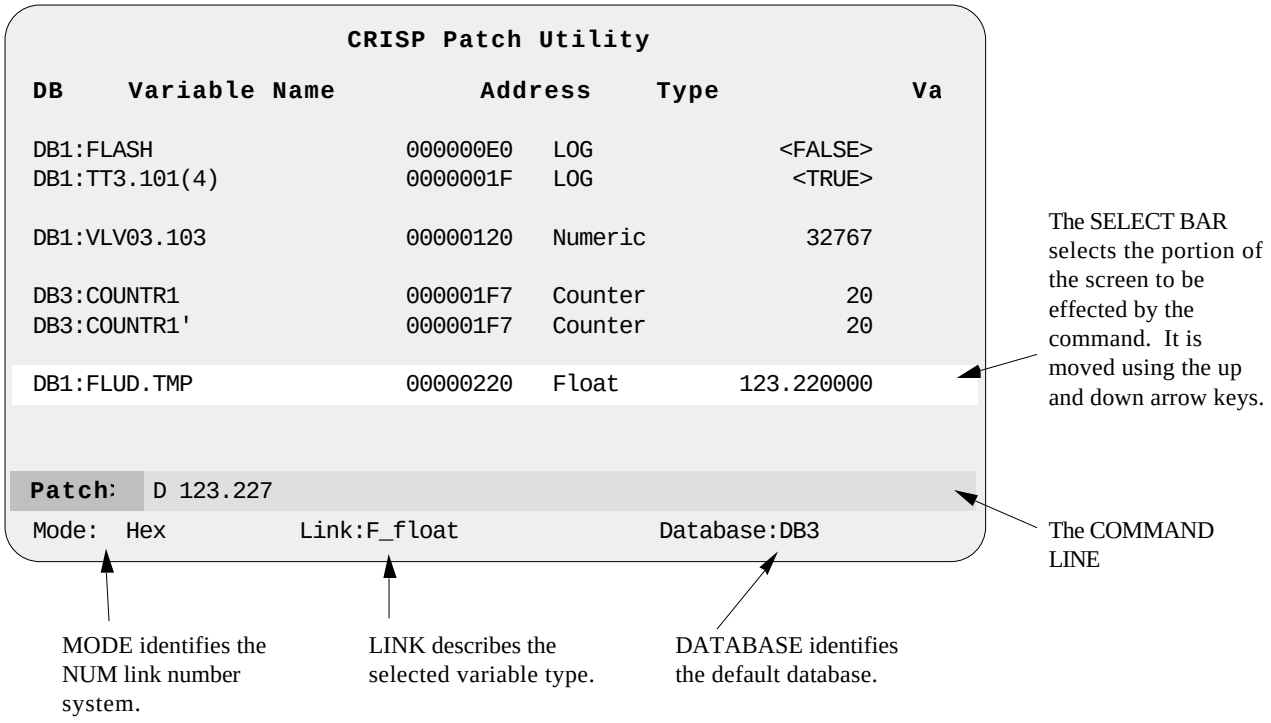
The Patch utility screen is 'built' using the commands below and retains its contents; so that you can EXIT the screen, then review the same screen next time the PATCH command is issued.

Format

The PATCH command has the following format:

PATCH

This causes the Patch utility screen to be displayed.



P - Open Patch Utility (cont)

Commands

Commands issued from the command line are explained in the following.

EXAMINE [db:]variable[(sub)]

The Examine command causes the specified variable to appear on the screen at the Select Bar. The database name is required only when the first variable of the Patch session is specified and when changing to another default database. Only constant array subscripts (i.e., `XYZ(5)`) may be used - variable subscripts are not supported.

DEPOSIT value

The Deposit command causes the specified value to be written to the selected variable.

DELETE

The Delete command causes the selected variable to be removed from the Patch utility screen.

SET MODE {DECIMAL | HEXADECIMAL}

The Set Mode command determines the numbering system for subsequently linked variables (refer to the following).

Step	Mode	Description
1.	COMMAND	Issue command SET MODE HEXADECIMAL from Patch utility.
2.	EDIT LINK	Position cursor and issue the E command to create a NUM link.
3.	DISPLAY	Observe the link; it is displayed in hex. Other links are NOT affected.
4.	COMMAND	Issue command SET MODE DECIMAL
5.	EDIT LINK	Position cursor and issue the E command to create another NUM link.
6.	DISPLAY	Observe this link; it is displayed in decimal. Notice that link from Step 2 is still displayed in hex.

SET SCREEN {24 | 48}

The Set Screen command causes the Patch utility screen to accommodate either 24 or 48 display lines.

P - Open Patch Utility (cont)

Function Keys

The following keys and key sequences provide functions in the Patch Utility.

Key	System Response
CLEAR	Pressing the CLEAR key causes the value of FALSE to be written to an Intermediate Variable or the value of zero to be written to a Numeric, Float, or Longword.
SET	Pressing the SET key causes the value of TRUE to be written to an Intermediate Variable or the value of one (1) to be written to a Numeric, Float, or Longword.
Crtl W	Pressing the CTRL key and the W key simultaneously (^W) causes the variables displayed on the Patch Utility screen to be updateed with their current values.

RD - Remote Display

This command is used to cause a specified display page to be displayed on another Basic Workstation. The remote workstation must be in the Display mode for the RD command to work.

Format

This command has the following format:

R c D t ⟦,b⟧

where, display screen 't' (top) and 'b' (bottom) are displayed on the remote workstation 'c'. The RD command does not respect 48-line pairs; you must specify 't' and 'b' to assure that a 48-line pair will be displayed on the remote workstation.

Examples

The following examples show valid command syntax.

Example	Description
R 4 D 50	Displays screen 50 on remote workstation 4.
R 4 D 50,51	Displays screen 50 (top) and 51 (bottom) on remote workstation 4.

S - Set Directory, Database, or Logging

The SET command allows the user to set and change certain system-wide defaults and functions:

- The directory used by default to save and recall screen files.
- The default database.
- Logging of changes made to variables (has several levels of control).

Format

The format of the SET command varies widely depending on the function to be performed. Refer to the following format statements.

SET DEFAULT DIRECTORY dir.spec

Setting the default directory determines which VMS directory will be used to save and recall display screens. The directory specification 'dir.spec' must conform with VMS syntax for specifying directories (e.g. device:[group.member]).

SET DEFAULT DATABASE db:

This determines the database which is used by default, when no database ID is specified (for example, when entering links in the EL mode).

SET [NO] LOGGING {SYS | CRT | DB dbid }

This command either enables or disables the logging of changes made to variables at one of three specified levels:

- CRT - any change made at this workstation,
- DB - any change made to the specified database, 'dbid'
- SYS - any change made at any workstation.

This logging function is independent from the logging function created in the EL mode via the /L switch. Logging is performed via the MESSAGE facility. Refer to SETMSG in the CRISP Subroutines Manual.

Examples

The following examples show valid usage of the SET command.

Command	Description
SET D D [CRISP.CRT]	Specifies [CRISP.CRT] as the default directory.

(Continued on next page.)

S - Set Directory, Database, or Logging (cont)

Command	Description
SET D DAT DB2	Specifies DB2: as the default database.
SET L S	Set logging of any change made to any variable value from all system workstations.
S N L S	Turn off logging established in command above.
S L CRT 3	Set logging of any change made to a variable value from the workstation whose process is identified as CRT3.

SH - Show Status Information

The SHOW command is used to display the following information:

- User-defined keys for this workstation, and system-wide.
- The current default directory.
- The current default display.
- The CRT number of this workstation.
- The status of links on a specified display page (several levels of information available).

Format

The format of the SHOW command varies depending on the function to be performed. Refer to the following format statements.

SHOW KEYS [n] [/SYS]

If the specified key 'n' has been re-defined by the user (via the DEFINE command) the user-defined value is displayed to the screen.

When the no key number is specified a specially-formatted screen is presented which shows the user-defined value for all redefined keys. See the following example.

```
<CR> to continue, <COPY> to print this page, ◊C or ◊Y to abort

             LOCAL COMMAND MODE KEYLINKS

  T  E  S
  E  C  H
  R  H  O
  M  O  W    KEY  STRING

  Y  Y  Y    24   DD 12
  Y  Y  Y    25   SH /FULL STA DIS 1
  N  Y  Y    26   SH /PR STA DIS
```

SHOW DEFAULT DISPLAY

This command shows the display page(s) which will be accessed if no page argument is supplied to the D, DD, E, EL, or ED commands.

SH - Show Status Information (cont)

SHOW DEFAULT DIRECTORY

This command displays the VMS directory in which display pages are saved. For more information, refer to the SET command.

SHOW CRT

This command displays the CRT number of this Color Console.

SHOW [/FULL] [/PRINTER] STA DIS n

This command (without /FULL or /PRINTER switches) displays link information for the specified screen.

If the optional /FULL switch is used detailed information about each link is displayed.

If the optional /PRINTER switch is used detailed information about each link (similar to the format of the /FULL switch display) is routed to the message queue.

Refer to the following screens for typical screen formats with, and without the /FULL switch.

```
<CR> to continue, <COPY> to print this page,  ≠ C or ≠ Y to abort

Row   Col   DB     Name              /V=          /W=   /D=

4     9     DB1    DB1:ADDBIT1       1     NUM    1     RT
4     17    DB1    DB1:ADDVALUE1     1     NUM    5     RT
5     5     DB2    DB2:TEMP1         1     NUM    5     RT
5     9     DB1    DB1:ADDBIT3       1     NUM    1     RT
12    17    DB1    DB1:ADDVALUE4     1     NUM    5     RT
14    5     DB2    DB2:TEMP3         1     NUM    5     RT
14    9     DB1    DB1:ADDBIT2       1     NUM    1     RT
14    17    DB1    DB1:ADDVALUE2     1     NUM    5     RT
17    5     DB2    DB2:TEMP4         1     NUM    5     RT
17    9     DB1    DB1:ADDBIT5       1     NUM    1     RT
18    17    DB1    DB1:ADDVALUE5     1     NUM    5     RT
19    5     DB2    DB2:TEMP5         1     NUM    5     RT
20    9     DB1    DB1:ADDBIT6       1     NUM    1     RT
```

SHOW STATUS DISPLAY With /FULL Switch

SH - Show Status Information (cont)

```
Summary of display 3 at 16-APR-1986 15:45:01.11
   23 Link entries (320 possible)   7% utilization
   23 Names (320 possible)   7% utilization
      23 Numerics
         19 Integers
          0 Floats
          4 Strings
      0 Attribute Modifiers
      0 Partial Color Modifiers
      0 Bar Graphs
      0 Trends
      0 Keylink
      0 String Modifier
      0 Other (Bar links)
   DD Command line at row 1
   Second display = 4
   Previous display = 1    Next display = 5
   Last link occurred at 6-APR-1986 17:23:39.30
```

SHOW STATUS DISPLAY Without /FULL Switch

Examples

The following examples show valid command syntax.

Command	Description
CRISP/32	System prompt.
sh k 5	Command - Show key 5.
No string defined for this key.	Response.
CRISP/32	System prompt.
sh k 24	Command - Show key 24.
DD 12	Response.
CRISP/32	System prompt.
sh keys	Command - Show all keys. System responds with display shown below.

```
<CR> to continue, <COPY> to print this page, ≠C or ≠Y to abort

              LOCAL COMMAND MODE KEYLINKS

T   E   S
E   C   H
R   H   O
M   O   W    KEY      STRING

Y   Y   Y    24       DD 12
Y   Y   Y    25       SH /FULL STA DIS 1
```

SH - Show Status Information (cont)

Command	Description
CRISP/32	System prompt.
sh d d	Command - Show default display.
Default display is 5	Response.
CRISP/32	System prompt.
sh d dir	Command - Show default directory.
CRISP$DSP:.CRT	Response.
CRISP/32	System prompt.
sh crt	Command - Show CRT number.
This is CRT 2	Response.

U - Unlock Color Console

The UNLOCK command is used to unlock this workstation from the lock placed on using the lock command. Refer to the lock command for more details.

Format

This command has the format:

UNLOCKpassword

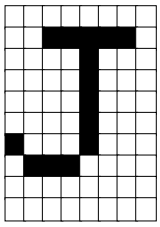
Where 'password' is the same group of zero to six characters, followed by the RETURN key, that was used to lock the workstation via the lock command.

Introduction

The purpose of the Edit mode is to permit you to type characters and special symbols to the screen in order to create images that can later be linked to variables in the database.

Characters

The basic 'building blocks' for creating screen images are characters, typed from the keyboard onto the screen. A total of 1,920 characters 'fit' onto the display screen: 80 per line, by 24 lines. The characters themselves are composed of 80 dots, or pixels, arranged in an 8 by 10 matrix pattern.



The character J, enlarged to show the condition of the pixels.

Default Character Set

The CRISP system provides you with a default character set of 256 characters (shown at the bottom of the page). These characters include the letters, numbers, punctuation marks, and a number of special symbols which can be used to 'draw' many typical screen images: lines, boxes, ISA symbols, etc.

Character Groups

To allow you access to 256 characters from a workstation keypad, the character set is divided into four character groups of 64 characters each. The character groups are designated F0, F1, F2, and F3. You can select which character group is printed to the screen by pressing the corresponding 'F' key. When F1 is selected, the characters typed to the screen match the labels on the key caps.

The characters in the shaded column are all accessed via the 'B' key. The character typed to the screen depends on which character group is selected, and whether or not the Shift key is held down.

Character Groups (cont)

The SHOW key allows you to see all 256 characters on your screen. The characters in each group are displayed in such a way that you can see which workstation key corresponds to which character or symbol. The characters in the SHOW display are aligned in rows and columns. The rows correspond to character groups F0, F1, F2, and F3 and the columns represent the workstation keys.

Editing Characters

In addition to the 256 characters provided, the Basic Workstation software permits you to modify the existing characters to create characters of your own. This is done to create screen images: flow diagrams, views of your processes, etc.

You may edit any of the characters but you will probably want to avoid editing the text characters (064 through 127). Also some of the characters are used by CRISP: characters 001 through 031 and 128 through 143 are used by CRISP to build graphs.

How to Edit Characters

To edit characters, use the following procedure:

1. From the Command mode, type the ED command to access one of the display screens in the Edit mode.

2. Type the character that you want to modify onto the screen (remember, if you change a character that is in use, it will change all occurrences on that screen).

3. Place the cursor on the character and press the CBLD key. An enlarged view of the character is displayed in the upper left hand corner of the screen which represents the condition of the pixels in the selected character.

4. Use the arrow keys to move the cursor around the CBLD display. Once the cursor is positioned where you want it, use one of the special keys shown below to edit the character. The chart shows the keys and key sequences on the left, and the system responses are described to the right.

Key	Function
Crtl C	Abort character build. Do not save changes.
Clear	Turn OFF all pixels from the cursor position to the bottom, right corner of the matrix.
Alt 1 Clear	Turn OFF all pixels preceding the cursor position to the top, left corner of the matrix.

How to Edit Characters (cont)

Key	Function
Set	Turn ON all pixels from the cursor position to the bottom, right corner of the matrix.
Alt 1 Set	Turn ON all pixels preceding the cursor position to the beginning of the matrix.
space bar	Turn OFF the pixel at the cursor position.
any character	Turn ON the pixel at the cursor position.
Cbld	Save the displayed matrix for this character and exit back to the Edit mode.

CBLD Cut & Paste

You can place the pixels of a CBLD display into a 'cut' buffer for later transfer (or 'paste') to another CBLD display. This technique can be handy when you are building two or more characters that are similar. Refer to the following procedure.

1. Position the cursor on the top left pixel and press the SEL key.
2. Move the cursor, using the arrow keys to the bottom right pixel.
3. Press the CUT key.
4. Immediately press the PASTE key to repaste the pixels. This does not empty the cut buffer.
5. Press the CBLD key to remove the CBLD matrix.
6. Place the cursor the new character and press the CBLD key.
7. Press the SEL then SHOW keys. The cut buffer will be displayed on the screen.
8. Use the arrow keys to move the image around the screen until the desired location is found.
9. Press the PASTE key. The cut & paste operation is over.

Special Symbols

Above, we mentioned that the purpose of the Edit mode is to type characters and special symbols to the screen in order to create images that can later be linked to variables in the database.

(Continued on next page.)

Special Symbols (cont)

The difference between the two is this: characters are typed on the screen to create an image that will be viewed at the time of operation, special symbols are visible in the Edit mode but will not be visible during operation. They are used only to reserve a space on the screen for a link to a database variable (which will be made later). The special symbols are typed to the screen by pressing one of the function keys. Refer to the following section of this manual, FUNCTION KEYS, for more details. A chart follows which pictures each of the special symbols and explains its purpose.

	The NUMBER SUBSTITUTION FIELD symbol. Each of these symbols reserves a space for one numerical digit. For example, if you plan to display a Float variable to the nearest tenth of a degree, you would type "φφφφφ" on the screen. The actual link to this field will be done later in the Edit Link mode.
	= The BAR GRAPH symbol. This symbol is used to extend the bar graph, one character at a time, from the Bar Direction symbol. Refer to the Edit Link section for more details. = The BAR DIRECTION symbol. This symbol is the first field of a bar chart. The bar chart is used to graphically represent the value of a variable as it varies between some starting value to some other specified maximum value. The Bar Direction symbol identifies the 'starting end' of the graph and points to the direction that the bar graph will 'grow' towards its maximum value. Starting and ending values may be positive or negative, giving you the maximum flexibility with the design of bar charts. Bar charts can be used to build simple bar graphs, or to build Trending areas, where the bar chart displays the average value of a variable vs time. Refer to the Edit Link section for more details.

Function Keys

Function keys are used to place characters and symbols on the screen and to perform other functions in the Edit mode. Refer to the next section for a complete listing of function keys and their special functions.

Commands

To issue commands from the Edit mode, you must first press the DD mode key. This causes a blue command line to appear. You may then type one of the following commands.

Commands (cont)

ABORT The ABORT command causes the current editing session to terminate without saving the changes made during this session. This command has the same effect as the ^C command.

CSET The CSET command allows you to specify a character set for this display. When a screen is created, it is assigned the character set from display 0. After that, the only way to reassign a new character set is with this command.

This command has the following format:

CSET {n | DCS | DEFAULT} [/group]

n If display screen number n is specified, the character set from that display screen is applied to the current display screen.

DCS If DCS is specified the default character set from display 0 is applied to the current display screen.

DEFAULT If DEFAULT is specified the default character set from display 0 is applied to the current display screen.

/group A character group F0, F1, F2, or F3 may be appended to this command as to modify the effect of the command. When used, only the specified character group is applied to the current display screen. The slash (/) is required.

EL This command causes the editing session to convert to the Edit Link mode.

EXIT The EXIT command causes the current editing session to terminate, saving the changes made during this session. This command has the same effect as pressing the EXIT key.

(Continued on next page.)

Commands (cont)

SET

The SET command allows you to establish certain parameters of your editing session. It allows you to change the location of the Command line and to specify whether links are to be pasted when the CUT buffer is placed using the PASTE key.

The SET command has either of the following formats:

SET PASTE NO LINKS

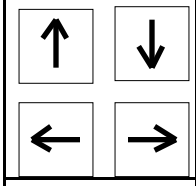
The default condition is that when the CUT buffer is pasted to the screen, the screen image with imbedded links are placed. You may alter this with SET PASTE NO LINKS and reinstate with SET PASTE LINKS.

SET COMMAND n

Specify line number 'n' to establish the location of the Command line. This will determine where the command line will appear when this screen is viewed in the DD mode.

Function Keys

The following keys and key sequences provide functions in the Edit mode of operation.

Key	Function
	Press the arrow keys to move the cursor up, down, right, and left on the screen.
Alt 1 Arrow Key	Changes the default direction of cursor movement in the direction of the arrow pressed.
Bar Direct	Places the Bar Direction symbol on the screen. Each time the key is pressed the direction of the arrow changes.
Bar Extend	Places a Bar Graph symbol on the screen. Can only be used to extend a bar graph that has a Bar Direction symbol at its point of origin.
Cbld	Press to display an 8 by 10 pixel map of the character at the cursor position. The pixels can be altered to form a new character. Press Cbld again; the pixel map disappears and the change becomes effective.
Clear	Press when the CBLD pixel map is displayed to turn OFF all pixels from the cursor to the 'last' cursor (at the lower right-hand corner of the map).
Alt 1 Clear	Press when the CBLD pixel map is displayed to turn OFF all pixels from the cursor to the 'first' cursor (at the upper left-hand corner of the map).
Crtl C	Returns you to the Command mode. All changes made to the display page this session are lost (i.e., the previous copy of this page is retained).

Function Keys (cont)

Key	Function
color key	Actual key labels = Black, Blue, Red, Green, White, Cyan, Magenta, and Yellow When a color key is pressed, that color is selected as the color of each subsequently typed character. This color is referred to as the 'foreground' color.
Alt 1 color key	Selects the default background color (i.e., the background behind each subsequently typed character). The background color is somewhat less intense than the foreground version of the same color, allowing characters to be visible when a single color is selected as both foreground and background.
Copy	Changes the color of the character at the cursor position to the current foreground/background color combination.
Sel Copy	Paints a foreground/background color combination to a SELected area of the screen. Once the area is SELected, press the ALT1, then the COPY keys.
Sel Cut	Press Cut after SELecting a screen area to remove the selected area (both image and links) from the screen and place it in the Cut buffer.
Alt 1 Cut	Clears the Cut buffer.
DD Mode	Causes the Command Line to be displayed. Refer to the Commands section for a list of available commands.
Subst Field	Places a Number Substitution Field symbol (φ) on the screen.
Exit	Returns you to the Command mode. The current version of the display page is filed, erasing the previous copy of this page.

Function Keys (cont)

Key	Function
Find	Press when the cursor is resting on a character and all occurrences of the character will flash. Press a second time to extinguish flashing.
F0 F1 F2 F3	Selects the character group to be used for subsequently typed characters.
Paste	Pastes the contents of the Cut buffer onto the screen. The buffer is placed on the screen such that the current cursor position corresponds to the cursor position when the Cut operation was performed.
Return	Moves the cursor down one line and to the left-most screen position.
Shift	Used in all character groups (F0 through F3) to select the alternate character (a:A, b:B, 2:@, etc.)
Sel	Selects a character for Cut & Paste or Color Copy operations. Move the cursor to SELect a larger screen area. As the cursor is moved, the SELected area is displayed in reverse video. Press SEL again and the SELected area returns to normal. Refer to SEL / SHOW for another function.
Set	Press when the CBLD pixel map is displayed to turn ON all pixels from the cursor to the 'last' cursor (at the lower right-hand corner of the map).
Alt 1 Set	Press when the CBLD pixel map is displayed to turn ON all pixels from the cursor to the 'first' cursor (at the upper left-hand corner of the map).
Show	Press to display the F0, F1, F2, and F3 character groups to the screen. Press again to remove.

Function Keys (cont)

Key	Function
Sel Show	Displays the contents of the Cut buffer temporarily to the screen at the cursor position. Press the arrow keys to move this temporary display field in any direction. Press the SHOW key again and the temporary field disappears.
space bar	Press to type a blank space. Used in the CBLD pixel map to turn OFF individual pixels.
Trend	Extends a Trend Bar Graph to the left; will not extend a Trend Bar Graph to the right.
	Deletes the character to the left of the cursor.
Sel 	Removes the SELected region from the screen.

Edit Link Mode

Introduction

The Edit Link mode lets you to create and change 'links' (or associations) between locations on the display screens to database variables.

Commands

This linking is done by the use of COMMANDS issued from the display screens. Refer to the chart below for a short description of each command and for an index to the page where complete details can be found.

Command	Description	Page
A	ALTER LINK	47
CH	CHAIN PAGES	48
CL	CLEAR LINKS	49
D	DELETE LINK	50
E	ENTER LINK	51
ED	ENTER EDIT MODE	66
FL	FORCE LINKING	67
LOCK	LOCK WORKSTATIONS	68

Definition of 'Link'

A database link occurs when a spot or area on the screen is associated with a variable in such a way that the condition of the variable affects the way the linked area is displayed at run time. A screen is linked to many database variables so that its image can change, as conditions in the process change. Perhaps the best way to see this is to list a few examples of the function of links:

1. The current numerical value of any process variable can be displayed on the screen; updated in real time.

2. Vertical and horizontal bar graphs can change length to represent the relative value of a variable.

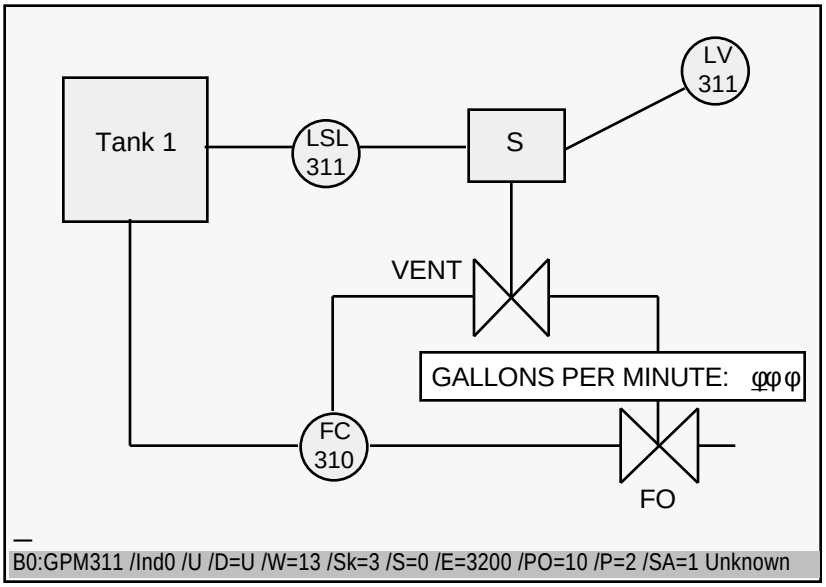
3. Alphabetic characters or words can change, disappear, blink, or change color according to the condition of variables linked to them.

4. An area on the screen can change through a range of colors gradually to indicate the condition of a slowly changing process variable.

5. A process symbol can change from one color to another as the operational status of the corresponding device on the floor changes states.

Display Features

A typical display screen accessed in the Edit Link mode is shown below. Note the screen features explained to the right.



= The graphics created in the Edit mode are displayed.

A flashing cursor is positioned on a linked field.

=

A cursor indicates the presence of a Command Line.

=

= Link Status messages are displayed immediately below the command line. This line is also used to display error messages.

Functions Keys

To make certain jobs easier, special uses are assigned to some of the the function keys. These are described in detail in the Function Key pages, at the end of this section.

A - Alter Link

This command is used to change the characteristics of an existing link. The link at the Link Status message line is altered as specified.

Format

This command has the format:

A ⟦name⟧⟦/switch⟧...

Any switches (/switch) listed are assigned to the link at the cursor position. Any valid switch can be specified. Refer to the ENTER command for a complete listing of switches.

If the optional argument, 'name' is used, the link at the cursor position is changed to the name of specified variable. The name may include the database ID.

Examples

The following examples show valid command syntax.

Example	Description
A B0:	Change only the database ID for the link.
A TEMP.RAW	Change the link name to TEMP.RAW.
A /1=YK/U=1	Add or change two switches to the link specification.

CH - Chain Pages

This command logically connects this display to a NEXT or PREVIOUS display page.

This allows the specified pages to be accessible when an operator presses the NEXT or PREV keys when the screen is in use (in D or DD modes).

Format

This command has the following format:

CH⟦/P=p⟧⟦/N=n⟧

The argument '/P=p' links display page number 'p' to the PREV key.

Display page number 'n' is linked to the NEXT key.

If the /P and /N switches are omitted, the current chain connections are shown on the MESSAGE line.

Examples

The following examples show valid command syntax.

Example	Description
CH/N=5/P=7	Links display pages 5 and 7 to the NEXT and PREV keys, respectively.
CH <Return>	Current chain connections are displayed.
CH/P=26	Links display page 26 to the <PREV> key.

CL - Clear Links

This commands removes all links on this page.

Links are not removed until you EXIT from the screen. If you wish to exit without the CL command taking effect, type Ctrl/C to exit the screen without any changes taking effect.

Format

This command has the syntax:

CL

D - Delete Link

This command causes the link listed on the Link Status message line to be removed.

Format

This command has the following format:

D

E - Enter Link

This command causes a link to be made between a database variable and the screen coordinates where the cursor is positioned when the link is made. The link will cause the condition of the variable to affect the display at that location. The type of effect is controlled by *qualifiers* appended to the ENTER command.

For example, a link can cause the numerical value of a variable to be displayed on the screen, continuously updated as the process runs. Another link made at this location could cause the value to change from GREEN to RED if the value increases past a specified 'safe' value. Another link could cause these numbers to flash on and off.

Format

This command has the following format:

E db:name⟦(subscript)⟧/qualifier⟦/qualifier⟧...

The argument 'name' is the name of a database variable. The database name 'db:', followed by a colon, may be prefixed to the variable name (i.e., db:name). If the database identifier is omitted, the current default database is assumed. Specifying a database name sets the default database pointer to the specified database until you exit from the Edit Link mode. For array variables, constant array subscripts may be used - variable subscripts are not supported.

A prime (') appended to the name of a Counter or Timer variable (i.e., NAME') links to the CURRENT value. The variable name alone links to the SET value.

Types of Links

Qualifiers control the nature of the link. They determine exactly what kind of link is being ENTERed. The qualifiers are different for each kind of link and will be explained in detail as indexed below: There are six types of links:

Link Type	Description
Attribute Modifier	An Attribute Modifier (ATM) link is used to alter the display graphics at the cursor position, based on the condition of a specified variable. An ATM link can be assigned at any screen location.
(page 53) **Numerical**	A Numerical (NUM) link can only be assigned when the cursor is on a Numerical Substitution symbol (φ). The link allows the numerical value of the linked variable to be displayed at that screen location. The linked variable can be any type of variable, including INTERMEDIATE, FLOAT, NUMERIC, TIMER, etc. Intermediate

	values TRUE and FALSE are displayed as 1 and 0, respectively.
(page 56)	

Types of Links (cont)

Link Type	Description
Bar graph	A Bar graph link is made at a BAR DIRECTION symbol. This symbol allows the numerical value of the variable to be displayed in bar graph form. The variable value is plotted on the BAR EXTEND blocks that extend out from the BAR DIRECT symbol. The current value of a variable is plotted as a point between a high and low values established when the BAR link is made.
(page 59)	
Trend Display	A Trend (TND) display link is a special form of the Bar graph link. With the Trend link, the value displayed in bar graph form represents the *average* value of a number of samples (the BAR or NUM links display the *instantaneous* value of a variable).
(page 60)	
Soft Key	The Soft key link assigns a special function to a key on the workstation keyboard. This link affects the function of the key only on the display screen where the link is assigned.
(page 62)	
Partial Color Modifier	An Partial Color Modifier (PCM) link is used to alter the foreground/background color combination at the cursor position, based on the condition of a specified variable. The PCM link allows the screen to assume 16 different color combinations in response to 16 different conditions.
(page 63)	

General Rules

When ENTERing links, the following rules should be remembered:

- A single screen location may have more than one link to one or more variables. When two links conflict, the last link has priority.
- Some qualifiers are optional; some are required. If you do not enter the required qualifiers, the system assigns them for you, using defaults.
- Trend links are made at the far right BAR DIRECT symbol. Trend bars appear to 'scroll' from right to left as each new trend bar is written to the screen.
- The DD Mode key allows you to edit the command line when entering links. Use the arrow keys to move the cursor.

General Rules (cont)

- The COUNTDOWN word of a Timer or Counter is accessible by appending the prime (') to the name (e.g., NAME').
- Use the arrow keys to position the cursor for ENTERing links. However, you must use the PREV and NEXT keys to position the cursor on existing links. Refer to the Function Keys section of the Edit Link Mode.

Attribute Modifier (ATM) Qualifier The following qualifiers may be used with an Attribute Modifier (ATM) link:

ATM Link Qualifiers

Qualifier	Description
/ATM	This qualifier identifies the link as an Attribute Modifier link. It is optional when entering the link since CRISP 'recognizes' ATM qualifiers and will assign the /ATM qualifier to the link for you. Similarly, when this qualifier is used,CRISP will assign default ATM qualifiers to the link.
/0=fb	When the linked Intermediate variable is 0, set foreground 'f' and background 'b' as specified. The color codes for 'f' and 'b' are as follows. W = white K = black R = red C = cyan G = green M = magenta B = blue Y = yellow NOTE: Pressing the desired color key causes the correct color code to be written to the link line. If this qualifier is not specified when ENTERing the link, the default Current Colors are assigned to the link.
/0=:"str"	When the variable value is 0, display the character string "str" (maximum of 14 characters) in the linked field. Note that the quotation marks (") are required. If the number of characters of the string exceeds the width (/W qualifier) of the linked field, the string will not be fully displayed.

ATM Link Qualifiers

Qualifier	Description
/0=fb:"str"	When the linked Intermediate variable is 0, set foreground 'f' and background 'b' as specified. The color codes for 'f' and 'b' are shown as above. Also, display the character string "str" (maximum of 14 characters) in the linked field (quote marks required). If the number of characters of the string exceeds the width (/W qualifier) of the linked field, the string will not be fully displayed.
/0=BLINK	When the linked Intermediate variable is 0, the character at the linked field blinks. NOBLINK causes the reverse effect.
/1=fb	When the linked Intermediate variable is 1, set foreground 'f' and background 'b' as specified. The color codes for 'f' and 'b' are shown above; or press the desired Color Key to cause the correct color code to be written to the link line. If this qualifier is not specified when ENTERing the link, the default Current Colors will be assigned to the link.
/1=:"str"	When the variable value is 1, display the character string "str" (maximum of 14 characters) in the linked field. Note that the quotation marks (") are required. If the number of characters of the string exceeds the width (/W qualifier) of the linked field, the string will not be fully displayed.
/1=fb:"str"	When the linked Intermediate variable is 1, set foreground 'f' and background 'b' as specified. The color codes for 'f' and 'b' are shown as above. Also, display the character string "str" in the linked field (quote marks required). If the number of characters of the string exceeds the width (/W qualifier) of the linked field, the string will not be fully displayed.

ATM Link Qualifiers

Qualifier	Description
/1=BLINK	When the linked Intermediate variable is 1, the character at the linked field blinks. NOBLINK causes the reverse effect.
/DIRECTION**=x**	Establishes the field direction, where 'x' = R (right), L (left), U (up), or D (down). Field width is always evaluated from the cursor position and is determined by the /D and /W qualifiers. The default direction is R (i.e., to the right of the cursor).
/NO**F**LIPFLOP**=t:f**	This link was designed to be used in creating the illusion of rotating paddles in a mixer. One half of the paddles are linked F=1:0 and the other half is linked F=0:0. When the named variable is TRUE, the colors at the link will alternate between the /0 colors and the /1 colors with each successive refresh. If 't' is 1, the colors assigned with the /1= qualifier will be displayed when the link goes TRUE, and then alternate to the /0 color. If 't' is 0, then the /0 colors are displayed first. The value of 'f' is 0 or 1 and determines which colors are displayed when the linked variable is FALSE. If 'f' is 1, the colors assigned with the /1= qualifier will be displayed when the link goes FALSE, and conversely. NOFLIPFLOP is the default.
NOBLINK	Reverses the effects of a /1=BLINK or /0=BLINK.
/UPDATE**=n**	This specifies the frequency of update of the linked variable value where 'n' represents the number of logic scans between updates. When 'n'=1, the value displayed is updated after each scan (this is the default condition). When '/U=3' the value is updated every three scans, and so on. When '/U=0' is specified, the value is determined at display time and does not change (Max value is 127).

ATM Link Qualifiers

Qualifier	Description
/WIDTH=n	Specifies the width of the link field where 'n' can be any number from 0 to 80. Field width is always evaluated from the cursor position. The direction of the field is determined by the /D qualifier (default is to the right of the cursor). If this qualifier is not specified when ENTERing the link, the default value of 1 is assigned to the link.

Numerical Link (NUM) Qualifiers

The following qualifiers may be used with a Numerical (NUM) link:

NUM Link Qualifiers

Qualifier	Description
/DIRECTION=x	Establishes the field direction, where 'x' = R (right), L (left), U, or D (down). Field width is always evaluated from the cursor position and is determined by the /D and /W qualifiers. The default direction is R (i.e., to the right of the cursor).
/END=n	This establishes an upper limit where 'n' is the maximum valid value which the operator is permitted to ENTER in the DD mode.
/NOHEX	Causes the value to be displayed in hexadecimal. NOHEX causes the value to be displayed in decimal (this is the default).
/NOICC	Causes any change made in the DD Mode to be sent to the redundant CRISP controller. NOICC prohibits the transfer message (this is the default).

NUM Link Qualifiers

Qualifier	Description
/NOLOG	Enable DD-mode logging of all changes made to this variable. When DD-Mode logging is enabled, a message is printed at the CRISP device, for each change made to this variable. The record consists of CRT number, Time and date of the change, old value, and new value.
/NOLOCK	Variables linked with the /L qualifier will be locked on workstations locked with the L command (refer to the L command in this manual for complete details). The cursor does not come to rest on links with this qualifier.
/NUMERIC	This qualifier identifies the link as a Numerical (NUM) link. This qualifier is optional since the system recognizes the Numerical substitution symbol (φ) and assigns the /NUM qualifier to the link for you. Additionally, if this qualifier is used, the system can assign default NUM qualifiers to the link.
/NOOCTAL	Causes the value to be displayed in octal. NOOCTAL causes the value to be displayed in decimal (this is the default).
/NOPLOCK	When '/PLOCK' is specified, you can not change the field regardless of whether the workstation is locked or unlocked. NOPLOCK is the normal (default) condition.
/NOSECURE	Values are not displayed to the screen in DD mode; instead, asterisks (*) are displayed. In addition, when the cursor rests on this link, the name of the variable is not displayed. NOSECURE is the default condition.
/START=n	This establishes a lower limit where 'n' is the minimum valid value. An asterisk is displayed when values less than 'n' exist. If zero (0) is specified, all values are displayed. Zero is the default.

NUM Link Qualifiers

Qualifier	Description
NOSYNCHRONIZE	When a link is set /NOSYNCH (the default), DD mode changes to the database occur immediately and asynchronously. When the /SYNCH qualifier is used, DD mode changes to the database occur at the end of a scan of the CRISP application logic. The /SYNCH qualifier can prevent an asynchronous change to a variable value 'in the middle' of a series of calculations spanning several lines of CRISP code.
/UPDATE**=n**	This specifies the frequency of update of the linked variable value where 'n' represents the number of logic scans between updates. When '/U=1', the value displayed is updated after each scan (this is the default condition). When '/U=3' the value is updated every three scans, and so on. When '/U=0' is specified, whatever the value is at display time is written to the screen. This value is not updated thereafter. Maximum value is 127.
/WIDTH**=n** . n	Specifies the width of the link field where 'n' can be any number from 0 to 80. Field width is always evaluated from the cursor position. The direction of the field is determined by the /D qualifier (the default is to the right of the cursor). Using the optional decimal point (.) specifies the position of a decimal point in the display field. The number following the decimal point indicates the number of digits that will follow the decimal point. Example: `/w=4.2` The field width should always be equal to or greater than the number of digits that will be displayed. If the number of digits exceeds the field width, only asterisks (*) will be displayed. If this qualifier is not specified when ENTERing the link, the width of the numerical field is assigned by the system; equal to the number of numerical substitution fields (φ).

Bar Graph Qualifiers

The following qualifiers may be used with a Bar graph link:

BAR GRAPH Link Qualifiers

Qualifier	Description
/BAR	This qualifier identifies the link as an Bar graph link. This qualifier cannot be used to ENTER a Bar graph link but will be assigned by default when a link is ENTERed from a BAR DIRECT symbol (in the absence of a /TREND qualifier). NOTE: The Bar graph function works by displaying a number of characters from the default character set. An upward bar uses default characters 0 - 10, a downward bar uses 10 - 19, a bar that extends to the right uses 128 - 136, and a bar to the left uses 136 - 144. Refer to the Appendix of this manual.
/DIRECTION=x	Establishes the direction of the bar graph, where 'x' = R (right), L (left), U, or D (down). The default direction is the direction pointed to by the BAR DIRECT symbol
/END=n	This establishes an ending value where 'n' is the value at which the Bar is fully extended. The system uses the starting and ending values of a Bar graph link to determine the height of the bar in relation to the variable value. The default is 10 times the /WIDTH value. The default value is zero. This default value must be changed in order for the bar graph to work properly (the graph will look like no bar graph link exists).
/START=n	This establishes a lower limit (starting value) where 'n' is the minimum valid value. The system uses the starting and ending values of a Bar graph link to determine the height of the bar in relation to the variable value.
/TOP	This causes the display of the top line of bar graph only; the bar graph is not filled with a solid color. The Bar graph function works by displaying a number of characters from the default character set. The TOP ONLY function uses default characters 20 - 29. Refer to the Appendix of this manual.

BAR GRAPH Link Qualifiers

Qualifier	Description
/UPDATE**=n**	This specifies the frequency of update of the linked variable value where 'n' represents the number of logic scans between updates. When '/U=1', the value displayed is updated after each scan (this is the default condition). When '/U=3' is specified, the value is updated every three scans, and so on. When '/U=0' is specified, the value is determined at display time and does not change thereafter. Maximum value is 127.
/WIDTH**=n**	Specifies the width of the link field where 'n' can be any number from 0 to 80. Field width is always evaluated from the cursor which must be placed on the BAR DIRECT symbol. If this qualifier is not specified, a value is assigned equal to the number of BAR EXTENDs plus the BAR DIRECT symbol.

Trend Link Qualifiers

The following qualifiers may be used with a Trend display link:

TREND Link Qualifiers

Qualifier	Description
/DIRECTION**=x**	Establishes the direction of the bar graph, where 'x' = R (right), L (left), U, or D (down). The default direction is the direction pointed to by the BAR DIRECT symbol
/END**=n**	This establishes an ending value where 'n' is the value at which the TREND Bar is fully extended. The system uses the starting and ending values of a TREND link to determine the height of the TREND bar in relation to the variable value. The default is 10 times the /WIDTH value. The default value is zero. This default value must be changed in order for the TREND bar graph to work properly.

TREND Link Qualifiers

Qualifier	Description
/START=n	This establishes a lower limit (starting value) where 'n' is the minimum valid value. CRISP uses the starting and ending values of a TREND link to determine the height of the TREND bar in relation to the variable value.
/SAMPLES=n	This establishes the number of samples to be averaged (and displayed as a single value). The default is 1.
/SKIP=n	This qualifier allows interlacing of up to three variables on a single TREND display. Skips 'n' bars before displaying next TREND bar of this variable.
/TOP	This causes the display of the top line of TREND bar only; the TREND bar is not filled with a solid color.
/TREND	This qualifier identifies the link as a Trend display (TND) link. This qualifier is optional since CRISP 'recognizes' TREND qualifiers and will assign the /TND qualifier to the link for you. Similarly, if this qualifier is used, the CRISP can assign default TREND qualifiers to the link.
/PERIOD=n	Used on TREND links to establish the time period between samples where 'n' is in seconds. The default value is 1.
/POINTS=n	Used on TREND links to indicate the number of bars (or history points) that are charted on the TREND graph. If no /POINTS value is specified, the value will be determined based on the number of contiguous TREND bars on your TREND display.

TREND Link Qualifiers

Qualifier	Description
/UPDATE=n	This specifies the frequency of update of the linked variable value where 'n' represents the number of scans between updates. When '/U=1', the value on the screen is updated with each refresh of the workstation (this is the default condition). When '/U=0' is specified, the value is determined at display time and does not change thereafter.
/WIDTH=n	Specifies the width of the link field where 'n' can be any number from 0 to 80. Field width is always evaluated from the cursor which must be placed on the BAR DIRECT symbol. If this qualifier is not specified, a value is assigned equal to the number of BAR EXTENDs plus the BAR DIRECT symbol.

Soft Key Link Qualifiers

The following qualifiers may be used with a Soft key link:

SOFT KEY Link Qualifiers

Qualifier	Description
/KD=<ALTx>k:n	Allows a specified Display page number to be accessed when the key (sequence) is pressed. This link only affects the workstation when *this display screen* is being displayed. This link is *not* a link with a specific variable, but a link between a key and an action (that of displaying a new screen). 'k' is a key number (refer the Appendix for location of the User-defined keys). '<ALTx>' is optional and specifies that the ALT1, ALT2, or ALT3 key must be pressed prior to the key, 'k'. The screen number 'n' specifies which display screen is accessed.
/KVALUE=	This qualifier allows a specified value to be assigned to a variable when the key (sequence) is pressed. The format for this qualifier is: /KVALUE=<ALT>k:value

SOFT KEY Link Qualifiers

Qualifier	Description
	'k' is a key number (refer the Appendix for location of the User-defined keys). '<ALT>' is optional and specifies that the ALT1 key must be pressed prior to the key, 'k'. The value 'n' specifies the value to be written to the linked variable. NOTE: This link is effective when this screen is displayed in the DD mode *regardless of the position of the cursor* when the linked key is pressed.
NO**SY**NCHRONIZE	When a link is set /SYNCH (the default), DD mode changes to the database occur at the end of a scan of the CRISP application logic. When a link is set /NOSYNCH, the change in value is sent to the database immediately (asynchronously). The /SYNCH qualifier can prevent an asynchronous change to a variable value "in the middle" of a series of calculations spanning several lines of CRISP code.

Partial Color Modifier (PCM) Qualifier The following qualifiers may be used with a Partial Color Modifier (PCM) link:

PARTIAL COLOR MODIFIER Link Qualifiers

Qualifier	Description
/0BACKGROUND**=b**	Specifies the background color 'b' to be displayed when the linked variable value is zero (0). The color codes are as follows: W = white K = black R = red C = cyan G = green M = magenta B = blue Y = yellow NOTE: Pressing the desired Color Key causes the correct color code to be written to the link line.

PARTIAL COLOR MODIFIER Link Qualifiers

Qualifier	Description
/0FOREGROUND**=f**	Specifies the foreground color 'f' to be displayed when the linked variable value is zero (0). The color codes are shown above; or press the desired Color Key to cause the correct color code to be written to the link line.
/1BACKGROUND**=b**	Specifies the background color 'b' to be displayed when the linked variable value is one (1). The color codes are shown above; or press the desired Color Key to cause the correct color code to be written to the link line.
1FOREGROUND**=f**	Specifies the foreground color 'f' to be displayed when the linked variable value is one (1). The color codes are shown above; or press the desired Color Key to cause the correct color code to be written to the link line.
/DIRECTION**=x**	Establishes the field direction, where 'x' = R (right), L (left), U (up), or D (down). Field width is always evaluated from the cursor position and is determined by the /D and /W qualifiers. The default direction is R (i.e., to the right of the cursor).
/PCMODIFIER	This qualifier identifies the link as a Partial Color Modifier (PCM) link. It is optional when entering the link since CRISP 'recognizes' PCM qualifiers and will assign the /PCM qualifier to the link for you. Similarly, when this qualifier is used, CRISP will assign default PCM qualifiers to the link. An unlimited number of PCM links can be assigned to an area on the screen. If more than one of the links are TRUE simultaneously, the last link ENTERed is the link with the first priority; the next to last ENTERed, second priority, and so on. The same priority scheme applies if several are FALSE simultaneously.

PARTIAL COLOR MODIFIER Link Qualifiers

Qualifier	Description
/WIDTH=n	Specifies the width of the link field where 'n' can be any number from 0 to 80. Field width is always evaluated from the cursor position. The direction of the field is determined by the /D qualifier (default is to the right of the cursor). If this qualifier is not specified when ENTERing the link, the default value of 1 is assigned to the link.

ED - Enter Edit Mode

The ED command allows you to begin editing the current display page in the Edit mode.

Format

This command has the syntax:

ED

FL - Force Linking

This command causes links to be performed upon EXITing the display screen. This is the default condition—this command may be used after issuing the CL command to reinstate the default condition.

Format

This command has the syntax:

FL

Lock - Lock Workstation

This command is used to lock the specified Basic Workstations so that they may not be used in the DD mode.

Format

This command has the format:

LOCK ⟦/switch⟧

If the lock command is issued without a switch, it lists all workstations that are currently locked out of the DD mode.

Command modifiers may be used as shown below.

Switch	Function
/ADD=n ⟦,n⟧⟦,n⟧…	Adds the specified workstation numbers to the list of locked workstations. 'n' = workstation process number (Refer to PDMON command in CRISP/32 Utilities Reference Manual.
/ADD=ALL…	Adds all workstation numbers to the list of locked workstations.
/SUB=n ⟦,n⟧⟦,n⟧…	Subtracts the specified workstation numbers to the list of locked workstations.
/SUB=ALL…	Subtracts all workstation numbers to the list of locked workstations.

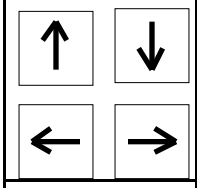
Examples

The following examples show the use of the LOCK command:

Example	Description
LOCK	Causes all locked workstation numbers to be displayed
LOCK/ADD=ALL	Locks all workstations from using the DD mode.
LOCK/ADD=2,4, 5	Locks workstations 2, 4, and 5. Any other workstations currently locked remain so.
LOCK/SUB=2,4, 5	Unlocks workstations 2, 4, and 5. Any other workstations currently locked remain so.

Function Keys

Many of the Color Console Function keys have special functions when operating in the Edit Link mode. The following chart lists each Function key followed by a description of its function.

Key	Function
	Press the arrow keys to move the cursor up, down, right, and left on the screen.
Clear	Writes /0= to the COMMAND line.
color keys	Pressing a color key writes that color character on the command line where, BLACK = K and all other colors use the first letter of the color.
Ctrl U	Erase Command Line.
Copy	Copies the link name displayed on the bottom line to the COMMAND line.
Cut	Copies the link displayed on the bottom line and stores it in the CUT buffer.
DD Mode	Allows editing of the COMMAND line. Use arrow keys and the backspace key to move within the COMMAND line. Note the COMMAND line changes color. Press again to resume Edit Link mode.
Exe Cmd	Writes the text from the SAVE/RESTORE buffer to the COMMAND line, followed by an ENTER, causing the link command to be executed.
Exit	Files the display page, storing all links made this session and returns you to the Command level.
Next	Move cursor to the next link.
Paste	Writes the previously CUT link to the cursor position.

Function Keys (cont)

Key	Function
Prev	Move cursor to the previous link.
Restore Cmd	Writes the text from the SAVE/RESTORE buffer onto the COMMAND line.
Return	Move cursor to next link.
/ Return	Moves cursor to previous link.
Alt 1 Save Cmd	Copies the text currently on the COMMAND line into the SAVE/RESTORE buffer.
Set	Writes /1= to the COMMAND line.
Find	Moves cursor to the closest link from the current cursor position.

Introduction

The Display mode displays the graphics created in the Edit mode. Also, areas of the screen which have been linked (via the EL mode) to variables are displayed conditionally; depending on the value of the variable and the type of link switches used.

The Display mode is identical to the DD mode except that the operator is prohibited from entering changes to variable values.

Function Keys

Much of the functionality of the Basic Workstation, in the Display mode, is provided by use of the special keys on the keyboard. The chart below shows each special key and key sequence on the left and a description of the system response on the right.

Key	System Response
Ctrl C	Exit this screen. Go to the Command mode.
Alt 2 Copy	Save screen. Create a copy of the current screen and place it in the directory CRISP.EXE.
DD Mode	Press to switch to the DD mode (may not function if this workstation has been locked out of the DD mode. If permitted, this key toggles between Display and DD modes.
Exit	Exit this screen. Go to the Command mode.
Next	Exit this screen. Go to the NEXT screen. The order of display screens is established in the Edit Link mode (refer to the CH command).
Prev	Exit this screen. Go to the PREV screen. The order of display screens is established in the Edit Link mode (refer to the CH command).

User-Defined Keys

Certain keys may be assigned alternate functions, specific to your application, either through the Edit Link mode KD command, or via the DEF command in the Command mode. Refer to the appropriate section of this manual.

Notes:

Dynamic Display Mode

Introduction

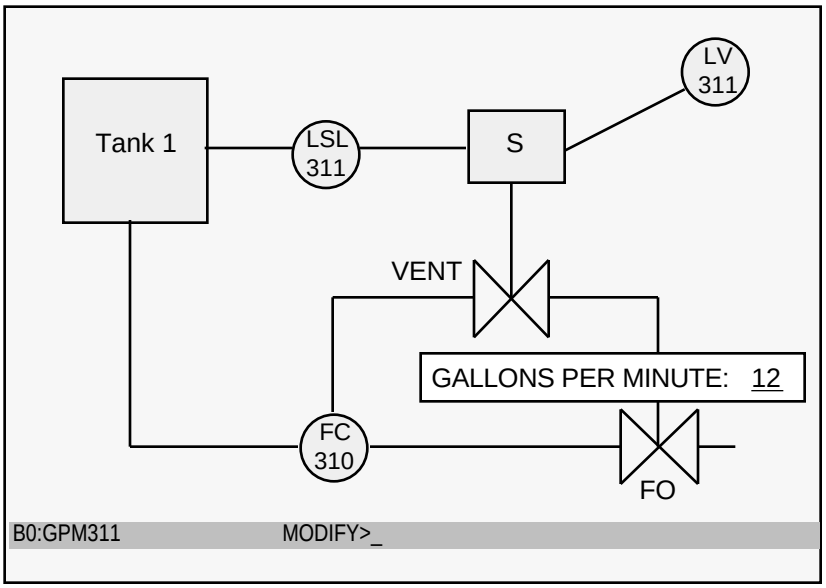
Once a display screen has been created in the Edit mode and linked in the Edit Link mode, it can be displayed in the Dynamic Display (DD) mode. Also, areas of the screen which have been linked (via the EL mode) are displayed conditionally; depending on the value of the variable and the type of link switches used.

The DD mode is similar to the Display mode except that the operator may actually modify process variables in the DD mode. Changes made to displayed variables' values are sent to the database. Any variable displayed on the screen that has not been specifically locked against operator interaction may be changed 'dynamically' in the DD mode.

Basic Workstations may be locked out of displaying screens in the DD mode via the LOCK command. In these cases, the Display mode becomes the only way to display the process screens.

Display Features

The following is a typical display screen, displayed in the DD mode. Note the screen features explained to the right.



= The DD mode displays the graphics created in the Edit mode. Areas linked to database variables are displayed conditionally– depending on the value of the variable and the type of link qualifiers used.

= A flashing cursor underlines a database variable on the screen.

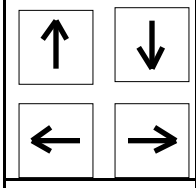
= A blue MODIFY LINE appears on the screen. The name of the variable at the cursor position is displayed on this line. To modify the value, type a new value, then press Return.

Function Keys

Much of the functionality of the Basic Workstation in the DD mode is provided by use of the function keys on the keyboard. Refer to the Function Keys Operation section for complete details.

Function Keys Operation

Many of the Basic Workstation keys have special functions when operating in the DD mode. The following chart defines each special key and key sequence on the left and a description of the system response on the right.

Key	System Response
	Arrow keys move the cursor around the screen to the next variable whose value can be modified.
Clear	Sets the value of the field at the cursor position to zero (0). DD mode only.
Ctrl C	Exit this screen. Go to the Command mode.
Ctrl U	Erase the text on the Modify Line.
Alt 2 Copy	Save screen. Create a copy of the current screen and place it in the directory CRISP.EXE.
DD Mode	Press to switch to the Display mode. Toggles between Display and DD modes.
Exit	Exit this screen. Go to the Command mode.
Next	Exit this screen. Go to the NEXT screen. The order of display screens is established in the Edit Link mode (refer to the CH command). Press after typing a screen number on the MODIFY LINE and the corresponding screen is displayed.
Prev	Exit this screen. Go to the PREVious screen. The order of display screens is established in the Edit Link mode (refer to the CH command). Press after typing a screen number on the MODIFY LINE and the corresponding screen is displayed.

Key	System Response
Return	Advance the cursor to the next interactive field. Also used to terminate the MODIFY> entry, assigning the new value to the variable. DD mode only.
Ramp Up	Press to increase the value of a Float variable by 1% or a Numeric variable by 1. Press and hold for auto-repeat. Percentage based on values /S and /E qualifiers (see Edit Link Mode ENTER command). When used to change variables in remote databases, you must press the Return key after ramping to transmit the change to the remote database.
Shift Ramp Up	Press to increase the value of a Float variable by 10% or a Numeric variable by 10. Press and hold for auto-repeat. Percentage based on values /S and /E qualifiers (see Edit Link Mode ENTER command). When used to change variables in remote databases, you must press the Return key after ramping to transmit the change to the remote database.
Ramp Down	Same as RAMP UP, except decreases the value of the variable. Press and release or press and hold as required.
Shift Ramp Down	Same as Shift RAMP UP, except decreases the value of the variable. Press and release or press and hold as required.
Set	Assigns the value of one (1) to the variable at the cursor position.
	Deletes the character to the left of the cursor. Used in editing the Modify Line only.

User-Defined Keys

Certain keys may be assigned alternate functions, specific to your application through the use of Soft Key link qualifiers (refer to the Edit Link mode ENTER command).

Notes:

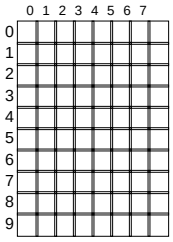
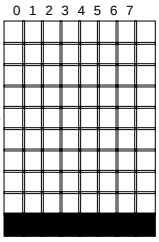
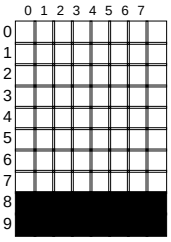
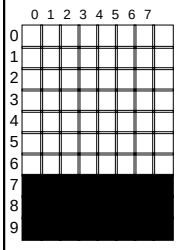
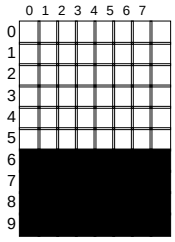
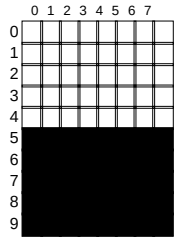
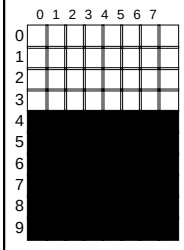
Appendix A

Introduction

This Appendix includes information that will support your use of the Basic Workstation. The sections of this Appendix are as follows.

Section	Description
Default Character Set *(page 78)*	This section shows the pixel maps of each character in the default character set. The last page of this section shows a key to interpreting the pixel maps.
Character ID Codes *(page 85)*	This chart shows the numerical Character ID Code associated with each keyboard character.
Keyboard Layout *(page 86)*	This section shows the location of keys on the Basic Workstation. It also shows the location of programmable 'soft keys'.

Appendix A

F0: @	F0: A	F0: B	F0: C	F0: D	F0: E	F0: F
						
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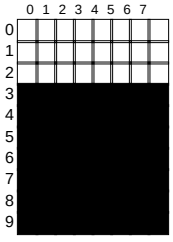	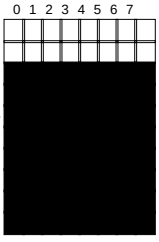	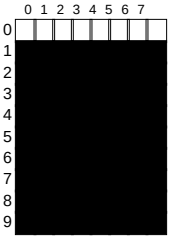	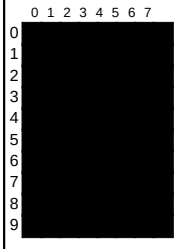	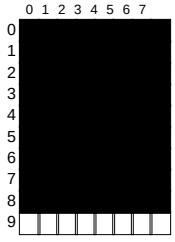	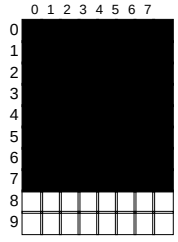	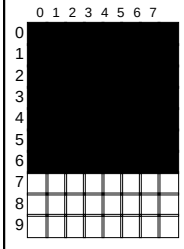
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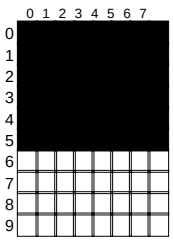	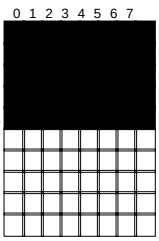	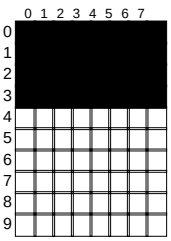	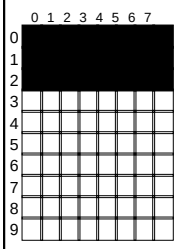	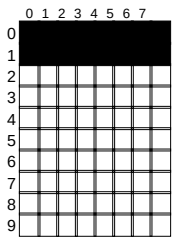	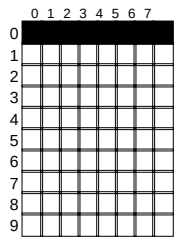	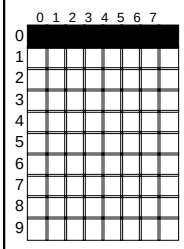
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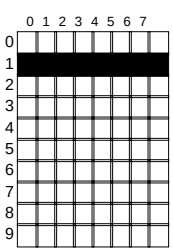	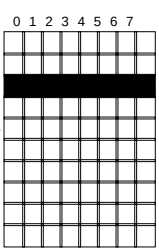	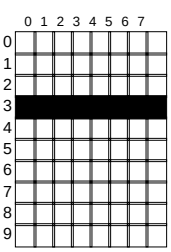	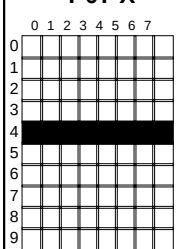	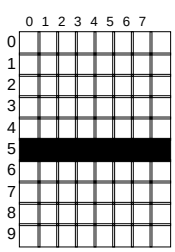	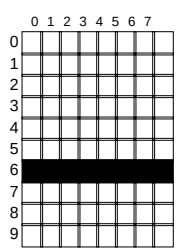	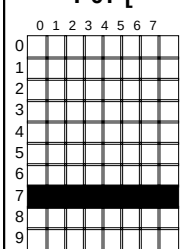
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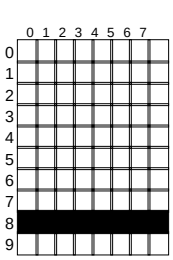	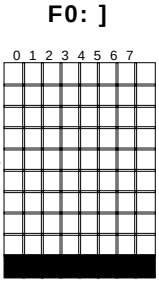	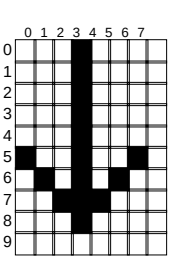	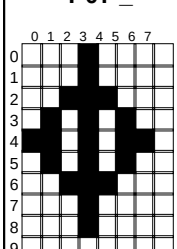	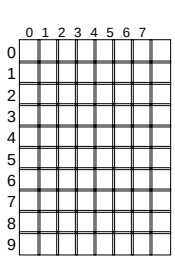	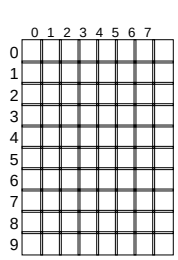	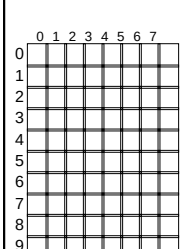
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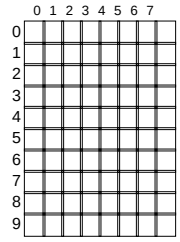
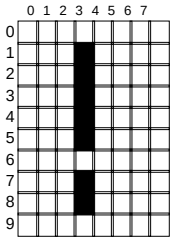
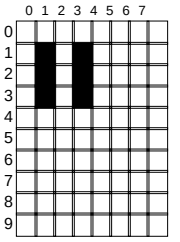
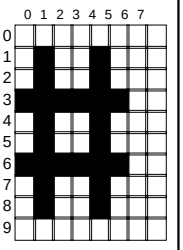
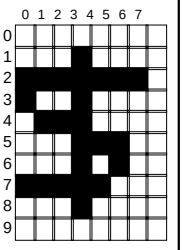
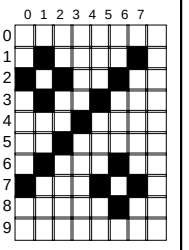
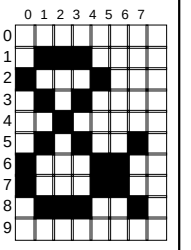
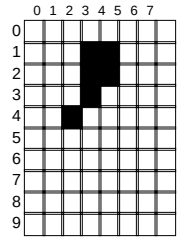
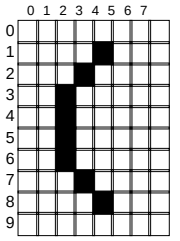
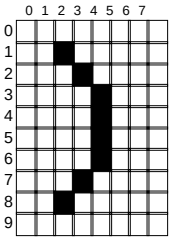
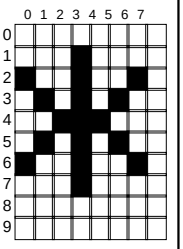
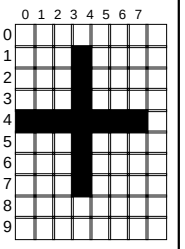
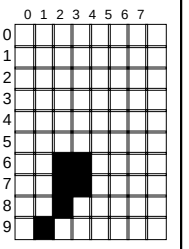
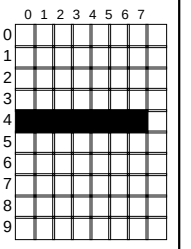
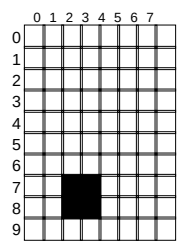
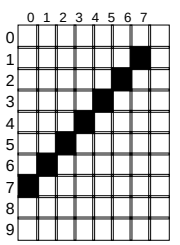
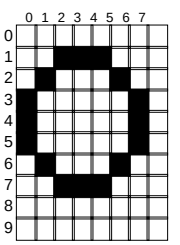
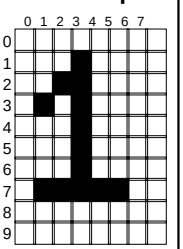
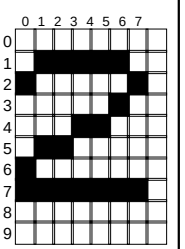
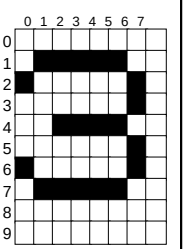
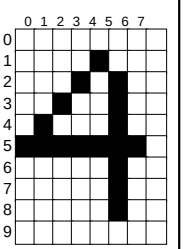
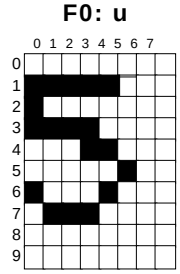
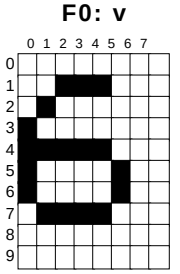
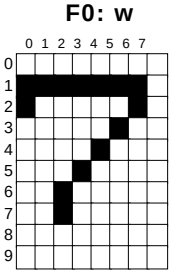
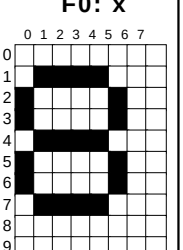
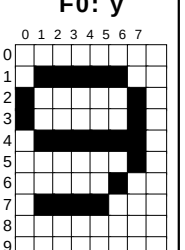
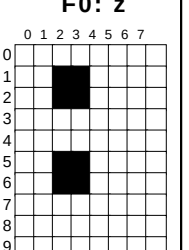
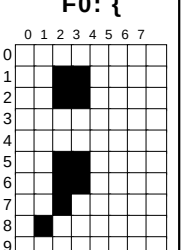
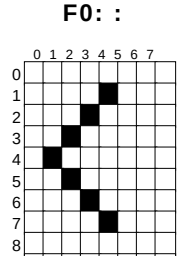
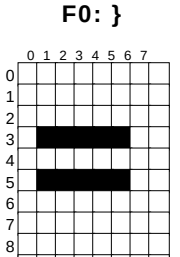
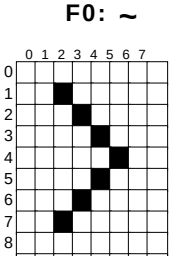
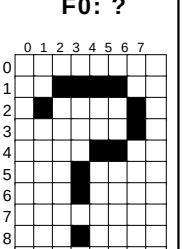
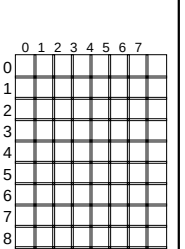
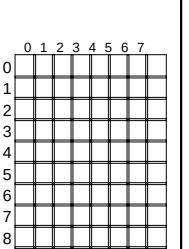
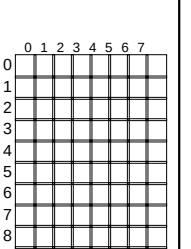
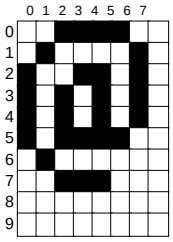
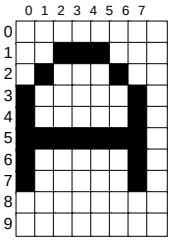
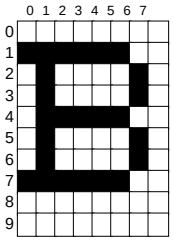
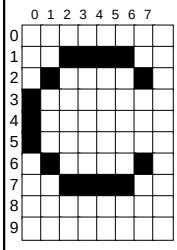
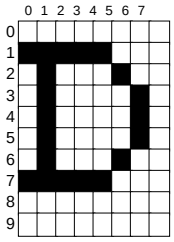
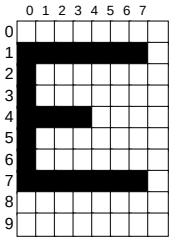
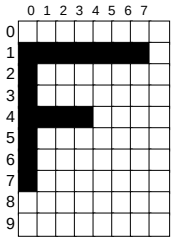
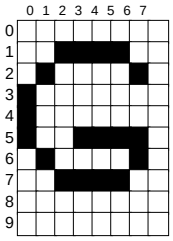
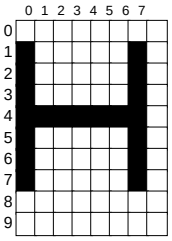
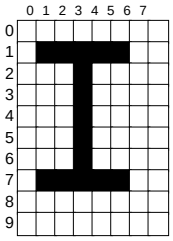
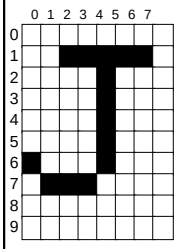
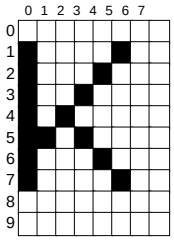
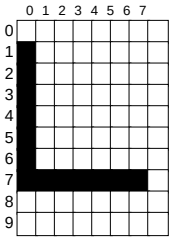
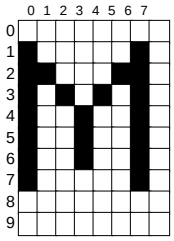
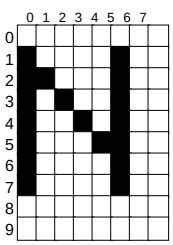
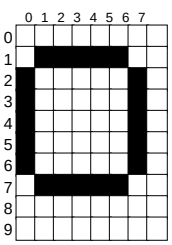
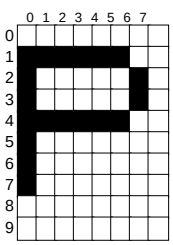
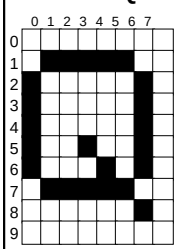
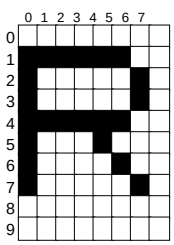
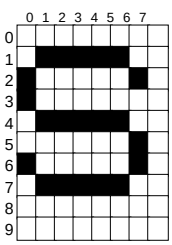
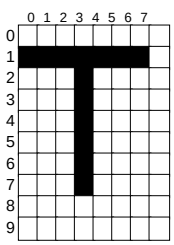
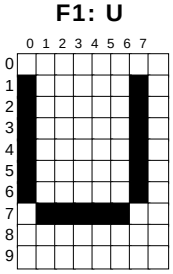
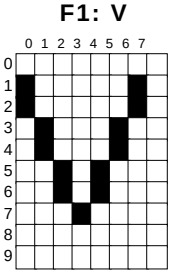
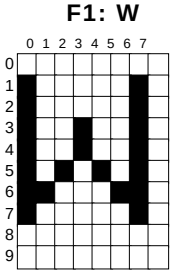
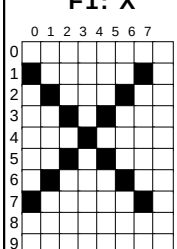
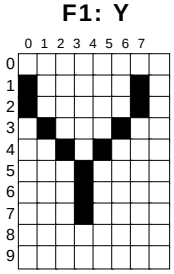
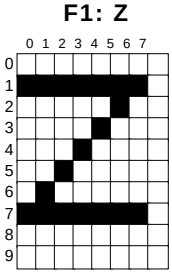
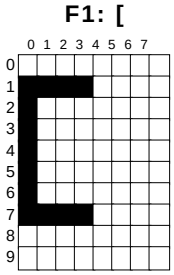
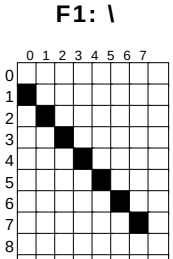
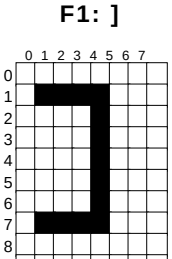
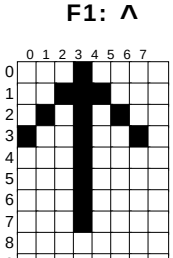
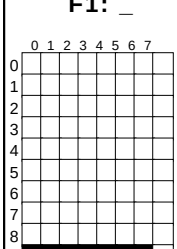
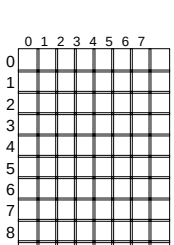
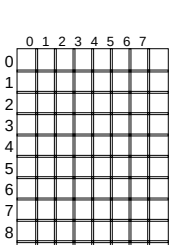
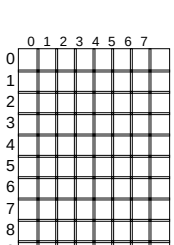
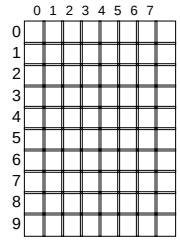
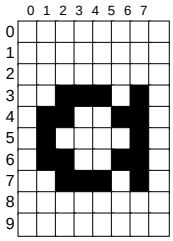
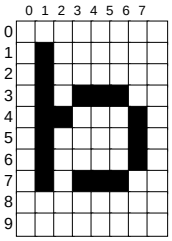
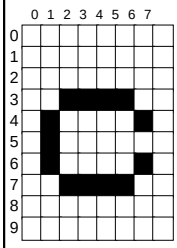
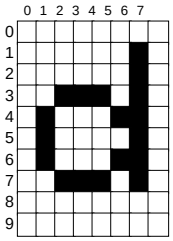
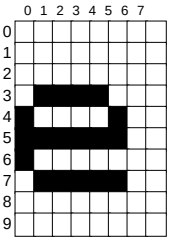
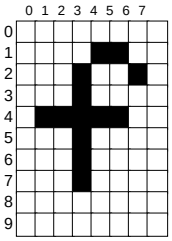
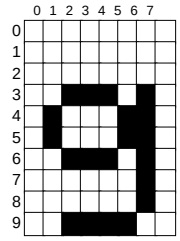
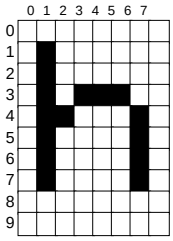
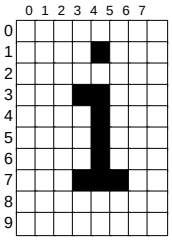
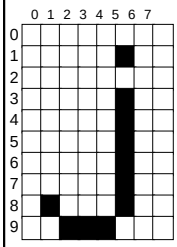
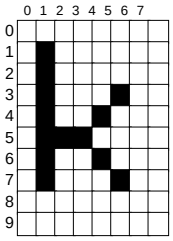
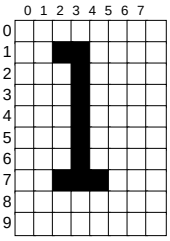
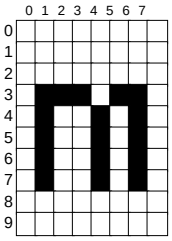
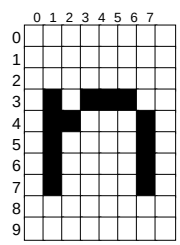
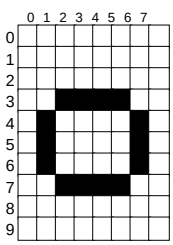
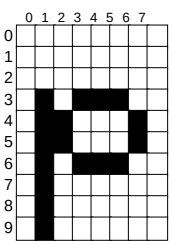
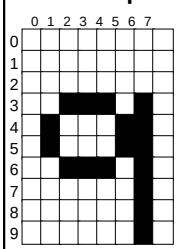
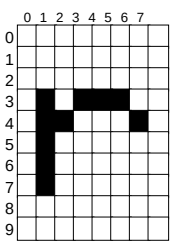
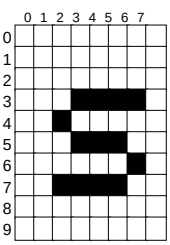
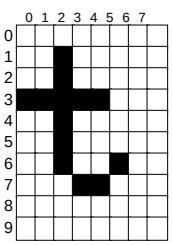
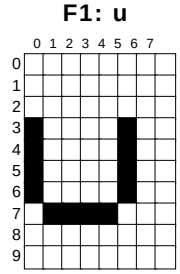
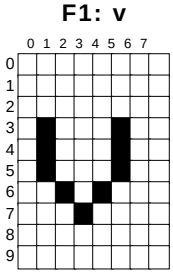
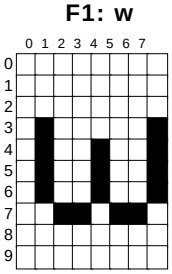
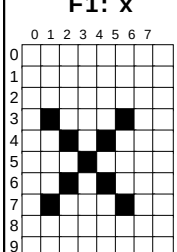
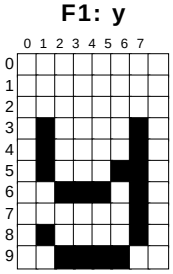
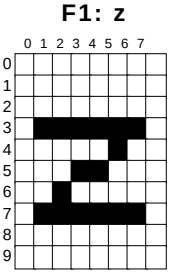
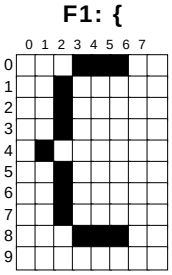
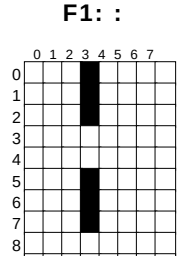
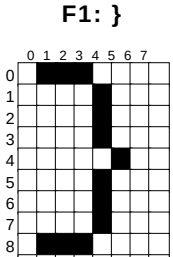
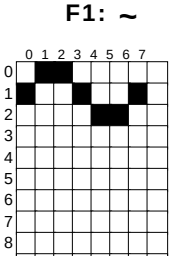
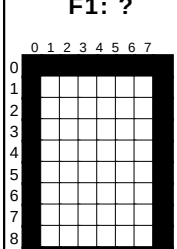
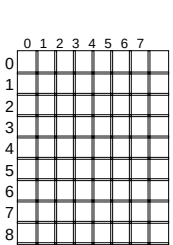
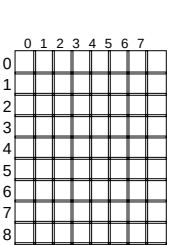
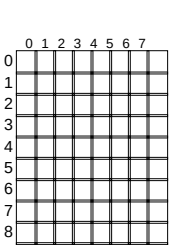
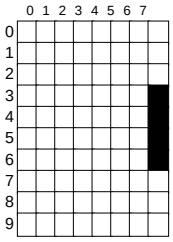
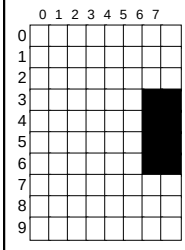
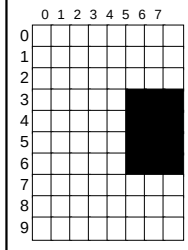
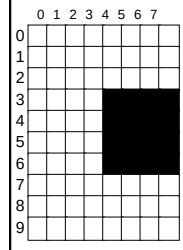
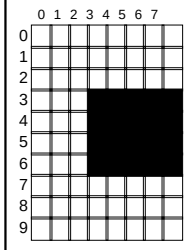
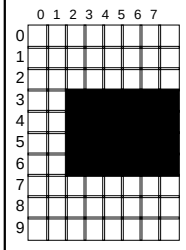
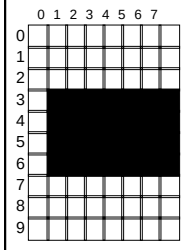
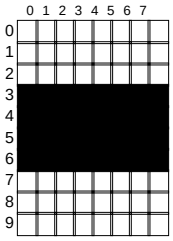
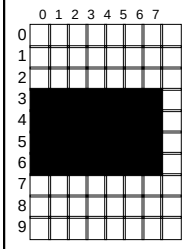
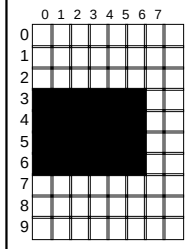
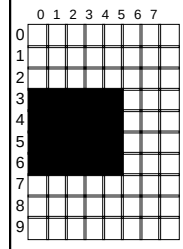
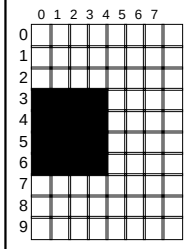
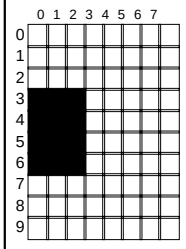
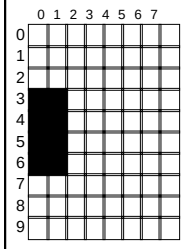
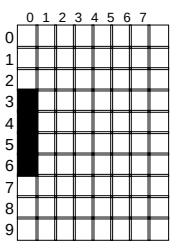
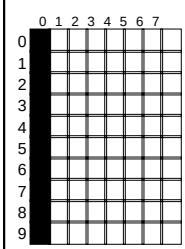
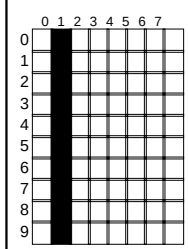
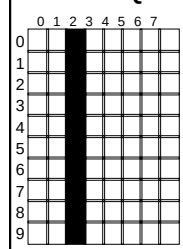
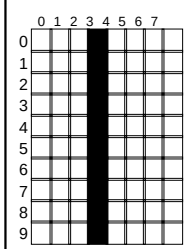
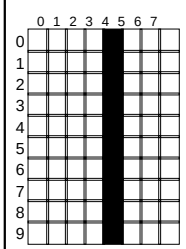
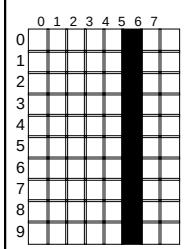
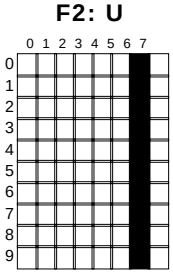
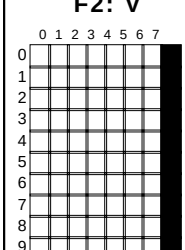
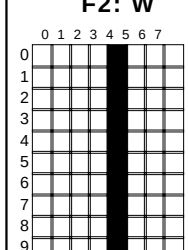
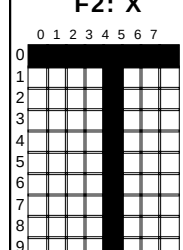
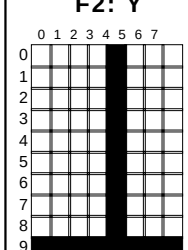
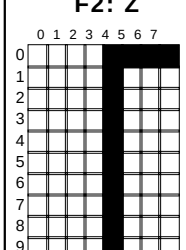
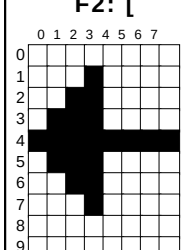
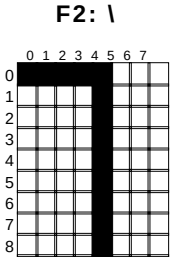
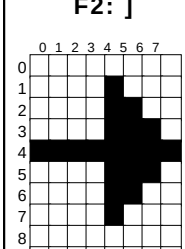
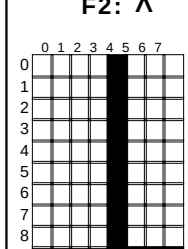
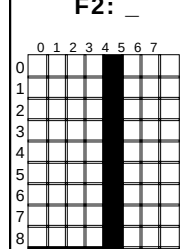
unused  32	F0: a  33	F0: b  34	F0: c  35	F0: d  36	F0: e  37	F0: f  38
F0: g  39	F0: h  40	F0: i  41	F0: j  42	F0: k  43	F0: l  44	F0: m  45
F0: n  46	F0: o  47	F0: p  48	F0: q  49	F0: r  50	F0: s  51	F0: t  52
F0: u  53	F0: v  54	F0: w  55	F0: x  56	F0: y  57	F0: z  58	F0: {  59
F0: :  60	F0: }  61	F0: ~  62	F0: ?  63			

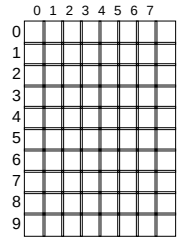
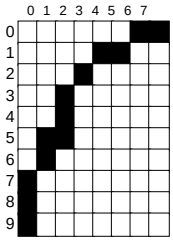
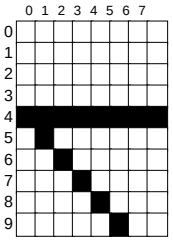
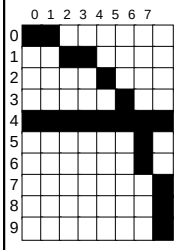
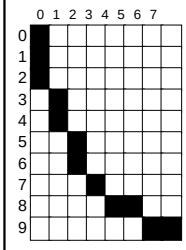
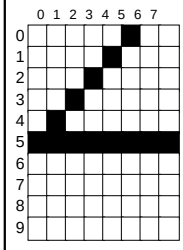
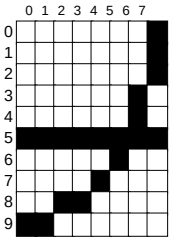
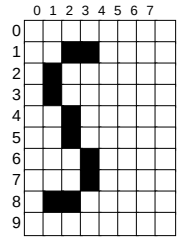
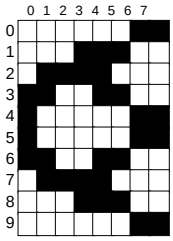
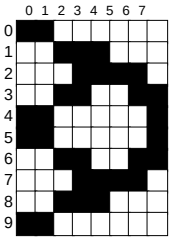
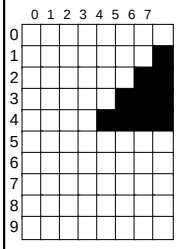
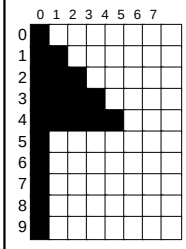
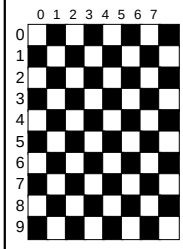
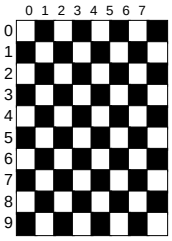
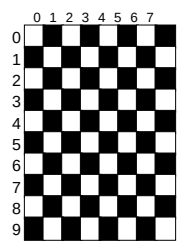
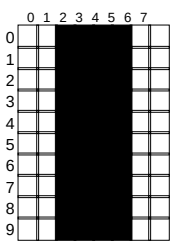
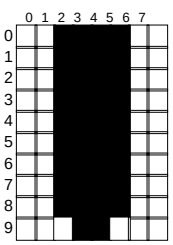
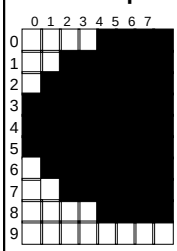
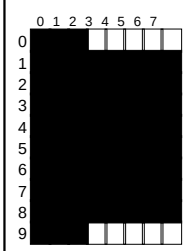
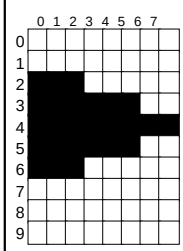
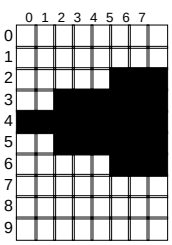
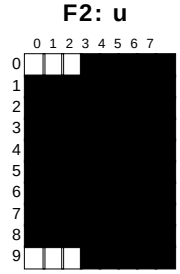
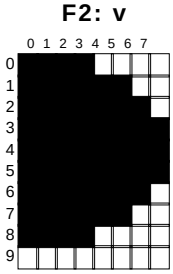
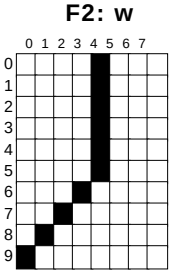
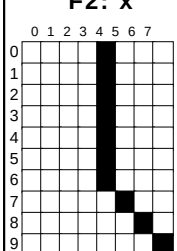
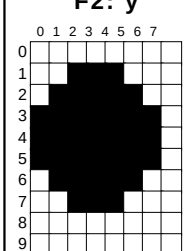
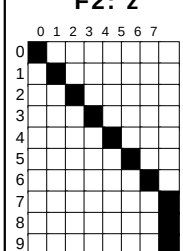
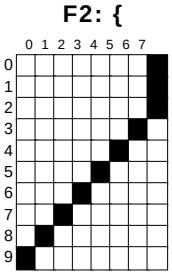
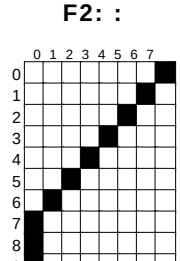
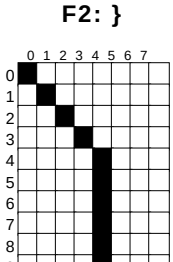
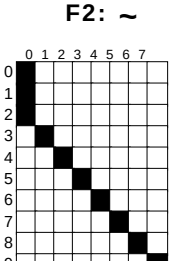
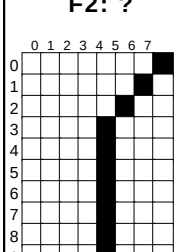
Appendix A

F1: @  **64**	**F1: A**  **65**	**F1: B**  **66**	**F1: C**  **67**	**F1: D**  **68**	**F1: E**  **69**	**F1: F**  **70**
F1: G  **71**	**F1: H**  **72**	**F1: I**  **73**	**F1: J**  **74**	**F1: K**  **75**	**F1: L**  **76**	**F1: M**  **77**
F1: N  **78**	**F1: O**  **79**	**F1: P**  **80**	**F1: Q**  **81**	**F1: R**  **82**	**F1: S**  **83**	**F1: T**  **84**
F1: U  **85**	**F1: V**  **86**	**F1: W**  **87**	**F1: X**  **88**	**F1: Y**  **89**	**F1: Z**  **90**	**F1: [**  **91**
F1: **  **92	**F1:]**  **93**	**F1: ^**  **94**	**F1: _**  **95**			

unused  96	F1: a  97	F1: b  98	F1: c  99	F1: d  100	F1: e  101	F1: f  102
F1: g  103	F1: h  104	F1: i  105	F1: j  106	F1: k  107	F1: l  108	F1: m  109
F1: n  110	F1: o  111	F1: p  112	F1: q  113	F1: r  114	F1: s  115	F1: t  116
F1: u  117	F1: v  118	F1: w  119	F1: x  120	F1: y  121	F1: z  122	F1: {  123
F1: :  124	F1: }  125	F1: ~  126	F1: ?  127			

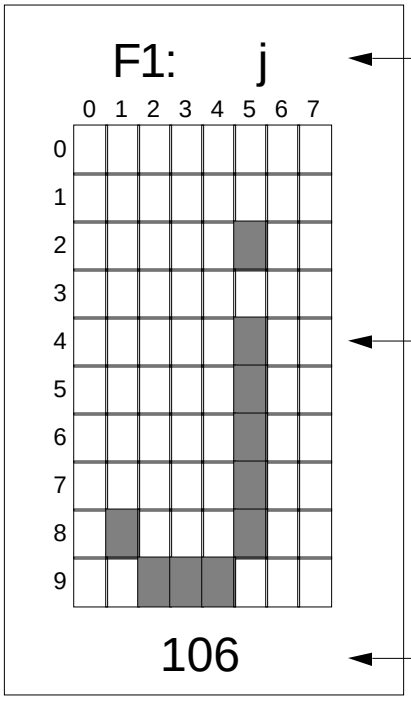
Appendix A

F2: @  128	F2: A  129	F2: B  130	F2: C  131	F2: D  132	F2: E  133	F2: F  134
F2: G  135	F2: H  136	F2: I  137	F2: J  138	F2: K  139	F2: L  140	F2: M  141
F2: N  142	F2: O  143	F2: P  144	F2: Q  145	F2: R  146	F2: S  147	F2: T  148
F2: U  149	F2: V  150	F2: W  151	F2: X  152	F2: Y  153	F2: Z  154	F2: [ 155
F2: \  156	F2:]  157	F2: ^  158	F2: _  159			

unused  **160**	**F2: a**  **161**	**F2: b**  **162**	**F2: c**  **163**	**F2: d**  **164**	**F2: e**  **165**	**F2: f**  **166**
F2: g  **167**	**F2: h**  **168**	**F2: i**  **169**	**F2: j**  **170**	**F2: k**  **171**	**F2: l**  **172**	**F2: m**  **173**
F2: n  **174**	**F2: o**  **175**	**F2: p**  **176**	**F2: q**  **177**	**F2: r**  **178**	**F2: s**  **179**	**F2: t**  **180**
F2: u  **181**	**F2: v**  **182**	**F2: w**  **183**	**F2: x**  **184**	**F2: y**  **185**	**F2: z**  **186**	**F2: {**  **187**
F2: :  **188**	**F2: }**  **189**	**F2: ~**  **190**	**F2: ?**  **191**			

Pixel Maps

Pixel maps shown on the preceding pages are offered in order to assist you in using the special characters to create displays. Refer to the following illustration for the conventions used in describing this character set.



'F1: j' identifies what key combinations cause this character to be typed to the screen. The F1 identifies the character group (i.e. F0, F1, F2, or F3), and the lower case 'j' indicates that the 'J' key unshifted will cause this letter to be typed to the screen.

The eight by ten pixel map is shown with each pixel row and column numbered. This will help in the alignment of lines and symbols when creating images.

'106' identifies the Character ID Code. The Character ID Code is used in linking. Refer to Bit Link qualifier /0='nnn'.

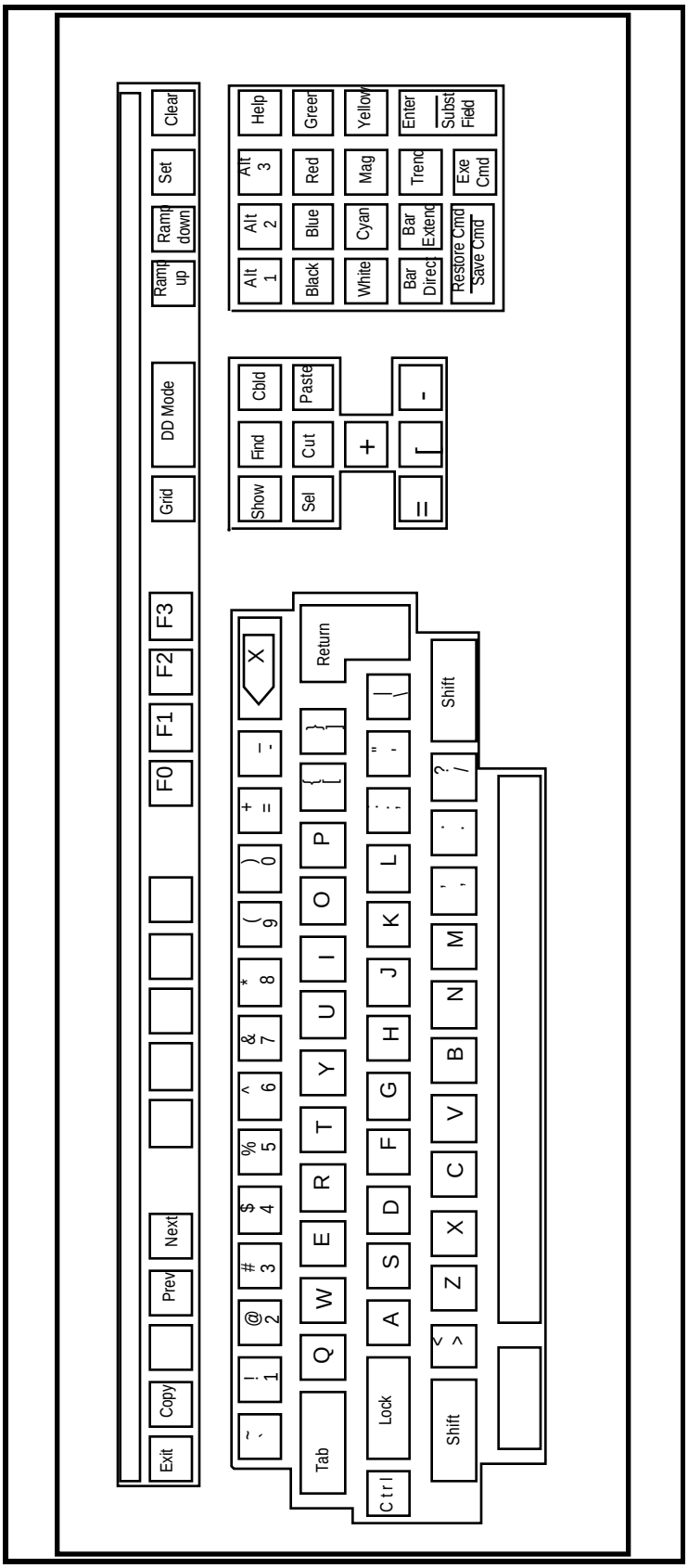
Character ID Codes

The following chart shows the Character ID codes associated with each keyboard character. The column on the left shows the F1 character (i.e. the character typed from that key (shifted and unshifted) when F1 is selected). The columns to the left show the Character ID codes associated with the other character sets.

Key	CHARACTER ID CODES			
	F1	F0	F2	F3
@	64	1	128	192
A	65	2	129	193
B	66	3	130	194
C	67	4	131	195
D	68	5	132	196
E	69	6	133	197
F	70	7	134	198
G	71	8	135	199
H	72	9	136	200
I	73	10	137	201
J	74	11	138	202
K	75	12	139	203
L	76	13	140	204
M	77	14	141	205
N	78	15	142	206
O	79	16	143	207
P	80	17	144	208
Q	81	18	145	209
R	82	19	146	210
S	83	20	147	211
T	84	21	148	212
U	85	22	149	213
V	86	23	150	214
W	87	24	151	215
X	88	25	152	216
Y	89	26	153	217
Z	90	27	154	218
[	91	28	155	219
\	92	29	156	220
]	93	30	157	221
†	94	31	158	222
_	95	32	159	223

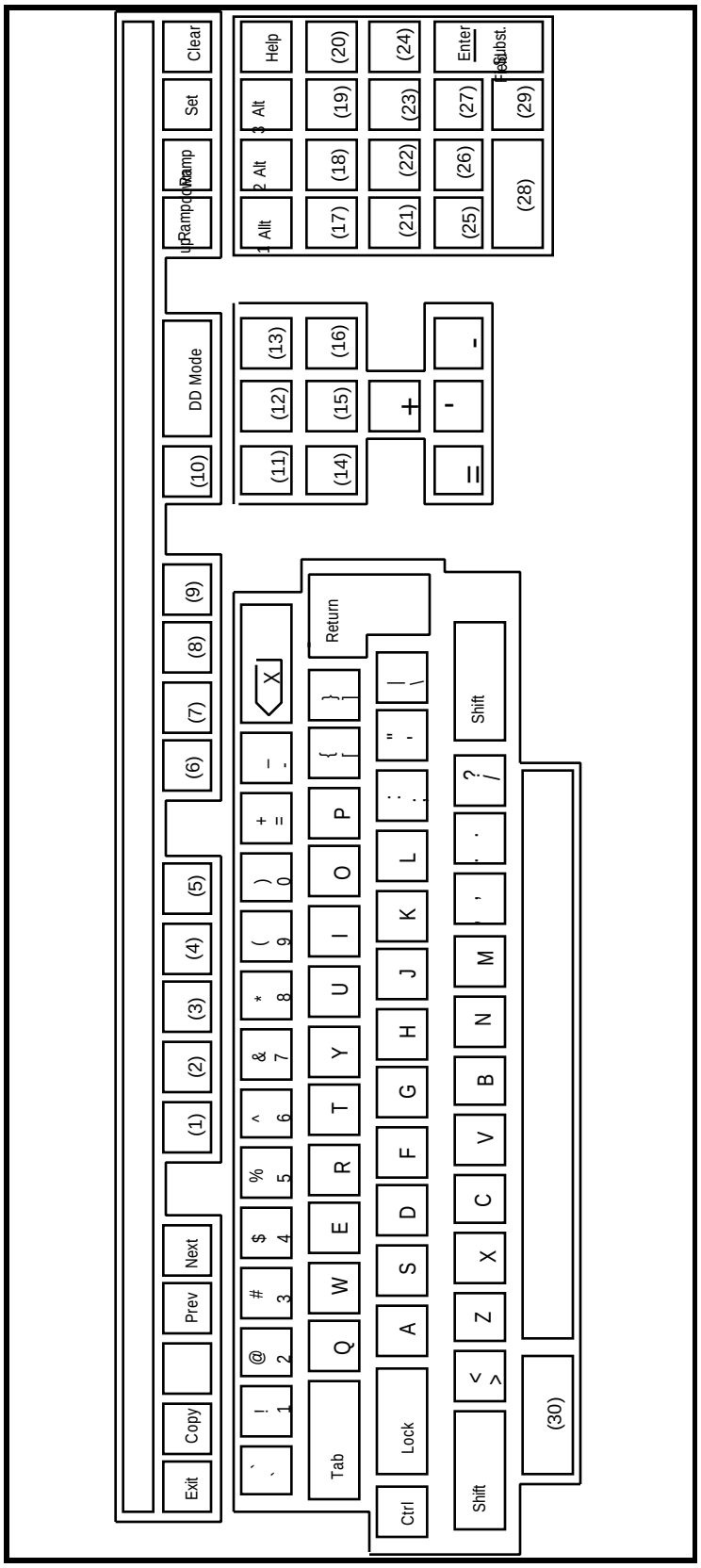
Key	CHARACTER ID CODES			
	F1	F0	F2	F3
unused	96	32	160	224
a	97	33	161	225
b	98	34	162	226
c	99	35	163	227
d	100	36	164	228
e	101	37	165	229
f	102	38	166	230
g	103	39	167	231
h	104	40	168	232
i	105	41	169	233
j	106	42	170	234
k	107	43	171	235
l	108	44	172	236
m	109	45	173	237
n	110	46	174	238
o	111	47	175	239
p	112	48	176	240
q	113	49	177	241
r	114	50	178	242
s	115	61	179	243
t	116	62	180	244
u	117	63	181	245
v	118	64	182	246
w	119	65	183	247
x	120	66	184	248
y	121	67	185	249
z	122	68	186	250
{	123	69	187	251
:	124	70	188	252
}	125	71	189	253
~	126	72	190	254
?	127	73	191	255

CRISP Basic Workstation Keyboard



CRISP Basic Workstation Keyboard

Showing location of user-definable keys (in parentheses)



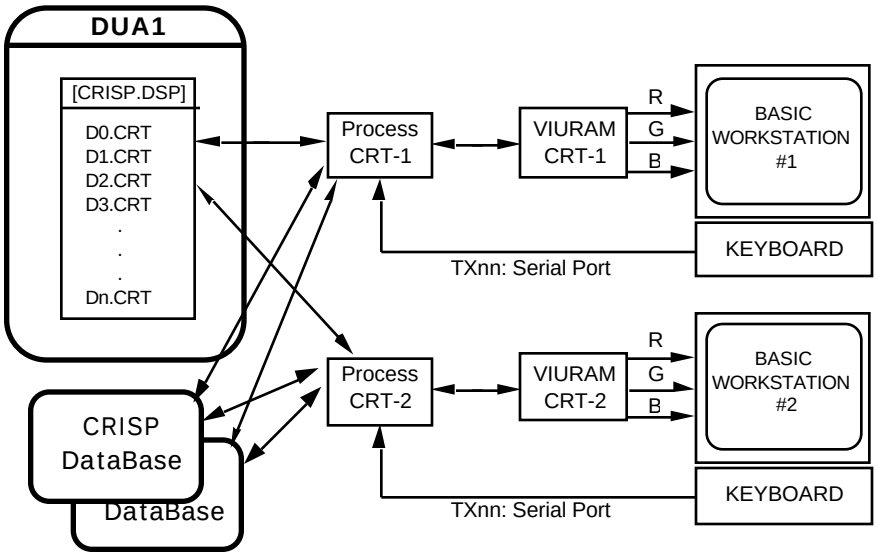
File Organization

Each Basic Workstation display screen is stored in its own file. These display screen files are named:

Dn.CRT

Where 'n' is the display screen number; for example, display screen 38 is stored in file D38.CRT. The Basic Workstation accesses these display files from its default directory (use the SET DEF command). Normally, the default directory is [CRISP.DSP].

When you issue an EDIT, DISPLAY, or DD command, the CRT process writes the display file to its VIURAM. The VIURAM is essentially an external memory region, where the display file is modified by run time events (such as keyboard commands and database value changes).



File Copy

In order to create new display files for your system, copy an existing display screen file. This is done using the VAX DCL COPY command. (Type COPY at a system console; you will be prompted for the rest.)

When copying the top half of a 48-line display, the top display file contains the information that links the top screen to the bottom screen. When the top screen is copied, the pairing information remains intact and the newly copied screen will be linked to the 'old' bottom half.

] **Caution:**]

Extreme care should be exercised when copying the top half of a 48-line display. You will have to shut down and restart the CRT process if the copied screen is later accessed and the 'old' bottom screen is not available for display (the display file remains locked when the CRT process unwinds).

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