

OPERATOR'S MANUAL
FOR CHECKING SYSTEM

Submitted to: Geological Survey
of Canada

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FOR
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Experimental Airborne Operations

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OVERVIEW

This document details the operational procedures of the Field Checking System for the Experimental Airborne Operations of Geological Survey of Canada. The System will reside in the field laboratory during field operations.

Using a Beechcraft B80 Queenaire aircraft, sampling lines are flown to record aeromagnetic data using the Aeromagnetic Data Acquisition System, built internally at Energy Mines and Resources. This combined magnetic and navigational data is stored, during flight, on a rigid disk drive.

Magnetic data will also be collected at a Diurnal Ground Station and stored on a hard disk. The hard disk cartridges can be removed from their acquisition systems and taken to the field laboratory for data verification and transfer to magnetic tape, a permanent storage medium. An IBM-AT will be used to verify the recorded information, to plot magnetic data on a printer/plotter, to perform fourth difference calculations and to copy data between hard disk and magnetic tape. As well, the System will allow the creation of an edited tape, to be sent to the Booth Street Laboratories of E.M.R. for computer compilation of the resultant aeromagnetic maps.

SECTION I
OPERATIONAL PROCEDURES

	Page
1.0 OPERATOR INTERFACES REVIEWED	1
1.1 Keyboard	1
1.2 Display	1
1.3 Modifying Values on the Screen	4
2.0 GAINING ACCESS TO THE FIELD CHECKING SYSTEM	6
2.1 VENIX Login	6
2.2 FSC Invocation	6
3.0 SYSTEM SPECIFICATIONS	9
3.1 Logical Unit Numbers	11
3.2 Recording Parameters	14
3.2.1 Parameter Code	14
3.2.2 Parameter Mnemonic	15
3.2.3 Parameter Type	15
3.2.4 Parameter Length	16
3.2.5 Parameter Scale	16
3.2.6 Parameter Sign	17
3.2.7 Parameter Units	18
3.2.8 Paging	18
3.3 Airborne Data Check Set and Header	24
3.3.1 Data Check Set	24
3.3.2 Block-Print Header	25
3.4 Diurnal Data Check Set and Header	28
3.5 Storage Device Specifications	30
3.5.1 Disk Drive Specifications	30
3.5.2 Magnetic Tape Specifications	32
3.6 Returning to System Specifications Menu	34
3.7 Terminating System Specifications Option	36
4.0 MEDIUM CONTROL UTILITY	37
4.1 Magnetic Tape Functions	39
4.2 Disk Control Functions	43
4.2.1 Format a Cartridge	46
4.2.2 Clear Disk Directory	47
4.2.3 Display Disk Directory	48
4.2.3.1 Disk Directory Definition	48
4.2.3.2 Movement Through Disk Directory	50
4.2.4 Returning to Medium Control Function Menu	51
4.3 Copying and Searching for Data	53
4.3.1 Positioning and Searching Devices	54
4.3.2 Copying Data	57
4.3.3 Returning to Medium Control Function Menu	58
5.0 BLOCK PRINTING	60
5.1 Block Printing Format Selection	60

5.2	Block Printing Frequency Selection	62
5.3	Returning to Main Menu	68
6.0	PLOT PROCESS	70
6.1	Plot Specifications	72
6.1.1	Plot Specification	72
6.1.2	Scale Lines	73
6.1.3	Vertical Scale	73
6.1.4	Fiducial Parameter and Interval	73
6.1.5	Source LUN	74
6.2	Modifying Plot Specifications	76
6.3	Successive Difference Specifications	81
6.4	Plot Generation	82
6.5	Returning to Plot Menu	84
6.6	Returning to Main Menu	85
7.0	STACKED PROFILES	86
7.1	Data Parameter Extraction	86
7.2	Data Inclusion Specifications	91
7.3	Stacked Profile Plot Specifications	94
7.4	Error Handling of Plot Specifications	98
7.5	Stacked Profile Plot Generation	100
7.6	Returning to the Data Inclusion Specifications Display	103
7.7	Returning to the Extraction Parameters Display	103
7.8	Returning to Main Menu	103
8.0	GRADIENT PARAMETER CREATION	105
8.1	Specifications	105
8.2	Gradient Parameter Creation Process	108
8.3	Exiting Gradient Parameter Creation Process	110
9.0	EDIT FUNCTIONS	111
9.1	Batch Editor	113
9.1.1	Edit Limits	113
9.1.2	Dump Blocks Unchanged	116
9.1.3	Add A Value to an Existing Parameter	118
9.1.4	Replace a Parameter Value	120
9.1.5	Delete/Add a Parameter	122
9.1.5.1	Parameter Deletion	122
9.1.5.2	Parameter Insertion	122
9.1.5.3	Verification	125
9.1.6	Change a Digit	127
9.1.7	Check For Spikes	130
9.1.8	Batch Editor Invocation	133
9.2	Screen Editor	135
9.2.1	Editor Keys	135
9.2.2	Read A Block to Screen	138
9.2.3	Paging	138
9.2.4	Cursor Movement	138

9.2.5	Changing a Character	139
9.2.6	Character Deletion	139
9.2.7	Character Insertion	140
9.2.8	Backwards One Block	140
9.2.9	Error Check A Block	141
9.2.10	Writing a Block from Screen	142
9.2.11	Exiting Screen Editor	142
9.3	Returning to the Main Menu	142

OPERATIONAL PROCEDURES

1.0 OPERATOR INTERFACES REVIEWED

The Operator will provide input and control to the system entirely through the IBM-AT keyboard terminal. The AT's Video Display Monitor will create a display of twenty-five lines by eighty characters which will be used to inform and prompt the operator.

1.1 Keyboard

The IBM-AT Keyboard will be used to provide any requested inputs during operation of the system as well as providing system control. Prompts and menus will be issued on the Display to assist the Operator when commands and data are required by the system.

1.2 Display

The display is 25 lines of 80 characters each. However, only certain areas of the display will be available to the Operator. The screen layout is illustrated in Figure 1-2.

The largest portion of the display will be known as the Presentation Area. This zone will be 20 lines by 78 characters and will be enclosed by a rectangular box.

Immediately below the Presentation Area will be a line dedicated to displaying error and status messages. This line will be referred to as the Error Line Window. Error and status messages will be highlighted using inverse video.

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Below this will be a line on which all Operator prompts will be printed. This line will be referred to as the Prompt Line Window.

The bottom line of the display will be designated as the Operator input zone. This line will be referred to as the Input Line Window. All input will be made here, with the exception of screen editing explained in following subsections (prompts will inform the Operator when screen editing is in effect).

```
0123 . . . column . . . . . 79

0  +-----+
1  |
2  |
.  |
.  |
.  |
r  |
o  |
w  |
.  |
.  |
.  |
.  |
.  |
.  |
19 |
20 |
21 +-----+
22 ERROR / STATUS LINE
23 PROMPT LINE
24 INPUT LINE
```

Figure 1-1-1 IBM-AT Screen Definition

1.3 Modifying Values on the Screen

When the prompt "USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS" is issued on the Prompt Line Window, the Operator will be required to make System definitions in the Presentation Area. This area will be made up of one or more 'fields' which will mark the areas of the display accessible to the Operator.

Each of the fields of the Presentation Area may be modified using the cursoring motions described. The <left> and <right> arrow keys move the cursor along a row and the <up> and <down> arrow keys move the cursor along a column. When a field is to be changed and the cursor is positioned at the beginning of this field, the left and right tab keys will be used to move the cursor along within the field. The right tab is the key marked as -->| and the left tab is the <shift> key and |<-- keys held down simultaneously. This cursor motion provides for nondestructive movement within a field.

To clear data within a field, the Operator will move right using the <spacebar> key. When the tab key is used to position the cursor over a character within a field to be changed, the new character will be added by depressing the key on the keyboard. This new character will overwrite the old and the cursor will be moved one position to the right.

When the end of the field is reached while overwriting data, the cursor will not be moved any further and the bell will sound to inform the Operator of this. Similarly, if nondestructively cursoring and either the end or the beginning of the field is reached cursoring will not be permitted beyond the end and the

bell will sound.

To make space in front of a character in order to add data to a field and move all characters to the right one position, the open, square brace key <[> will be used. BEWARE: the last character in the field will be moved beyond the end and lost. A space will be added at the cursor location.

To remove a character from a field and move all characters to the left one position, the closed, square brace key <]> will be used. In this case, a space is added at the end of the field.

To back up and delete a character while modifying a field, the rubout key <--> will be used. This key is found above the <enter> key. Attempting to back up beyond the start of field will cause the bell to sound.

In cases where a field spans more than one row, movement beyond the end of the first row will reposition the cursor at the beginning of the next: the field can be considered as continuous.

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2.0 GAINING ACCESS TO THE FIELD CHECKING SYSTEM

2.1 VENIX login

To gain access to the Field Checking System, the Operator will type **emr** <enter> to login when the prompt:

login:

is shown on the left edge of the IBM-AT Monitor. This will place the Operator in the VENIX directory: /usr/emr/fieldcheck. A brief message will be shown on the Monitor to the effect of:

```
Welcome to VENIX                Thu Apr  9 12:33:58 1989
```

```
-----  
VenturCom's VENIX/86 Version 2.1 / Modified  
-----
```

```
emr>
```

2.2 fcs Invocation

Two forms of the Field Checking System are available at time of invocation. The first, invoked by typing **fcs**<enter> in response to the **emr>** prompt will execute the System in the "no-hard-copy-report" mode. Typing **fcs -p**<enter> will inform the System of the Operator's desire for error reporting. This Error Reporting will take the form of Error Line messages on the IBM-AT Monitor being duplicated on the System Console (Star Printer). Consequently, the Star Printer must be configured in the System prior to invocation with the '-p' option.

Approximately three seconds will pass after invocation while the System initializes itself, and then the IBM-AT Monitor will clear. Two seconds later the Main Menu should appear. Figure

2-2 shows this menu as it should be presented.

The cursor will be located at the extreme bottom, left corner of the display, in the area of the IBM-AT Monitor referred to as the Input Line Window. Typing <CTRL C> or <CTRL Z> while in the Main Menu will cause the Field Checking System to terminate, returning the Operator to the 'fieldcheck' directory in the VENIX Operating System environment.

The prompt 'ENTER NUMBER OF OPTION' will instruct the Operator to make a choice from the Menu. This prompt will be located to the left of the display, one line from the bottom in the area of the Monitor referred to as the Prompt Line Window.

The keyboard will be used to enter the single numeric character corresponding to the desired choice. Any key stroke not matching one of the options available will result in the error message "INVALID OPTION". This error message will appear beginning at the left edge of the display, two lines above the cursor in the area of the IBM-AT Monitor referred to as the Error Line Window.

FIELD CHECKING SYSTEM	
Main Menu	
Option	Description
1	System Specifications
2	Medium Control Utility
3	Block Printing
4	Plotting
5	Stacked Profiles
6	Gradient Parameter Creation
7	Edit Functions
CTRL C/Z	Quit FIELD CHECKING SYSTEM

ENTER NUMBER OF OPTION

Figure 2.2 Field Checking System Main Menu

3.0 SYSTEM SPECIFICATIONS

Typing a <1> from within the Main Menu will result in the System Specifications Menu being displayed on the Monitor. Again, the prompt 'ENTER NUMBER OF OPTION' will instruct the Operator to use the keyboard to enter the character corresponding to the desired option. Figure 3-0 illustrates the System Specifications Menu. Typing either <CTRL C> or <CTRL Z> will return the Operator to the Main Menu.

FIELD CHECKING SYSTEM	
System Specifications Menu	
Option	Description
1	Logical Unit Numbers
2	Recording Parameters
3	Airborne Check-Set and Header
4	Diurnal Check-Set and Header
5	Storage Device Specifications
CTRL C/Z	Return to Main Menu

ENTER NUMBER OF OPTION

Figure 3-0 System Specifications Menu

3.1 Logical Unit Numbers

Typing a <1> from within the System Specifications Menu will result in the Logical Unit Numbers Display being presented on the Monitor. The prompt will now be "USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS". Figure 3-1 shows this display.

The various devices of the Field Checking System, namely the magnetic tape units, hard disk units, Versatec Printer, Star Printer, Versatec Plotter and IBM-AT Monitor will all be accessed by means of a logical unit number. This Logical Unit Number will be used when assigning the devices for input and output. Entering a single, numeric character for a device when requested is far faster then having to type the full device name.

To modify the assigned LUN's on the display the cursor keys will be used. The cursor keys will allow the Operator to move between 'fields' of related data on the screen. These fields will be located in the outlined box referred to as the Presentation Area Window.

Hitting the <right> or <down> cursor keys located on the numeric keypad at the right of the keyboard will move the cursor from the Input Line to the top logical unit number field of the Presentation Area. Continued typing of either of these two keys will move the cursor down to the next field, eventually returning the cursor to the Input Line.

Hitting the <up> or <left> cursor keys while in the Input Line will position the cursor at the bottom field of the Presentation Area. Continued typing of either of these two keys will move the cursor up to the next field, eventually returning the cursor to

the Input Line.

While in a field of the Presentation Area, the logical unit number above the cursor may be changed using the keyboard. A logical unit number of zero ('0') indicates an unassigned device: that is, the device is to be considered as not being physically part of the Field Checking System. Hitting the <enter> key while in a field of the Presentation Area will return the cursor to the Input Line Window.

Typing <CTRL C> at any time will quit the modifications and restore the specifications to the values that existed prior to entering the display. Typing <CTRL Z> will invoke the verification process for the modifications made. If all changes are acceptable, they will be made to the Logical Unit Number Table used by the software and saved as new default values, and the System Specifications Menu will be presented again. However, if errors are detected during verification, appropriate messages will be displayed on the Error Line. Possible messages will be as follows:

- (1) "DUPLICATE LUN'S ASSIGNED"
Two or more devices share the same logical unit number but are not '0'.
- (2) "INVALID DATA"
A logical unit number is not in the range of '0' through '8', inclusive, which represents the minimum and maximum allowable values.
- (3) "INVALID CHARACTER"
A device is assigned a LUN character that is not a numeral.

FIELD CHECKING SYSTEM	
Logical Unit Numbers	
LUN	Device
---	-----
4	Magnetic Tape Drive #0
7	Magnetic Tape Drive #1
3	Rigid Disk #0
1	Rigid Disk #1
8	Versatec Printer
5	Star Printer
6	Versatec Plotter (SPP)
2	IBM-AT Monitor

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 3-1 Logical Unit Numbers Display

3.2 Recording Parameters

Typing <2> as an option of the System Specifications Menu will cause page 1 of the Recording Parameters Display to be presented. The prompt "USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS" will be found in the Prompt Line Window. Figures 3-2a, 3-2b, and 3-2c show the three Recording Parameters Display pages.

Use of the <right> or <down> cursor keys when the visible cursor is in the Input Line Window will reposition the cursor to the parameter #1 field on the display.

IMPORTANT NOTE: parameter #0 will not be Operator-changeable and its specifications will be defined and remain as shown on the display.

3.2.1 Parameter Code

Each recording parameter field will contain several specifications. The first of these will be a two-character code. This code may only be made up of the characters 'G' through 'Z'. Anything other than this will result in the error message

- (1) "INVALID PARAMETER CODE"
Parameter code contains invalid characters.

being displayed on the Error Line when attempting to quit and save the display using <CTRL Z>.

Example: parameter code = 'GF' or 'G1' or 'ag' all result in this error message.

3.2.2 Parameter Mnemonic

A space or minus sign will separate the parameter code from the second attribute: the five-character, parameter mnemonic. This mnemonic will be used for the block printing, plotting and stacked profiling processes. There will be no restriction on the characters that may be used to form the mnemonic.

3.2.3 Parameter Type

A space or minus sign will separate the mnemonic from the single character parameter type. This character must be either a capital 'D' to identify a decimal number or 'H' to identify a hexadecimal form for a parameter. Anything other than these two characters to define the type will result in the message

(2) "INVALID PARAMETER TYPE"

Parameter type specified is not one of either 'H' or 'D'.

on the Error Line of the display.

Example: type = 'G' or '' or 'd' all result in this error message.

3.2.4 Parameter Length

A space or minus sign will separate the type from the single, numeric character representing the parameter length. This specification will be used when parsing data blocks. The character should be one of '0' through '8'. Anything else will result in the error message

(3) "INVALID PARAMETER LENGTH"

Character specifying length is not one of '0' through '8'.

Example: length = 'g' or '+' or 'V' all result in this error message.

3.2.5 Parameter Scale

A space or minus sign will separate the length from the two digit scale. This scale will represent the number of digits or the scaling multiple in units of 10 for decimal parameters and 16 for hexadecimal parameters. The characters making up this scale in the field must be decimal digits (that is, '0' to '8'). Anything else will result in the error message

(4) "LIMIT ERROR"

This message should be "INVALID CHARACTER" indicating the scale is not made up of decimal digits.

on the Error Line of the display.

Example #1: scale = 'F0' or '+3' or '4.' or 'g4' all result in this error message.

The error message

(5) "LIMIT ERROR"

Scale is less than 0 or greater than the number of digits making up the parameter value.

will also be issued if the scale specified is larger than the number of digits making up the parameter.

Example #2: parameter length = 5, scale = '06' results in this error message.

3.2.6 Parameter Sign

A space or minus sign will separate the scale from the single character representing the 'sign' of the value. This sign is intended as follows:

- (1) A space ' ' signifies that the value will be signed but only negative values will have the sign added to them in recording blocks. Thus, the value is positive if no sign is evident.
- (2) A plus '+' signifies that either the plus or the minus sign will be added to a recording block for the value: the consequences are that one character position is reserved for the sign.
- (3) A small 'n' signifies that the recording parameter is "latitude" and a special sign will be added as the first character for a parameter value in a data block. An 'n' indicating a Northernly direction and an 's' indicating a Southernly direction will be the two possible special characters used for signing direction to this parameter.
- (4) A small 'e' signifies that the recording parameter is "longitude" and a special sign will be added as the first character for a parameter value in a data block. An 'e' indicating an Easterly direction and a 'w' indicating a Westernly direction will be the two possible special characters used for signing direction to this parameter.

Anything other than these sign characters will result in the error message

- (6) "INVALID SIGN"
Sign character specified is not of valid set.

on the Error Line of the display.

Examples: '%' or 'W' or 'E' or '-' or 'S' all result in the error message.

3.2.7 Parameter Units

A space or minus sign will separate the sign from the five character unit text for the parameter. No restriction will be placed on the characters making up the units.

3.2.8 Paging

When the Recording Parameter option of the System Specifications Menu is chosen, backup copies will be made of each of the Recording Parameter display pages. If an exit and save (<CTRL Z>) is made from this option, these backups will be discarded and the modified display pages will stand as the new specifications. As well, the Recording Parameter Table used internally by the software will be updated to reflect any of the changes made.

However, if a quit and discard changes (<CTRL C>) is made the backup files will be used to restore the old values for each of the display pages and the Recording Parameters will be those defined before any modifications were made.

NOTE: All this will be transparent to the Operator: the Operator

will only need be concerned with the fact that a <CTRL C> exit will discard all changes and a <CTRL Z> exit will let any changes stand.

To move to page two of the Recording Parameters, the cursor must first be returned to the Input Line, either by using the cursor keys or, more quickly, by depressing the <enter> key. Now if a <2> is typed on the keyboard and no errors are detected, page two will be presented and page 1 will be saved temporarily as the new recording parameter display. Similarly, the same procedure is used to move between pages two and three and pages three and one; all specifications must be correct and the new values will be saved temporarily for the respective displays.

If two identical parameter codes are detected in separate fields across any of the Recording Parameter pages then the error message

- (7) "DUPLICATE PARAMETER CODES"
Parameter codes must be unique but two or more have been found to be identical.

will be shown on the Error Line of the display. Similarly, if two identical parameter mnemonics are detected in separate fields then the error message

- (8) "DUPLICATE PARAMETER NAMES"
Parameter mnemonics must be unique but two or more have been found to be identical.

will be issued. Unique parameter codes and mnemonics will be required for each recording parameter specification.

If an error is encountered while trying to exit and save (via

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<CTRL Z> key) or during verification prior to changing pages, then the appropriate error message will be displayed and the cursor will be moved to the start of the field containing the error. No exit and save or page changing will be permitted as long as an error is detected. Errors must either be corrected or <CTRL C> must be used to quit and discard the changes.

At any time, typing <CTRL C> or CTRL Z> with no errors detected will return the Operator to the System Specifications Menu.

FIELD CHECKING SYSTEM	
Recording Parameters -- Page 1	
00 = :NULL :D:0:00:0:	01 = 66:DATE :D:5:00: :
02 = 6H:LINE :H:8:00: :	03 = 6I:TIMHS:D:8:00: :
04 = 6J:TIMDS:D:8:-3: :SCNDS	05 = 6K:RWMU1:D:8:00: :6AMMA
06 = 6L:RWMU2:D:8:00: :6AMMA	07 = 6M:RWMU3:D:8:00: :6AMMA
08 = 6N:MAGU1:D:8:00: :6AMMA	09 = 6O:MAGU2:D:8:00: :6AMMA
10 = 6P:MAGU3:D:8:00: :6AMMA	11 = 6Q:GRAD1:D:7:00:+:6AMMA
12 = 6R:GRAD2:D:7:00:+:6AMMA	13 = 6S:GRAD3:D:7:00:+:6AMMA
14 = 6T:RAWM1:D:8:00: :6AMMA	15 = 6U:RAWM2:D:8:00: :6AMMA
16 = 6V:RAWM3:D:8:00: :6AMMA	17 = 6W:MAGL1:D:8:00: :6AMMA
18 = 6X:MAGL2:D:8:00: :6AMMA	19 = 6Y:MAGL3:D:8:00: :6AMMA
20 = 6Z:.016U:D:7:-2: :6AMMA	21 = 6G:.016L:D:7:00: :6AMMA
22 = 6H:STAT :H:5:00: :	23 = 6I:LAT :D:8:00:n:MINS
24 = 6J:LONG :D:8:00:e:MINS	25 = 6K:HEAD :D:4:00: :D6REE
26 = 6L:ROLL :D:4:00: :D6REE	27 = 6M:PITCH:D:4:00: :D6REE
28 = 6N:R.ALT:D:4:00: :FEET	29 = 6O:AIRD :D:5:00: :

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 3-2 Recording Parameters Display -- Page # 1

```

+-----+
|
|               F I E L D   C H E C K I N G   S Y S T E M
|
|       R e c o r d i n g   P a r a m e t e r s   --   P a g e   2
|
| 30 = HP:DPPX:H:6:00: :MILE           31 = HQ:DPPY:H:0:00: :MILE
| 32 =                                33 = HR:VLFQL:D:5:00: :
| 34 = HS:VLFQL:D:5:00: :              35 = HT:VLFQL:D:5:00: :
| 36 = HU:VLFQL:D:5:00: :              37 = HV:TCMPU:D:5:00: :
| 38 = HW:LCMPU:D:5:00: :              39 = HX:VCMPU:D:5:00: :
| 40 = HY:TCMPL:D:5:00: :              41 = HZ:LCMPL:D:5:00: :
| 42 = IG:VCMPU:D:5:00: :              43 =
| 44 = IH:CSHZU:D:7:00: :HERTZ          45 = II:CSHZL:D:7:00: :HERTZ
| 46 = IJ:A/D#0:D:7:00: :VOLTS          47 = IK:A/D#1:D:7:00: :VOLTS
| 48 = IL:A/D#2:D:7:00: :VOLTS          49 = IM:A/D#3:D:7:00: :VOLTS
| 50 = IN:A/D#4:D:7:00: :VOLTS          51 = IO:A/D#5:D:7:00: :VOLTS
| 52 = IP:A/D#6:D:7:00: :VOLTS          53 = IQ:A/D#7:D:7:00: :VOLTS
| 54 = IR:A/D#8:D:7:00: :VOLTS          55 = IS:A/D#9:D:7:00: :VOLTS
| 56 = IT:A/D#A:D:7:00: :VOLTS          57 = IU:A/D#B:D:7:00: :VOLTS
| 58 = IV:A/D#C:D:7:00: :VOLTS          59 = IW:A/D#D:D:7:00: :VOLTS
|
+-----+

```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 3-2 Recording Parameters Display -- Page # 2


```
+-----+
|                                     |
|               FIELD CHECKING SYSTEM               |
|                                     |
|       Recording Parameters  --  Page 3              |
|                                     |
| 60 = IX:A/D#E:D:7:00: :VOLTS           61 = IY:A/D#F:D:7:00: :VOLTS |
| 62 = IZ:FLMFT:D:3:00: :FEET           63 =                               |
| 64 = JH:.0166:D:7:00: :GAMMA          65 =                               |
| 66 =                                     67 =                               |
| 68 = JL:TRALT:D:5:00: :FEET           69 = JM:SPARE:D:5:  : :           |
| 70 = JN:RCTIM:D:6:00: :HHMMSS         71 = ZZ:JUNK :D:8:00: :           |
| 72 =                                     73 =                               |
| 74 = S6:SDIF1:D:8:00: :              75 = S8:SDIF2:D:8:00: :           |
| 76 = S1:SDIF3:D:8:00: :              77 = S3:SDIF4:D:8:00: :           |
| 78 = S5:SDIF5:D:8:00: :              79 = S7:SDIF6:D:8:00: :           |
| 80 = K6:PR6D1:D:8:00: :              81 = K8:PR6D2:D:8:00: :           |
| 82 = K1:PR6D3:D:8:00: :              83 = K3:PR6D4:D:8:00: :           |
| 84 = K5:PR6D5:D:8:00: :              85 = K7:PR6D6:D:8:00: :           |
| 86 = KM:QD6D1:D:8:00: :              87 = K9:QD6D2:D:8:00: :           |
| 88 = K0:QD6D3:D:8:00: :              89 =                               |
|                                     |
+-----+
```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 3-2 Recording Parameters Display -- Page # 3

3.3 Airborne Data Check Set and Header

Typing a <3> when in the System Specifications Menu will result in the Airborne Check Set and Header Display appearing on the screen. Figure 3-3 shows this display.

3.3.1 Data Check Set

Near the top in the Presentation Area will be a dashed line between two capital vees. Under this text, will be the first field, reached from the Input Line via the <right> or <down> arrow keys. This field will define the Airborne Check Set, which lists only those characters to be used to make up data blocks acquired by the Airborne Data Acquisition System. This field will be 130 characters long, thereby spanning two rows. All characters must be unique.

Attempting to exit and save (via <CTRL Z> key) while two characters in the field are identical will result in the error message

- (1) "DUPLICATE CHARACTERS FOUND"
Characters in check-set must only be specified once but two or more are identical.

shown on the Error Line of the display and the cursor will be positioned at the start of this field.

If the Operator wishes a space () to be part of the check-set then it must be placed in the field with another character to the right of it: a space placed at the end of the check-set will not be recognized as a desired character. It must be recognized that two space characters in the check-set will cause the aforementioned error message to be issued.

3.3.2 Block-Print Header

The Airborne Block-Print Header field will be reached from the Input Line via the <left> and <up> arrow keys. This field will be set up to contain the mnemonics of the recording parameters to be printed from the Block Printing option of the Main Menu. Spaces must be placed between the mnemonics to be used to set the column positions of the values. In short, the Block Print Header will be used as a template when printing the ten records of each of the recording blocks in a formatted form.

This field will span four rows allowing the header to be up to 260 characters in length. NOTE: the line length for the Versatec Printer is 132 characters. Thus a header of more than 132 characters will require two print lines on the Versatec for each record.

Attempting to exit and save (via <CTRL Z> key) with the block-header containing an invalid parameter mnemonic will result in the error message

- (2) "INVALID PARAMETER NAME"
To be valid, mnemonic must have been specified in the Recording Parameters Specifications.

being issued on the Error Line of the display.

At the end of the header, the NULL parameter must be placed to mark the end of the spacing for the last parameter. If the NULL parameter is not present when attempting to exit and save then the error message

- (3) "MISSING PARAMETER(S) "
The NULL parameter must be the last specified in Block Header.

#2100-12-003.01.0

will result.

Typing <CTRL C> or <CTRL Z> with no errors detected will return the Operator to the System Specifications Menu.

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```

+-----+
|
|               F I E L D   C H E C K I N G   S Y S T E M
|
|           A i r b o r n e   D a t a   C h a r a c t e r   S e t
|
| V.....V
| 0123456789ABCDEFGHInews+-JKLMNOPQRSTUVWXYZ
|
|-----|
|
|           A i r b o r n e   B l o c k   P r i n t   H e a d e r
|
| V.....V
| TIMDS   MAGU1   MAGU2   MAGU3   .016U   STAT   LAT   LONG
| HEAD ROLL PITCH TRALT R.ALT AIRD   TCMPU LCMPU VCMPU CSHZU   NUL
| L
|
|
|
|
+-----+

```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 3-3 Airborne Check-Set and Header Display

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3.4 Diurnal Check-Set and Header

Figure 3-4 illustrates the Display presented when a <4> is entered as an option while in the System Specifications Menu. The Diurnal Check-Set and Header will be set up in the same manner as the Airborne Check-Set and Header.

FIELD CHECKING SYSTEM	
Diurnal Data Character Set	
V.....V	ABCDEFGHIJKLMNOPQRSTUVWXYZ+-1234567890

Diurnal Block Print Header	
V.....V	TIMDS NULL

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 3-4 Diurnal Check-Set and Header

3.5 Storage Device Specifications

Typing a <5> when in the System Specifications Menu will result in the Storage Device Specifications Menu appearing on the screen. Figure 3-5 shows this display.

3.5.1 Disk Drive Specifications

The upper segment of the display will contain specifications relating to the two Bernoulli Box hard disks. Hitting the <right> or <down> key when the cursor is in the Input Line window will cause the cursor to be moved to the Starting Logical Address (LAD) field for Disk Drive #0. This field will define the lower limit of where disk accessing will occur. The field immediately to the right will set the upper limit. Combined, these two specifications will create a 'partitioning' of the disk ensuring that no data will be read or written outside of this area. The Operator will set these limits after reading the directory on a cartridge and determining where a particular segment of data resides. Little understanding of the format of the Iomega cartridges will be required on the part of the Operator. However, the Operator is encouraged to read Section 3.3.2 Logical Block Addressing of the Technical Description Manual for the ALPHA-20H with Extended SCSI (IOMEGA Corporation document #00760600-001) to obtain a more detailed discussion of the Logical Block Addressing of the Iomega cartridges.

The two fields immediately below the first two will define the starting and ending LADs for the second disk drive, referred to as Drive #1. These two fields will be set up in a similar fashion as outlined above. Restrictions on the values which may be specified are as follows:

- (1) The starting LAD must be greater than the last address containing directory information. Currently the smallest starting LAD is 6.
- (2) The ending LAD must be less than the largest logical address available on the cartridge. Currently the largest ending LAD is 145ff (hex) or 83455 (decimal).
- (3) The starting LAD must not be greater than the ending LAD.
- (4) The LADs must contain only hexadecimal digits.

If one or more of the above conditions are not met error messages will inform the Operator of the fault. The error messages used are as follows:

- (1) "VALUE OUT OF RANGE"
The starting LAD is less than the last directory address or the ending LAD is greater than the largest logical cartridge address available.
- (2) LIMIT ERROR"
The starting LAD is greater than the ending LAD.
- (3) "INVALID CHARACTER"
The logical address specified contains a nonhexadecimal digit.

3.5.2 Magnetic Tape Specifications

Below the address fields for the rigid disks will be two rows defining the Magnetic Tape Unit parameters. Once these parameters are set they should not have to be changed except under abnormal circumstances such as using a smaller tape or changing one or both of the Magnetic Tape Units.

The first specification, Usable Tape, will inform the Field Checking System of the length of the magnetic tape available on the reel loaded. This information will only be needed when writing to the tape: the System must be able to anticipate the physical end of tape. The value will be specified as a decimal integer representing inches of tape.

The next field to the right will be the Recording Density. With the two tape units currently configured to the Field Checking System, this parameter will be set to 1600 for both units, representing a recording density of 1600 bits per inch. This number, too, will be a decimal integer.

The last field for each tape unit will specify the Interrecord Gap. Trial and error or empirical measurement will have to be used to find this number. The field will represent the length of tape, in inches, separating each block on tape. It will be defined as a decimal integer where the digits will be converted by the System as follows:

d ₅	d ₄	d ₃	d ₂	d ₁	
				-----	d x 10 ⁻³ inches
			-----		d x 10 ⁻² inches
		-----			d x 10 ⁻¹ inches
	-----				d x 10 ⁰ inches

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----- d x 10¹ inches

Error messages will be issued for the following faults:

- (1) "INVALID CHARACTER"
Any one of the three fields contain a nondecimal digit.
- (2) "LIMIT ERROR"
Any one of the three fields have specified a value less than 1 or greater than 32767.

3.6 Returning to System Specifications Menu

When the specifications are set up as desired the Operator will return to the System Specifications Menu using either the <CTRL Z> or a <CTRL C> keys. <CTRL Z> will exit only if no errors are detected. If none are, any modifications made in the Presentation Area will be saved as new default values.

Typing <CTRL C> will return the previous menu, discarding any changes made.

FIELD CHECKING SYSTEM			
Storage Device Specifications			
	Start LAD	End LAD	
Rigid Disk #0:	00006	001f8	
Rigid Disk #1:	00006	145ff	
	Useable Tape	Rec. Density	Interrecord gap
Mag. Tape #0:	06700	01600	00700
Mag. Tape #1:	06700	01600	00700

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 3-5 Storage Device Specifications Display

#2100-12-003.01.0

3.7 Terminating System Specifications Option

Typing <CTRL C> or <CTRL Z> from within the System Specifications Menu will return the Operator to the Main Menu.

4.0 MEDIUM CONTROL UTILITY

While in the Main Menu, if the Operator types a <2> the Medium Control Utility of the Field Checking System will be invoked with the Medium Control Utility menu being brought up. The prompt "USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS" will be visible on the Prompt Line. Figure 4-0 shows this menu.

There will be three options available. The first two will allow the Operator to manipulate the primary storage devices of the Field Checking System. The third option will allow data copying as well as the ability to search for a location on a storage medium by pattern-matching a given string.

FIELD CHECKING SYSTEM	
Medium Control Utility	
Option	Function
-----	-----
1	Tape Control Functions
2	Disk Control Functions
3	Search/Copy Functions
CTRL C/Z	Return to Main Menu

ENTER NUMBER OF OPTION

Figure 4-0 Medium Control Utility Menu

4.1 Magnetic Tape Functions

Choosing the first option of the Medium Control Utility will result in a display similar to that of Figure 4-1 being presented on the IBM-AT Monitor. Prior to making a choice from this Menu, the Operator must set the desired source LUN. This field will be reached from the Input Line via any of the four cursor keys. The character representing the source device (that is, the Logical Unit Number assigned to the device in the System Specifications) will be entered in the field. This LUN will be checked when an option is chosen from the menu. The following error messages may result, depending upon the LUN specified:

- (1) "INVALID CHARACTER"
The character specified is not one of the valid LUN characters.
- (2) "INVALID DEVICE"
The LUN specified has not been assigned to one of the two magnetic tape units which are the only devices to which the options of the menu apply.

An option will be chosen by returning the cursor to the Input Line window, either by cursoring or striking the <enter> key. The Operator will then hit the key corresponding to the option desired. The following message may result when a choice is made:

- (3) "INVALID OPTION"
A key was depressed that does not match one of the choices available in the Menu.

When a valid LUN and option exist, the action desired will be performed, if possible. However, if the device is off-line or not configured in the System no action will result.

NOTE: magnetic tape functions will be performed off-line of the Field Checking System. The Operator, therefore, will be permitted to continue in the Field Checking System but will not be able to perform another magnetic tape function on the same unit until the current action completes.

Option <1> will advance the tape by one file, until the first file mark is detected or the physical end of the tape is detected. If the end of tape is reached and a Forward File command is issued, the tape will advance until it runs off the take-up reel.

Option <2> will back the tape up by one file. Again, the device must be loaded and on-line. NOTE: The tape will not back up beyond the beginning of the tape.

Option <3> will advance the tape by one block (blocks are separated by interrecord gaps which determine where a block ends). The same notes apply concerning the respective unit being loaded and on-line. Also, attempting to move beyond the physical end of a tape will create the same result as advancing by a file beyond the end of tape.

Option <4> will back up the tape by one block. Once the start of the tape is reached, no further movement will be possible with this action.

Option <5> will cause an end-of-file (EOF) marker to be written to the tape, provided the write enable ring is in place in the back of the take-up reel and the Operator responds with <y> or <Y> when the prompt "ARE YOU SURE?" is issued on the Monitor; if both of these conditions are not met, no EOF marker will be

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placed on the tape.

Option <6> will rewind the tape to the beginning, if it is on-line, loaded and not currently at the beginning of the tape. Once the start-of-tape marker is reached, this function will have no affect.

To exit and return to the Medium Control Function Menu, either <CTRL C> or <CTRL Z> must be entered via the keyboard. Entering <CTRL Z> will save any modifications made in the Presentation Area, provided the LUN specified is valid; <CTRL C> will ignore any changes made to the LUN field.

FIELD CHECKING SYSTEM	
Magnetic Tape Control Function	
Option	Function
1	Forward File on tape device
2	Backward File on tape device
3	Forward Block on tape device
4	Backward Block on tape device
5	Write EOF marker to tape device
6	Rewind tape device
CTRL C/Z	Return to Previous Menu
LUN = 4	

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

2.1 Magnetic Tape Functions Menu

4.2 Disk Control Functions

Choosing <2> from within the Medium Control Function Menu will result in a display similar to Figure 2-2 being brought up on the IBM-AT Monitor.

Prior to making a choice from this Menu, the Operator must set the desired source LUN. This field is reached from the Input Line via any of the four cursor keys. The character representing the source device will be entered in the field. This LUN will be checked when an option is chosen from the menu. The following error messages may result, depending upon the LUN specified:

- (1) "INVALID CHARACTER"
The character specified is not one of the valid LUN characters.
- (2) "INVALID DEVICE"
The LUN specified has not been assigned to one of the two rigid disk drives which are the only devices to which the options of the menu apply.

To the right of the Source Lun will be a field for defining the sector interleave used when formatting the Iomega cartridges. The value which should be specified for Sector Interleave as a rule is 4. It should not be changed unless the Operator understands the implications of a different Interleave value. The following errors will be flagged for this field:

- (3) "INVALID CHARACTER"
The field contains a nondecimal digit.
- (4) "LIMIT ERROR"
The interleave specified is less than 0 or greater than 32.

An option will be chosen by returning the cursor to the Input Line window, either by cursoring or by striking the <enter> key. The Operator will then hit the key corresponding to the option desired. The following messages may result when a choice is made:

(5) "INVALID OPTION"

A key was depressed that does not match one of the choices available in the Menu.

When a valid LUN and option exist, the action desired will be performed, if possible. However, if the device is off-line or not configured in the System no action will result and the following message will be issued on the Error Line window:

(6) "ERROR AT SOURCE DEVICE"

Source device is not configured in the system, is off-line, is busy or encountered an error while performing command.

The three options available will be: (1) format a cartridge, (2) clear the disk directory on a cartridge, and (3) read the disk directory on a cartridge. NOTE: The first two options will destroy data on the disk and should be used with caution.

FIELD CHECKING SYSTEM	
Bernoulli Disk Control Function	
Option	Function
1	Format Disk
2	Clear Disk Directory
3	Display Disk Directory
CTRL C/Z	Return to Previous Menu
LUN = 3	Cartridge Sector Interleave = 04

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 4-2 Disk Control Functions Menu

4.2.1 Format a Cartridge

When this option is chosen, text will appear on the Prompt Line window of the display similar to the following: "ARE YOU SURE?". This is intended to provide a buffer between the Operator inadvertently hitting the wrong action in the Disk Control Menu and actually wishing to format the disk. If the format is truly desired, either the <Y> or <y> key should be depressed followed by the <enter> key. Formatting will begin, off-line to the Field Checking System, and continue to completion, provided no errors are encountered.

- (1) "ERROR AT SOURCE DEVICE"
Cannot open device, or device is not configured or is off-line.

will be issued if an error occurs during any phase of the format procedure. Special attention should be made to ensure that the cartridge is not write protected.

Once the format is in progress, no other disk accessing of any kind will be permitted until the format completes. If any command is issued to either of the two disks, the new command will override the format command. The red light on the Bernoulli drive will light while the disk is active and will go dark when the format completes.

4.2.2 Clear Disk Directory

When this option is chosen, text will appear on the Prompt Line window of the display similar to the following: "ARE YOU SURE?". Again, this is intended to provide a buffer between the Operator inadvertently hitting the wrong action in the Disk Control Menu and actually wishing to clear the disk directory. If the Operator truly wishes to clear the disk directory, either the <Y> or <y> key should be depressed followed by the <enter> key.

The area of the disk containing the directory will be written with 'null' characters marking the disk as having no data on it.

- (1) "ERROR AT SOURCE DEVICE"
Cannot open device, or device is not configured or is off-line.

will be issued if an error occurs during the clearing process. Special attention should be made to ensure that the cartridge is not write protected.

NOTE: although the disk directory will be cleared to mark the disk as data-free, any data that resided on the disk outside of the directory segment will remain intact and may be recoverable using other options of the Field Checking System or VENIX Utility routines.

4.2.3 Display Disk Directory

When this option is chosen, page number one of the disk directory will be brought up in the Presentation Area of the IBM-AT Monitor. Figure 4-2-3 shows an example of a disk directory page as it will appear on the display.

If the message

- (1) "NOT ENOUGH BUFFER SPACE"
Directory is corrupted or none exists for cartridge.

appears on the Error Line Window immediately after the first attempt to read the directory for a cartridge, the most likely fault will be that either the cartridge is unformatted or that it has been formatted but the directory on it has not been cleared.

4.2.3.1 Disk Directory Definition

Each page will contain five columns of ten rows of directory information. The first column will identify the date the data was acquired, as the Julian day and the year.

Column two will list the traverse line number for the data. This line number will have been extracted from the first block of data recorded during flight. Therefore, if the line number changes during sampling the new line will not be identified unless the disk being examined is a copy of the original data where the copy was made using the Field Checking System, Medium Control Utility, Search/Copy option. The Operator need not be too concerned with this note but should be aware of how the information contained in the directory is collected.

The third column, marked 'RECS', will show the number of 256 byte sectors of the disk that are used for an entire data block. This information will be used by the software. The value is arrived at by rounding up to the largest 256 increment, the actual data block size. As an example, a data block of 1457 bytes will require $(1457 + 255) \text{ MOD } 256 = 6$ sectors: data can not be written or read to partial sectors on the disk. Again, the Operator need not be too concerned with this directory item.

The fourth and fifth columns will identify the disk partition containing the flight line data and must be understood by the Operator since this information will be used. The 'START LAD' will be the first logical disk address (LAD) containing data associated with the flight line indicated. The 'END LAD' will be the first LAD not containing data for the flight line indicated, or looking at it from another view, the first available LAD for data from the next flight line. The Operator will use these two addresses in the following way:

- (1) The flight lines to be processed are determined from the first and second columns.
- (2) The start LAD of the first flight line to be processed is obtained; the end LAD of the last flight line to be processed is obtained.
- (3) Since data will be written sequentially to the disk all blocks for the lines to be processed will be accessible between the start and end LAD's. These two values will be placed in their respective fields of the Storage Device Specifications Display of the System Specifications. A disk partition will then exist which will allow data processing of only the flight lines desired.

Near the bottom of each page on the left will be a number identifying the directory page currently displayed. On the

right, the LUN will be indicated.

4.2.3.2 Movement Through Disk Directory

A new prompt will be issued on the Prompt Line listing the available options while viewing the directory. <PgUp> will cause the next sequential page to be presented. If the last page of the directory is currently being displayed then <PgUp> will redisplay page number one.

<PgDn> will cause the previous sequential page to be presented. If page number one is currently being displayed then <PgDn> will force the last page of the directory to be shown on the Monitor.

The <CTRL C> and <CTRL Z> keys will both return the Disk Control Function Menu. Since no screen modifications will be permitted while viewing the disk directory, both keys will function identically when exiting.

4.2.4 Returning to Medium Control Function Menu

To exit and return to the Medium Control Function Menu, either <CTRL C> or <CTRL Z> will be entered via the keyboard. The <CTRL Z> key will save any modifications made in the Presentation Area, provided the LUN specified is valid. The <CTRL C> key will ignore any changes made to the LUN field.

FIELD CHECKING SYSTEM					
Disk Directory					
FLIGHT DATE	LINE NUMBER	RECS	START LAD	END LAD	
08487	00000100	6	00006	002EE	
08487	00000101	6	002EE	0067E	
08487	00000102	6	0067E	0098A	
08487	00000103	6	0098A	00D32	
08487	00000104	6	00D32	0105C	
08487	00000105	6	0105C	013CE	
08487	00000106	6	013CE	016E6	
08487	00000107	6	016E6	01A58	
08487	00000108	6	01A58	01DA6	
08487	00000109	6	01DA6	020EE	
PAGE = 1				LUN = 3	

^C = ^Z = EXIT; PgUp = PAGE FORWARD; PgDn = PAGE BACKWARD

Figure 4-2-3 Disk Directory, page number one

4.3 Copying and Searching for Data

Choosing <3> from within the Medium Control Function Menu will result in a display similar to that of Figure 4-3 being brought up on the IBM-AT Monitor. Prior to making a choice from this Menu, the Operator must set the desired source and destination LUN's. The source LUN field will be reached from the Input Line via the <right> and <down> cursor keys; the destination LUN field will be reached from the Input Line via the <left> and <up> cursor keys. The character representing the devices will be entered in the respective fields. These LUN's will be checked when an option is chosen from the menu. The following error messages may result, depending upon the LUN specified:

- (1) "INVALID CHARACTER"
The character specified is not one of the valid LUN characters.
- (2) "INVALID DEVICE"
The LUN specified has not been assigned to one of the two rigid disk drives, the two magnetic tape units or, for the destination device only and inclusive, the 'null' device which will be the only devices to which the options of the menu apply.
- (3) "SOURCE DEVICE SAME AS DESTINATION DEVICE"
The source and destination devices must be unique: data cannot be read and written to the same device in the same operation.

An option will be chosen by returning the cursor to the Input Line window, either by cursoring or striking the <enter> key. The Operator will then hit the key corresponding to the option desired. The following message may result when a choice is made:

- (4) "INVALID OPTION"
A key was depressed that does not match one of the choices available in the Menu.

When valid LUN's and a valid option exist, the action desired will be performed, if possible. However, if one of the source or destination devices is off-line or not configured in the System no action will result and one of the following messages will be issued on the Error Line window:

(5) "ERROR AT SOURCE DEVICE"

The source device is not configured in the system, is off-line, is busy or encountered an error while performing the command.

(6) "ERROR AT DESTINATION DEVICE"

The destination device is not configured in the system, is off-line, is busy or encountered an error while performing command.

4.3.1 Positioning and Searching Devices

Options <1> through <4> are all similar and will be described together with any differences noted. Effectively, these options will search for a pattern match on a string supplied by the Operator against each data block on the specified device. Options <1> and <3> will work on the source device while options <2> and <4> will work in conjunction with the destination device.

The Operator must first define the search string in the Presentation Area designated for the said purpose. This field is reached via the right or down cursor keys. The string is placed, left-justified with the string-terminating character being a space. The cursor must be returned to the Input Line prior to choosing a Menu option.

When one of the four option keys is depressed, the prompt on the

Monitor will change to "ARE YOU SURE?". If the search string in the Presentation Area is as desired, the affirmative <y> or <Y> keys may be depressed followed by <enter> to commence the search; otherwise, any other key followed by <enter> will cancel the request.

Prior to the search commencing, a message will be logged on the error console to the effect:

"D/T *** searching for string 'S' ..."

where D/T = current date and time,
 S = search string.

The search will commence from the current location on the device: that is, from the current tape location for magnetic tape, or from the last accessed logical disk address for rigid disks. Each block will be checked for the string. If no match is made in the block being checked, a new block will be read and the process will continue.

NOTE: ensure that the Star Printer is on line before commencing the search.
--

When a search is successful, a message will be logged on the Message Console (Star Printer) to the effect that

"match found in block B at character C"

where B = block number counting from the starting location,
 first block being 1, and
 C = the character position within the block,
 first character being 0.

If the medium searched is one of the two hard disks, an additional line of text will follow the above message, in the form:

"disk LAD = L"

where L = logical disk address of block containing string.

An unsuccessful search will continue until one of the following messages is issued on the Error Line of the display:

- (7) "End of Source Device Encountered"
Logical end of source device encountered.
- (8) "ERROR AT SOURCE DEVICE"
Could not read from source device.
- (9) "ERROR AT DESTINATION DEVICE"
Could not read from destination device.

Unsuccessful searches will result in the following message being logged on the Message Console:

"D/T: no match found for string S".

Options <1> and <2> will do more than merely search for a string: these two functions will back up one block on the respective devices when a match is found. If another search is made on the same string, the match will be made, then, in the first block. NOTE: Positioning on one of the two hard disks will not be maintained using either of these two functions since the devices are closed when the Copy/Search Menu is left. To position on a rigid disk the following procedure is recommended:

- (1) Set up the bounding start and end logical addresses using the Storage Device Specifications option of the System Specifications Menu.

- (2) Search for the string on the device in question.
- (3) If a match is made, use the logical address given in the Message Console listing and add this number to the starting LAD for the device.
- (4) Return to the Storage Device Specifications display and make the change to the starting LAD value. Now when the disk is accessed, the first block processed will contain the search string.

4.3.2 Copying Data

To copy from one device to another, option <5> will be used. Data may be copied between any combination of magnetic tape units and rigid disks: that is, tape to tape, tape to disk, disk to tape and disk to disk.

Prior to commencing a data transfer, after choosing option <5>, the Operator will be prompted with "ARE YOU SURE?". A response of <y> or <Y> will initiate the copy with the message:

- (1) "Copy Commencing ..."
Copying in progress.

Copying from disk to disk will require that the destination disk partition be at least as large as the source device partition. If the partition specified is not large enough then the message:

- (2) "LIMIT ERROR"
Not enough room in disk partition for copy.

will be issued on the Error Line Window.

When coping to magnetic tape, however, all that will be required is that the correct specifications be made in the Storage Device Specifications so that a correct logical end of tape may be

calculated. When an end of tape is encountered, the Operator will be prompted with "CHANGE TAPE AND HIT f1 TO RESUME". When the current tape has been replaced with a new one and <f1> has been depressed, the copy will continue as before: the same prompt may appear several more times during the course of the copy, especially when copying from an entire disk to tape.

When the copy has completed successfully (the end of the source device encountered), the message:

- (3) "... Copy Complete."
Successful copy performed.

will be issued on the Error Line of the IBM-AT Monitor. The Operator may then perform another of the options of the Search/Copy Menu, the same option, or return to the previous menu.

4.3.3 Returning to Medium Control Function Menu

The <CTRL C> and <CTRL Z> keys will return the Operator to the Medium Control Function Menu. <CTRL Z> will save the LUN's and search string specified if no errors are detected in the choices made; the <CTRL C> will discard any modifications to the screen values.

```

+-----+
|
|           F I E L D   C H E C K I N G   S Y S T E M
|
|           S e a r c h / C o p y   U t i l i t y
|
|           Option                Function
|           -----
|           1      Position to a String on Source LUN
|           2      Position to a String on Destination LUN
|           3      Search For a String on Source LUN
|           4      Search For a String on Destination LUN
|           5      Copy From Source LUN to Destination LUN
|           CTRL C/Z  Return to Previous Menu
|
|
|
|
|           Source LUN=3      Destination LUN=4
|
|           Search String = [499430506J      ]
|
+-----+

```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 4-3 Search/Copy Menu

5.0 BLOCK PRINTING

Choosing option <3> of the Main Menu will bring up the Block Printing Format Menu with the prompt "ENTER NUMBER OF OPTION". This Menu will allow the Operator the choice of printing formatted airborne data, formatted diurnal data or unformatted data. Figure 5-1 shows the menu.

5.1 Block Printing Format Selection

Options <1> and <2> will treat any input data as formatted airborne and formatted diurnal respectively. With the exception of the Block Id at print time, both these types are treated identically and will be described as such. In any event, the same display will be brought up regardless of which option is chosen at this level: the choice is used only by the System. This applies to Unformatted data, option <3> as well.

The following error messages may be displayed on the Monitor when an option is entered:

- (1) "INVALID OPTION"
Keyboard entry does not match one of the options listed in the Menu.

FIELD CHECKING SYSTEM	
Block Printing Format Menu	
Option	Description
1	Print Formatted Airborne Data
2	Print Formatted Diurnal Data
3	Print Unformatted Data
CTRL C/Z	Return to Main Menu

ENTER NUMBER OF OPTION

Figure 5-1 Block Printing Format Menu

5.2 Block Printing Frequency Selection

When a valid choice is made from the Print Format Menu, the Print Frequency Menu will be displayed along with the prompt "USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS". Figure 5-2 shows the Menu.

The fields requiring set-up will be the source and destination device LUN's, located near the bottom of the Presentation Area, and a response to whether or not block checking is to be performed during dumping. An 'n' or 'N' in this last field will signify no checking; a 'y' or 'Y' will request checking. The added overhead of checking all blocks for correct length, correct characters, correct parameter codes and correct digits for each parameter results in a significant decrease in processing throughput. NOTE: Block Checking should only be done once on a recorded medium or when the integrity of the recorded data is in doubt. As with the Medium Control Utility, the specified field values will not be verified until the Block Printing Process commences.

When the specifications have been set up as desired, the cursor will be returned to the Input Line prior to making a choice from the Print Frequency Menu. If the Operator chooses the 'every N'th block option' (<4>), the prompt will change to "ENTER SIGNED INTEGER". This integer should be positive and should contain only decimal digits. If a mistake is made and the Operator wishes to back up to change a character while entering the integer the rubout key <--> will be used. When satisfied with the frequency specified, the <enter> key will be depressed, returning the original prompt to the display.

The Block Printing Process will commence if no errors are found for the print frequency and LUN's specified. Possible error messages which may be issued include the following:

- (1) "VALUE OUT OF RANGE"
Block print frequency specified is too large.
- (2) "INVALID CHARACTER"
Block print frequency specified contains a nonnumeric character.
- (3) "INVALID DEVICE"
Source device is not one of magnetic tape units or hard disk units; or destination device is not Versatec printer or Star printer or 'null' device.
- (4) "ERROR AT SOURCE DEVICE"
Could not open the source device: device is not configured or is off-line.
- (5) "INVALID RESPONSE"
Character is not one of 'y' or 'Y' for affirmative; 'n' or 'N' for negative.
- (6) "CANNOT OPEN DEVICE"
[see message (4)]
- (7) "AMBIGUOUS SPECIFICATION"
Bad-Block-Print-Frequency has been specified yet the check-for-bad-blocks field indicates no checking requested.

If no errors are encountered while initializing for the Block Printing Process the following message will be issued on the Error Line of the Display:

- (8) "Block Printing Commencing ..."
Devices are valid, have been opened and Block Printing is commencing.

For each block printed, a Block Id will be included. This will, at the least (in the case of unformatted or bad blocks), identify which block is being printed and the length of the block. For

Diurnal and Airborne data, this Id will also include the day and year that the data was recorded. For Airborne data, the traverse line number to which the data applies will also be included in this Block Id.

Formatted data will be output in the columnar form defined by the Block Header set up as a System Specification. For each parameter and under the Block Id, the parameter mnemonics will be printed. Directly under this will be a line containing the parameter codes, followed by a dashed line. Finally, the data from each of the ten records will be formatted and printed.

NOTE: when setting up the Block Header in the System Specifications, the Operator must leave enough spacing between parameters in order for all digits to be printed. One space between each parameter will be reserved by the software.

complete TIMDS value = 49923457
DATE value = 12389

Examples:

- (1) header: TIMDS DATE NULL
 4992345 12389
- (2) header: TIMDS DATE NULL
 49923 1238
- (3) header: TIMDS DATE NULL
 49923457 12389

During Block Checking, errors detected at the frequency of dumping specified by the Operator will result in the block being printed on the destination device in a raw format, preceded by a line of text indicating the error encountered. figure 5-2a shows an example of the layout of this presentation.

#2100-12-003.01.0

```
BLOCK NO.      0   LENGTH 257   DAY 327   YEAR 87   LINE 00011115
INVALID BLOCK LENGTH   LAD = 0x023F5
32787GG00011115GH54200050GJ57159836GN57159836G057159858GP5716003GZ54321HHn0573674HIw1
0750HW-0002HX20000002IH-0820JL15032005GI54200350GJ57159813GN57159836G057159858GP571600
```

Figure 5-2a Error Reporting at Frequency

If a bad block is encountered but not at the frequency of dumping, a message will be logged on the System Console (Star Printer). This message will take the form:

```
"D/T:  Bad Block (      B) encountered:
E
Block Header = [H] ... LAD = L"
```

where D/T = current Date and Time;
 B = logical Block number from start of medium;
 E = text of Error message indicating fault detected;
 H = block Header, the first 27 characters of raw data
 in the block;
 L = Logical disk address of where error occurred (if
 source device one of two hard disks).

When formatted data is being printed, and checking is requested, a check will be done to verify that the parameter codes are in the same location within each block to be printed. If not: message

(9) "INVALID PARAMETER CODE"
Parameter code not found in data block at expected location.

will be the resulting error message produced.

If the date or line number is not found within a block, the message

(10) "MISSING PARAMETER(S)"
Date or Line Number parameter has not been recorded.

will follow on the output.

The 'Every Bad Block' option will use the character checking set (for formatted block types) to ensure that all characters of a data block are a subset of this check-set. The length of each block will also be examined for missing data. If an invalid character is detected during the Printing Process the message

(11) "INVALID CHARACTER"

A character has been encountered which is not a member of the valid set used in a recording block.

will be printed. This same message will be issued if an invalid digit is encountered within the value of any of the recorded parameters.

If the length of a data block changes, the message

(12) "INVALID LENGTH"

The data block has changed length or the length determined does not allow for the correct length of header and ten equal records.

will be produced.

(13) "INVALID PARAMETER CODE"

Two characters are out of sequence in the data block.

will result if a character is missing in a block of data. This same message will also result if there is a change in the recording format between the current and previously read blocks. This will occur when the recording parameters are changed in the Data Acquisition System. As an example, Block Printing of data that has been collected on more than one flight may be the result of this error.

If the message

(14) "Block Printing Commencing ..."
Dumping of data to the printer has begun.

has appeared on the screen but no output is being generated the usual cause will be the destination device being off-line (except, of course, if the output has been routed to the 'null' device, LUN 0). Also check the System Console (Star Printer) to ensure that it, too, is on-line.

When the logical end of source device is encountered, the message "end of source device encountered" will flash quickly on the screen followed by the message

(15) "... Block Printing Complete"
Dumping has completed successfully.

which will remain on the Error Line of the display. For unsuccessful completion, one of the aforementioned error messages will have presented itself. The last block encountered will also be dumped (if the frequency is not "Bad-Blocks") when the end of the source device is encountered.

A logical end of tape will be defined by an end-of-file marker. If this is not present on a source tape, the physical end of tape will be reached: in most cases, no error message will result as the tape unit is more than likely trying to read what it believes to be a very large block. This special case should be watched for to avoid aggravation. If it is encountered, the Operator should try turning the magnetic tape unit off and back on to regain control of the Field Checking System.

Following completion or termination of the dumping process, the Operator will use the keyboard to enter another option from the

Print Frequency Menu choices given to perform the process again.

To return to the Block Printing Format Menu either the <CTRL Z> or <CTRL C> keys will be used. <CTRL Z> will save the specified field values, assuming they are valid. The <CTRL C> key will cause any Presentation Area modifications to be discarded prior to redisplaying the previous menu.

5.3 Returning to Main Menu

To exit the Block Printing Format Menu and return the Main Menu to the Monitor, either the <CTRL C> or <CTRL Z> keys will be used to do so.

```

+-----+
|
|           F I E L D   C H E C K I N G   S Y S T E M
|
|           P r i n t   F r e q u e n c y   M e n u
|
|           Option                Function
|           -----                -
|           1                    Every Block
|           2                    Every 10th Block
|           3                    Every 100th Block
|           4                    Every Nth Block
|           5                    Every Bad Block
|           CTRL C/Z             Return to Print Format Menu
|
|
|
|
|           Error Checking? [y]
|
|           Source LUN=3          Destination LUN=0
|
+-----+

```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 5-2 Block Printing Frequency Display

6.0 PLOT PROCESS

Choosing option <4> of the Main Menu will bring up the Plot Menu with the prompt "ENTER NUMBER OF OPTION". Figure 6-0 shows this Menu. Three options are available: (1) Plot Specifications #1, (2) Plot Specifications #2, and (3) Successive Difference Specifications. All the specification displays will be identical: the three will be available simply as a means of allowing more than one default only to be set up. With a slight variance for Successive Differences, all displays will be set up in the same manner. This variance will be discussed in a later section.


```
FIELD CHECKING SYSTEM

Plot Menu

Option      Description
-----
1           Plot Specifications #1
2           Plot Specifications #2
3           Successive Difference Specifications
CTRL C/Z    Return to Main Menu

ENTER NUMBER OF OPTION
```

Figure 6-0 Plot Menu

6.1 Plot Specifications

The Operator will choose the desired display via the keyboard, resulting in the corresponding Plot Specifications Display being brought up on the Monitor. Figure 6-1 shows one of the three displays.

6.1.1 Plot Parameters

Near the top of the screen, above a dashed line, will be a line of text containing the words: "ID SCALE POSITION" repeated three times. Most of the display will be filled with fields resembling the following: "PMxx = , (,)". To be exact, there will be thirty-six such fields. As many as thirty-six parameters may be plotted at a time.

Each parameter to be plotted will be specified by its two-character parameter code. This will be placed under the text "ID" in the appropriate columns and rows.

The text "SCALE" will refer to the full-scale deflection and will be a seven-digit (decimal) value representing the maximum value to be plotted before the curve wraps around from the end plot sector back to the first. A value of 0 would be plotted at the start plot sector (exception: Successive Differences -- see later subsection).

Finally, the text "POSITION" will refer to the sector location on the plot page within which the curve for a parameter must lie. The start and end sectors will be inclusive. For the Versatec V-80, the maximum end sector will be 132.

The Parameter Id and Scale will be combined into one field. The two character parameter code is separated from the Scale by a single character which may be left as a space, or a comma or a hyphen or any other suitable character: it will not be of importance to the System.

The plot position will be a field by itself, reached by cursoring right. A three, decimal digit start sector position will be separated from a three, decimal digit end sector position by a single character which may be left as a space, or a comma or a hyphen or any other suitable character: it too will be of no importance to the System.

6.1.2 Scale Lines

Near the bottom of the Presentation Area is a line of text and fields which will be used to set up the plot page attributes. The first, Scale Lines, will determine whether vertical lines will overlay the plot page marking the start and end sector locations. "Scale Lines?" will require either a 'y' (or 'Y') or 'n' (or 'N') character response in the field.

6.1.3 Vertical Scale

Vertical Scale will refer to the number of blank plot lines to be left between horizontal plot lines of actual data. This number may range between zero and ten (inclusive) where zero will indicate that no vertical exaggeration will be made and the curve should be solid in appearance and ten will leave ten vertical spaces between each parameter data value plotted.

6.1.4 Fiducial Parameter and Interval

The Fiducial Parameter and Interval will be used to create the scale lines along the left and right edges of the plot page. The Fiducial Parameter will be the two-character parameter code of the data value to be used for scaling. The Interval will set the difference between graduation marks on the page edge and will be a seven, decimal digit value. As an example, if the Fiducial Parameter specified is TIMDS with an Interval of 12000, then the scale marks ('-') would represent $12000 / 1000 = 1.2$ seconds, where 1000 is the scaling value for TIMDS as specified in the Recording Specifications of the System Specifications.

6.1.5 Source LUN

The last field on the display, Source LUN, will define from where the data for the plot is to be read. As with LUN definitions for previous options, it will be a single character mapping to a physical device as defined in the System Specifications.

```

+-----+
|                                     |
|               F I E L D   C H E C K I N G   S Y S T E M               |
|                                     |
|               P l o t   S p e c i f i c a t i o n s   # 2               |
|                                     |
|   ID scale  position   ID scale  position   ID scale  position   |
|-----|-----|-----|-----|-----|-----|
|PM1 =6Z,25000 , (001-029) PM2 =      , (      ) PM3 =      , (      ) |
|PM4 =6Z,2500  , (032-052) PM5 =      , (      ) PM6 =      , (      ) |
|PM7 =6Z,250   , (054-074) PM8 =      , (      ) PM9 =      , (      ) |
|PM10=          , (      ) PM11=      , (      ) PM12=      , (      ) |
|PM13=          , (      ) PM14=      , (      ) PM15=      , (      ) |
|PM16=          , (      ) PM17=      , (      ) PM18=      , (      ) |
|PM19=          , (      ) PM20=      , (      ) PM21=      , (      ) |
|PM22=          , (      ) PM23=      , (      ) PM24=      , (      ) |
|PM25=          , (      ) PM26=      , (      ) PM27=      , (      ) |
|PM28=          , (      ) PM29=      , (      ) PM30=      , (      ) |
|PM31=          , (      ) PM32=      , (      ) PM33=      , (      ) |
|PM34=          , (      ) PM35=      , (      ) PM36=      , (      ) |
|Scale Lines?y Vert. Scale=00 Fiducial Parm & Intvl=[6J,10000 ] Source Lun=1 |
+-----+

```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 6-1 Plot Specifications Display

6.2 Modifying Plot Specifications

From the Input Line, depressing either the <right> or <down> arrow keys will place the cursor in the Id and Scale field for the first plot parameter. Here the two character code will be entered. As an example, assume a code of "VA" is entered. The separating character recommended between the code and the scale is a comma. Moving to the Scale via the <-->|> key, assume a value of "13f00" is entered.

Using the <right> arrow key, the cursor will be moved to the Position field for parameter one. A three digit start position will be expected: for the example, assume "00r" is entered. A Hyphen (-) will be the recommended character to separate the start and three-digit end position. Assume a "299" value is placed in the field.

If thirty-six parameters are not to be plotted simultaneously, the parameter Id and Scale field as well as the Position field will be left empty (as spaces) for those not to be plotted.

Using any of the four cursor keys available, the cursor must be moved to the leftmost field of the bottom line in order to specify whether or not Scale Lines will be included as part of the plot. For the example, assume the response is set to 'g'.

Moving to the right via the <right> arrow key, The Vertical Scale must be set. Let a "99" be the example, here.

Moving right to the field specifying the Fiducial Parameter and Interval, a similar set up will be required as for each of plot parameters. The two character code and seven digit interval will

be contained in the same field. For the example, let the parameter code be "V5" and the interval be "\$2300". A comma will be the recommended character separating the two components of the field.

Finally, moving right once more, the Source Lun must be set. For the example let the field be set to a 'v'. Depressing the <enter> key will return the cursor to the Input Line.

When ready to commence the plotting process, the Operator will depress the <P> key. Prior to commencing the plot, the specifications set up in the Presentation Area will be verified. The examples given above have been made in order to illustrate the error handling for which the Verification Process will be responsible.

The first error issued on the Error Line will be:

- (1) "INVALID PARAMETER CODE"
Parameter code specified is not defined in the Recording Specifications.

and the cursor will be positioned at the top, left field where the error exits. Assume the error is corrected by replacing the parameter code with "GZ" and the cursor is returned to the Input Line by typing <enter>.

Next, typing a <P> will cause the error message:

- (2) "INVALID CHARACTER"
A nondecimal digit character has been found in a field which is to contain only decimal characters.

to be shown on the Error Line of the Monitor, with the cursor positioned at the field containing the error. The right tab key <-->|> will be used to move to the scale and replace the previous text with "1000 " for the example. Depressing <enter> will return the cursor to the Input Line.

Typing a <P> now will bring up the message:

(3) "INVALID CHARACTER"

A nondecimal digit character has been found in a field which is to contain only decimal characters.

and the cursor will be located at the Position field for parameter #1. The invalid character of the start sector will be in error, based on the value defined in the example. Assume the three characters for the start sector are changed to "023" and the cursor is returned to the Input Line via <enter>.

Now, when plotting is attempted, the message:

(4) "INVALID PLOT POSITION"

plot sector is less than minimum (0) or greater than maximum (132) or start is greater than end sector position.

will appear on Error Line. This is due to the "999" specified for an end sector position being larger than the maximum of 132. Let this text be changed to "021" and another attempt made to perform a plot.

Again, the message "INVALID PLOT POSITION" will appear with the error in the same field. In this case, the error will have been caused by a start sector specified being greater than the end sector specified. Assume the end sector is changed to "025", the

#2100-12-003.01.0

cursor is returned to the Input Line, and another attempt is made at plotting.

No further errors will be flagged for the Plot Position field. However, now the error message will be:

- (5) "INVALID RESPONSE"
Response character not one of 'y' or 'Y' or 'n' or 'N'.

Assume the response is changed to 'y' in the Scale Lines field.

The error message on the next attempt will change to:

- (6) "LIMIT ERROR"
Vertical Scale specified is less than minimum (0) or greater than maximum (10).

and the cursor will be located at the Vertical Scale field. As outlined earlier, the Vertical Scale must lie between the values of 0 and ten (inclusive) and, thus, a value of 99 is too large. Reducing this number to '02' in the field, returning to the Input Line and typing <P> will initiate another attempt at plotting.

Now, however the message:

- (7) "INVALID PARAMETER CODE"
Parameter code specified is not defined in the Recording Specifications.

will be issued since the Fiducial Parameter code specified is incorrect. Modifying this to "GJ" (for TIMDS) and trying once more will change the error message to "INVALID CHARACTER" as the Interval is not made up of decimal digits only. Changing this portion of the field to "12000 " will alleviate this problem.

The next attempt will result in the message:

- (8) "INVALID CHARACTER"
LUN character not between minimum (0) and maximum (8).

with the cursor located at the Source LUN field. A LUN of 'v' will not be acceptable and should be changed to a value that is contained in the LUN Table of the System Specifications, but does not match one of valid devices (ie. not one of the magnetic tape units or hard disks). Now an attempt to plot will result in the message:

- (8) "INVALID DEVICE"
Device specified is not a valid source of data.

The LUN should be changed to one of the magnetic tape units or hard disks. At this point in the example, all specifications will be acceptable and verification will be successfully performed. Plotting may now be initiated or the specifications may be saved and the Plot Menu returned by typing <CTRL Z>.

6.3 SUCCESSIVE DIFFERENCE SPECIFICATIONS

The set up of the Successive Difference Specifications will differ only slightly from that outlined in the previous section. The first parameter of the display will be used to define that parameter from which the raw data for the successive differences is to be taken. Therefore, all that will be needed is the two character Parameter Code. The Scale will be set to zero and the Position field will be left blank. If this is not done, the specifications will be treated as a standard plot.

Parameters two through eight will be reserved for the successive difference codes which are defined in the System Specifications; these being "SG" through "SM". Any combination, in any order, of successive differences may be plotted. The Scales and Plot Positions will be defined for them in the same way as are the specifications described in the previous section for standard plots. The raw data may be plotted as Successive Difference 0.

If a nonzero scale is defined for the first parameter yet one or more of parameter codes "SG" through "SM" are specified, when the plot is attempted the message:

- (9) "MISSING PARAMETER CODE"
Cannot find parameter code in data block.

will be shown on the Error Line since "Sx" parameters will never be recorded by either the airborne or ground data acquisition systems. The message "INVALID CHARACTER" may also likely occur at the same time since the software attempts to do other things with the nonexistent codes. REMEMBER: these codes are not true recording parameters.

6.4 Plot Generation

When a plot is ready for generation, that is all specification and logical errors have been corrected, typing <P> on the keyboard while the cursor is in the Input Line will commence the Plotting Process.

The source device will be opened and read to obtain a block of data. The message:

- (1) "ERROR AT SOURCE DEVICE"
Cannot open device, device is off-line or device is not available to be read.

may be issued on the Error Line of the display. Otherwise, the data block will be parsed to search for all the necessary parameters and if they are not all located then the "MISSING PARAMETER CODE" message will result.

If all parameter data is available, plotting will commence with the message:

- (2) "Plotting commencing ..."
Source device opened, and all parameters exist in data block.

A plot header will be generated first. This plot header will be located at the top of the page and will contain two lines of text separated by a blank line. The first line will contain the flight date, (day and year) as well as the flight line number. If the plot is a successive difference, the text "SUCCESSIVE DIFFERENCE" will also be included.

Immediately following the line number, but preceding any further

text will be one or two characters indicating the primary direction of flight, if this information is available, or a space otherwise. The following table shows how the direction characters are determined:

000.0 <= x <= 022.5 degrees	'n'	[north]
022.5 < x < 067.5 degrees	'ne'	[northeast]
067.5 <= x <= 112.5 degrees	'e'	[east]
112.5 < x < 157.5 degrees	'se'	[southeast]
157.5 <= x <= 202.5 degrees	's'	[south]
202.5 < x < 247.5 degrees	'sw'	[southwest]
247.5 <= x <= 292.5 degrees	'w'	[west]
292.5 < x < 337.5 degrees	'nw'	[northwest]
337.5 <= x < 360.0 degrees	'n'	[north]

The parameter HEAD (HK), is used to determine the general direction of flight.

The second line of text will contain the vertical scale and the fiducial parameter interval, along with the fiducial parameter units.

Two lines beneath this will be a hashed line marking the plot page sectors. Under this will be a line reserved for the mnemonic of the fiducial parameter. Beneath the mnemonic the plot will commence.

The text on the first plot line will include the first fiducial parameter value. Commencing approximately four lines below this, left justified at the start sector, the mnemonic for the parameter being plotted will be visible. One line beneath will be the Full Scale and below this will be the parameter Units, where known.

The remainder of the plot will be taken up with the curve(s), and

scale lines, if they were desired. Along the left and right edges, at equal intervals, will be hash marks (-) indicating the fiducial parameter interval change from the last hash. After nine hash marks, the actual fiducial value will be printed as a reference on the left edge.

Full scale deflection for standard plots will differ slightly from that for Successive Differences. The start sector will represent a value of zero for standard plots while the zero reference for successive differences will lie halfway between the start and end sectors. In this way, negative and positive values both may be shown without deflection for Successive Differences.

Plotting will continue until the end of the source device is encountered. Successful completion will be signaled with the message:

- (3) "... plotting complete"
Successful completion of Plotting Process.

being shown on the Error Line of the Monitor. The Operator may notice the quick flash on the Error Line as the "end of source device encountered" message is issued prior to the completion message.

The specifications may be modified or another plot may be generated simply by typing <P>. NOTE: the source device may have to be repositioned.

6.5 Returning to Plot Menu

To save the specifications of the Presentation Area and return to the Plot Menu the Operator will type <CTRL Z>. To discard the

#2100-12-003.01.0

specifications and return to the Plot Menu the Operator will exit by typing <CTRL C>.

6.6 Returning to Main Menu

To return to the Main Menu from the Plot Menu, either of the <CTRL C> or <CTRL Z> keys will perform the exit since there are no Presentation Area specifications associated with the Menu.

7.0 STACKED PROFILES

7.1 Data Parameter Extraction

Choosing option <5> of the Main Menu will bring up the Stacked Profile Extraction Display on the Monitor along with the prompt "USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS". Figure 7-1 shows this display. The Presentation Area will consist of eleven fields: ten fields for defining the extraction parameters and one field for the source lun.

The extraction parameter fields will specify which parameters are to be extracted from the source data and placed in smaller data blocks for later use during Stacked Profile Creation. By extracting the data and having it in Reader's Digest form (condensed blocks), the Field Checking System will be able to create the Stacked Profile more rapidly. Each extraction parameter will be specified by its two-character recording parameter code.

The last item that must be defined before extraction may commence will be the source device. This will be done by placing the LUN of the physical device containing the source data in the field near the bottom of the Presentation Area. This LUN must specify either one of the magnetic tape units or one of the rigid disks.

In a special case, the LUN may be set to zero. When data has been extracted from one of the tape or disk units, it will be stored, temporarily, on the IBM-AT hard disk. Prior to exiting the Stacked Profiling option, the Operator will be permitted to either remove or leave the extracted data intact on the IBM-AT disk. If the data is not deleted then it will be available for

performing Stacked Profiles at any time until it is deleted or new data is read over it. If existing data is to form the basis of a Profile, then this may be specified by a LUN of zero. The following error message:

- (1) "ERROR AT SOURCE DEVICE"
No extraction data could be found on the IBM-AT disk.

will be issued if the Profile cannot be created from data already extracted. NOTE: only those parameters already extracted and not those parameters specified in the Presentation Area will be available to the Profiling Process.

When the extraction parameters have been specified, the cursor will be returned to the Input Line, either via the <enter> key or by using the four arrow keys. The extraction process may now be started by depressing the <P> key. If no errors are detected during verification of the specifications, the message:

- (2) "Extraction commencing ..."
All data parameters and source LUN have been verified and extraction of those parameters specified is commencing.

will be displayed on the Error Line of display and the source device will be read, a block at a time. The data will be extracted as requested until the end of the source device is encountered or an error is detected in the System.

If the Extraction Process is successful, the message "end of source device" will flash on the Error Line of the display, immediately followed by the message:

- (3) "... extraction process completed"
A successful extraction of the specified data parameters has been completed.

However, there will be errors that may be detected prior to and during the Extraction Process.

Errors that may be detected in the extraction specifications will include:

- (4) "INVALID PARAMETER CODE"
No such parameter code has been defined in the Recording Parameter Specifications of the System Specifications.
- (5) "INVALID CHARACTER"
LUN character is not within the range between the minimum (0) and maximum (8) possible values.
- (6) "INVALID DEVICE"
LUN is not one of the magnetic tape units or hard disks configured in the Field Checking System.

Errors that may be detected during the extraction process will include:

- (7) "ERROR AT SOURCE DEVICE"
Device is not configured, is off-line or failed to read correctly.
- (8) "MISSING PARAMETER CODE"
Specified parameter could not be found in data recorded on source device.

IMPORTANT: The Operator should have a full understanding of the logic to the Stacked Profile Process before using this option of the Field Checking System. The System will assume that the raw data on the source device has been recorded by the Airborne Data Acquisition System in the following manner:

Data for the first flight line will have been flown on a bearing of Y degrees. Data for next flight line will have been flown on the opposite bearing or $360 - Y$ degrees. As well, both flight lines originated and terminated at roughly the same locations.

Therefore, data of the second flight line is reversed. This means that the data obtained near the end of the second flight line and data obtained near the beginning of the first flight line correspond to roughly the same geographical location, with the difference being the line separation.

When data of the second line is plotted it will be reversed with respect to data of the first line. Likewise, data of the fourth, sixth, eighth, etc. traverse lines will also be treated in this manner while data of the third, fifth, etc. lines will be processed "as is", similar to the first line.

If this is not the case with the data at hand, then the Operator may set the orientation in the next procedure of the Profile Process.

#2100-12-003.01.0

```
FIELD CHECKING SYSTEM
Stacked Profile Extraction Parameters

PARM0 = 6J
PARM1 = 6Z
PARM2 = H1
PARM3 = HJ
PARM4 =
PARM5 =
PARM6 =
PARM7 =
PARM8 =
PARM9 =

Source LUN = 3
```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 7-1 Stacked Profile Extraction Parameters Display

7.2 Data Inclusion Specifications

After the "... Extraction Complete" message has been given, the display will quickly change to the Data Inclusion Specifications. Figure 7-2 shows this display. The Operator will set up the specifications which define the data to be included in the Profile as well as the orientation of each flight line.

The right arrow key will place the cursor at the Line Number field. This field will specify the line number to be included in the Profile and the order of occurrence on the plot. The line number will be the eight character value as found in the Recording Block. The message

- (1) "INVALID CHARACTER"
Line number contains nonhexadecimal characters.

or

- (2) "INVALID LINE NUMBER"
Data has not been extracted for the specified line.

may result for a bad specification in this field.

Moving right to the next field will bring the Operator to the Orientation flag for the line. It is here that the Operator can specify the line's direction. The character codes '0' and '1' will be used to define orientation where '0' might mean a North-South orientation and '1' would be the opposite: East-West. Specifying any other character in this field will result in the message

- (3) "INVALID RESPONSE"
Only '0' and '1' may be used to specify orientation.

#2100-12-003.01.0

Up to twenty four lines may be so specified for any Profile. All lines specified for Profiling must have been extracted.

When all specifications have been set up as desired, and the cursor has been returned to the Input Line, depressing the <P> key will cause the specifications to be verified and, if all is okay, the Stacked Profile Plot Specifications Display will be presented; otherwise, errors will be indicated and must either be corrected, to proceed, or the display must be exited via <CTRL C>.

```

+-----+
|
|           F I E L D   C H E C K I N G   S Y S T E M
|
|       D a t a   I n c l u s i o n   S p e c i f i c a t i o n s
|
|   L i n e #   D r                               L i n e #   D r
|   -----
|   00011280 0
|   00011290 1
|   00011320 0
|   00011330 1
|   00011560 1
|   00011570 0
|   00011620 0
|   00011630 1
|   00011650 1
|
|
|
|
+-----+

```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 7-2 Data Inclusion Specifications

7.3 Stacked Profile Plot Specifications

After the inclusion data has been specified and processed, the display will change to Stacked Profile Plot Specifications. Figure 7-3 shows this display. The Operator will set up the specifications that define the form of the plot for the Stacked Profile.

The right arrow key will place the cursor at the Profile Parameter field. This field will specify the data parameter to be plotted by the two character code for the recording parameter. NOTE: This parameter must be one of those extracted in a previous operation.

Moving right to the next line will bring the Operator to the first field used to define the Format Specifications. Three formats will be possible: (1) Free Format which will simply plot the curves alongside one another with no data adjustment, (2) Time-Adjusted Format which will assume all lines are to be plotted in the same vertical distance on the page and will adjust shorter length lines to end plotting at same time as longer length lines, and (3) an "Other" Format which will allow the Operator to choose the parameter against which to base the plot. This third case might be used in the situation where the lines are of differing physical lengths but have common points among them such as latitude and longitude positions.

NOTE: in either case, the format parameter must have been one of those specified and extracted; TIMDS will have to have been extracted for Free and Time-adjusted profiles.

If a Free format profile is desired then the Operator will place

a 'y' or 'Y' in the first field of the Format Specification Line and will place an 'n' or 'N' in the Time-adjusted field and will leave the Other field blank.

If a Time-adjust profile is desired then the Operator will place an 'n' or 'N' in the Free format field, a 'y' or 'Y' in the Time-adjust field and will leave the Other field blank.

If another type of format is desired then the Operator will place an 'n' or 'N' in both the Free and Time-adjust fields and will place the two character recording parameter code of the format basis parameter in the Other field.

The last field of the Format Specifications line will define the Format Interval which will be used to determine where to place the scale markings along the left and right edges of the plot page. This eight digit number must be made up of decimal digit characters.

The next field will specify whether the line numbers will be printed beside each curve as a means of identifying the flight line data plotted. If the line numbers are to be listed, a 'y' or 'Y' will be placed in this field. Otherwise, an 'n' or 'N' must be placed in the field.

The first field on the next line of the specifications will determine the full scale deflection for the profile parameter. This seven digit Plot Scale value must be made up of decimal characters.

Moving right, the First Plot Position field will determine the horizontal location of the curves on the page. The first three

characters of the field will define the start position, in sectors, of the first curve. This will be followed by a single character location containing a space or comma or minus sign to separate the start position from the three-character end position of the curve. The start position must be located ahead of the end coordinate. The sector coordinates are inclusive to the curves.

The three character plot Separation field will define the number of sectors to be left between the start coordinates of each curve. This value may be set so as to allow curves to overlap or to be situated in separated positions on the plot page.

Finally, the vertical scale will define the number of blank plot lines to be left between each horizontal line of plot data: that is, it will define the vertical exaggeration of the plot.

```

FIELD CHECKING SYSTEM

Stacked Profile Plot Specifications

Profile Parameter = 6Z
Profile Format: Free? n   Time-Adjusted? n   Other (parm. code) = HJ
Profile Interval = [1      ]
List Line #s? y
Plot Scale = 025000
First Plot Position = (010-020)           Separation =12
Vertical Scale = 00
Include Scale Lines? y

Type:  CTRL C to quit and exit
      CTRL Z to save and exit

```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 7-3 Stacked Profile Plot Specifications

7.4 Error Handling of Plot Specifications

When the plot specifications have been set up and the cursor has been returned to the Input Line, depressing the <P> key will cause the specifications to be verified and, if all is okay, the Stacked Profiling Process to commence. Many error messages may result. These will be described in the next paragraphs. In all cases the cursor will be positioned to the field containing the error after the appropriate message has been issued on the Error Line window.

- (1) "LIMIT ERROR"
Value defined in the Vertical Scale is greater than the limit of 10 or a nondecimal digit has been encountered in the field.
- (2) "INVALID PLOT POSITION"
The Separation specified is not made up of decimal characters only, or the value set is greater than the maximum plot sector available on the page.
- (3) "INVALID PLOT POSITION"
The start or end plot sector defined in the First Plot Position field is not within the correct range or the start sector is greater than the end sector: both values must be made up of decimal characters.
- (4) "INVALID CHARACTER"
The Plot Scale field contains a nondecimal character.
- (5) "INVALID RESPONSE"
The response given for "Line Numbers?" was neither one of the affirmative choices ('Y' or 'y') nor one of the negative choices ('n' or 'N').
- (6) "INVALID CHARACTER"
The format interval does not consist of decimal characters only.
- (7) "INVALID PARAMETER CODE"
The Other format field has not been set to two spaces and the parameter code placed in the Other field is not one that

has been defined by the Recording Specifications of the System Specifications.

- (8) "INVALID RESPONSE"
The character placed in the Time-adjust field is not 'n', 'N', 'y' or 'Y'.
- (9) "INVALID RESPONSE"
The value in the Free field is not one of 'n', 'N', 'y' or 'Y'.
- (10) "MISSING PARAMETER(S)"
No format has been set: an 'n' or 'N' has been placed in both the Free and Time-adjusted fields and the Other field has been left blank.
- (11) "AMBIGUOUS SPECIFICATION"
Either of the following three cases are true, implying that no correct format may be determined from the specifications given:
 - (1) Free = 'n', Time-adjusted = 'y', Other = a valid parameter code;
 - (2) Free = 'y', Time-adjusted = 'n', Other = a valid parameter code;
 - (3) Free = 'y', Time-adjusted = 'y', Other = a valid parameter code;
 - (4) Free = 'y', Time-adjusted = 'y', Other = blank.
- (12) "INVALID PARAMETER CODE"
The profile parameter specified does not exist in the Recording Parameter Specifications.

7.5 Stacked Profile Plot Generation

When any errors have been corrected, depressing the <P> key will begin the plotting process. This will be evident from the message:

- (1) "Stacked Profiling Commencing ..."
Plotting Process starting for Stacked Profile generation.

appearing on the Error Line. The Versatec Printer/Plotter must be on and, when it is, the profile will be generated on the device, assuming no errors at the source device have been encountered. The source device, in this case, will be the IBM-AT Hard Disk and an error may be the result of not having any flight line data available. If so, the message:

- (2) "ERROR AT SOURCE DEVICE"
Cannot open or cannot find flight line data files.

will be evident on the Error Line window.

At the top of the profile output will be a header. The first line of this header will include the text "STACKED PROFILE" and "FORMAT". The corresponding format will be printed be it "FREE", "TIME-ADJUSTED" or the mnemonic of the Other format. The Format Interval and the units will be printed near the right edge of this first line.

The second line will show the flight date consisting of the day and year.

The third line will indicate the mnemonic of the parameter being profiled, along with its full scale deflections and units of

measurement.

The last line of the header will contain the Vertical Scale and the Separation between the start sectors of the various curves.

A blank line will separate the bottom of the header from a line of hashes marking the vertical sectors across the page. Below this scale, on the left page edge will be the mnemonic of the format parameter. In the case of Free and Time-adjusted formats, this format mnemonic will be "TIMDS".

Under this text will be the initial value for the format parameter of the longest flight line in the profile. The plot will have commenced on the output by this point and may possibly overlay this text.

A couple of lines down from the format mnemonic, at the start of each plot position and continuing on each line below until exhausted will be the line numbers of each flight line. NOTE: these will only be printed if requested in the specifications.

Along the left and right edges of the plot will be a scale mark (-) indicating a difference of Format Interval since the last scale mark. At every tenth scale mark the actual format value will be printed as text for Operator reference.

These scale markings and reference values will continue along with the flight line curves until all data is exhausted. When the Profile is complete the message:

- (3) "... Stacked Profiling complete"
Successful completion of the Profiling Process has been attained.

#2100-12-003.01.0 .

will be issued on the Error Line. At this time, the Operator may now change a specification and reprofile either the same parameter or a new one.

7.6 Returning to the Data Inclusion Specifications Display

When ready to exit the Stacked Profile Plotting option, the <CTRL C> key will be used to discard any changes made in the Presentation Area and <CTRL Z> will be used to update the changes as the new default values. The Data Inclusion Specifications Display will be presented once more.

7.7 Returning to the Extraction Parameters Display

When ready to exit the Stacked Profile Plotting option, the <CTRL C> key will be used to discard any changes made in the Presentation Area and <CTRL Z> will be used to update the changes as the new default values. The Extraction Parameters Display will be presented once more.

7.8 Returning to Main Menu

When ready to exit the Extraction Parameter Display, the <CTRL C> key will be used to discard any changes made in the Presentation Area and <CTRL Z> will be used to update the changes as the new default values. If the Extraction Process was performed then prior to the Main Menu being redisplayed on the Monitor, the Operator will be prompted with the following: "Remove extracted data from IBM-AT Hard Disk?". If the response entered via the keyboard and terminated with the <enter> key is either <y> or <Y> then the data that was extracted will be removed from the disk and will not be available the next time the Stacked Profile option of the Main Menu is chosen. Any other input for the prompt will cause the data to be left on the disk and this data will be available without having to perform the extraction process the next time the Stacked Profiling option is invoked.

#2100-12-003.01.0

The Main Menu will be presented once more following the exit from the Extraction Parameters Display.

8.0 GRADIENT PARAMETER CREATION

Choosing option <6> of the Main Menu will cause the Gradient Parameter Creation Display to appear with the prompt "USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS". Figure 8-0 shows this display. This process will allow the Operator to create new parameters based on the differences of existing parameters.

8.1 Specifications

Near the bottom of the Presentation Area is text which lists the parameters that may be created and their formulas. These nine parameter codes must be defined as recording parameters in the System Specifications before they may be used to create new gradient parameters.

From the Input Line hitting the <right> arrow key will move the cursor to the first field ("A = "). The 'A', 'B' ... 'L' in this area of the screen will be the basis parameters for the formula below. Defining parameters for 'A' and 'B' will allow the creation of the gradient 'KG'. Defining parameters for 'C' and 'D' will allow the creation of the gradient 'KH' as well as 'KI'. Similarly, definitions for the other single character codes will allow for the creation of further gradients.

NOTE: an even number of parameters must be defined and definitions must commence from 'A'. Also, at least two parameters must be defined.

If no parameters are specified, the error message

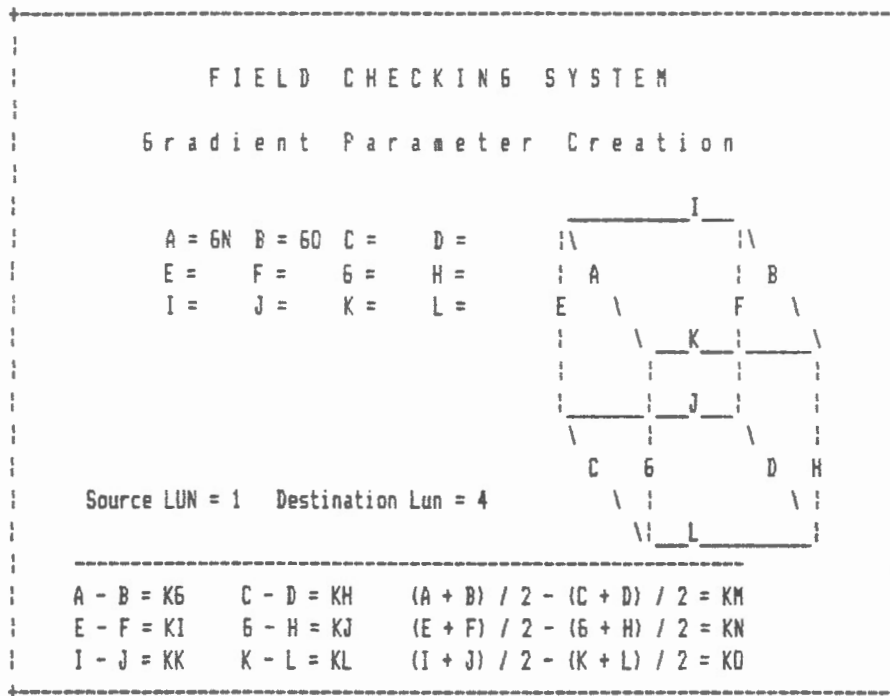
- (1) "MISSING PARAMETER(S) "
No basis parameters have been specified for Gradient Parameter Creation.

will appear on the Error Line. If an odd number of parameters is specified the same message will appear. Likewise, if an even number of parameters are specified but do not commence at 'A' and are not continuously defined (example: 'A', 'B', 'C', 'E') then the same error message will appear.

Near the middle of the Presentation Area will be the two fields for the source and destination LUN's. These will be set up as outlined for previous processes. Either of the following messages may be issued as a result of the LUNs specified:

- (2) "INVALID CHARACTER"
LUN character specified is less than 0 or greater than maximum LUN available.
- (3) "INVALID DEVICE"
Cannot read from or write to the specified device for the Gradient Parameter Creation Process.

After setting up the Presentation Area specifications, the cursor will be returned to the Input Line either using the cursor keys or the <enter> key before parameter creation may commence. Striking the <P> key will cause the verification process to be performed at which time one of the above messages may result. If no errors are detected, the Gradient Parameter Creation Process will commence.



USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 8-1 Gradient Parameter Creation Display

8.2 Gradient Parameter Creation Process

The Gradient Parameter Creation Process will begin with the message:

- (1) "Gradient Parameter Creation Process Commencing ..."
All specifications defined have passed verification and the Creation Process will begin.

appearing on the Error Line of the Monitor. If, however, either of the messages:

- (2) "ERROR AT SOURCE DEVICE"
Cannot open or read from the Source device.
- (3) "ERROR AT DESTINATION DEVICE"
Cannot open or write to the Destination device.

appears on the Error Line window, then the creation process will quickly terminate.

If no errors are detected while opening the source and destination devices then the process will continue until the logical end of source device is encountered. At this time, the message:

- (4) "End of Source Device Encountered"
Logical end of device has been reached successfully.

will flash on the screen followed by the permanent message

- (5) "...Gradient Parameter Creation Process Complete"
Successful completion of Gradient Parameter Creation Process.

Occasionally the error message

- (6) "NOT ENOUGH BUFFER SPACE"
Length of text converted from value exceeds available buffer.

may appear during the creation process. This message will inform the Operator of the following: a parameter value has been calculated that, while being converted from its numeric representation to its text representation, the number of characters of text for the parameter is greater than the length set in the Recording Parameter Specifications. When this error occurs, the process will not terminate. However, the Operator should be aware that the data on the output device will not be correct as it will be missing those values that were too large to convert to text.

As the process proceeds, essentially what will be occurring is as follows:

- (1) each block of input data will be split into its header and record components;
- (2) the header will be copied to another buffer;
- (3) each record will be copied in turn to this second buffer;
- (4) at the end of each record, the new parameters created as gradients will be appended;
- (5) this new buffer will be written to the output device.

Once the Process has terminated, either successfully or not, the Operator may type <P> to performed the Gradient Parameter Creation another time.

#2100-12-003.01.0

8.3 Exiting Gradient Parameter Creation Process

When Gradient Parameter Creation is no longer desired, the current display specifications may be saved via the <CTRL Z> key or discarded via the <CTRL C> key. In either case, the Main Menu will be returned to the Monitor.

9.0 EDIT FUNCTIONS

Choosing option <7> of the Main Menu will bring up the Edit Functions Menu and the Prompt "USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS". Figure 9-0 shows this display. Prior to using either the Batch Editor or the Screen Editor, the Source and Destination LUNs of the devices involved will need to be specified.

Using the cursor keys the Operator will move to the two fields of the Presentation Area and set the LUNs as desired. Once set these fields will be verified whenever an option of the Edit Menu is chosen. Similar to other processes, the two error messages which may result at time of verification include:

- (1) "INVALID CHARACTER"
LUN character specified is not a numeral in the valid range.
- (2) "INVALID DEVICE"
Cannot perform a read or write on this device for the Edit Function chosen.

Once the source and destination LUNs have been specified correctly, the options of both the Batch and Screen Editors may be called upon.

```

+-----+
|
|           F I E L D   C H E C K I N G   S Y S T E M
|
|           E d i t   F u n c t i o n   M e n u
|
|           O p t i o n           D e s c r i p t i o n
|           -----
|
|       Batch Editing:
|           1           Set Start/Stop Edit Limits
|           2           Output NNN Blocks
|           3           Add to/Subtract from a Parameter
|           4           Replace a Parameter Value
|           5           Delete/Add Parameters
|           6           Change One Digit
|           7           Check For Spike
|           8           Perform Edit Changes
|           9           Screen Editor
|           CTRL C/Z     Return to Main Menu
|
|           Source LUN = 4           Destination LUN = 7
|
+-----+

```

ENTER NUMBER OF OPTION

Figure 9-0 Edit Menu

9.1 Batch Editor

9.1.1 Edit Limits

Prior to performing a Batch Edit, the edit limits should be set. This will be done by choosing option <1> of the Edit Menu. A display similar to Figure 9-2-1 will be presented.

Near the top of the Presentation will be the Basis Parameter. This field will be set to the two-character parameter code of the data item to be used as the limiting value for batch edits.

Beneath the Basis Parameter field will be the Start and Stop Edit Limits. These two fields will contain the initial and final values against which editing will occur. That is, no batch editing will be done on any block of data whose basis parameter value is less than the start limit or greater than the stop limit. The start and stop limit field will be eight characters long.

When the parameters have been set as desired on the screen, the cursor will be returned to the Input Line. To verify and save the screen specifications the Operator will exit this display via the <CTRL Z> key. Possible errors detected during verification will include:

- (1) "INVALID PARAMETER CODE"
Basis parameter code specified does not exist as one defined in the Recording Parameter Specifications of the System Specifications.
- (2) "INVALID CHARACTER"
Start or stop limit contains a character other than one representing a correct numeral for the parameter type ('0'..'9' for decimal and '0'..'9', 'a'..'f' for hexadecimal

#2100-12-003.01.0

values).

To add these screen-defined specifications to the Edit Table so that they will be used during a batch edit, an exit and save must be done at some time prior to invoking the batch editor.

Discarding any modifications made and returning to the Edit Menu will be accomplished via the <CTRL C> key.

```

FIELD CHECKING SYSTEM

Set Start / Stop Edit Limits
-----

Basis Parameter = 6J
Start Limit      = 50289085
Stop Limit       = 90651795


CTRL C/Z      Return to Edit Menu

```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 9-1-1 Edit Limits Display

9.1.2 Dump Blocks Unchanged

Option <2> of the Edit Function Menu will allow a number of blocks to be dumped to the output device with no changes made to them. NOTE: with the destination LUN set to zero (NULL device), this option may be used as a forward block command.

When <2> is entered at the keyboard, the prompt will change to "ENTER SIGNED INTEGER". The number of blocks to be output will be entered via the keyboard. Prior to hitting the <enter> key changes may be made using the rubout key <-->. When <enter> is hit, the number of blocks specified will be transferred from the source device to the destination device and a message will be logged on the Message Console (Star Printer) to record this transfer. If either the source or destination device cannot be opened or is off line or is not loaded or is in an error state, then an appropriate message

- (1) "ERROR AT SOURCE DEVICE"
Source device cannot be opened and read.
- (2) "ERROR AT DESTINATION DEVICE"
Destination device cannot be opened or written.

will be issued on the Error Line of the display and no transfer will occur. If the number entered at the keyboard is too large or contains invalid characters then the message

- (3) "VALUE OUT OF RANGE"
Number entered via keyboard is too large to convert to a decimal value or contains non decimal characters.

will be shown.

#2100-12-003.01.0

The message logged on the Console will contain the date, time and number of blocks transferred between the VENIX O/S name for the source device and VENIX O/S name of the destination device. At the end of a successful or aborted transfer, the prompt "ENTER NUMBER OF OPTION" will be returned to the screen.

9.1.3 Add a Value to an Existing Parameter

Option <3> of the Edit Function Menu will allow the Operator to add to a parameter value during a batch edit. Figure 9-1-3 shows the display presented when this option is chosen.

From the Input Line, moving right via the cursor keys will place the cursor in the PARM1 field which requires the parameter code of the data item to be adjusted. The field to the right of this will specify the value to be added to the raw data. This eight character value will be signed, meaning that to subtract a value from a parameter, simply add the negative value to it, hexadecimal parameters included. Up to ten recording parameters may be modified in this way.

Returning to the Input Line the Operator will verify any changes made in the Presentation Area by typing <CTRL Z>. Errors that may be detected will include:

- (1) "INVALID PARAMETER CODE"
Parameter code not defined in the Recording Parameters of the System Specifications.
- (2) "INVALID CHARACTER"
Addition value contains nondecimal or nonhexadecimal characters for decimal and hexadecimal parameters respectively.

If neither of these messages are issued on the Error Line window, then the specifications defined will be saved as new default values and as the current batch edit specifications. The Edit Menu will be returned to the Monitor.

A <CTRL C> exit will discard any changes made to the display as well as leaving the current batch edit specifications untouched.

FIELD CHECKING SYSTEM	
Add A Value To A Parameter	
Parameter	Value (signed)
PARAM1 = 6J	VALUE = 10000000
PARAM2 =	VALUE =
PARAM3 = HI	VALUE = -0000005
PARAM4 =	VALUE =
PARAM5 =	VALUE =
PARAM6 =	VALUE =
PARAM7 =	VALUE =
PARAM8 = 6J	VALUE = -5
PARAM9 =	VALUE =
PARAM10 =	VALUE =

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 9-1-3 Add a Value to a Parameter Display

9.1.4 Replace a Parameter Value

Option <4> of the Edit Function Menu is identical to option <3> with the exception that instead of adding to a parameter value, the parameter value will be replaced by a constant. Therefore, "Replace a Parameter Value" means replace all occurrences of a specified parameter's data value with the given constant. Error messages and exiting considerations from the Replace a Parameter Value display will be identical to that of Add a Value to A Parameter. Figure 9-1-4 shows the display.

FIELD CHECKING SYSTEM	
Replace A Parameter Value	
Parameter	Value
PARM1 = HI	VALUE = s0000001
PARM2 = HJ	VALUE = e0000002
PARM3 =	VALUE =
PARM4 =	VALUE =
PARM5 =	VALUE =
PARM6 =	VALUE =
PARM7 =	VALUE =
PARM8 =	VALUE =
PARM9 =	VALUE =
PARM10 =	VALUE =

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 9-1-4 Replace A Parameter Value

9.1.5 Delete/Add A Parameter

Choosing option <5> of the Edit Menu will cause a display similar to that shown in Figure 9-1-5 to be presented on the Monitor. This option will allow the Operator to both delete existing parameters and add new ones to the Batch data blocks.

9.1.5.1 Parameter Deletion

Near the top of the Presentation Area will be the fields for deleting parameters. Reached from the Input Line via the <right> and <down> arrow keys, these five fields will simply be set to contain the two-character parameter codes of those parameters (and data) to be removed from each data block during batch editing. All five fields are in the same row and so movement between them will be accomplished using the <left> and <right> cursor keys.

9.1.5.2 Parameter Insertion

Below a hashed line in the Presentation Area will be the fields used to define the parameters to be inserted. The first field will be to the left of the equal sign (=). Here, the parameter code will be placed. NOTE: any parameter code will have to be defined in the System Specifications prior to attempting to insert during a batch edit.

For each parameter to be inserted, the formula used to calculate its value must be defined. This is done in the field to the right of the equal sign, cursoring right from the parameter code field. The formula will consist of up to eight operators and, therefore, nine operands up to the fifty-nine characters making

#2100-12-003.01.0

up the field. The operands will be either constants or recording parameters (that is, the codes). Negative constants will be permitted. The operators will be any of the simple multiplication (*), division (/), addition (+) or subtraction (-) operations. No parenthesis will be permitted and operations will be performed strictly in the order of parsing. Operators and operands will be separated by spaces.

NOTE: if a required formula is too complicated to define as a single formula it is recommended that it be defined as two separate formulas.

```

+-----+
|               |
|   FIELD CHECKING SYSTEM   |
|               |
|   Delete A Parameter      |
|               |
| PARM1 = K6  PARM2 =      PARM3 =      PARM4 =      PARM5 =      |
|               |
|-----|
|               |
|   Insert A Parameter      |
|               |
| PARM1: ZZ = 6J - 10000 + HI |
| PARM2:      =              |
| PARM3:      =              |
| PARM4:      =              |
| PARM5:      =              |
|               |
|               |
+-----+

```

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 9-1-5 Delete/Insert Parameters Display

9.1.5.3 Verification

When all parameters for insertion and deletion have been defined and the cursor has been returned to the Input Line, typing <CTRL Z> on the keyboard will cause verification to be done of the specifications set up. Error messages on the Error Line of the Monitor will inform the Operator of problems such as the following:

- (1) "INVALID PARAMETER"
Deletion or insertion parameter code is not defined in the Recording Parameter Specifications of the System Specifications.

The table below lists several valid formulas and several of the combinations that will cause each of the possible error messages to appear.

E R R O R	E X A M P L E

(2) "INVALID PARAMETER CODE"	"ff + 99"
(3) "SYNTAX ERROR"	"- 99" "1 99" "99 +"
(4) "INVALID CHARACTER"	"s99 + 1"
(5) "INVALID CONSTANT"	"99 + a"

NOTE: if a parameter code is specified for insertion then a formula must be provided for it, even if the formula is no more than a constant.

If no errors are detected, a <CTRL Z> exit will add the specifications to the edit table defining the Batch Edit commands

#2100-12-003.01.0

and save any modifications made as new display default values.
To exit and discard any modifications the Operator will type
<CTRL C>.

9.1.6 Change a Digit

To change a single digit of a parameter value option <6> of the Edit Function Menu will be used. When this option is chosen the "Change a Digit" Display will be presented on the Monitor along with the prompt "USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS". Figure 9-1-6 shows this display. Up to ten parameters may be modified in this way during any single batch edit.

For each parameter value to be modified three specifications will be required. The first will be the two-character recording code defining the parameter which is set in the first field, to the leftmost edge of the Presentation Area.

The second field, the digit Position, will be the location within the value for the digit to be changed and will be defined as the natural number position from the right. For example, the position of each digit in the value 38162935 will be as follows:

digit	3 8 1 6 2 9 3 5

position	8 7 6 5 4 3 2 1

The third field in each row will be a single character defining the replacement digit. For parameters whose type is hexadecimal this character may be in the range of '0' .. '9' or 'A' .. 'F'. Otherwise, only the decimal digit characters will be permitted.

Verification will be performed when exiting the display via the <CTRL Z> key. Error messages that may be encountered will include the following:

- (1) "INVALID PARAMETER CODE"
Parameter code specified has not been defined in the Recording Parameter Specifications of the System Specifications.
- (2) "VALUE OUT OF RANGE"
Digit Position is too large (as an example: for a parameter with a length of 8, specifying a digit Position of 9 will cause this error).
- (3) "INVALID CHARACTER"
Replacement character is not in the range of '0'..'9', and additionally in the case of hexadecimal parameters, is not in the range of 'A'..'F'.

A <CTRL Z> exit will add the specifications to the edit table for batch editing and save any modifications as display defaults prior to returning the Edit Menu to the Monitor; a <CTRL C> exit will simply discard any modifications and return the Edit Menu.

FIELD CHECKING SYSTEM		
Change One Parameter Digit		
Parameter	Digit	
PARM1 = HI	POSITION = 8	VALUE = n
PARM2 = HJ	POSITION = 8	VALUE = w
PARM3 =	POSITION =	VALUE =
PARM4 =	POSITION =	VALUE =
PARM5 =	POSITION =	VALUE =
PARM6 =	POSITION =	VALUE =
PARM7 =	POSITION =	VALUE =
PARM8 =	POSITION =	VALUE =
PARM9 =	POSITION =	VALUE =
PARM10 =	POSITION =	VALUE =

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 9-1-6 Change One Parameter Digit Display

9.1.7 Check For Spikes

Option <7> will bring up the Check For Spike Display and the prompt "USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS". Figure 9-1-7 shows this display. This option will allow the Operator to examine a parameter for magnitude changes greater than a defined limit. A 'spike' will be defined as "a change of more than X that has occurred over Y samples or less".

From the Input Line the <right> arrow key will be used to place the cursor in the first field. The ten fields in the first column will require the two-character parameter codes of the recorded data to be examined. The fields immediately to the right of these will contain the unsigned values of change. Up to eight digits in length, these values will be the X component of the spike definition.

The Y component will be defined in the last field of each row and will be the number of records over which the change is to be compared. The maximum size of this component will be 99.

Verification will be done when exiting via the <CTRL Z> key. Error messages that may be encountered will include

- (1) "INVALID PARAMETER CODE"
Parameter code not defined in System Specifications.
- (2) "INVALID CHARACTER"
Nondecimal digits encountered in the Change and Range fields.

As with the other options described previously, a <CTRL Z> exit will save any modifications made as new display defaults and will add the Spike Check definitions to the Edit Table to be used

#2100-12-003.01.0

during the Batch Edit; the <CTRL C> key will be used to discard any changes. In either case, the Edit Menu will be redisplayed after exiting this option.

FIELD CHECKING SYSTEM		
Check For Spike		
Parameter	Spike Definition	
PARAM1 =	CHANGE =	RANGE =
PARAM2 =	CHANGE =	RANGE =
PARAM3 =	CHANGE =	RANGE =
PARAM4 =	CHANGE =	RANGE =
PARAM5 =	CHANGE =	RANGE =
PARAM6 =	CHANGE =	RANGE =
PARAM7 =	CHANGE =	RANGE =
PARAM8 =	CHANGE =	RANGE =
PARAM9 =	CHANGE =	RANGE =
PARAM10= HH	CHANGE = 99999999	RANGE = 00

USE CURSOR KEYS AND KEYBOARD TO SET UP SPECIFICATIONS

Figure 9-1-7 Check For Spike Display

9.1.8 Batch Editor Invocation

To invoke the Batch Editor option <8> of the Edit Function Menu will be chosen. IMPORTANT: the start/stop edit limits option must have been set up before the Batch Editor will operate on any source data. The prompt "ARE YOU SURE?" will be issued and if the Operator responds affirmatively with either <y> or <Y> then the message

- (1) "Batch Edit Commencing ..."
Batch edit commencing on source data.

will be shown on the Error Line of the display while the edit process takes place. When complete, the message

- (2) "...Batch Edit Complete"
Successful completion of batch editing process.

will be issued on the screen indicating successful completion.

Attempting to do a batch edit where the basis parameter is beyond both start and stop limits will result in the error message

- (3) "LIMIT ERROR"
First batch edit basis parameter value is greater than both the start and stop limits defined.

being given on the Error Line and the batch edit process will terminate with no change to the output device. On the other hand, commencing a batch edit with both the start and stop limits beyond the current basis parameter value will cause any data blocks up to the start limit to be copied to the output device "as is", with no alterations. Then, when the start limit is reached, the data blocks will be modified and or tested for

spikes as requested until the stop limit is reached.

If a Spike-Check is requested and a spike is detected, a message will be logged on the Message Console (Star Printer) which will include: the date and time that a spike was detected; the logical block number and record number containing the spike (block numbers start at 1, record numbers start at 0); the value causing the spike; and change in value.

When a Batch Edit is complete, any one of specifications may be changed and another Edit performed or the Edit may be performed again identical to the first. NOTE: all specifications of the first batch edit will remain as defined unless changed by entering the option in question or quitting and returning the Edit Menu.

9.2 SCREEN EDITOR

Option <9> of the Edit Function Menu provides the Operator with a Screen Editor, useful for examining blocks of data individually. When a <9> is entered at the keyboard, the screen will clear and the prompt will change to "^C = ^Z = exit, ^R = read, ^W = write, ^B = backward block, ^E = error check". The Operator will now be in the editor. Typing <CTRL R> will cause a block of data to be read from the source device and shown in the Presentation Area of the display, a page at a time.

9.2.1 Editor Keys

Most of the editor keys will be found on the auxiliary keypad to the right of the <enter> key. The following table summarizes the keys and their functions in a concise and easy to access summary.

KEY	FUNCTION	COMMENTS
PgDn	Move window down one full screen	
PgUp	Move window up one full screen	
Ins	Toggle to/from Insert Mode	When in Insert Mode, message shown on Error Line Window
Home	Position Cursor at top, left corner	
Del	Delete character above cursor	Characters to right shifted one position to the left
<-	Left Arrow	Move Cursor to left one character
->	Right Arrow	Move Cursor right one character
^	Up Arrow	Move Cursor up one character
v	Down Arrow	Move Cursor down one character
enter	Return cursor to Input Line	
^R	Read a block of data from source	
^W	Write a block of data to destination	
^C	Return to Edit Function Menu	
^Z	Return to Edit Function Menu	
^B	Back up a block on source device	
^E	Check block on	Error checking assumes data was

#2100-12-003.01.0

	display for	acquired using airborne system and	
	errors	format is as defined by Block	
		Header of System Specifications	

9.2.2 Read A Block to Screen

To read a block of data from the source device and display it in the Presentation Area, the Operator will type the <CTRL R> key sequence on the keyboard. When the block has been displayed it may be examined using the paging functions or modified using the cursor keys.

9.2.3 Paging

To examine a page of text below that being displayed, the key marked <PgDn> will be depressed. The next segment of text will be presented. Typing <PgDn> will continue to move the display window 'down' until the bottom page or portion of text has been displayed. When the bottom is reached, attempting to page down will result in the bell being sounded to indicate that paging in this direction is no longer possible.

Similarly, to move the text down or to page up, the <PgUp> key will be used. When the beginning of the block of data is displayed on the screen, the bell will sound if a "page up" is attempted, since paging in the desired direction will no longer be possible.

9.2.4 Cursor Movement

To move around on the screen, from character to character, the cursor keys will be used. From the Input Line the cursor keys will behave as follows: <Right> and <Down> will position the cursor at the first character in the top, left corner of the Presentation Area; <Left> and <Up> will position the cursor at the last character or special end-marking character in the

lowermost, right corner of the Presentation Area.

When in the Presentation Area the cursor keys will operate in the following fashion:

- (1) The cursor is moved to the adjacent character closest to the current character position, if possible.
- (2) If at the end or beginning of a line and a cursor motion is made beyond the edge, the cursor will be moved either up or down one line (depending upon the cursoring direction) and the cursor will be placed at the opposite edge of the Presentation Area.
- (3) If the motion of (2) involves the top or bottom line of the Presentation Area, the cursor will be moved as described in (2) but after the text window has been moved one line in the required direction. That is, a line of text at the top will be rolled off of the screen and a line of text will be rolled on at the bottom (for the case of cursoring right from the bottom, right edge of the Presentation Area).
- (4) When cursoring is no longer possible in the indicated direction the bell will sound. That is, cursoring will not be permitted beyond the start or the end of the data block.

9.2.5 Changing a Character

To change a character located at the cursor the new character will simply be typed on the keyboard. No change will be made to any other screen location and the Presentation Area will remain the same with the exception of the changed character.

9.2.6 Character Deletion

To delete a character located at the cursor the key will be

depressed. The current character will disappear. As well, all characters to the right of the cursor will be shifted left one position with a character from the succeeding page being brought on to the display in the bottom, right corner.

9.2.7 Character Insertion

To add a character to the right of the cursor, the <Ins> key will be struck. This will place the Editor in the Insert Mode and a message stating this will be shown on the Error Line of the Monitor. The Operator may now insert a character by typing it on the keyboard. All characters to the right of the new character will be shifted right one position with the character previously in the bottom, right corner of the Presentation Area being shifted to the top of the next display page. To disable the Insert Mode the <Ins> key will be depressed a second time.

NOTE: paging in either direction will not be permitted while in the Insert Mode. If this is attempted, the bell will sound, the Insert Mode will be cancelled, and the cursor will be returned to the Input Line. If editing is desired, the cursor will have to be repositioned and the Insert Mode reactivated.

9.2.8 Backwards One Block

<CTRL B> will be used to back up one block on the source device. When this key sequence is depressed with magnetic tape as the source medium, the Operator will observe the tape reversed, if it is not at its beginning and the unit is on-line. For one of the two hard disks as a source, no physical observation may be made on back up: however, the Field Checking System will record the request and the next time a block is read from the disk, backward

requests will be processed accordingly.

9.2.9 Error Check A Block

This option will be useful in highlighting errors within a block of data presented on the display. The assumption will be that the data will fit the format defined by the Block Header and Character Check Set of the System Specifications. Errors which may be detected using the <CTRL E> option include:

- (1) "INVALID BLOCK LENGTH"
Length of block does not conform to the formula:
 $\text{length} = \# \text{ chars. in header} + 10 * \text{record length} + 1 \text{ (null)}$
- (2) "INVALID CHARACTER"
A character not defined in the Character Check Set or an invalid digit within a parameter value was encountered.
- (3) "INVALID PARAMETER CODE"
A parameter not specified in the Block Header was encountered in the data block.

When an error is detected, the display will be reorganized so that the questionable data will be at the top, left corner of the Presentation Area and will be highlighted using inverse video. The cursor will be moved to the top to the Presentation Area as well. Text indicating the error encountered will be shown on the Error Line of the display. If no change is noted in the display, no errors were detected during the check.

NOTE: only one error at a time will be indicated: therefore, <CTRL E> should be depressed, after making necessary changes, for each error highlighted until no messages are shown on the Error Line window.

9.2.10 Writing a Block from Screen

To write the complete block of data on the screen to the destination device the Operator will type <CTRL W>.

9.2.11 Exiting Screen Editor

To exit the Screen Editor and return the Edit Function Menu to the Monitor the Operator will use either of the <CTRL Z> or <CTRL C> keys.

9.3 Returning to the Main Menu

To save the LUNs as defined in the Presentation Area the Operator will type <CTRL Z> to return to the Main Menu. To discard any screen modifications and return the Main Menu to the display the <CTRL C> key will be used.