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TECHNICAL MANUAL
PROGRAMMING MANUAL

OPTICAL CHARACTER READER
RP-238/GYX

HEADQUARTERS, DEPARTMENT OF THE ARMY
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" # S0392 (3)
" # JO861 (10)
" # CO214 (2)

NG: NONE

USAR: NONE

For explanation of abbreviations see, AR 310-50.

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INTRODUCTION

1. GENERAL. - The information contained in this manual describes the programming of the Optical Character Reader RP238/GYX, manufacturcd under contract number MDA904-96-C-0246.

2, SCOPE AND PURPOSE OF MANUAL. - This manual contains all information necessary for the programming of the equipment. The contents of chapters 1 through 4 are described below.

Chapter 1. Output Programming Introduction And Definition. - This chapter provides an introduction to the programming and describes the Output Programming Module.

Chapter 2. Code Conversion Module (Header Sheets). - This chapter describes Header Sheet Sets, how to load these sets and the Header Module,

Chapter 3. Head Sheet Set Preparation. - This chapter describes how to prepare header sheets for use in this equipment.

Chapter 4. @ Commands. - This chapter defines the @ command and describes other commands used in the programming.

CHAPTER 1

OUTPUT PROGRAMMING INTRODUCTION AND DEFINITION

1-1. OUTPUT PROGRAMMING INTRODUCTION. - The Optical Character Reader RP-238/GYX (hereinafter referred to by its commercial odel name "ALPHA") converts typewritten characters into coded electrical data. The data codes must be defined by the user and stored in the ALPHA memory.

For each and every typed character, or set of characters, a corresponding code conversion must be programmed in memory which defines the character(s) (Input String) to be converted, and the coded data (Output String), which the ALPHA will output for that conversion. Any character not defined in an Input String will be dropped from the output. For example, if the is not defined, any "A"s that appear in the typed message form are not code converted and will not appear in the output.

Careful loading of Header Sheet Sets is critical for complete character set definition. If entries are not typed within the scanning area, they will not be stored and will not be output.

1-2. OUTPUT PROGRAMMING DEFINITION, - The ALPHA Output Programming Module consists of two sections:

a. Section one converts scanned input characters and certain physical page characteristics to any predetermined output code

Prior to putting to the data base. This section is described in the Code Conversion Header Module section.

b. Section two processes commands which will establish or change the criteria being used for scanning the message text. These commands are described in the @ command section.

CHAPTER 2

CODE CONVERSION MODULE (HEADER SHEETS)

2-1. HEADER SHEET SET DESCRIPTION, - Header Sheet sets are typed pages conforming to the rules set forth below. A set consists of two parts:

a - A Cover Page which contains commands necessary for setting the machine up to read and load code conversion information.

b- Header Pages which contain the data which defines the code conversions.

The steps necessary for the creation of the Cover Page and Header Pages are described in paragraphs 3-2 and 3-3 respectively.

2-2. LOADING HEADER SHEET SETS. - Header Sheet Sets are loaded the same way as Message Pages with the exception that the Output Switch should be held in the OFF position for the first page. It may be released for subsequent pages.

The Header Sheets must be in the proper order as described in paragraph 3-3h. Failure to have the sheets in order may result in a Header Error. The various types of Header Errors are found in Table 2-1. Care should be taken to insure that all the sheets are loaded as a missing page will result in failure to perform the code conversions listed on that Reader Page.

2-3. HEADER MODULE ERROR HANDLING, - The Header' Module checks to see if certain error conditions occur in scanned input. If for any reason an error is found, the alarm buzzer will sound

and a standard format error message will be displayed on the three-digit LED Display located on the control Console. The line which caused the error will be visible in the Key Optics window, with the scan head normally stopped in the left-most position.

The display will contain:

(Bel) - H - n

Where:

(Bel) is a character signifying an error message

H signifies a Header Module error (Table 2-1)

n is a digit from 0 through 8 to indicate the type of error encountered.

The only two responses possible to an error halt are either pressing the "CONTINUE" 9witch or the "START" switch. "CONTINUE" will allow scanning to resume with the next line on the page, but all processing will have halted at the point in the line where the error was encountered. "STAR T" will eject the current page, cause a Page Abort character to be processed for code conversions, and begin scanning of the next page.

CAUTION - If for any reason an error is generated while scanning a Header Sheet, the user may continue scanning and finish the entire code conversion table. However, he will not be permitted to generate any output from a code conversion table stored t hi s way. This feature allows a complete trial scanning of Header Sheets

to check for errors yet prevents. accidental outputting from a table which has an error. This is particularly useful in scanning Header Sheet Sets which have been used many times to check whether they have become smudged from long use. If many stops occur while trying to input from an old set of, Header Sheets, the set should be replaced with a new set.

The only way to completely recover, from an error is to reload and rescan the entire Header Sheet Set.

Table 2-1

Header Errors

LED DISPLAY	ERROR DESCRIPTION
BEL-H-0	A number in a @ command or on a Header Sheet was larger than the allowed maximum for a number used in this context.
BEL-H-1	Illegal @ code on Header Sheet line.
BEL-H-2	Header Sheets out of sequence. (i.e. an attempt was made to read a longer input string length code.
BEL-H-3	Illegal character to the right of the equal sign on a Header Sheet line.
BEL-H-4	Missing, or incomplete, specification of output field (right of equal sign) on a Header Sheet.
BEL-H-5	Attempt to output from incorrectly defined code conversion table.
BEL-H-6	@ Command error (such as no space following the command).
BEL-H-7	Code Conversion Table Full.
BEL-H-8	Scanning Parameter error (out of range)

CHAPTER 3

HEADER SHEET SET PREPARATION

3-1. PHYSICAL REQUIREMENTS. -

a. Paper. - Any good quality paper may be used. It should be 24 lb. white bond or 60 Lb, white offset. It must be unbleached, not watermarked, rough finish paper.

b. Typing Header Sheets. - Header Sheets are typed double-spaced on 8" x 10-1/2" pages using DD-173 margins. A one-time carbon ribbon must be used in the preparation, Deletion Symbol Editing may be used where necessary as described in the Operations Manual.

3-2. COVER PAGE PREPARATION. - The first page of each Header Sheet Set is the "Cover Page" containing statements to set up the ALPHA to accept the data typed on the subsequent Header Pages. The statements are of three types: "Initialize", "Clear Header," and "Parameter"= Each is described more fully below. It is important that these statements be typed in the order presented below.

a. Initialize Statement - This statement - @I@ - sets the ALPHA's scanning parameters to a set of preprogrammed values, See the @I@ statement explanation in paragraph 4-2 for a complete listing of the preprogrammed values.

b. Clear Header Table Statement, - This statement - @C1@ - clears and initializes the Header Table already in memory. This table must be cleared prior to loading new Header Sheets-

c. **Parameter Statements.** - If it is desired to set any of the scanning parameters to values other than the preprogrammed values, @ commands may be included on the Cover Page to establish the desired values. The @ commands are listed and described in paragraph 4-2.

3-3. **HEADER PAGE PREPARATION.** -

a. **"Define Header" Statement.** - Header Pages must be defined as being Header Pages by placing a "Define Header" Statement at the top of each Header Page. This.. Definition Statement is written:

@D1@

When more than one typed page is needed for the codes table, all of them must have the @D1@ on the first Line. They must be scanned in proper sequence and therefore should be numbered. (See paragraph 3-3h.) Numbering may be typed near the top edge above the top margin or as a comment on the @D1@ line, or anywhere using a RED felt tip pen. Numbering should include the number of pages to the set as well as the page number.

b. **Code Conversions - Definition.** - Code Conversion is a process whereby one set of data is converted to another set of data. Each input character or combination of characters is matched against a table of "Input Strings" to see if a match is made. When a match occurs, that "Input String" is removed from the data flow and its corresponding "Output String" is placed into the data flow. The Code Conversion Table contains the data necessary for this process. Header Sheets. contain the information necessary to load the Code Conversion Table. This information consists of three parts:

(1) An "Input String" which is the data which will be compared during Code Conversion.

(2) A separator to distinguish the "Input String" from the "Output String." This consists of:

(One or more spaces)(Equal Sign) (One or more spaces)

(3) An "Output String" which: is the data that will replace the "Input String."

The Code Conversion Table is loaded via Header Sheets as described in the following paragraphs.

c. Code Conversions - General Form. - Each Code Conversion is typed on a separate line and has the following format:

[Input String][One or more spaces][=][One or more spaces][Output String]

For example:

@@@E = 015,012

@S = 040

$ = 044

A = 0101

@(215)=012

d. Code Conversions - Types.

(1) Single. - A Single Code Conversion is made when one input character is converted to one output code.

(2) Implosion. - An Implosion Code Conversion is made when the number of codes in the Output String is smaller than the number of characters in the Input String.

(3) Explosion. - An Explosion Code Conversion is made when the number of codes in the Output String is larger than the number of characters in the Input String.

(4) Octal. - The Octal Code Conversion is used to convert the octal code entered in the input string from the ALPHA keyboard. The Code Conversion is written in the form:

@(xxx) = nyyy

where xxx is the internal ASCII code created by keying the character on the keyboard (refer to Table 3-1 on next page) and yyy is the octal number which will be output due to the Code Conversion and n is S, U, 0 or H (see paragraph 3-3g(2)).

e. Context Switches. -

(1) Definition. - Context Switches are characters which are generated by the program and inserted into the flow of data being scanned. These Context Switches indicate certain occurrences in the scanning process as listed and described below. They may be code converted in conjunction with the actual data being read.

For example, one of the Context Switches generated is an End-of-Line character - @E. It might be required to issue to the data base a Carriage Return and a Line Feed whenever an End-of-Line is detected in the scan process. Therefore, a Code Conversion is set up which converts the @E to a Carriage Return and a Line Feed on the output lines. This conversion could be written:

@E = 015,012

(2) List. - The following Context Switches are generated and inserted into the data flow by the scanning process. A complete explanation of each follows this list.

TABLE 3-1

Keyboard Codes

KEY	UNSHIFT		SHIFT		CONTROL	
	LED	OCTAL	LED	OCTAL	LED	OCTAL
	DC1	021	DC1	021	DC1	021
1	1	061	!	041	1	261
2	2	062	"	042	2	262
3	3	063	#	043	3	263
4	4	064	$	044	4	264
5	5	065	%	045	5	265
6	6	066	&	046	6	266
7	7	067	'	047	7	267
8	8	070	(	050	8	270
9	9	071	)	051	9	271
0	0	060	0	060	0	260
-	-	055	=	075	-	255
^	^	136	~	176	RS	036
\	\	134	|	174	FS	034
BACK SPACE	—	—	—	—	—	—
NUL	—	—	—	—	—	—
TAB	HT	011	HT	011	HT	011
Q	Q	121	Q	121	DC1	021
W	W	127	W	127	ETB	027
E	E	105	E	105	ENQ	005
R	R	122	R	122	DC2	022
T	T	124	T	124	DC4	024
Y	Y	131	Y	131	EM	031
U	U	125	U	125	NAK	025
I	I	111	I	111	HT	211
O	O	117	O	117	SI	017
P	P	120	P	120	DLE	020
@	@	100	`	140	NUL	200
[	[	133	{	173	ESC	233

KEY	UNSHIFT		SHIFT		CONTROL	
	LED	OCTAL	LED	OCTAL	LED	OCTAL
_	_	137	_	137	US	037
CR	—	—	—	—	—	—
—	ESC	033	ESC	033	ESC	033
A	A	101	A	101	SOH	001
S	S	123	S	123	DC3	023
D	D	104	D	104	EOT	004
F	F	106	F	106	ACK	006
G	G	107	G	107	BEL	007
H	H	110	H	110	BS	210
J	J	112	J	112	LF	212
K	K	113	K	113	VT	013
L	L	114	L	114	FF	014
;	;	073	+	053	;	273
:	:	072	*	052	:	272
]	]	135	}	175	GS	035
	LF	012	LF	012	LF	012
DEL	—	—	—	—	—	—
Z	Z	132	Z	132	SUB	032
X	X	130	X	130	CAN	030
C	C	103	C	103	ETX	003
V	V	126	V	126	SYN	026
B	B	102	B	102	STX	002
N	N	116	N	116	SO	016
M	M	115	M	115	CR	215
,	,	054	<	074	,	254
.	.	056	>	076	.	256
/	/	057	?	077	/	257
SPACE BAR	—	040	—	040	—	040

Context Switch	Defining
@A	Start of Page
@B	Start of Line
@E	End of Line
@I	Indent Cods
@P	Page Abort
@nS	Space Conversion
@T	Timeout
@Z	End of Page

(3) Descriptions. -

(a) Start of Page (@A). - This Context Switch is generated as soon as paper is detected by the Read Head Assembly at the top. of the page. A line is sent to the Header Module containing the Start of Page character along with the Start and End of Line characters, Therefore, the Start of Page condition should be represented in the input string of a Code Conversion as: @B@A@E.

(b) Start of Line (@B). - This Context Switch is generated at the beginning of each scanned line, and is inserted into the data flow as if the first scanned character on that line was the Start of Line character,,

(c) End of Line (@E). - This Context Switch is generated at the end of each scanned line, and is inserted into the data flow as if the last character scanned on that line was the End of Line character.

(d) Indent (@I). - This Context Switch is generated and substituted for five or more spaces at beginning of line if space compression (paragraph 4-2) is on.

(e) Page Abort (@P). -If, for any reason while scanning a page, the "START" switch is pressed after a stop, the ALPHA will perform a "Page Abort." A line will be passed to the Header Module containing the Page Abort character along with the Start and End of Line characters. Therefore, a Page Abort Code Conversion should have @B@P@E for the Input String.

In order to get a Page Abort, a Begin Page must have been generated, so the operator may press "STOP" and "START" completely at will between pages.

If "RESET" is pressed at any time, a press of "START" will not generate a Page Abort regardless of whether a page is presently being scanned.

(f) Space Conversion (@nS). - This Context Switch is used whenever it is desired to do a Code Conversion of spaces. Since the rules for forging Code Conversions prohibit the' inclusion of spaces in the Input String (paragraph 3-3f), this Context Switch provides the means for specifying spaces for conversion. The Space Conversion form is (@nS) where "n" equals the number of spaces which must be scanned consecutively for a match to occur, and the Code Conversion to take place, If "n" equals one, it may be omitted,

(9) Timeout (@T). - This character is generated whenever the ALPHA i s in "RUN" and no paper feeds for approximately

one minute. A line is passed to the Header Module containing the Timeout character along with the Start and End of Line characters, Therefore, a Code Conversion for a timeout should have a @B@TaE Input String. If a continuation code has not been executed, whatever actions are specified in the Code Conversion Output String specification will. be performed. The ALPHA will also shut down all mechanical motion and enter the Standby Mode.

(h) End of Page (@Z). - This character is generated whenever the scanner determines that a page has finished- This may be because the Page Finish Criteria has been met (two blank lines by default), or because the Scan Head ran off the paper, or because the bottom margin has been crossed. When this occurs, a line is sent to the Header Module containing the End of Page character along with the Start and End of Line characters- Therefore, the Input String should be represented as @B@Z@E.

f. Input Strings. -

(1) Definition. - An Input String consists of a typed character or set of characters which will be compared with the data being read to see if a match exists. When the input data matches an Input String, a Code Conversion will be made and the Input String will be replaced with its corresponding Output String.

The Input String may consist of any number of typed characters or Context Switches with no embedded spaces.

For example:

@B@A@E = 0202 generates even parity ASCII STX Character for every start of page.

@@BQQ@2SQQ - i causes no data to be output from a line beginning _ "Q Q sp sp Q Q"

g- Output Strings -

(1) Definition. - An Output String is the data which will be substituted for an Input String whenever that Input String is scanned by the ALPHA. Output Strings consist of one or more of the following separated by commas:

Character Codes

Subroutine Commands

Field Delimiters

Ignore Instructions

If an Output String will not fit on one typed line, it may be continued by typing an "@," at the start of the next line and continuing the string.

For example:

@B@P@E =037,010,010,02,01,04,01,04,01,04,01,04,04,04,01,04, @,01,04,01,03,012 - generates LTRS 2CR LF E E E E E E E E AR, in ITA-2, for a Page Abort.

A Code Conversion may not be continued beyond the end of a page.

(a) Entries in the Output String must be separated by commas. The following are valid Output Strings,

033,U20,U20,U20

U06,<3, HA9, S33

U07,022,X,033,X,S12

(2) Character Codes. - A Character Code is the data that will be written in the Output String when an Input String is matched. These Character Codes have the format:

Xddd

where X is any of the following:

S = Shift (octal);

U = Unshift (octal);

0 = Neutral (octal);

D = Neutral (decimal);

H = Neutral (hexademical);

and ddd is:

a one, two, or three digit octal number when X = S, U, or 0;

a one, two, or three digit decimal number when X = D;

a one or two digit hexidecimal number when X = H.

(3) Subroutine Commands. - Subroutine Commands may be inserted into the Output String when it is desired to have the Code Conversion result in the calling of a particular subroutine. The Subroutine Command is written:

<N

where N may be a numeral or an alphabetic character

NUMERAes

N = 0 Resets the XSTOP Flag;

N = 1 Sets the XSTOP Flag;

N = 2 Resets the YSTOP Flag;

N = 3 Sets YSTOP Flag;

N = 4 Sets the Default Shift Status and suppresses End of Page output if defined (see description below);

N = 5 NULL Output (see description below).

(a) Subroutine No. 4. - Whenever Subroutine No. 4 is executed, the Begin Job shift status is forced in the ALPHA's shift register. The default Begin Job Shift State is usually Shift, but may be changed using the @B command.

When the ALPHA is on-line, it can be programmed to send whatever character is desired to signal the successful completion of a page. If it is desired to suppress this End of Page character, Subroutine No. 4 should be called by some previously defined Code Conversion.

(b) Subroutine No. 5. - Whenever Subroutine No. 5 is called, it must be followed by:

Dxxx

where xxx is a one, two, or three digit decimal number giving the number specifying the number of desired NULLS to be output.

(c) For Alphabetic Characters, - The following letters may also follow the <, They also specify subroutines, but they are chosen identically to the letter used in the @ command which performs the same function.

<A	Change Number of Data and Stop Bits;
<E	Change End Line Criteria;
<F	Change Space Compression Flag;
<L	Change Left Margin;
<R	Change Null Line Criteria;
<O	Change Bottom Margin;
<P	Change Page Finish Criteria;
<R	Change Right Margin;
CT	Change Top Margin.

When any of these subroutines are called, they must be followed by a comma and character specification which serves to give the new value of that scanning parameter, subject to the same limits as specified in the corresponding @ command. The most convenient character to use is a decimal specifier.

For example:

/L = <L,D20

will cause a new left margin of 2.0 inches to be set for the line following the one with the "/L" typed on it.

(4) Field Delimiters. - The Field Delimiters are X and Y Stops. When a pair of X's occur in an Output String, the codes that occur between them are output only if the XSTOP Flag is reset, Otherwise, they are suppressed. Similarly, when a pair of Y's occur in an Output String, the characters between them are output only if the YSTOP Flag is reset. Otherwise, they are suppressed. The YSTOP Flag is customarily used to suppress leading spaces on new lines depending on the

end of line conditions on the preceding Line, Note that X and Y are always used in pairs within an Output String.

(5) Ignore Instruction. - Whenever "I" by itself comprises the Output String, the Input String shalt be ignored by the ALPHA, i.e. removed from the data f low and not output.

h= Ordering of Code Conversions. - Code Conversions must be scanned in order of decreasing Input String length. Thus, if the longest Input String contains five characters, then all five character Input String Conversions are scanned first, then all four character Input String Conversions, etc, Input items such as @B, @E etc., count as one character each. @nS counts as "n" characters. Pages should be made up to contain conversions of the same length, then the pages placed in order by descending Input String length. Once in order and the Cover Page is included, the pages should be numbered as to their order and the total number of pages to the set.

i. Comment Lines. - Comment lines which are not part of the Codes Table may be typed on a Header Page for any purpose such as for identification or explanation. Comment lines have the format:

[@][One or more spaces][Any Text]

j. Sample Header Sheet Sets, - This section contains required Code Conversions for the typical installation and sample Header Sheet Sets:

CHAPTER 4

@ COMMANDS

4-1. DEFINITION -@ commands provide the means for setting and changing the various parameters used in the scanning process.

@ commands may appear anywhere on a text page, except for @D1@.

4-2. Text

a. @An,x@ - Change Number of Data Bits and Stop Bits. - This command establishes the form of serial data which will be output where "n" is the decimal number of stop bits (one or two) and "x" is the decimal number of data bits (five to eight). There is always one start bit. This instruction takes effect with the outputting of the current line. Initializing sets preprogrammed default values of eight data bits and one stop bit.

b. @Bn@ - Select Begin Job Shift State. - Where n is an S, *U, or* N (for Shift, Unshift, and Neutral, respectively:. They immediately change the ALPHA shift state to what is specified and remember the state for use. by subroutine No. 4.

Example: At End of Message, it might be necessary to leave the scanner in Unshift for the start of the next message or, if it is desired to always get a shift or unshift character as the first character of a message, the Begin Job Shift State may be made neutral. (See subroutines and @I@ command.)

c. @C1@ - Clear Codes Table. - This erases the Codes Table in memory.

d. **@D1@ - Define Codes Table.** - This command must appear on the first line of all Header Pages. This @ command causes the ALPHA to enter Header Definition Mode and to remain in this mode until the end of the current page. Every remaining line on this page will be expected to conform to Header Definition Language. Any text typed to the right of this code on a line will be ignored.

e. **@Eddd@ - Select End Line Criteria.** - Where ddd is a decimal number specifying the number of blank spaces which will end scanning of a typed line. This new criteria takes effect on the following line.

f. **@Fn@ - Select Space Compression Flag.** - Where n is either a 0 or 1. If the flag is reset (O) all scanned spaces embedded in text and at beginning of line, but not end of line, will be left intact for Code Conversion. If the flag is set (1) all multiple spaces will automatically be compressed to a single space for Code Conversions. Spaces at beginning of line (up to five) will be suppressed. Five or more spaces will be converted to an indent code.

g. **@I@ - Initialize (Set All Preprogrammed Values).** - Sets the ALPHA's internal Code Conversion and scanning parameter values to a set of preprogrammed ones:

(1) Code Conversions. -

(a) The Shift character set to 17 (octal).

(b) Unshift character set to 16 (octal).

(c) Begin Job Shift Status set to Neutral.

(d) Current Shift State set to Shift.

(e) Space Compressicn Flag set to off (not compress).

(2) Scanning Parameters. -

(a) Top Margin set to 0.6 inches.

(b) Left Margin set to 0.4 inches.

(c) Right Margin set to 7.6 inches.

(d) Bottom Margin set to 7.9 inches.

(e) End of Line Criteria set to 6 8 spaces.

(f) Null End Line Criteria set to 3.0 inches from left margin.

(g) Page Finish criteria set to 2 blank lines.

(h) Vertical spacing set to the 6 lines per inch range.

This command unconditionally sets the X and resets the Y conditional STOP flags. (See "Subroutines" and "Field Delimiters.")

h. @Lddd@ - Select New Left Margin. - Where ddd is a decimal number representing tenths of inches giving the desired new left scanning margin. The minimum left margin is 0.4 inches (ddd = 04). The maximum left margin is one-tenth inch less than the current right margin value.

Note;- It is recommended that the left margin be set approximately two-tenths inches Less than the actual typed left margin to insure no characters are Lost at start of line if a typist is slightly careless. This command takes effect on the next scanned line.

i. @Ndd@ Select Null Line Criteria. - Where ddd is a decimal number representing the number of tenths of inches to scan from left margin before deciding that a line is blank and terminating scanning. The minimum value is 0.1 inches. The maximum is 6.3 inches. This command takes effect on the next scanned line.

j. @Oddd@ - Select New Bottom Margin. - Where ddd is a decimal number in tenths of inches. The minimum value is one-tenth inch greater than the current top margin value. The maximum value is 25.1 inches. This command takes effect on the next page.

k. @Pddd@ - Select Page Finish Criteria. - Where ddd is a decimal number representing the number of blank lines required to end scanned page. This command takes effect immediately. Minimum Page Finish Criteria is one line. The maximum is 255.

l. @Rddd@ - Select Right Margin. - Where ddd is a decimal number representing tenths of inches giving the desired new right scanning margin, The minimum right margin is one-tenth larger than the current left margin value. The maximum right margin is 10.5 inches (ddd = 105), This command takes effect on the next line scanned.

m. @Sddd@ - Define Shift Character. - Where ddd is a one, two, or three digit octal value of the desired character. This command must be used if for any reason it is desired to select other than the ALPHA default value. (See @I@ command.) This command takes effect immediately,

n- @Tddd@ - Select New Top Margin - Where ddd is a decimal number representing tenths of inches giving the desired new top scanning margin. The minimum top margin is five-tenths inches (ddd = 05). The maximum top margin is one-tenth inch less than the current bottom margin value.

0. @Uddd@ - Define Unshift Character. - Defined just as Shift Character Command (@Sddd@).

p- @Vd@ - Select Vertical Line Spacing. - Where d may be a 4, 5, or 6 to represent the single space line spacing of the typed pages. This command sets the range of the vertical spacing. The "Line Spacing" switch on the Format Panel selects the single or doutle spaced distance within that range. This command takes effect after the next line.

Example-- @V6@ allows the choice of 3 or 6 LPI
@V5@ allows the choice of 2.5 or 5 LPI
@V4@ allows the choice of 2 or 4 LPI

APPENDIX A

SAMPLE HEADER SHEETS

@D1@

@B@P@E = 030

@B@A@E = 03,<F,D1

@B@T@E = I

@B@Z@E = 03

@B@S@E = I

@B@2S = I

@B@S = I

@B@E = 012

@E = 012,<F,D0

@S = 0240

@(212) = 012

@(215) = 0215

@(16) = 0216

@(17) = 017

@C1@

@I@

@L005@

SD1S

A = 0101

B = 0102

C = 0303

D = 0104

E = 0305

F = 0306

G = 0107

H = 0110

I = 0311

J = 0312

K = 0113

L = 0314

M = 0115

M = 0116

O = 0317

P = 0120

Q = 0321

R = 0322

S = 0123

T = 0324

BD10

U = 0125

V = 0126

W = 0327

X = 0330

Y = 0131

Z = 0132

0 = 060

1 = 0261

2 = 0262

3 = 063

4 = 0264

5 = 065

6 = 066

7 = 0267

8 = 0270

9 = 071

: = 072

; = 0273

< = 074

= = 0275

0D1A

> = 0276

? = 077

! = 041

" = 042

= 0243

$ = 044

% = 0245

& = 0246

' = 047

(= 050

) = 0251

+ = 053

, = 0254

- = 055

. = 056

/ = 0257

[= 0333

] = 0335

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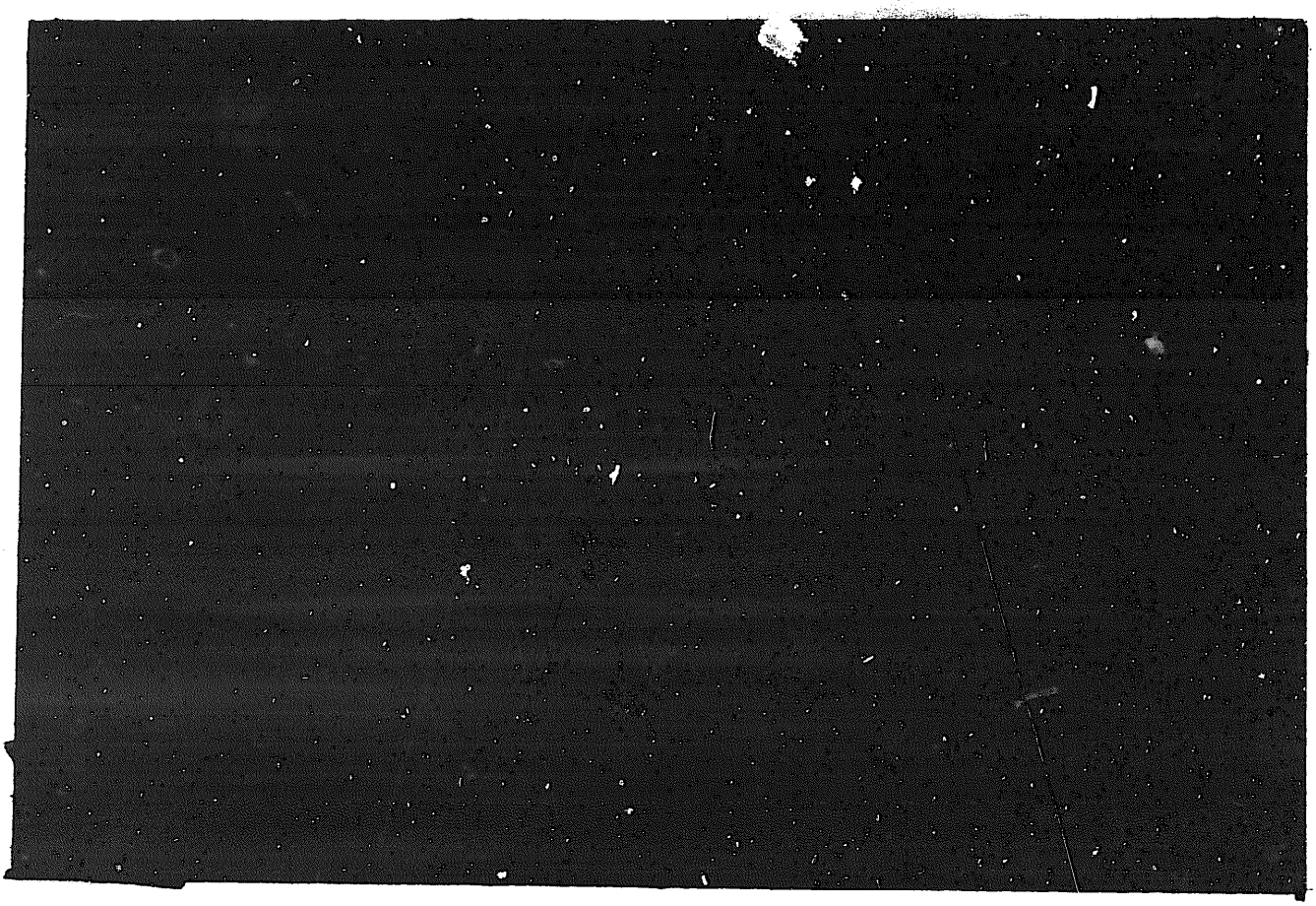

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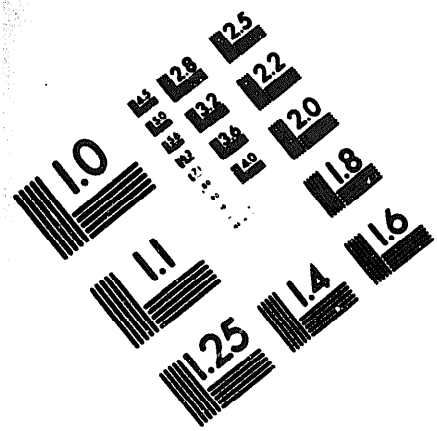
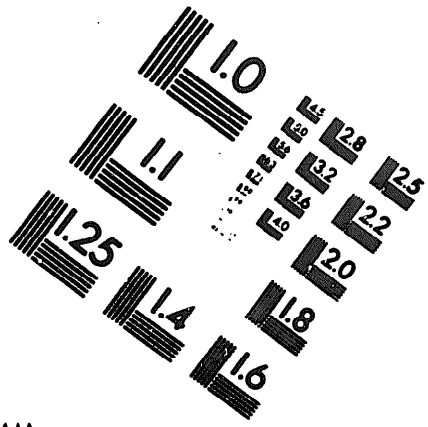
TEST TARGET





150 MM

1.0 mm (e= .81 mm)

ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890
abcdefghijklmnopqrstuvwxyz$¢£/%#½¼¾—=+×&@*

1.5 mm (e= 1.09 mm)

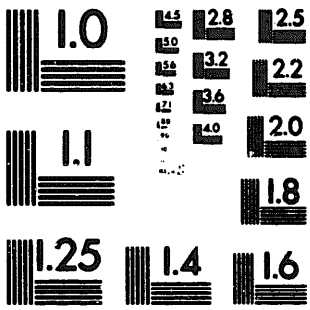
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890
abcdefghijklmnopqrstuvwxyz$¢£/%#½¼¾—=+×&@*

2.0 mm (e= 1.37 mm)

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890$¢£/%#½¼¾—=+×&@*

2.5 mm (e= 1.77 mm)

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890$¢£/%#½¼¾—=+×&@*



1.0 mm (e= .81 mm)

ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890
abcdefghijklmnopqrstuvwxyz$¢£/%#½¼¾—=+×&@*

1.5 mm (e= 1.09 mm)

ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890
abcdefghijklmnopqrstuvwxyz$¢£/%#½¼¾—=+×&@*

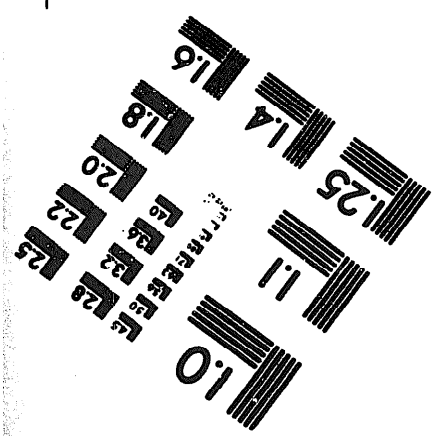
2.0 mm (e= 1.37 mm)

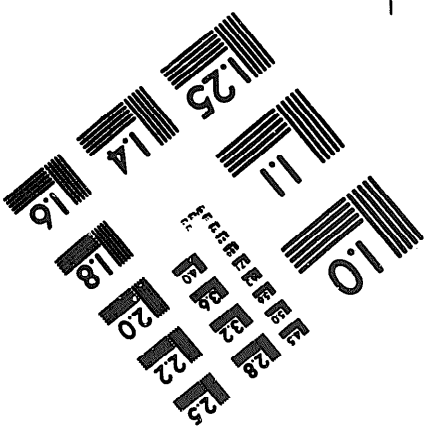
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890$¢£/%#½¼¾—=+×&@*

2.5 mm (e= 1.77 mm)

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890$¢£/%#½¼¾—=+×&@*

200 MM





250 MM