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TEXAS NATURAL RESOURCES INVENTORY AND MONITORING SYSTEM (TNRIMS)

APPLICATIONS SYSTEM VERIFICATION AND TRANSFER (ASVT)

REMOTE SENSING INFORMATION SUBSYSTEM (RSIS)
INTERIM INTERACTIVE GRAPHICS SUBSYSTEM
(IIGS) USER'S GUIDE

TNRIS Task Force
Austin, Texas

A. M. FAILS
LOCKHEED ELECTRONICS COMPANY, INC.
SYSTEMS AND SERVICES DIVISION
1830 NASA ROAD 1
HOUSTON, TEXAS 77058

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

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TEXAS NATURAL RESOURCES INVENTORY AND MONITORING SYSTEM (TNRIMS) APPLICATIONS SYSTEM VERIFICATION AND TRANSFER (ASVT)

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Job Order 75-562

PREPARED BY

A. M. Fails

Lockheed Electronics Company, Inc.
Systems and Services Division
Houston, Texas

APPROVED BY

National Aeronautics and Space Administration
Lyndon B. Johnson Space Center

J. R. Gilbert, Task Monitor

G. E. McKain, Deputy
Project Manager, Texas ASVT

Lockheed Electronics Company, Inc.
Systems and Services Division

T. F. Mackin, Supervisor
Exploratory Investigations Section

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ABBREVIATIONS AND ACRONYMS

bpi	Bytes per inch
CCT	Computer Compatible Tape
CRT	Cathode Ray Tube
CT	Computer Tomography
DEC	Digital Equipment Corporation
FIPP	(RAMTEK) Fortran Image and Plot Package
IIGS	Interim Interactive Graphics Subsystem
I/O	Input/Output
LUN	Logical Unit Number
OS/32	Interdata 7/32 Operating System
Pixel	Picture Element
RSIS	Remote Sensing Information System
VLT	Video Lookup Table

1. PURPOSE AND SCOPE

The "Remote Sensing Information System Interim Interactive Graphics Subsystem User's Guide" will provide guidance and instructions to the personnel of the Texas Water Resources Board to effectively analyze image data from the Landsat satellite after pre-processing has been performed on the raw Landsat data in the Remote Sensing Information System (RSIS) version of the DAM software package.

The Interim Interactive Graphics Subsystem (IIGS) is an integral part of the RSIS and its general purpose is to allow a user to visually analyze image data on a color cathode ray tube (CRT). The software developed for the IIGS allows the user to perform analysis in an interactive mode on the Interdata 7/32 computer using the Ramtek 9351 processor for the image display. The analysis performed by the user utilizing the IIGS is limited as all calculations done on the raw image pixel data will be done in the pre-processing software of RSIS version of the DAM package.

2. OVERVIEW

The IIGS software performs the following task:

- Display of an image window (512 pixels by 512 lines maximum)
- Report of CRT coordinates of the cursor positioned at a point of interest
- Color Table Report containing colors being used in current image
- Color changes of colors in the existing color table
- Interactive user menu/query capabilities to provide user control of the software functions.

The IIGS does not interactively interface with any other applications system. However, its use is dependent upon pre-processing of raw Landsat data or other forms of raw image data by the RSIS version of the DAM package. The IIGS utilizes software modules from the Ramtek Fortran Image and Plot Package (FIPP), the Interdata Run Time Library and the Ramtek supplied Ramtek/Interdata software interface drivers.

The IIGS will also accept as a form of input data a computer compatible tape (CCT) that was output by the IIGS in a Ramtek/ Interdata compatible format in a previous execution of the IIGS.

The IIGS software operates in the interactive mode on the Interdata 7/32 under the control of the Interdata OS/32 operating system. Figure 1 presents the general operational data flow for the IIGS.

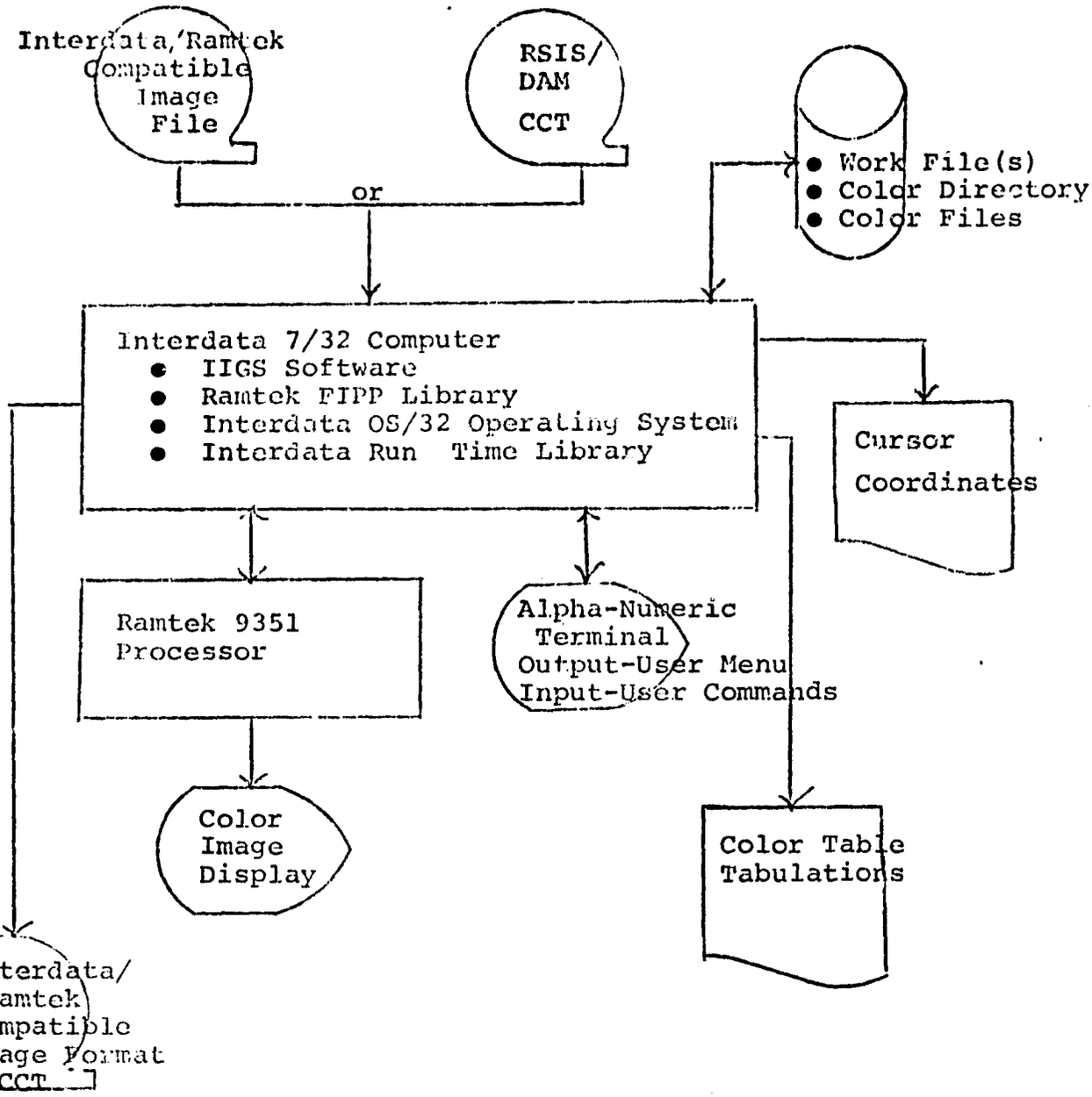

Figure 1. IIGS Flow Diagram

3. OPERATING PROCEDURES

All image data input to the IIGS will either be contained on a CCT output by the RSIS version of the NASA DAM Package Software or will be contained on an Interdata/Ramtek compatible CCT created during a previous IIGS execution. Both types of input CCTs are recorded on a nine-track 1600 bits per inch (bpi) digital CCT. The format of the RSIS CCT output by the RSIS version of DAM is detailed in Appendix A of this document. The Interdata/ Ramtek compatible CCT format is detailed in Appendix B of this document.

In the normal operations of the IIGS, the user will have control of the IIGS to perform all operations supplied by the IIGS software. The user controls the IIGS software by entry of an appropriate response to queries or menus output by the IIGS. The queries and menus output by the IIGS are detailed in section 3.2 of this document. This section also contains information describing the results of any user response.

3.1 PRE-OPERATING PROCEDURE

In order to execute the IIGS software on the Interdata 7/32 computer, the IIGS software must be compiled, a load module built and the load module linked with the Interdata 7/32 Run Time Library routines, the Ramtek FIPP object modules and the Ramtek/Interdata software. Appendix D of this manual details the files that build the load modules, link the modules and the job file to execute the IIGS software.

The user must perform the following steps in order to begin the IIGS processing:

1. Mount the input CCT on the Interdata 7/32 tape drive and ready the tape drive.

2. Turn the Ramtek processor power on.

3. Depress the reset switch on the Ramtek processor.

4. Turn the Ramtek CRT on.

5. Make sure the Interdata 7/32 is running and is ready to execute the IIGS software.

6. Load the IIGS executable file into the Interdata 7/32.

3.2 PROCEDURES FOR OPERATING THE IIGS

The IIGS menus, queries, and user responses are detailed in the following paragraphs. This section of the user's guide is divided into two sub-sections. The first sub-section (3.2.1 RSIS CCT Processing) deals with the queries and responses that are required to operate the IIGS when the input is on a RSIS CCT generated by the RSIS version of the NASA DAM software package. This form of input is also referred to as the standard input. The second sub-section (3.2.2 Interdata/Ramtek Compatible CCT Processing) deals with the queries and responses that are required to operate the IIGS when the input is on an Interdata/Ramtek compatible CCT. This form of input is also referred to as the non-standard input.

All diagnostics (error messages, warning messages, and user diagnostic options) are detailed in Appendix C of this document.

3.2.1 RSIS CCT PROCESSING

In the following paragraphs each query is numbered for documentation purposes. In actual operation of the IIGS the query numbers do not appear.

Query 1 - Begin Processing

The IIGS begins processing image data by outputting* the following:

RSIS INTERIM INTERACTIVE GRAPHICS SUBSYSTEM

*All input and output described in this section of the document refers to input from and output to the IIGS alpha-numeric terminal or operator's console.

INPUT DATA IN RSIS UNIVAC FORMAT (Y or N)?

The IIGS outputs Query 1 in order to determine the proper IIGS processing branch to take. This sub-section deals with the standard form of input, an RSIS UNIVAC written CCT. Therefore, the user will input either a "Y" or a "YES" response to the above query.

Query 2 - Determination of Input Medium

Following the user response to Query 1, the IIGS will output:

INITIALIZE THE IIGS FOR RSIS CCT PROCESSING

IS THE STANDARD INPUT ON A DISC FILE (Y or N)?

The standard input will normally be on a CCT. Therefore, the normal response to Query 2 is a user input of an "N" or "NO." However, if the input image data is stored in a disc file on the Interdata 7/32, then the user will enter a "Y" or "YES" following Query 2. If a "Y" or "YES"* response is input, then IIGS will output:

FILE NAME =

The user will then input the name of the file on the Interdata 7/32 disc that contains the image data to be processed.

Query 3 - Obtaining Image Data File Number

If the input data is on a standard RSIS CCT, then following the user interaction with Query 2, the IIGS will output:

ENTER THE FILE NUMBER ON THE RSIS CCT TO BE PROCESSED.

FILE NUMBER =

*In the following paragraphs when an input of a "Y" is noted a "YES" can also be input to obtain the same result. Similarly, when "N" can be input a "NO" can also be input for the same result.

The user will then input the file number on the RSIS CCT which contains the image data to be processed during the current pass (execution) in the IIGS. The input RSIS CCT can contain multiple image data files and the above query provides the user the capability to select any file on the input RSIS CCT for processing. The above entry is expected to be input in a Fortran "I2" format. This means if the user inputs a single integer value, then this single integer must be preceeded by a zero or a blank character, e.g., the user wants to process data in the fourth file, therefore the user responds to Query 3 with an input of either "04" or "b4" (b symbolizing the blank character).

The IIGS will then begin to search for the selected file on the input RSIS CCT.

Query 4 - User Selection of Mode of Ramtek Initialization

Upon finding the selected image data file, the first record (the UNIVAC header record) will be read into core storage. If the read is successful, the following will be output:

DOES THE USER WANT TO INPUT THE TYPE OF INITIALIZATION (Y or N)?

If the user does not want to select the type of initialization, then an "N" is input following the above query. The type of initialization for the Ramtek common blocks stored in word 4 of the UNIVAC header record will be used and the following queries, Query 3 and the queries described in Tables 1 and 2, will be skipped.

If the user wants to choose the type of initialization to be performed for the Ramtek common blocks in the IIGS, then the user will input a "Y" following Query 4.

Query 5 - User Selection of Type of Initialization

If the user input a "Y" following Query 4, then IIGS will output the following query/menu:

WHAT TYPE OF INITIALIZATION IS REQUIRED?

0 = TERMINATE THE CURRENT EXECUTION

1 = TERMINAL INPUT

2 = STANDARD INITIALIZATION

3 = NON-STANDARD INITIALIZATION

4 = USER TYPE OF INITIALIZATION IN RSIS HEADER

ENTER TYPE -

The user will then input the integer number which represents the option that the user wants to exercise. In all cases, except response equal to 0 or 4, the type of initialization in the UNIVAC header record, record 1 in the current image file, will be ignored. The following paragraphs explain the above options:

Initialization Option 0 - Terminate the Current Execution

If the user inputs a "0" (zero) following the "ENTER TYPE-" query, then the following will be output:

TERMINATION OF CURRENT EXECUTION REQUESTED BY THE USER.

The IIGS will then end the current pass (execution) and begin another pass starting again with Query 1. The output of Query 1 signifies that the IIGS software has been restarted.

Initialization Option 1 - Terminal Input

If the user input a "1" (one) following the "ENTER TYPE-" query, then the IIGS will expect the user to manually enter all Ramtek common block variable initialization values via the alpha-numeric terminal. The manual inputs are detailed in Tables 1 and 2.

Initialization Option 2 - Standard Initialization

If the user inputs a "2" (two) following the "ENTER TYPE-" query, then the IIGS will set all Ramtek Common block initialization variables to standard settings hard coded into the IIGS software. The hard coded initialization values are detailed in Table 3.

Initialization Option 3 - Nonstandard Initialization

If the user inputs a "3" (three) following the "ENTER TYPE-" query, then the IIGS will initialize all Ramtek common block variables that are to be initialized for Ramtek Level 3 and Level 4 modules with values stored words 5 through 82 in the UNIVAC header record, record one of the image file. See Appendix A Record 1 - UNIVAC to RAMTEK HEADER RECORD for details of words 5 through 82.

Initialization Option 4 - Use Type of Initialization in RSIS Header

If the user inputs a "4" (four) following the "ENTER TYPE-" query, then the IIGS will use the type of initialization option stored in word 4 of the UNIVAC header record. In essence this is the same as if the user had entered a response of "N" following Query 4.

Illegal Option

If the user inputs a value less than zero or greater than four, then the IIGS will output the initialization menu/query again.

Initialization Message Output Following Query 4 or Query 5

Following the user selection of initialization type or using the type of initialization code stored in the UNIVAC header record, IIGS will output:

RAMTEK LEVEL 3 and 4 INITIALIZATION

If the type of initialization is type 1, the initialization of the Ramtek Level 3 and Level 4 common block variables will be done manually, via input from the alpha-numeric terminal, by the user. The IIGS, in this case, will output:

INITIALIZATION INPUT FROM THE USER VIA TERMINAL REQUESTED, USER MUST MAKE AN ENTRY FOR EACH REQUESTED ENTRY. BEGIN LEVEL 3 INITIALIZATION

The initialization menu for Level 3 initialization will then be output. The entries in this menu are detailed in Table 1. After the user has made all the required Level 3 entries, the IIGS will output:

BEGIN LEVEL 4 INITIALIZATION

The initialization menu for Level 4 initialization will then be output. The entries in this menu are detailed in Table 2.

Table 1 - RAMTEK LEVEL 3 COMMON BLOCK NON-STANDARD INITIALIZATION MENU

The IIGS will output the following query prior to outputting the Level 3 initialization menu.

STANDARD LEVEL 3 INITIALIZATION (Y OR N)?

If the user inputs a "Y" or a "YES", then the IIGS will use the standard initialization values detailed in Table 3 for level 3 initialization and the following menu will not be output.

If the user inputs on "N" or a "NO" response, then the following menu will be output. If an integer value is to be input for any of the following entries, then the entry must be compatible with a FORTRAN "I10" format. That is to say if a user wants to input a single integer value, then he must enter nine preceeding zeros or nine preceding blanks, etc., e.g., if a user wants to enter a value of 2048, then he must input either "0000002048" or "ØØØØØØØ2048."

RAMTEK LEVEL 3 INITIALIZATION MENU

RAMTEK LOGICAL UNIT = User inputs the required logical unit number. Normally a 6 will be input.

ERROR REPORTING LOGICAL UNIT = User inputs the required logical unit number. Normally a 7 will be input.

TABLE 1 - Continued

EVENT FLAG FOR QIO = User inputs the required event flag number. Normally a 1 will be input.

X RESOLUTION = User will input the horizontal resolution of the Ramtek CRT. Normally 512 will be input.

Y RESOLUTION = User will input the vertical resolution of the Ramtek CRT. Normally 512 will be input.

NO. OF MEMORY PLANES = User will input the number of memory planes existing in the Ramtek 9351 processor. In the Texas RSIS Ramtek, 12 will always be input.

VLT WIDTH IN BITS = User will input a 13 as there are 13 bits in each Video Lookup Table (VLT) storage location.

VLT LENGTH IN WORDS = User will input the value 2048 as there are 2048 storage locations in the VLT.

BLINK (Y or N)? If the user wants the video to blink, a "Y" or "YES" will be input. Otherwise input an "N" or a "NO".

FIRMWARE OPTIONS (Y or N)

INTERACTIVE PERIPHERALS? User should enter a "Y" or "YES" as there are graphics interactive peripherals in the Texas RSIS Ramtek.

GRAPHICS? User should enter a "Y" or "YES" as there are graphic capabilities in the Texas RSIS Ramtek.

SCROLL? User should enter an "N" or "NO" as the Ramtek series 93XX has no scrolling capability.

STATUS MANAGEMENT? User should enter an "N" or "NO" as this capability is not supported on the Texas RSIS Ramtek.

PROGRAMMABLE FONT? User should enter an "N" or "NO" as the Ramtek Programmable font support firmware does not exist on the Texas RSIS Ramtek.

TABLE 1 - Concluded

USER SUBROUTINE?	User should enter an "N" as a "user subroutine" does not replace any of the existing Ramtek FIPP modules.
RT-11 MODE (Y OR N)?	User should enter an "N" or "NO" as the Texas RSIS host processor is an Interdata 7/32 not a DEC processor with the RT-11 Operating System.
TRACE FLAG ON (Y OR N)?	Normally the user will enter an "N" or "NO". However, if an error occurs the user might want to enter a "Y" or "YES" to force a walk back through Ramtek modules associated with the error.
DEBUG FLAGS ON (Y OR N)?	Normally the user will enter an "N" or "NO". However, if an error is encountered the user could input a "Y" or "YES" to force some debug information to be output by the Ramtek FIPP modules.

TABLE 2 - RAMTEK LEVEL 4 COMMON BLOCK NON-STANDARD INITIALIZATON MENU

The IIGS will output the following query prior to outputting the level 4 initialization menu.

STANDARD LEVEL 4 INITIALIZATION (Y OR N)?

If the user inputs a "Y" or a "YES", then the IIGS will use the standard initialization values detailed in Table 3 for level 4 initialization and the following menu will not be output.

If the user inputs an "N" or a "NO" response then the following menu will be output. If an integer value is to be input for any of the following entries, then the entry must be compatible with the FORTRAN I/O "I10" format. That is, if a user wants to input a two integer value, say 10, then the user must input eight preceeding zeros or eight preceeding blanks, e.g., if the user wants to enter a value of ten, 10, then the user must input either "0000000010" or "ØØØØØØØØ10."

RAMTEK LEVEL 4 INITIALIZATION MENU

IMAGE LOGICAL UNIT = The user enters the required logical unit number. Normally the user will input a 4 (four).

REVERSE PACKING FOR WT & WR (Y OR N)?

The user will normally enter an "N" or "NO" as the data used with the Write Text (WT) or Write Raster (WR) will not be packed in reverse order.

CT BIAS = The user will input the bias to add to the VLT index to obtain external or displayed CT values to colors. Normally, the user will enter a zero (0).

CT SCALE FACTOR = The user will input a scale factor to multiply the VLT index by to obtain external or displayed CT values to colors. Normally the user will enter a one (1).

TABLE 2 - Concluded

VLT DEVICE NUMBER = The user will input the video lookup table (VLT) device number. Normally the user will input a zero (0).

NUMBER OF RESERVED VLT ENTRIES - The user will enter the required value. In normal processing 2 entries are reserved. Therefore, normally the user will input a value of two (2).

CURSOR DEVICE NUMBER - The user will input the cursor device number for the Texas RSIS system this value will be zero (0).

KEYBOARD DEVICE NUMBER - The Texas RSIS Ramtek does not have a Ramtek keyboard device. However, for software compatibility the user will input a zero (0).

ENTER NAME OF TEMPORARY IMAGE WORK FILE - The user will input the name of the file that will be used by various Ramtek FIPP modules for temporary storage. The normal input is "0S32:WRKFIL.WRK."

CURSOR WAIT TIME IN CLOCK TICS - The user will input in clock tics (tic = 1/60 sec) the time delay to be used in waiting between cursor polling. Normally the user will enter a 30 (thirty),

NUMBER OF OVERLAY CHANNELS - The user will enter the number of channels (memory planes) that are to be used in the overlay mode. Normally a 1 (one) will be input.

If a number >0 is entered for the number of overlay channels, then the following will be output:

CHANNEL 1 BIT NUMBER = The user inputs the bit number (0-11) associated with overlay channel 1. Normally, if used, an 11 (eleven) will be input.

CHANNEL 4 BIT NUMBER =

If the type of initialization is type 2, then initialization of the Ramtek Level 3 and Level 4 common block variables will be done using values for the common block variables that have been hard coded into the IIGS software. Table 3 contains the variables and the hard coded standard settings for these variables when standard initialization is done. IIGS will output:

STANDARD RAMTEK LEVEL 3 AND 4 INITIALIZATION SELECTED.

If the type initialization is type 3, then initialization of the Ramtek Level 3 and Level 4 common block variables will be done using the values stored in words 5 through 83 of the UNIVAC header record. See Appendix A record 1 for details. When initialization type 3 begins, IIGS will output:

NON-STANDARD RAMTEK LEVEL 3 INITIALIZATION SELECTED.

QUERY 6 - COLOR INITIALIZATION WITH STANDARD COLOR FILE

If the information in the UNIVAC header record indicates that a standard color file is to be used with the current image display, then the IIGS will output:

A COLOR FILE IS TO BE USED IN THE CURRENT DISPLAY. THE NAME OF THE INTERDATA COLOR FILE IS: <:FILE NAME:> IS THIS THE CORRECT NAME (Y or N)?

The user will then verify the file name as read from the UNIVAC header record. If the name is correct, then the user will input a "Y."

If the name is incorrect or the user wants to use another file, then the user will input an "N." IIGS will then output:

USER WANTS TO CHANGE COLOR FILE NAME.
ENTER NEW NAME -

TABLE 3 RAMTEK LEVEL 3 AND LEVEL 4 COMMON BLOCK VARIABLES STANDARD SETTINGS

RAMTEK LEVEL 3 COMMON BLOCK VARIABLES INITIAL SETTINGS

Variable Name	Common Block	Description	Initial Value
XRES	DEVCHR	X, Horizontal, resolution of the Ramtek CRT. less one	512
YRES	DEVCHR	Y, vertical, resolution of the Ramtek CRT less one	512
NPLANE	DEVCHR	Number of memory planes available to hold an image value	12
MAXMSK	DEVCHR	Maximum number that can fit in NPLANE bits plus 1	
XYMAX	DEVCHR	Greater of the two resolutions XRES or YRES	511
FRMOPT	DEVCHR	Array of flags identifying the firmware available in the display device.	
		FRMOPT(1) = Interactive Peripherals	True
		FRMOPT(2) = Graphics	True
		FRMOPT(3) = Scroll	False
		FRMOPT(4) = Status management	False
		FRMOPT(5) = Programmable font	False
		FRMOPT(6) = User subroutine	False
		FRMOPT(7) = Conics	False
		FRMOPT(8), ...FRMOPT(10) = SPARE	False
RMLUN	INTERN	Logical unit number of the Ramtek display device	6
ERRLUN	INTERN	Logical unit number of the error report disc file.	7
EVNFLG	INTERN	Event flag used for operating system to inform Level 3 modules that I/O has completed	1
IOSB	INTERN	I/O status block. The low byte of the first I/O status block (ISOB(1)) entry contains a code indicating the status of the I/O. A zero value indicates the I/O is pending. A 1 indicates sucessful I/O completion. A value indicates an error	
		IOSB(1)	1
		IOSB(2)	0

TABLE 3 - Continued

RAMTEK LEVEL 3 COMMON BLOCK VARIABLES INITIAL SETTINGS

Variable Name	Common Block	Description	Initial Value
IDS	INTERN	Directive status word. Indicates whether the I/O was accepted and queued by the operations system. IDS = 0; I/O request pending IDS = 1; I/O request accepted IDS = -1; I/O request rejected	1
OPTFLG	OPTS	Flag for whether there are any options or paramters that need to be sent with the next Ramtek instruction work	False
ADRMOD	OPTS	Address mode option	0
OPT	OPTS	A flag array of 6 entries, one for each of the options in the low order byte of the Ramtek instruction word.	
		OPT(1) = Address mode option	False
		OPT(2) = Additive write option	False
		OPT(3) = Reverse background option	False
		OPT(4) = Reverse packing option	False
		OPT(5) = Operand (parameter) option	False
		OPT(6) = Data option	False
SUBMKS	PARAMS	Subchannel mask parameter	4095
FGDCOL		Foreground parameter value	4095
BGDCOL		Background parameter value	0
IX1X		Index register 1 parameter X	0
IX1Y		Index register 1 parameter Y	0
IX2X		Index register 2 parameter X	0
IX2Y		Index register 2 parameter Y	0
ORGX		Origin parameter X value	0
ORGY		Origin parameter Y value	0
WINSX		Window parameter start X value	0
WINSY		Window parameter start Y value	0
WINEX		Window parameter stop X value	511
WINEY		Window parameter stop Y value	511
SCAN		Scan mode parameter value	0
DIMW		Dimension parameter width value	7
DIMH		Dimension parameter height value	9
SPACEH		Horizontal space parameter value	7
SPACEV		Veritcal space parameter value	9
FUNC		Logical/arithmetic function parameter value	0
SCALE		Scale parameter value	0
BASEL		Baseline parameter value	0
SCRCNT		Scroll Count parameter value	0
COPX		Current Operating Point X Value	0
COPY		Current Operating Point Y value	0
PARM	PARMS	A flag array of 16 entries with each entry corresponding to 1 of the 16 possible parameters.	
		(PARAM(1), ..., PARAM(16) =	False

TABLE 3 - Continued

RAMTEK LEVEL 3 COMMON BLOCK VARIABLES INITIAL SETTINGS

Variable Name	Common Block	Description	Initial Value
RT11	TEST	Flag for whether the package is running in the RT-11 mode or the RSX-11M mode. As the Texas RSIS is utilizing an Interdata 7/32 computer as the host processor and not a DEC machine, then this flag will always be set FALSE.	False
TRACE	TEST	Flag for whether Ramtek module "ERROR" is to intentionally perform a divide by zero in order to produce a traceback by subroutine and line number when an error is detected.	False
BWRK	TEST	Flag for whether module "BUILD" is to dump its built-up normal format instruction stream	False
BOPT	TEST	Flag for whether Ramtek module "BUILD" is to dump the array "OPT" and whether the Ramtek module "INST" is to dump the operation code.	False
INLUN	TEST	Console or analyst alpha-numberic terminal logical unit number (input)	5
OUTLUN	TEST	Console or analyst alpha-numeric terminal output logical unit number	7
DBGLUN	TEST	Debug output logical unit number	7
VLTW	VLTDAT	Video Lookup Table width in bits	13
VLTL	VLTDAT	Video Lookup Table size (number of entries that can be stored in the VLT).	2048
BLNK13	VLTDAT	Flag for setting blink bit in the VLT	False

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TABLE 3 (Continued)

RAMTEK LEVEL 4 COMMON BLOCK VARIABLES INITIAL SETTINGS

Variable Name	Common Block	Description	Initial Value
IMGLUN	L4COM	Logical unit on which to read and write images	4
REVPAC	L4COM	Flag for automatically setting reverse packing option when writing text strings	False
BIASS	L4COM	Bias to add to the VLT index to obtain external or dispalyed CT values CT = SCALEF*VLT index + BIASS	0
SCALEF	L4COM	Scale factor to multiply VLT index by to obtain the external or displayed CT values	1
PICUP	L4COM	Flag for whether an image has been displayed successfully on the Ramtek CRT	False
CURNO	L4COM	Cursor device number	0
KBNO	L4COM	Keyboard device number	0
WRKFIL	L4COM	An array of 10 entries (20 characters) identifying the name to be used for a temporary work file. Initial set to: OS32:WRKFIL. WRK	
CURSWT	L4COM	Time delay in clock tics (1 tic = 1/60 sec) to wait between cursor polling. Cursor movement does not generate interupts in the Ramtek FIPP package. Cursor movement is detected by repeatedly polling the cursor.	30
LWRKNM	L4COM	Number of characters in array "WRKFIL"	15
NUMOVR	OVRLAY	Number of overlay channels	1
OVRBIT	OVRLAY	Array of up to 4 entries containing the bit number associated with each overlay channel. OVRBIT(1) OVRBIT(2) OVERBIT(3) = OVRBIT(4)	 11 0 0
OVRFLG	OVRLAY	Flag for whether the Ramtek overlay mode has been selected	False

Table 3(continued)

RAMTEK LEVEL 4 COMMON BLOCK VARIABLES INITIAL SETTINGS

Variable Name	Common Block	Description	Initial Value
OLDMSK	OVRLAY	Mask parameter at time the overlay mode was selected. This mask parameter will be restored when the overlay mode is terminated.	0
NAMDIR	STDCOL	Name of the color directory file which contains the name of the standard color files OS32: COLOR.DIR	
LNMDIR	STDCOL	The number of characters in the color directory name	14
MAXCOL	STDCOL	The maximum number of names of standard color files that can exist in the color directory	200
COLLUN	STDCOL	The logical unit number of color directory	4
VLTNO	VLTDAT	Video Lookup Table device number	0
UPLIM	VLTDAT	Last usable entry in the VLT. Entries above the UPLIM in the VLT have been reserved for Ramtek FIPP module usage such as storage of text color. UPLIM = VLTL - NRES	2047
VLTUP	VLTDAT	Flag for whether the VLT data has successfully been loaded into the Ramtek display device	False
BW	VLTDAT	Flag for whether the image displayed is black and white or color	False

The user will then input the file name of the Interdata 7/32 disc file which contains the standard color data needed for the current image display.

QUERY 7 - COLOR INITIALIZATION-NO STANDARD COLOR FILE

If the information in the UNIVAC header record, word 52, indicates that a standard color file is not to be used with the current image display, then the IIGS will output the following query:

DOES THE USER WANT TO USE A STANDARD COLOR FILE (Y or N)?

The purpose of this query is to allow the user to override the standard color file flag in the RSIS UNIVAC header record if the user wants to.

If the user does not want to use a color file, then he will input an "N" following query 7. If the user does want to use a standard color file, a "Y" will be input IIGS will output:

ENTER NAME OF THE STANDARD COLOR FILE TO BE USED.
FILE NAME =

The user will then input the name of the desired standard color file.

QUERY 8 - LOADING COLOR ARRAYS IF THE INPUT FILE CONTAINS A B/W VLT

The following query will be output only on the special occasion when the input RSIS CCT contains no color VLT record and does contain a B/W Video Lookup Table record and color/level records (see appendix A records type 5 and 6). If this condition exists then, IIGS will output:

A B/W VLT HAS BEEN LOADED INTO THE RAMTEK.
DOES THE USER WANT TO BUILD AND LOAD A COLOR VLT FROM DATA IN ARRAYS "COLOR" AND "LEVEL" (Y or N)?

The user will input a "Y" if he wishes to load these color data values into the Ramtek VLT for this special circumstances. If the user does not want to change the VLT, he will input an "N" following query 8.

Following the user response to Query 7 or Query 8 if it is output, the IIGS will begin reading the image records from the image data file on the RSIS and transmitting the data to the Ramtek for display. This process will continue until all data is displayed on the Ramtek CRT, unless an error is encountered. The system will then output query/menu 9.

QUERY 9 - USER SELECTION OF ACTION TO BE DONE AFTER IMAGE DISPLAY

Following the initial display of the image data on the CRT, the IIGS will output the following menu/query:

```
ENTER NEXT ACTION CODE
  1 = CURSOR COORDINATES REQUIRED
  2 = COLOR TABLE REPORT/CHANGES REQUIRED
  3 = RE-STORE LAST SCENE ON DISPLAY CRT
  4 = DISPLAY PROCESSING COMPLETE

IF THE USER WANTS TO CONTINUE CURRENT IMAGE ANALYSIS THEN
MAKE NO ENTRY UNTIL ONE OF THE ABOVE ACTIONS IS REQUIRED.
ACTION =
```

The user then performs an analysis on the image displayed on the CRT. The user, upon completion of the initial analysis, will choose an action for IIGS from the above menu/query.

QUERY 10 - ACTION = 1 - CURSOR COORDINATES REQUIRED

If the user inputs a "1" (one) following Query 9, then the IIGS will begin collecting cursor coordinates for the user. The IIGS will then output:

```
RSIS CRT CURSOR COORDINATE REPORT
THE IMAGE TITLE IS: < title >
DOES THE USER WANT THE CURSOR COORDINATES OUTPUT TO A PRINT
FILE (Y OR N)?
```

If the user wants the CRT coordinates written to a tabulation disc file, then the user will input a "Y". The IIGS will then dynamically open a file named: "OS32:CURSOR.DAT." This file will receive all cursor coordinates that the user has indicated he wants reported and will be available for outputting on the Interdata printer at a

later point in time. If the user does not want to store coordinates in a tabulation file, then the user will enter an "N" following the above query. Following the above input response, the IIGS will output:

IS THE CURSOR POSITIONED TO THE POINT OF INTEREST (Y or N)?

The IIGS will then wait for the user to select a point on the Ramtek CRT. The point is selected by the user positioning the cursor over a point of interest in the current image display. Once the user has positioned the cursor, he will then input a "Y" response to the above query. The IIGS will then read the cursor coordinates from the Ramtek and output the following:

THE HORIZONTAL COORDINATE X (NNN) = XXX (NNN = coordinate number)
THE VERTICAL COORDINATE Y (NNN) = XXX (XXX = integer number)

If the user has requested coordinates to be output to the print file, then these lines will also be output to the designated disc file. Following the above output, IIGS will then output:

DOES THE USER WANT TO CONTINUE COORDINATE COLLECTING (Y or N)?

The user will input a "Y" response if more coordinates are to be output and the above query:

IS THE CURSOR POSITIONED TO THE POINT OF INTEREST (Y or N)?

Will be output again. The user will again position the cursor and enter a "Y." The coordinates will be output following the "Y" input response. The user will continue the above actions until all the required cursor coordinates have been reported. Upon completion of collecting and reporting the cursor coordinates, the user will input an "N" response following the query asking if more coordinates are to be collected. The IIGS will then output the action menu/query, Query 9, to allow the user to exercise one of the other action options supplied by the IIGS.

QUERY 11 - ACTION - 2 COLOR TABLE REPORT/CHANGES REQUIRED

If the user inputs a "2" (two) following Query 9, then the IIGS

will begin the color table report/color changing process. The color report is diagrammed in figure 2 on the following page. Upon entry of the "2", IIGS will output:

IIGS COLOR REPORT

COLOR REPORT IS BEING OUTPUT ON THE CRT - WAIT FOR THE NEXT MESSAGE.

The IIGS will then clear the bottom portion of the Ramtek CRT (the color report window see figure 2) and begin outputting the current color table bar and the title information. If there are more than 128 colors being used to display the current image, then two color bars will be output containing the current colors. IIGS will never report more than 1024 colors. Upon displaying the color bar(s) on the Ramtek CRT, IIGS will output:

DOES THE USER WANT THE CURRENT COLOR TABLE OUTPUT TO A PRINT FILE (Y OR N)?

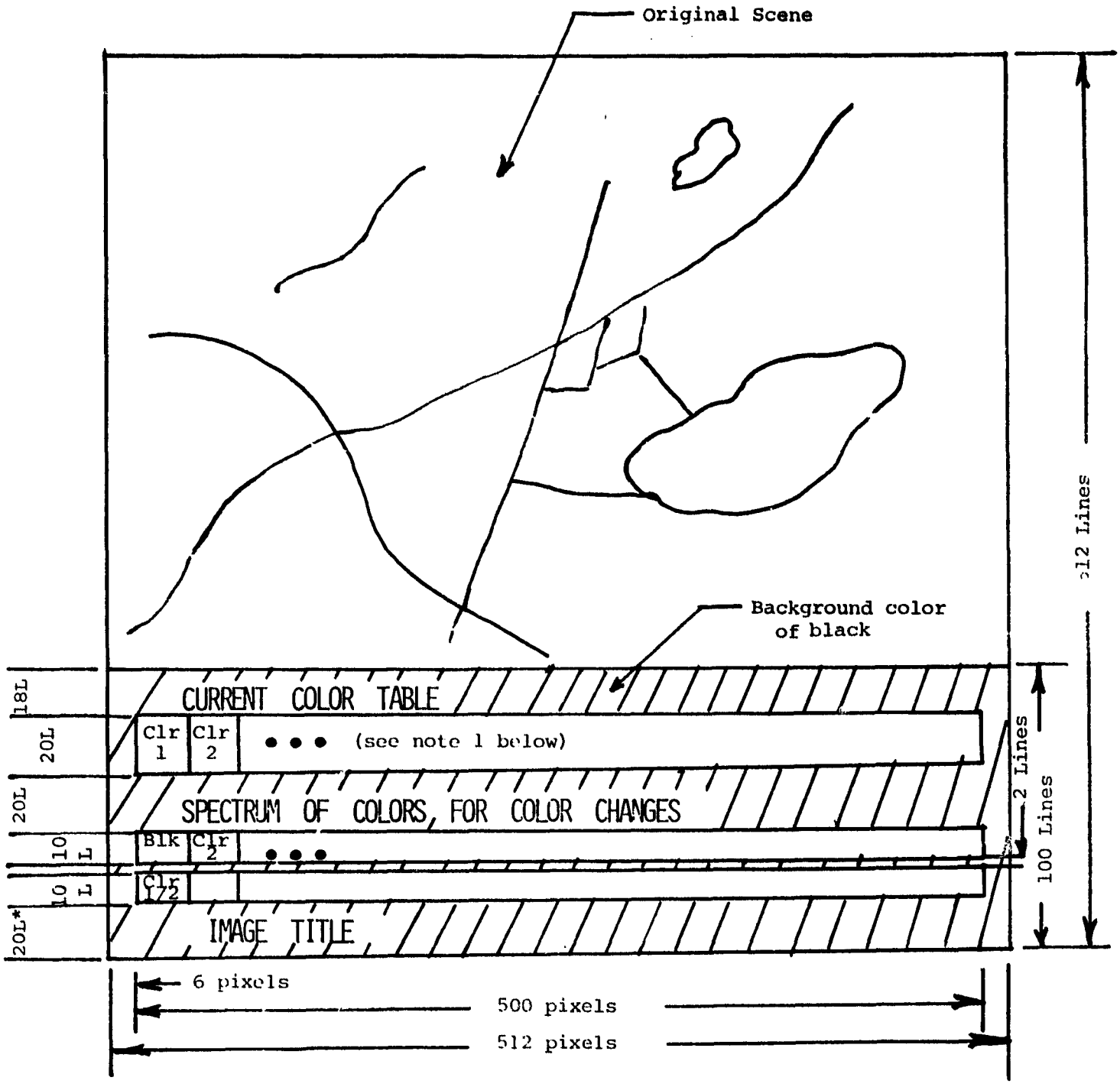
If the user does not want the colors output in a tabular format to a disc file, then the user will input an "N" response. If the user does want to output the color information for the colors being currently used to display the image data, then the user will input a "Y" response.

If the user inputs a "Y" response, the IIGS will dynamically open a file named: "ØS32:COLOR.DAT" and the color table data will be written to this file.

Following the above query, IIGS will output:

DOES THE USER WANT TO CHANGE ANY COLORS IN THE EXISTING SCENE (Y OR N)?

If the user does not want to change any colors, then the user will enter an "N". The IIGS will then output the action menu/query, Query 9, and the user can take some other course of action.



NOTES:

1. This color bar will be divided into 2 sections, as the bars shown below, if the number of current colors being used is greater than 128.
2. * 20L - 20 lines
3.

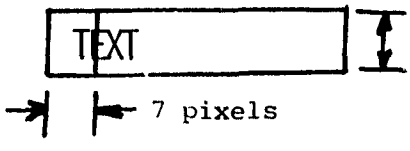


Figure 2.-- IIGS Color Report.

If the user wants to change colors, then the user will enter a "Y" response following the above query. The IIGS will then output the spectrum of colors for color changes color bars and its associated sub-title. The IIGS will then output:

DOES THE USER WANT MORE COLORS DISPLAYED IN THE SPECTRUM OF COLORS (Y or N)?

If the user wants IIGS to display more than 128 colors, then the user will input a "Y" response. The IIGS will then output a spectrum of color bars that contain 512 colors. If the user is satisfied with the original 128 color spectrum, then the user will input a "N" response following the previous query.

The following is then output by the IIGS:

DOES THE USER REQUIRE THE COLOR CHANGING PROCEDURE TO BE OUTPUT ON THE ALPHA-NUMERIC TERMINAL (Y OR N)?

If the user does not need instructions on the process of changing colors, then the user will input an "N" following the above query. However, if the user needs the color changing procedure to be detailed then he will input a "Y" response and the IIGS will then output the following detailed instructions:

RSIS COLOR CHANGING INSTRUCTIONS

THERE ARE CURRENTLY TWO SETS OF COLOR BARS BEING DISPLAYED ON THE RAMTEK CRT. THE TOP SET OF BARS CONTAIN THE COLORS CURRENTLY BEING USED IN THE IMAGE. THE BOTTOM SET OF BARS CONTAIN A SPECTRUM OF COLORS WHICH WILL BE USED WHEN CHANGING THE PRESENT COLOR TABLE. THE USER IS TO SELECT THE COLOR TO BE CHANGED BY POSITIONING THE CRT CURSOR OVER THE COLOR TO BE CHANGED ON THE TOP SET OF COLOR BARS AND DEPRESSING THE "ENTER" SWITCH ON THE CURSOR CONTROLLER. THE USER MUST THEN POSITION THE CURSOR OVER THE COLOR THAT IS TO BE USED AS A REPLACEMENT COLOR ON THE BOTTOM SET OF COLOR BARS AND THEN TURN THE "ENTER" SWITCH ON. THE CHOOSEN COLOR WILL REPLACE THE OLD COLOR IN THE VIDEO LOOKUP TABLE

THE USER WILL CONTINUE THE PROCESS DESCRIBED IN THE PREVIOUS PARAGRAPH UNTIL ALL COLOR CHANGES HAVE BEEN MADE. WHEN THE USER IS SATISFIED WITH THE NEW COLOR SCHEME, THE USER MUST MOMENTARILY TURN THE "VISIBLE" SWITCH OFF.

The user then will follow the procedure described above. When the visible switch has momentarily been turned off, the IIGS will then output the action menu/query, Query 9, to allow the user to exercise one of the other actions detailed in Query 9.

QUERY 12- ACTION - 3 - RE-STORE LAST SCENE ON DISPLAY CRT

This action can only be performed following action 2, color report/change action. When action 2 was chosen, the IIGS wrote the image data that was in the color report window to a disc file. When the user exercises action 3, then the user wants the stored data restored on the Ramtek CRT.

If the previous action code was not a "2" and the user enters a "3" following Query 9, than the IIGS will output:

USER REQUIRED TO RESTORE LAST SCENE AND THE LAST SCENE IS STILL AVAILABLE.

This message is output to inform the user that the IIGS has taken no action to re-store the scene as the scene is still intact on the CRT. The user has input the wrong action code.

If the previous action code was a "2," output of a color report, then the IIGS will output the following if color changes have been made:

DOES THE USER WANT THE ORIGINAL COLOR TABLE, PRIOR TO CHANGES, RESTORED (Y OR N)?

The above query will give the user the capability to display the image scene with the original colors if the user is not satisfied with the new color scheme. If the user is satisfied with the new colors, then the user will enter "N" response. Otherwise, the user will input an "Y" response.

The IIGS will then restore the missing portion of the image that was saved when a color report was output. Upon completion of restoring the image scene the IIGS will output the action menu/query, Query 9.

QUERY 13 - ACTION 4 - DISPLAY PROCESSING COMPLETE

Once the user is finished image analysis, and he does not want to exercise any of the other action options provided by Query 9, the user will input a "4" four following Query 9. IIGS will output:

USER HAS REQUESTED TERMINATION OF CURRENT DISPLAY.

The completion process of the current execution (pass) of the IIGS will then begin.

If the user inputs a response less than 1 or greater than 4 following Query 9, the IIGS will output Query 9 again in order that the user can enter a legal action code.

QUERY 14 - FILE SAVING

Before the current pass in the IIGS is completed, the user is given the option to save the image file in an Interdata/Ramtek compatible format and/or to save the colors currently being used in the image display in a standard color file stored on the Interdata 7/32 disc pack. The IIGS will output:

ARE ANY FILES TO BE SAVED (Y or N)?

If the user does not want to save any files, then the user will input a "N" response following the above query and the rest of the queries noted in this section will be skipped.

If the user wants to save one or both of the aforementioned files, then the user will input a "Y" response. IIGS will output:

IS THE IMAGE DATA TO BE SAVED (Y or N)?

If the user wants to save the image data in a Ramtek/Interdata compatible format and he has input a "Y" response, then the IIGS will output:

IS THE OUTPUT TO BE STORED ON A DISC FILE (Y or N)?

If the user wants to store the image data on a disc file, then the user will input a "Y" response and IIGS will output:

FILE NAME =

The user will then enter the name of the new image file. If the user wants to output the image data on a CCT, he will enter an "N" response following the previous query and IIGS will output:

MOUNT A SCRATCH TAPE ON THE INTERDATA TAPE DRIVE.
WHEN READY TO CONTINUE ENTER A 1.

When a scratch tape has been mounted and the user is ready to begin having the image data output to the CCT, the user will then input a "1" (one). The IIGS will then output:

THE TITLE OUTPUT ON THIS CCT IS: < title >

The image data will then be written to the CCT and upon completion the IIGS will output:

IF IMAGE PROCESSING IS TO CONTINUE MOUNT THE INPUT
CCT ON THE INTERDATA TAPE DRIVE.
WHEN READY TO CONTINUE ENTER A 1.

The above will cause the IIGS processing to pause until the user has mounted an input CCT if IIGS is to perform another pass on another set of data. When the user is ready, he will input a "1" (one).

Following the image save process, the IIGS will then output:

IS THE COLOR TABLE USED IN THE CURRENT IMAGE PROCESSING
TO BE SAVED (Y or N)?

If the user does not want the color table output to a standard disc color file, the user will input an "N" response.

If the user does want the color table data saved on a disc file, then the user will input a "Y" response. The IIGS will then output:

FILE NAME =

The user will then input the name of the file that is to contain the current color table data. The IIGS will then begin to output the color table data to the named file.

QUERY 15 - IIGS PROCESSING CONTINUATION/COMPLETION

The following is the last query output in any pass in the IIGS:

IIGS PROCESSING COMPLETE (Y or N)?

If all IIGS processing has been completed, then the user will input a "Y" response. The IIGS will then close all files and terminate processing on the Interdata 7/32.

If there is more image data to be processed, then the user will input an "N" response. The IIGS will then begin setting up for another pass through the IIGS software and Query 1 will be output again.

3.2.2 INTERDATA/RAMTEK COMPATIBLE CCT PROCESSING

The processing described in the following paragraphs, is the branch of IIGS processing performed when the input data is in an Interdata/Ramtek compatible format as described in Appendix B of this document. Each query is numbered for documentation purposes. In actual operation of the IIGS the query numbers do not appear.

QUERY 1 - BEGIN PROCESSING

The IIGS begins processing image data by outputting the following:

RSIS INTERIM INTERACTIVE GRAPHICS SUBSYSTEM
INPUT DATA IN RSIS UNIVAC FORMAT (Y or N)?

The IIGS outputs Query 1 in order to determine the proper processing branch to take. This subsection of the user's guide deals with the nonstandard form of input, an Interdata/Ramtek compatible CCT. Therefore the user will input an "N" response to the above query.

QUERY 15 - ASSURANCE OF TYPE OF INPUT

The IIGS will begin the nonstandard input processing and will output:

INITIALIZE THE IIGS FOR PROCESSING DATA FROM A
RAMTEK/INTERDATA COMPATIBLE FILE.
IS THE DATA TO BE DISPLAYED IN A RAMTEK/INTERDATA
FORMAT (Y or N)?

This query is output to give the user an option to terminate current processing if the user has selected the wrong branch of IIGS processing. If the input is in an Interdata/Ramtek compatible format, then the user will input a "Y" response following Query 15 and processing in the nonstandard branch of the IIGS software will continue. If, however, the user wants to terminate the current processing, then the user will input an "N" response. IIGS will then output ERROR 132 diagnostic, see Appendix C, and will then output Query 1 again.

QUERY 16 - TYPE OF INITIALIZATION

Upon input of a "Y" response following query 15, IIGS will output:

DOES THE USER WANT TO INITIALIZE KEY VARIABLES
VIA THE TERMINAL (Y or N)?

If the user wants to initialize the Ramtek Level 3 and Level 4 common block variables with standard setting hard coded into the IIGS software as described in Table 3 of this document, then the user will input an "N" response following Query 16.

If the user wants to initialize Ramtek Level 3 and Level 4 common blocks manually, input via the alphanumeric terminal, then the user will input a "Y" response following query 16. The manual initialization queries/menus are detailed in Tables 1 and 2 of this document.

Following the user selection of the type of initialization, the IIGS will follow the procedure and output the messages detailed

in subsection 3.2.1, paragraph "INITIALIZATION MESSAGES OUTPUT FOLLOWING QUERY 4 OR QUERY 5," page 10.

QUERY 17 - INTERDATA/RAMTEK INPUT MEDIUM

Upon initialization, the Ramtek Level 3 and Level 4 common block variables, the IIGS will output:

IS THE CURRENT INPUT DATA ON A CCT (Y or N)?

If the current Interdata/Ramtek compatible data is on a CCT, then the user will input a "Y" response and processing will continue in the IIGS nonstandard branch of software.

If the current Interdata/Ramtek compatible data is stored on a disc file, then the user will input an "N" response and the IIGS will output:

WHAT IS THE NAME OF THE IMAGE FILE?
FILE NAME =

The user will then enter the name of the Interdata disc file that contains the desired image data which has been written in an Interdata/Ramtek compatible format.

Following the required user responses to Query 17, the IIGS will output the image display data to the Ramtek CRT. When the image data has been displayed on the Ramtek CRT, Queries 9 through 14 will be output by the IIGS as done for standard input to the IIGS described in subsection 3.2.1.

APPENDIX A

RSIS STANDARD INPUT CCT FORMAT

OUTPUT FROM THE RSIS DAM PACKAGE SOFTWARE

IMAGE/GRAPHICS RECORD FORMATS

1. IMAGE RECORD FORMATS FOR RSIS IMAGE DATA

RECORD 1 - UNIVAC TO RAMTEK HEADER RECORD

The record described below will be input on each file of RSIS Image data transmitted to the Ramtek interactive graphics subsystem regardless of which version (Version IIGS or IGS).

WORDS 1 THROUGH 4 - GENERAL INFORMATION FOR ALL DATA INPUT FROM UNIVAC

Word* Number	Type	Description	
1	Integer(I)	Type of Input ;	1 = CCT Input
			2 = Hardwired UNIVAC display data transmission**
			3 = Hardwired UNIVAC command data transmission**
2	I	Type of Display;	1 = Image Display data in input file
			2 = X-Y Plot data in input file**
			3 = Text data in input file**
			4 = Other**
3	I	Type of Command;	1 = Display requested
			2 = Interactive user request**
			3 = Re-display last scene**
			4 = Exit

* - All words are 16 bit words

** - Value or option meaningful only in the IGS version of the graphics subsystem.

Word* Number	Type	Description
4	I	Type of Initialization; 1 = Alphanumeric Terminal (AT) Initialization 2 = Standard Initialization (Program Defaults) 3 = Non-Standard Initialization (Initialization values are stored in this record)

WORDS 5* THRU 25 - RAMTEK LEVEL 3 SOFTWARE INITIALIZATION VALUES

Word Number	Type	Description
5	I	Ramtek display device logical unit number (LUN); Default = 6.
6	I	Error report LUN; Default = 7.
7	I	X (horizontal) resolution, number of pixels in a CRT line, at display device; Default = 512.
8	I	Y (vertical) resolution, number of CRT lines, of display device; Default = 512.
9	I	Video Lookup Table (VLT) size, number of entries in VLT; Default = 2048
10	I	Flag for setting blink bit in VLT; Default = 0 0 = Blink off; 1 = Blink on
11-25		Spare Words

WORDS* 26 thru 100 - RAMTEK LEVEL 4 SOFTWARE INITIALIZATION VALUES

Word Number	Type	Description
26	I	LUN of Ramtek compatible Image file; Default = 4.
27	I	Flag for setting reverse packing option; Default = 0. 0 = reverse packing off 1 = reverse packing on

* - All words are 16 bit words

Word Number	Type	Description
28	I	Bias to add to VLT index to obtain external or displayed CT values when assigning CT values to colors or displaying CT base and window values when windowing an image where: CT = SCALE*VLT index + BIAS BIAS = Word 28 of this record SCALE = Word 29 of this record VLT indicies and image values run from 0 to n while a user may wish to associate a different external range than this. For example, if the user wishes the external range of values to be - 10240 to 10240, the bias would be set to -10240 and the scale factor to 10. Default value = 0;
29		Scale factor to multiply VLT index by to obtain external or displayed CT values. (see word 28 above) Default = 1
30	I	Video Lookup Table number; Default = 0
31	I	Number of reserved entries at top of VLT (which contain other than color information) At least one entry should be reserved for Level 4 software to use, since it uses the entry when displaying text information (last VLT entry). Any reserved entries will not be modified when generating lookup tables. Default = 1.
32	I	Cursor device nubmer. Default = 0
33	I	Keyboard device nubmer. Default = 0
34	I	Number of overlay channels; NOVR where $0 \leq NOVR \leq 4$; Default = 1
35	I	Bit number for overlay channel 1; Default = 11
36	I	" " " " " 2; Default = 0
37	I	" " " " " 3; Default = 0
38	I	" " " " " 4; Default = 0
39-40		Spare words

*Words are 16 bit words

Word Number	Type	Description
50	I	Logical unit number from which to receive console input; Default = 5
51	I	Logical unit number of display console; Default = 7
52	I	Standard color file flag 0 = no standard color file to be used 1 = standard color file to be used in current image processing
53-62	A*	Name of standard color directory if word 52 > 0; Default = "OS32:COLOR.DIR"
63-72	A*	File name of standard color file to be used in processing current image data; No default.
73-82	A*	File name to be used with image records for Ramtek display in Ramtek compatible format. Maximum of 20 characters; Default = "LANDSA
83-100		Spare words

*Alphanumeric characters

RECORD 2 - RAMTEK IMAGE HEADER RECORD

The following is a description of the Ramtek header record required for a normal Ramtek Image File. This record contains general information pertinent to processing image data on the Ramtek.

The header block structure is as follows:

Word*	Description
1	Number of characters in following image title.
2-21	Image title. Maximum length is 40 characters.
22	Number of entries (words) in color video lookup table. A value of zero indicates there is no color lookup table.
23	Number of entries (words) in black and white video lookup table. A value of zero indicates there is no black and white lookup table.
24	X coordinate of upper left corner of image window.
25	Y coordinate of upper left corner of image window.
26	X coordinate of lower right corner of image window.
27	Y coordinate of lower right corner of image window.
28	Scan mode the image was saved with. The mode determines how the image data records were written or are to be to be read. For example, in scan mode Ø, each image line within the window is a record and the number of records is determined by the window width.
29	Number of colors in COLOR/LEVEL arrays. A value of zero indicates there are no tables. The n words of level information are written in a single record following the VLT record.
30	CT bias if word 29 is non-zero.
31	CT scale factor if word 29 is non-zero
32	Number of tick marks
33	Magnification factor
34-256	Spare words

* - Words are 16-bit words.

RECORDS 3-N RAMTEK COLOR AND OVERLAY INFORMATION RECORDS

RECORD TYPE 3 - B/W VIDEO LOOKUP TABLE (VLT) DATA

If word 23 of the header record (record 2), containing the number of entries in the Black and White (B/W) VLT, is greater than zero, then this type of record will be present in the input file. All words in the type record are 16 bits in length. Following the first word, this record will contain the number of 16-bit words specified by word 23 of the header record and will be in the format detailed in Figure 1.

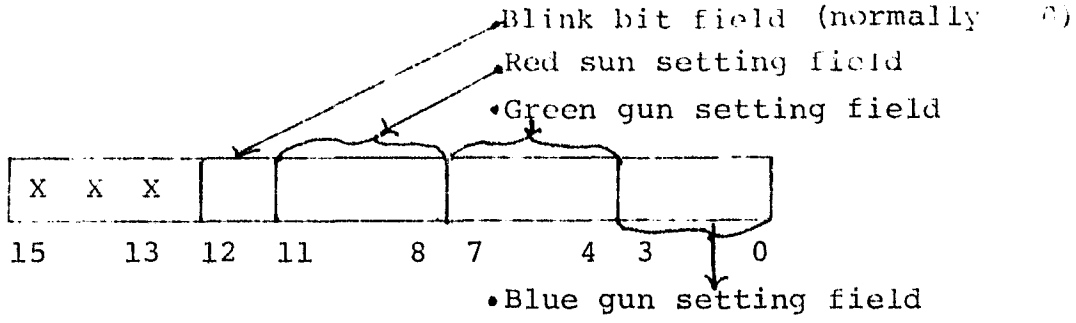


FIGURE 1. LAYOUT OF A VIDEO LOOKUP TABLE WORD

In a B/W VLT all guns will have equal intensities in order to achieve some level of white, gray or black color.

RECORD TYPE 4 - COLOR VIDEO LOOKUP TABLE (VLT) DATA

Word 22 of the Ramtek header record (record 2) contains the number of entries in the color VLT. If the value stored in word 22 is greater than zero, then this type of record will be present in the input file. Following the first 16-bit word, this record will contain the number of 16-bit words specified by the value stored in word 22 of the header record. The format of a color VLT word is detailed in figure 1 above.

RECORD TYPES 5 and 6 - COLOR TABLE DATA

Word 29 of the Ramtek header record (record 2) contains the number of color values/levels in the input file. If the value stored in word 29 is greater than zero, then both record types 5 and 6 will be present in the input file. In this case, record

type 5 will contain the number of words specified in word 29 of the header record in the format shown by figure 1 above. Record Type 6 will immediately follow Record Type 5 and will contain the number of words specified in word 29 of the header record in the format shown in figure 2 below.

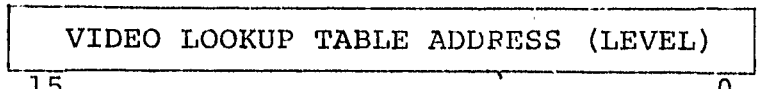


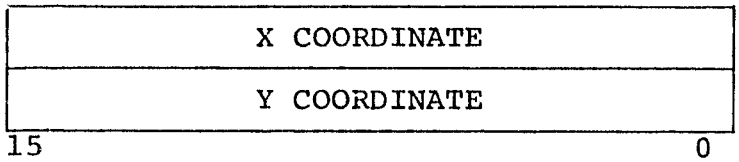
FIGURE 2. LAYOUT OF A COLOR LEVEL WORD

An example of a standard color file contains color value levels as shown on page C-2 of appendix C of the IIGS Detailed Design.

Record types 5 and 6 will be used to build a video lookup table. These records data will be loaded into Ramtek FIPP arrays "COLOR" and "LEVEL."

RECORD TYPE 7 - TICK MARK DATA

Word 32 of the Ramtek header record (record 2) contains the number of tick marks in the input file. If the value stored in word 32 is greater than zero, then this type of record will be present in the input file. This record will contain 2 times the value in word 32 of header record 16-bit words. Each tick mark will require two 16-bit words, one word containing the horizontal coordinate and the other word containing the vertical coordinate. Figure 3 below details the contents of a tick mark coordinate pair of words.



RECORD TYPE 8 - IMAGE DATA RECORDS

The number of image records (type 8 records) stored in any input file is variable and is dependent upon the scan mode (word 28 of the header block) of the data and upon either the width or height of the input window. There will be only one image window in a file. The maximum window size is 512 pixels by 512 lines. Normally, in the RSIS, the scan mode of the image data is zero which means that each image line within the window is a record and the number of records is determined by the window height. The following is a method to compute the number of records in an input file and the number of records per input file.

SCAN MODE = 0 : NORMAL RSIS MODE

In this mode (zero) the RSIS Image data records have the following format:

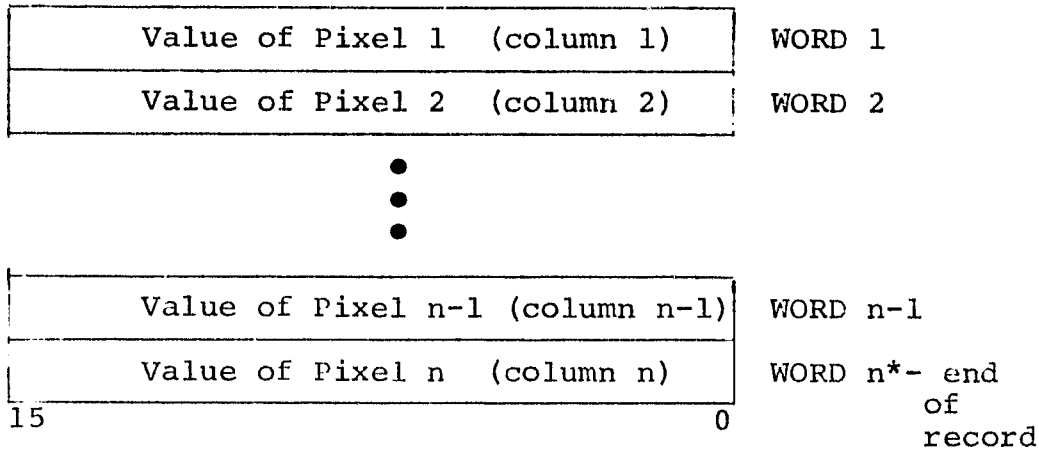


FIGURE 4. IMAGE DATA RECORD FORMAT; SCAN MODE = 0

NR_o = number of records in input file written in scan mode zero = window height

= (Y coordinate of lower right corner) - (Y coordinate of upper left corner)

= (value in word 27 or Ramtek header) - (Value in word 25 of Ramtek header) + 1

* - n must be less than or equal to 512

For example, if there are 512 lines of image data in the input file, then word 27 of Ramtek header = 511; Word 25 of Ramtek header = 0; NR_o = 511 - 0 + 1 = 512 records

The number of words in a record is dependent upon the scan mode (word 28 of the Ramtek header record) and upon the window height or width. All image data records within an input file will have the same number of 16-bit words. Normally, in the RSIS, the Scan Mode = 0, which means that the number of 16-bit words in a record is dependent upon the window width. The following is a method to compute the number of words per record when the scan mode = 0.

NW_o = number of 16-bit words in a record in scan mode zero =
window height
= (X coordinate of lower right corner) - (X coordinate at upper left window) + 1
= (value in word 26 of the Ramtek header record) - (value in word 24 of the header record) + 1

The following are methods to compute the number of records in a file and the number of words per record for scan modes other than zero.

SCAN MODE = 1

In Scan Mode = 1, the image data records have the following format:

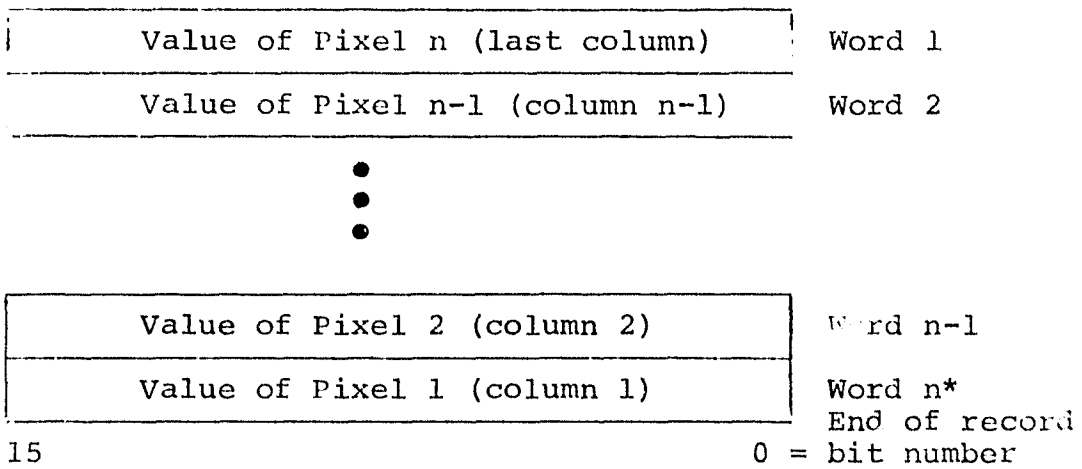


FIGURE 5. IMAGE DATA RECORD FORMAT; SCAN MODE = 1

*n must be less than or equal to 512.

The difference in scan mode 1 and scan mode 0 is that the image data is written from right to left in scan mode 1. Whereas, in scan mode 0, the data is written from left to right. The words per record and records per input file are computed in the exact same way as these values where computed in scan mode zero. Both of the modes write form top of screen (record 1 = line 1) to bottom of the CRT screen (record n = line n on CRT).

NR_1 = Number of records in input file written in scan mode 1
= (word 27 of Ramtek header record) - (word 25 of Ramtek header record) + 1

NW_1 = Number of 16-bit words per record in scan mode 1
= (word 26 of Ramtek header record) - (word 24 of Ramtek header record) + 1

SCAN MODE = 2

Image data when written in this mode is written from left to right (as shown in Figure 4) and then from the bottom of the CRT screen (record 1 = line n on the CRT) to the top of the CRT screen (record n = line 1 on the CRT). The words in a scan mode = 2 type record have the same format as those shown for scan mode 0 (figure 4). The records in a scan mode = 2 file have the following arrangement:

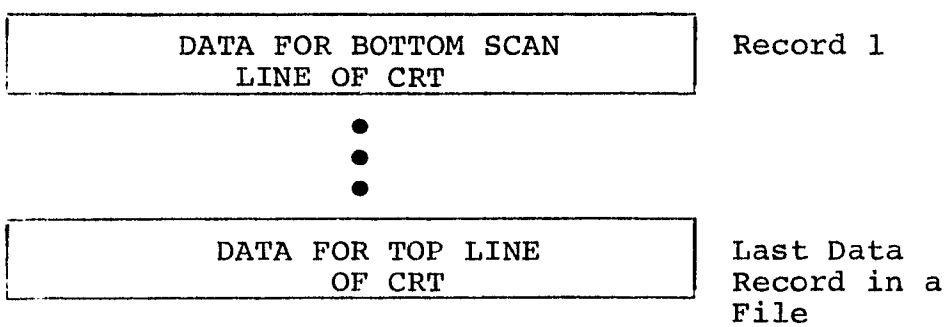


FIGURE 6. IMAGE DATA FILE STRUCTURE; SCAN MODE = 2

* n must be less than or equal to 512

SCAN MODE = 2 (continued)

NR_2 = number of records in input file written in scan mode 2
= (word 27 of Ramtek header record) - (word 25 of Ramtek header record) + 1

NW_2 = number of 16-bit words per record written in scan mode 2
= (word 26 of Ramtek header record) - (word 24 of header record) + 1

SCAN MODE = 3

Image data when written in scan mode 3 is written from right to left and botton line to top line. This means that the record format in this mode is in the same format as the record format for scan mode = 1; Figure 5. The record arrangement for data in this scan mode is the same as described in Figure 6.

NR_3 = number of records in input file written in scan mode 3
= (word 27 of Ramtek header record) - (word 25 of Ramtek header record) + 1

NW_3 = number of 16-bit words per record written in scan mode 3
= (word 26 of Ramtek header record) - (word 24 of Ramtek header record) + 1

SCAN MODE = 4

Image data when written in scan mode 4 is written from the top scan line (word 1 = pixel value in top line for current row) to bottom scan line (word n = pixel value n bottom line for current row) and left (record 1 = row 1) to right (record n = row n pixels).

The following is the record arrangement in the input file:

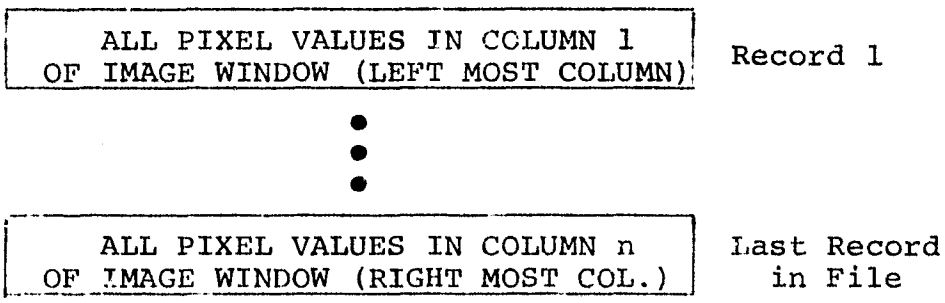


FIGURE 7. IMAGE DATA FILE STRUCTURE; SCAN MODE = 4

The following is the record format for data written in scan mode 4:

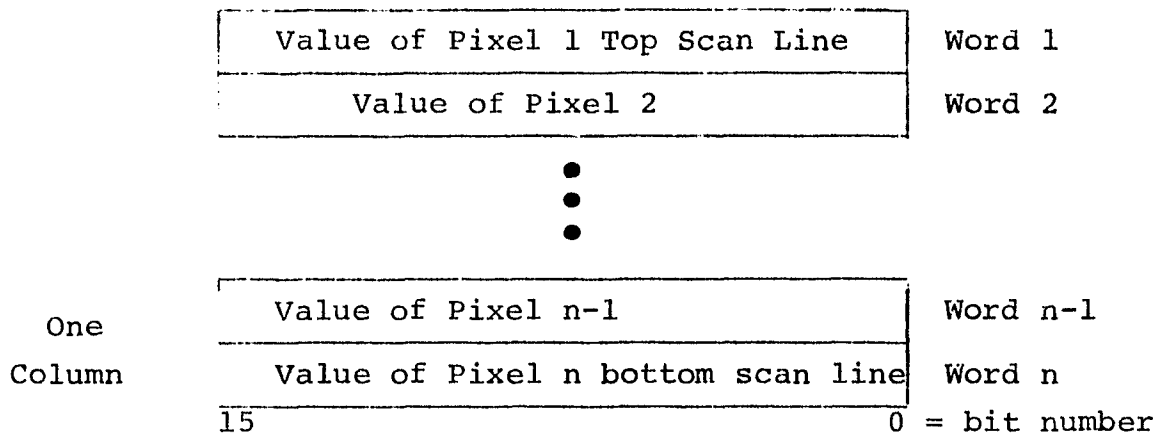


FIGURE 8. IMAGE DATA RECORD FORMAT; SCAN MODE = 4

SCAN MODE = 4

NR_4 = number of records in an input file with data written in scan mode 4

= (X coordinate of lower right corner) - (X coordinate of upper left corner) + 1

= (word 26 of Ramtek header record) - (word 24 of Ramtek header record) + 1

SCAN MODE = 4 (continued)

NW_4 = number of 16-bit words per record written in scan mode 4
= (Y coordinate of lower right corner) - (Y coordinate of upper left corner) + 1
= (word 27 of Ramtek header record) - (word 25 of Ramtek header record) + 1

SCAN MODE = 5

Image data written in scan mode = 5 is written from bottom to top then left to right. The following is the record format for data written in scan mode 5:

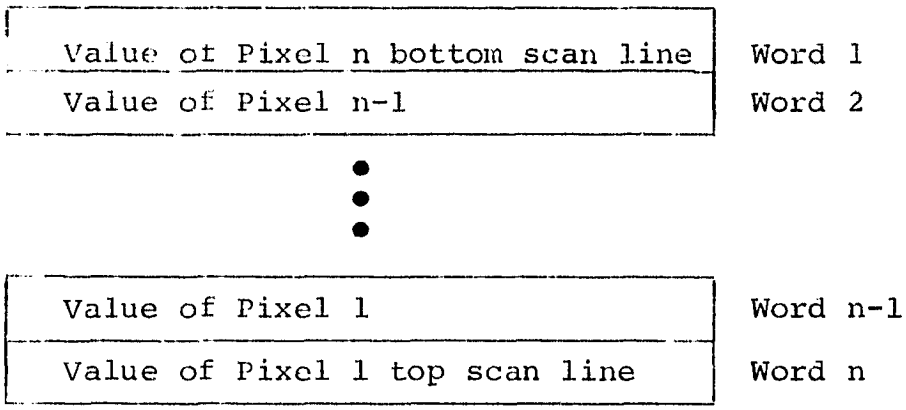


FIGURE 9. IMAGE DATA RECORD FORMAT; SCAN MODE = 5

The record arrangement for data written in scan mode 5 is the same as detailed on Figure 7 for scan mode 4.

NR_5 = (word 26 of Ramtek header record) - (word 24 of Ramtek header record) + 1
NW_5 = (word 27 of Ramtek header record) - (word 25 of Ramtek header record) + 1

SCAN MODE = 6

Image data written in scan mode = 6 is written top to bottom then right to left. The record format is the same as detailed in Figure 8 for data written in scan mode 4. The following is the record arrangement in the input file:

SCAN MODE = 6 (Continued)

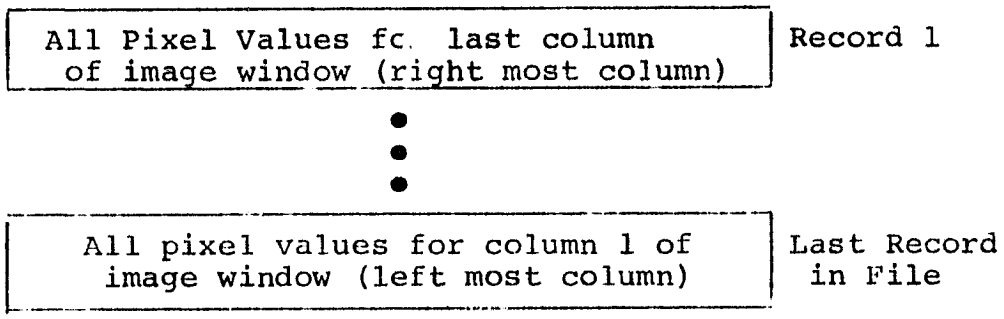


FIGURE 10. IMAGE DATA FILE STRUCTURE; SCAN MODE =6

NR_6 = (word 26 of Ramtek header record) - (word 24 of Ramtek header record) + 1

NW_6 = (word 27 of Ramtek header record) - (word 25 of Ramtek header record) + 1

SCAN MODE = 7

Image data written in scan mode = 7 is written bottom to top then right to left. The record format used for scan mode = 7 is the exact same as the record format for data written in scan mode 4 - Figure 9. The record arrangement in the input file is exactly the same as the record arrangement in scan mode 6 - Figure 10.

NR_7 = (word 26 of Ramtek header record) - (word 24 of Ramtek header) + 1

NW_7 = (word 27 of Ramtek header record) - (word 25 of Ramtek header) + 1

APPENDIX B

INTERDATA/RAMTEK COMPATIBLE INPUT IMAGE FILE FORMAT

9-1 BINARY IMAGE FILE STRUCTURE

Level 4 image transfer modules provide the capability of loading an image from or saving an image in a file. All I/O to the file is Fortran unformatted I/O to be as fast as possible. The overall structure of an image file is as follows:

Record	No.	Size in Words*	Contents
Header block	1	256	Items describing the image and how it is saved.
B/W VLT	1	Variable	Optional black and white video lookup table. Size is specified in header block.
Color VLT	1	Variable	Optional color video lookup table. Size is specified in header block.
Color table	1	Variable	Optional color & level table. Number of colors is specified in the header block. The color array of NCOLRS entries is stored first followed by the LEVEL array.
Image data	Variable	Variable	Image data. Size and storage method is specified in header block.

* Words are 16-bit words.

APPENDIX C

IIGS DIAGNOSTIC MESSAGES

C.1 IIGS DIAGNOSTIC MESSAGES

The IIGS has been designed to never abort an execution. All errors are trapped, if possible, and a fatal error causes control to be returned to the main program where the user can either terminate the program or process another set of image data. There may be occasions, however, where an Interdata Run Time Library routine will cause the program to be aborted. In this case the user must re-start the program.

There are 3 basic types of diagnostic or error messages output by the IIGS:

- ERROR MESSAGES NUMBERED 100 AND ABOVE
- WARNING MESSAGES
- ERROR MESSAGES LESS THAN 1 OUTPUT BY THE RAMTEK FIPP MODULES

The following pages contain the explanation of the first two types of error messages. The Ramtek error messages are detailed in section 10, pages 103 through 108, in the Ramtek Fortran Image and Plot Package User's Guide.

ERROR MESSAGES

Message Number	Routine	Message and Remedial Action**
100	IIGS*	ERROR 100 - AN ERROR WAS ENCOUNTERED IN IIGS INITIALIZATION. An error was encountered in either the "STDINT" or NONSTD" module. Immediately following the output of the above message the IIGS will output: DOES THE USER WANT TO CONTINUE IIGS PROCESSING (Y or N)? If the user decides to terminate the IIGS execution, he will enter an "N" on the alpha-numeric terminal and then the following will be output on the terminal: IIGS PROCESSING TERMINATED BY USER. If the user decides to try to initialize the subsystem again, he will enter a "Y". Other error messages should be output prior to the above error message which should help a user make the termination/ continue decision.
101	IIGS	ERROR 101 - ERROR ENCOUNTERED WHILE DISPLAYING DATA. An error was encountered in module "IGIN" or one of its subordinate modules. Following the output of the above error message, the IIGS will output: DOES THE USER WANT TO CONTINUE IIGS PROCESSING (Y or N)? The user responses will cause the actions as described in Message Number 100, above.
102	IIGS	ERROR 102 - ERROR ENCOUNTERED WHILE ATTEMPTING TO SAVE IMAGE FILE. DOES THE USER WANT TO TRY AGAIN (Y or N)? An error was encountered in the Ramtek FIPP module "IMAGER" or one of its subordinate mdoules. If the user decides to try again, he will input a "Y" response and the image file save process will start

*IIGS is the main program.
**Inputs and outputs noted in this appendix refer to inputs from or output to the alpha-numeric terminal.

Message Number	Routine	Message and Remedial Action**
102(cont.)	IIGS	again. If the user elects not try to save the image file, the IIGS will output: USER HAS ELECTED NOT TO SAVE IMAGE FILE. PROCESSING CONTINUES.
103	IIGS	ERROR 103 - UNABLE TO SAVE CURRENT COLOR TABLE DATA. PROCESSING CONTINUES. An error was encountered in the Ramtek FIPP Module "CSAVE" or one of its subordinate modules. The program software will ignore this error and continue to process other user requests. The color file attempted to be saved will not be available to user.
104	IIGS	ERROR 104 - THE INPUT CCT LOGICAL UNIT COULD NOT BE CLOSED. THE SYSTEM ERROR NUMBER = XXX. An error was encountered by the Ramtek FIPP module "CLOLUN" or one of its subordinate modules. The error number output is the error number returned by the Interdata System I/O routines. The user should refer to the Interdata OS/32 MT Pocket Guide in analyzing the problem. Following the output of the above error, IIGS will output: DOES THE USER WANT TO CONTINUE PROCESSING (Y or N)? If the user does not want to continue, he will input an "N" and the following will be output: IIGS PROCESSING TERMINATED BY USER. The current execution will then be terminated. If the user wants to continue, he will enter a "Y" and IIGS processing will begin at the start of the program.

Message Number	Routine	Message and Remedial Action
105	STDINT	ERROR 105 - UNABLE TO OPEN THE RSIS INPUT CCT FILE. PROCESSING IN MODULE "STDINT" TERMINATED. An error was encountered in module "ASSLUN" or one of its subordinate modules. Processing is returned to main program and error message number 100 is output.
106	STDINT	ERROR 106 - UNABLE TO POSITION THE RSIS CCT TO THE REQUESTED FILE. PROCESSING IN MODULE "STDINT" TERMINATED. An error was encountered in the Interdata Run Time Library "SYSIØ" Module. The error number is also output. Control is returned to the main program and error message number 100 is output.
107	STDINT	ERROR 107 - READ ERROR OCCURED WHILE ATTEMPTING TO READ THE UNIVAC HEADER RECORD. PROCESSING IN MODULE "STDINT" IS TERMINATED. An error was encountered in the Interdata Run Time Library module "SYSIØ". The Interdata Run Time Library module "IØERR" is called and the Interdata SVC 1 error number is output. (For an explanation of SVC 1 error numbers see the Interdata manual: "OS/32 MT Pocket Guide" SVC 1 I/O Operations Section). Control is then returned to the main program and error number 100 is output.
108	STDINT NONSTD	ERROR 108 - COULD NOT INITIALIZE THE IIGS. PROCESSING IN MODULE "STDINT"-"NONSTD" IS TERMINATED. An error was encountered in module "RSISIN" or one of its subordinate modules. The IIGS system has not been properly initialized and control will be returned to the main program which will then output error message number 100.

Message Number	Routine	Message and Remedial Action
109	RSISIN	ERROR 109 - ERROR ENCOUNTERED IN LEVEL 3 INITIALIZATION. PROCESSING IN MODULE "RSISIN" TERMINATED. An error was encountered in Ramtek FIPP module "INI3" or INITL3." An appropriate error message number should be output by either of these routines preceeding this error message. (Refer to the Ramtek FIPP Manual section 10.0 for details). Control is returned to module "STDINT" or NONSTD" and error number 108 is output.
110	RSISIN	ERROR 110 - ERROR ENCOUNTERED IN LEVEL 4 INITIALIZATION. PROCESSING IN MODULE "RSISIN" TERMINATED. An error was encountered in Ramtek FIPP Module "INI4" or INITL4." (see error message number 109).
111	IGIN	ERROR 111 - UNABLE TO RLSTORE LAST SCENE. An error was encountered in the Ramtek FIPP module "IMAGEW" when the user requested the image scene to be restored after viewing a color report on the Ramtek CRT. Processing will continue in this routine and the user will be asked to enter the next aciton.
112	STDIMG	ERROR 112 - AFTER MAGNIFICATION FACTOR WAS APPLIED TO IMAGE WINDOW COORDINATES, THE NEW COORDINATES WERE IN ERROR. THE NEW COORDINATES ARE: X(LEFT) = XXX X(RIGHT) = XXX Y(TOP) = XXX Y(BOTTOM)= XXX Either the user requested the scene to be magnified or the magnification factor in the Ramtek header record, record 2 in the file being processed, was greater than one. When this magnification factor was applied to the window coordinates input in the Ramtek header record, the new coordinates where out of the Ramtek range (greater than pixel number 511 or greater than line 511).

Message Number	Routine	Message and Remedial Action
112(Cont.)	STDIMG	Processing in module "STDIMG" is termiated. The user is to analyze the coordinates vs. the magnification factor and the user should lower the magnification factor he asked for when this error occured.
113	STDIMG	ERROR 113 - ERROR ENCOUNTERED IN MODULE "IMAGEC" WHILE ATTEMPTING TO CLEAR RAMTEK CRT SCREEN. DOES THE USER WANT TO ATTEMPT TO CLEAR THE SCREEN AGAIN (Y or N)? An error condition was returned by the module "IMAGEC" to "STDIMG." If the user wants to attempt to clear the screen again, then a "Y" is to be entered. If the user is forced to or chooses not to clear the screen again, then an "N" is to be input. If the user inputs an "N," then the IIGS outputs the following: DOES THE USER WANT TO TERMINATE THE CURRENT EXECUTION (Y or N)? If the user wants to terminate, then a "Y" is input. If the user wants to attempt to ignore clearing the screen, then an "N" will be input and processing in module "STDIMG" will continue, if possible.
114	STDIMG	ERROR 114 - ERROR ENCOUNTERED WHILE ATTEMPTING TO DISPLAY IMAGE TITLE. DOES THE USER WANT TO ATTEMPT TO DISPLAY TITLE AGAIN (Y or N)? An error condition was returned by a call to the Ramtek FIPP module "DSPFNT" by "STDIMG." If the user wants to attempt to display the image title again, then a "Y" will be input. If the user chooses to ignore the title output, then an "N" response is to be input. If an "N" is input, then processing will proceed with the IIGS performing the other functions of the module "STDIMG."

Message Number	Routine	Message and Remedial Action
115	STDIMG	ERROR 115 - DATA TRANSMISSION ERROR OCCURED. PROCESSING IN MODULE "STDIMG" IS TERMINATED. An error condition was returned to "STDIMG" in a call to module "IMGTRN" or Ramtek FIPP module "SETSCN" or "WIN." The user should analyze any proceeding messages to determine the problem and either continue processing or hard reset the system when control is returned to the main program.
116	RAMHDR	ERROR 116 - UNRECOVERABLE READ ERROR OCCURED WHILE ATTEMPTING TO READ THE RAMTEK HEADER RECORD FROM THE RSIS CCT. PROCESSING IN MODULE "RAMHDR" IS TERMINATED. An error was returned to module "RAMHDR" from the Interdata Run Time Library module "SYSIØ." This error terminates the current image being processed. The user may choose, after return to the main program, to try another image file or terminate IIGS processing. The file causing the above error message should either be copied onto another CCT or re-generated.
117	RAMHDR	ERROR 117 - THE CURRENT EXECUTION DOES NOT CONTAIN ANY VLT INFORMATION. THERE IS NO WAY FOR THE IIGS TO MAP PIXEL VALUES TO COLORS. The input RSIS CCT contains no color information according to information in the Ramtek header record, record 2 in the image file. See RAMHDR warning message for actions to perform following output of this message. (page C-19)
118	RAMHDR	ERROR 118 - THE HORIZONTAL COORDINATE FOR THE LEFT CORNER OF IMAGE WINDOW IS NOT IN THE HORIZONTAL RANGE OF THE CRT. THE CORRECT HORIZONTAL RANGE IS 0 to 511 PIXELS. DOES THE USER WANT TO ENTER ANOTHER COORDINATE (Y or N)?

Message Number	Routine	Message and Remedial Action
118(Cont.)	RAMHDR	Word 24 of the Ramtek header record contained a value that was <0 or >511. This word is to contain the horizontal coordinate of the left corner of the image window and must be in the range of 0 to 511. If the user wants to input a coordinate, then a "Y" response is to be entered, IIGS will then output: ENTER THE HORIZONTAL COORDINATE FOR THE LEFT CORNER. X(LEFT) = The user will then input some coordinate in the range 000 to 511. The format of the input is an I3 format. Therefore leading zeros must be input or blanks, e.g., for coordinate 51 the entry would be 051 or ⌀51. If the user does not want to input a coordinate, then an "N" response will be input, IIGS will then output: CURRENT PROCESSING TERMINATED IN MODULE "RAMHDR." The current image processing will then be returned to the main program.
119	RAMHDR	ERROR 119 - THE HORIZONTAL COORDINATE FOR THE RIGHT CORNER OF IMAGE WINDOW IS NOT IN THE HORIZONTAL RANGE OF THE CRT. THE CORRECT HORIZONTAL RANGE IS 0 to 511 PIXELS. DOES THE USER WANT TO ENTER ANOTHER COORDINATE (Y or N)? Word 26 of the Ramtek header record contains a value less than 0 or greater than 511. The word must be in the range of 0 to 511. The processing of user options following the query is the same as that done in error number 118.
120	RAMHDR	ERROR 120 - THE RIGHT HORIZONTAL COORDINATE IS NOT GREATER THAN THE LEFT HORIZONTAL COORDINATE. THE USER MUST INPUT THESE COORDINATES IF PROCESSING IS TO CONTINUE.

Message Number	Routine	Message and Remedial Action
120 (cont.)	RAMHDR	Word 26 of the Ramtek header record is not greater than word 24 of the header record. Upon output of this error message, error message number 118 will be output with its user option. If the user inputs a coordinate, then error message number 119 will be output and the user has the option specified for error number 119.
121	RAMHDR	ERROR 121 - THE VERTICAL COORDINATE FOR THE TOP LINE OF IMAGE WINDOW IS NOT IN THE VERTICAL RANGE OF THE CRT. THE CORRECT VERTICAL RANGE IS FROM 0 to 511 LINES. DOES THE USER WANT TO ENTER ANOTHER COORDINATE (Y or N)? Word 25 of the Ramtek header record, record 2 of the image file, contains a value that is either less than 0 or greater than 511. The value is this word must be in the range of 0 to 511. If the user wants to input a coordinate, then a "Y" response is to be entered, IIGS will then output: ENTER THE VERTICAL COORDINATE FOR THE TOP LINE OF THE IMAGE. Y(TOP) = The user will then input the coordinate for the top line in the range of 000 to 511. The format of the input response is an "I3" format. Therefore, leading zeros or blanks must be input preceding an integer input less than 100., e.g., for an entry of line 1, the entry would 001 or ØØ1. If the user does not want to input a coordinate then an "N" response will be input following the query. IIGS will then output: CURRENT PROCESSING TERMINATED IN MODULE "RAMHDR." The current image processing will then be terminated and control of program will be returned to the main program.
122	RAMHDR	ERROR 122 - THE VERTICAL COORDINATE FOR THE BOTTOM LINE OF IMAGE WINDOW IS NOT IN THE VERTICAL RANGE OF THE CRT. THE CORRECT VERTICAL RANGE IS 0 TO 511 LINES. DOES THE USER WANT TO ENTER ANOTHER COORDINATE (Y or N)?

Message Number	Routine	Message and Remedial Action
122(Cont.)	RAMHDR	Word 27 of the Ramtek header record contains a value less than 0 or greater than 511. The value in this word must be in the range of 0 to 511. The user options that can be exercised following this error message are almost identical to error message number 121.
123	RAMHDR	ERROR 123 - THE BOTTOM LINE COORDINATE IS NOT GREATER THAN THE TOP LINE COORDINATE. THE USER MUST INPUT THESE COORDINATES IF PROCESSING IS TO CONTINUE. Word 27 of the Ramtek header record is not greater than word 25 of the header record. Upon output of this error message, error message number 121 will be output. If the user chooses to enter a top line number, then error message 122 will be output.
124	RAMHDR	ERROR 124 - ERROR IN INPUT SCAN MODE SETTING: DOES THE USER WANT TO ENTER THE CORRECT SCAN MODE (Y or N)? Word 28 of the Ramtek header record, record 2 of the image file, contains a value less than 0 or greater than 7. The proper range of scan modes is 0 through 7. If the user chooses not to enter a scan mode an "N" is input following the query and IIGS will set the scan mode to the default scan mode which is equal to zero (0) and processing will continue. If the user chooses to enter a scan mode, then a "Y" will be input following the query. The IIGS will then output: ENTER THE SCAN MODE. SCAN MODE = 0, IS THE STANDARD MODE FOR RSIS PROCESSING. SCAN MODE = The user will then input a scan mode in the range of 0 to 7.

Message Number	Routine	Message and Remedial Action
125	CLRTCK	ERROR 125 - ERROR OCCURED WHILE ATTEMPTING TO SKIP RECORDS ON THE INPUT RSIS CCT. PROCESSING IN MODULE "CLRTCK" IS TERMINATED. A standard color file is to be used to map pixel values to colors and the input RSIS CCT had color data records also. These records have to be skipped in order to get to image or tick mark data records. While attempting to skip one of these records the Interdata Run Time Library module "SYSIØ" returned on error to module "CLRTCK." The run is automatically terminated and control returned to the main program. The user may, upon return to the main program, try to process the same file again, have the file copied onto another CCT, or re-generate the file.
126	CLRTCK	ERROR 126 - UNRECOVERABLE READ ERROR OCCURED WHILE READING RECORD XX ON RSIS CCT. PROCESSING IN MODULE "CLRTCK" IS TERMINATED. An error was encountered by the Interdata Run Time Library routine "SYSIØ" when it attempted to read data record XX from the input RSIS CCT. The action taken upon receiving this error message should be the same as that described for error message 125.
127	CLRTCK	ERROR 127 - UNABLE TO LOAD THE VLT IN THE RAMTEK. PROCESSING IN MODULE "CLRTCK" HAS BEEN TERMINATED. An error condition was returned to "CLRTCK" in a call to the RAMTEK FIPP module "CLOAD" or "LAM." The user should analyze any preceeding error messages to help determine the cause of the problem in order to determine if the system needs to have a hard re-set (termination of program and re-setting Ramtek with switch on Ramtek processor).
128	CLRTCK	ERROR 128 - NO VLT DATA HAS BEEN LOADED INTO THE RAMTEK. PIXEL VALUES CANNOT BE PROPERLY MAPPED TO COLORS.

Message Number	Routine	Message and Remedial Action
129	IMGTRN	ERROR 129 - IF THE REQUESTED MAGNIFICATION FACTOR IS APPLIED TO THE IMAGE DATA THE RESULTING NUMBER OF PIXELS/LINE WILL BE GREATER THAN THE CRT LIMIT. DOES THE USER WANT TO DISPLAY THE IMAGE WINDOW WITH NO MAGNIFICATION (Y or N)? A magnification is to be used with the current image data and if applied to the image data the resulting display would be too large to fit on the RAMTEK CRT. The user choice is self explanatory.
130	IMGTRN	ERROR 130 - WHILE DISPLAYING CURRENT IMAGE WINDOW, A TRANSMISSION ERROR OCCURED. DOES THE USER WANT TO TERMINATE THE CURRENT EXECUTION (Y or N)? An error condition was returned to "IMGTRN" after a call to the RAMTEK FIPP module "WI." The user should analyze any preceeding error messages output by the RAMTEK FIPP software to help determine the cause of the error before making a decision to proceed or terminate the current execution.
131	IMGTRN	ERROR 131 - AN UNRECOVERABLE READ ERROR OCCURED WHILE READING AN IMAGE DATA RECORD DOES THE USER WISH TO IGNORE THE ERROR AND CONTINUE PROCESSING (Y or N)? An error was encountered by the Interdata Run Time Library routine "SYSIØ" when it was called by "IMGTRN" to read an image data record. If the user enters an "N", then IIGS will output: USER HAS CHOOSEN TO TERMIATE THE CURRENT EXECUTION. Control will then be returned to the main program. In order to process the data at a later date, the user should either copy the image file causing the error or re-generate the file.

Message Number	Routine	Message and Remedial Action
131(Cont.)	IMGTRN	If the user want to attempt to continue, then a "Y" response will be input after the query. The IIGS will then attempt to read another image record and continue processing.
132	NONSTD	ERROR 132 - USER STATED THAT A NON-STANDARD FILE WAS INPUT TO THE IIGS. THE ONLY AUTHORIZED INPUT IN THE NON-STANDARD MODE IS A FILE IN A RAMTEK OR TITLE IMAGE FORMAT. PROCESSING IN MODULE "NONSTD" IS TERMINATED. In the main program the user stated that an RSIS CCT was not the mode of CCT input. Upon entry to the module "NONSTD" the user is asked if the input data was in a Ramtek/Interdata compatible file, to get this error the user had to have input an "N" response. Module "NONSTD" can only process data in a Ramtek/ Interdata Compatible format, therefore, message 132 is output and control is returned to the main program.
133	NONSTD	ERROR 133 - COULD NOT INITIALIZE THE IIGS. PROCESSING IN MODULE "NONSTD" IS TERMINATED An error was encountered in module "RSISIN" when called by "NONSTD" and the IIGS software could not properly be initialized. Error messages which preceed the output of this error message should be analyzed to determine the problem. Once the problem has been corrected, the user should begin execution again.
134	CURSOR	ERROR 134 - ERROR OCCURED WHILE READING THE CURSOR STATE. DOES THE USER WANT TO ATTEMPT TO COLLECT MORE DATA (Y or N)? An error was encountered in the Ramtek FIPP module "RCS" when called by module "CURSOR." The user should analyze preceeding error messages to determine the cause of the problem and to aide in responding to the query. If the user

Message Number	Routine	Message and Remedial Action
134 (Cont.)	CURSOR	inputs an "N" response to the query, then the error flag will be cleared, to allow user to exercise other IIGS options, and the following will be output: USER HAS REQUESTED TO TERMINATE CURSOR COORDINATE COLLECTING.
135	DISPTK	ERROR 135 - UNABLE TO PUT RAMTEK SYSTEM IN THE OVERLAY MODE. PROCESSING IN MODULE "DISPTK" IS TERMINATED. An error was encountered in Ramtek FIPP module "OVRBEG" when called by module "DISPTK" to put the Ramtek display system in the overlay mode. In order to display tick mark data without destroying some image data the program must be in the overlay mode. When this error occurs, the error flag is cleared to allow other processing and the tick mark data is not displayed. Preceeding error messages should be analyzed to determine the cause of the problem.
136	DISPTK	ERROR 136 - UNABLE TO RETURN RAMTEK SYSTEM BACK TO THE NORMAL MODE. PROCESSING IN MODULE "DISPTK" IS TERMINATED. An error was encountered in Ramtek FIPP module "OVREND" when called by module "DISPTK" to return the Ramtek display system to the normal mode after processing tick mark data. This is an non-recoverable error as the system must be in the normal mode to support other IIGS functions. Therefore, the control of the operations is returned to the main program where the system is to be restarted and re-initialized. Preceeding error messages should be analyzed to determine the cause of the error.
137	CLRPRT	ERROR 137 - THE CURRENT COLOR TABLE CONTAINS MORE THAN 1024 COLORS. PROCESSING IN MODULE "CLRPRT" IS TERMINATED.

Message Number	Routine	Message and Remedial Action
137(Cont.)	CLRPRT	More than 1024 colors cannot be meaningfully processed by module "CLRPRT." Therefore, if more than 1024 are currently being used, then the color table report will not be output.
138	CLRPRT	ERROR 138 - UNABLE TO SAVE IMAGE DATA IN THE COLOR REPORT AREA OF THE CRT. PROCESSING IN MODULE "CLRPRT" IS TERMINATED. An error was encountered in the Ramtek FIPP module "IMAGER" when called by "CLRPRT" to store the image data in the color report window on a disc file. The image data must be stored in order to restore the original scene after a color report is output. Therefore, if this error occurs then processing is terminated in "CLRPRT." The user should analyze preceeding error message to determine the cause of the error.
139	CLRPRT	ERROR 139 - UNABLE TO LOAD THE FOREGROUND COLOR IN THE RAMTEK VLT. PROCESSING IN MODULE "CLRPRT" IS TERMINATED. An error was encountered in the Ramtek FIPP module "LAM" when it was called by "CLRPRT" to load the foreground color into the VLT. The preceeding error messages should be analyzed closely as the system might have to be hard reset. When this error occurs processing in "CLRTCK" is terminated.
140	CLRPRT	ERROR 140 - UNABLE TO SET THE BACKGROUND COLOR PROCESSING IN MODULE "CLRPRT" IS TERMINATED. An error was encountered in the Ramtek FIPP module "BGD" when called by "CLRPRT" to set the background to a black color. Processing in module "CLRPRT" is terminated. Preceeding error message should be analyzed to determine cause of error.
141	CLRPRT	ERROR 141 - UNABLE TO SET WINDOW PARAMETERS. PROCESSING IN MODULE "CLRPRT" IS TERMINATED.

Message Number	Routine	Message and Remedial Action
141(Cont.)	CLRPRT	An error was encountered in the Ramtek FIPP module "WIN" when called by "CLRPRT" to set the color report window parameters. Preceeding error messages should be analyzed to determine the cause of the error.
142	CLRPRT	ERROR 142 - UNABLE TO ERASE COLOR TABLE REPORT WINDOW. PROCESSING IN MODULE "CLRPRT" IS TERMINATED. An error was encountered in the Ramtek FIPP module "ERS" when called by "CLRPRT" to clear the color report table window to a black color. Processing in "CLRPRT" is terminated.
143	CCBAR	ERROR 143 - UNABLE TO OUTPUT COLOR DATA TO THE PRINT FILE ERROR NUMBER XXX RETURNED BY OS32. The color report print file could not be opened as an error was returned to module "CCBAR" from the Ramtek FIPP module "ASSLUN." Processing continues in IIGS but color data information is not stored on the print file.
144	CLRTRN	ERROR 144 - UNABLE TO DISPLAY A COLOR BAR ON THE RAMTEK CRT. PROCESSING IN MODULE "CLRTRN" IS TERMINATED. An error was encountered in Ramtek FIPP module "LINEW" called by CLRTRN" to output 10 lines of color bar data. This error will not be output if 5 or more lines of color data have been successfully transmitted to the Ramtek and displayed. Preceeding error messages should be analyzed to determine the error cause.
145	CLRCNG	ERROR 145 - UNABLE TO POSITION CURSOR PROCESSING IN MODULE "CLRCNG" IS TERMINATED. The Ramtek FIPP module "WCS" encountered an error when called by module "CLRCNG" to position the cursor on the Ramtek to a particular position on the CRT.

Message Number	Routine	Message and Remedial Action
146	CLRCNG	ERROR 146 - UNABLE TO READ THE CURSOR STATE. PROCESSING IN MODULE "CLRCNG" IS TERMINATED. See error 134
147	CLRCNG	ERROR 147 - UNABLE TO LOAD A NEW COLOR IN THE VIDEO LOOKUP TALBE PROCESSING IN MODULE "CLRCNG" IS TERMINATED. An error was encountered in the Ramtek FIPP module "LAM" when called by "CLRCNG" to load a new color into the video lookup table. Analyze preceeding error messages to determine the cause of the error.
148	CLSPEC	ERROR 148 - UNABLE TO TRANSMIT COLOR DATA TO THE RAMTEK. PROCESSING IN MODULE "CLSPEC" IS TERMINATED. An error was encountered in the Ramtek FIPP module "WINERS" when called by "CLSPEC" to output a section of color on the spectrum of colors color bar.

WARNING MESSAGES

Routine	Warning Message and Meaning
STDINT	**** WARNING **** AN INCORRECT "TYPE OF INPUT" WAS IN THE RSIS HEADER. Word 1 of the UNIVAC header record, record 1 on the RSIS CCT input file, was not set to a 1. The setting is automatically corrected by the IIGS software.
STDINT	**** WARNING **** AN INCORRECT "TYPE OF DISPLAY" WAS IN THE RSIS HEADER. Word 2 of the RSIS UNIVAC header record was not set to 1 (the only legitimate setting in IIGS). The correct setting is automatically made in IIGS.
STDINT	**** WARNING **** AN INCORRECT "TYPE OF COMMAND" WAS IN THE RSIS HEADER. Word 3 of the RSIS UNIVAC header was not properly set. The value of 1 is set by the IIGS.
STDINT	**** WARNING **** AN INCORRECT "TYPE OF INITIALIZATION" WAS IN THE RSIS HEADER. Word 4 of the RSIS UNIVAC header record was not set correctly. The system default of 2, 2 = Standard Initialization, is used by the IIGS.
IGIN	**** WARNING **** UNABLE TO READ TICK MARK DATA FROM THE IMAGE FILE. PROCESSING CONTINUES. An error or an end of file was encountered when module "IGIN" attempted a Fortran read on the input non-standard file (Interdata/Ramtek compatible file). Processing will continue normally. However, tick marks will not be output to the RAMTEK CRT.

Routine	Warning Message and Meaning
IGIN	**** WARNING **** UNABLE TO TRANSMIT TICK MARK DATA TO THE RAMTEK. PROCESSING CONTINUES An error was encountered in module "DISPTK" and tick mark data was not properly transmitted to the Ramtek. Processing will continue normally after this error. However, the user should note with care any and all preceeding error messages and the current execution might have to be aborted and the system given a hard restart.
RAMHDR	**** WARNING **** NO VLT INFORMATION ON INPUT RSIS CCT USER MUST INPUT A COLOR FILE NAME TO PROCEED. This warning message is output when information in the Ramtek header record, record 2 in the image file, indicates that there is no color VLT record, no B/W VLT record, no color and level records or no standard color file information on the input RSIS CCT. Immediately following the output of the above message, IIGS will output: DOES THE USER WANT TO USE A STANDARD COLOR FILE (Y or N)? If the user wants to use a standard color file, then a "Y" response will be input and IIGS will output: ENTER NAME OF STANDARD COLOR FILE TO BE USED. FILE NAME = The user will then input the name of the standard color file that is to be used with the current image display. Processing in the module "RAMHDR" will then continue. If the user does not want to use a standard color file, then an "N" response will be input after the query of use of standard color file is output. IIGS will then output: ERROR 117 - THE CURRENT EXECUTION DOES NOT CONTAIN ANY VLT INFORMATION. THERE IS NO WAY FOR THE IIGS TO MAP PIXEL VALUES TO COLORS.

Routine	Warning Message and Meaning
RAMHDR(CONT.)	The IIGS will then output the following: DOES THE USER WANT TO USE A STANDARD COLOR FILE (Y or N)? The above message is output again to make sure the user does not want to display the current images, as if the user enters an "N" at this point, then the IIGS will output: CURRENT PROCESSING TERMINATED IN MODULE "RAMHDR." The current image processing will then be terminated and control of program will be returned to the main program for either program termination or processing of another image file. If the user enters a "Y" after the above query then a name of a color file will be asked for, as described above, and processing will continue after entry of file name.
CLRTCK	**** WARNING **** BOTH A B/W AND COLOR VLT EXIST ON THE INPUT RSIS CCT. THE COLOR VLT WILL BE LOADED IN THE RAMTEK. Both records type 3 and 4, COLOR VLT record and B/W VLT record, were on the input RSIS CCT. The IIGS automatically chooses the color record on the RSIS CCT as the record to be read and loaded into the Ramtek Video Lookup Table.
CLRTCK	**** WARNING **** THE VARIABLE "NCOLRS" WAS OUT OF RANGE FOR THIS VARIABLE. "NCOLRS" HAS BEEN DEFAULTED TO 256. Word 29 of the Ramtek header record, record 2 in the image file contains a value greater than 256. The variable "NCOLRS" is set equal to the value in word 29 and this value represents the number of entries to be loaded into the arrays "LEVEL" and "COLOR." These arrays have only 256 locations each and cannot legimately contain any more than 256 values respectively. Therefore, if "NCOLORS" is greater than 256 the IIGS automatically sets it ot 256 and loads only 256 values into array "LEVEL" and 256 values into the array "COLOR."

Routine	Warning Message and Meaning
CLRTCK	**** WARNING **** READ ERROR OCCURED WHILE READING TICK MARK RECORD. THE TICK MARK RECORD INFORMATION IN CURRENT EXECUTION IS IGNORED. An error condition was returned to "CLRTCK" in a call to the Interdata Run Time Library routine "SYSIO" when attempting to read the tick mark record, record type 7, on the input RSIS CCT. The tick mark data is ignored and IIGS attempts to continue processing.
CLRTCK	**** WARNING **** THE VARIABLE "NTICKS" WAS OUT OF RANGE FOR THIS VARIABLE. "NTICKS" HAS BEEN DEFAULTED TO 128. The variable "NTICKS" contains the number of coordinates in array "TICKS." The IIGS is designed to display a maximum of 128 tick marks (128 corrdinate pairs). This variable is set by word 29 of the Ramtek header record. If word 29 is greater than 128 then IIGS defaults the setting to 128.
IMGTRN	**** WARNING **** UNABLE TO TRANSMIT TICK MARK DATA TO THE RAMTEK, PROCESSING IN "IMGTRN" CONTINUES. An error condition was returned to "IMGTRN" after a call to the Interdata Run Time Library routine "SYSIO" when attempting to process a tick mark record. No tick mark will be output for current display.
CURSOR	**** WARNING **** UNABLE TO OPEN THE PRINT FILE. COORDINATES WILL BE OUTPUT TO THE TERMINAL ONLY. An error was encountered in the Ramtek FIPP module "ASSLUN" when it was called by module "CURSOR." The user had requested that cursor coordinates be output to a print file. However, the requested file could not be opened. IIGS ignores this error and continues processing, outputting coordinates to the alpha-numeric terminal only.

Routine	Warning Message and Meaning
CURSOR	**** WARNING **** THE CURRENT TICK MARK IS OUT OF THE RAMTEK CRT RANGE. THE COORDINATES IN ERROR ARE: X = XXX Y = XXX THIS ERROR OCCURED IN WORDS YYY AND YYY This error message is output by module "CURSOR" when one or both coordinates for a tick mark are not in the coordinate range of the RAMTEK CRT. The proper range is 0 to 511 pixels for the horizontal (X) coordinate and 0 to 511 lines for the vertical (Y) coordinate. Following the output of this message the current tick mark is discarded and other tick marks are processed.
CLRPRT	**** WARNING **** UNABLE TO WRITE COLOR TABLE HEADING ON THE RAMTEK CRT. An error was encountered in the Ramtek FIPP module "CHARWH" when called by "CLRPRT" to output the color report heading. Processing will continue in module "CLRPRT," if possible. However, the preceeding error message should be carefully analyzed to see if a serious problem exists in the IIGS.
CLRPRT	**** WARNING **** UNABLE TO WRITE IMAGE TITLE ON THE RAMTEK CRT. See preceeding warning description.
CLRTRN	**** WARNING **** THE CURSOR IS NOT POSITIONED TO THE PROPER AREA OF THE CRT. IN ORDER TO CHOOSE A COLOR TO CHANGE THE CURSOR MUST BE POSITIONED TO A COLOR IN THE "CURRENT COLOR TABLE" AREA OF THE CRT. The user has positioned the cursor to an area on the Ramtek CRT that is not on the "CURRENT COLOR TABLE" color bar. In order to choose a color to change the cursor must be positioned to the old color on the "CURRENT COLOR TABLE" color bar. The user must position the Ramtek to the proper area.

Routine	Warning Message and Meaning
CLRTRN	**** WARNING **** THE CURSOR IS NOT POSITIONED TO THE PROPER AREA OF THE CRT. IN ORDER TO SELECT A NEW COLOR THE CURSOR MUST BE POSITIONED TO A COLOR IN THE "SPECTRUM OF COLORS FOR COLOR CHANGES" AREA OF THE CRT. The user must position the cursor to the proper area on the CRT.
IGIN	**** WARNING **** A COLOR FILE ON THE INTERDATA IS TO BE USED IN THE CURRENT EXECUTION. THE NAME OF THE COLOR FILE TO BE USED WAS NOT IN THE UNIVAC HEADER RECORD. DOES THE USER WANT TO INPUT THE COLOR FILE NAME (Y or N)? The standard color file flag, word 32 on the Univac header record, was greater than zero. This indicates that a standard color file is to be used when processing the image data in this file. The flag was set, however, there was no data in the standard color file name words in the Univac header record. If the user wants to input a standard color file name, then a "Y" will be input following the output of the above warning. IIGS will then output: FILE NAME = The user will then input the name of the Interdata disc file which contains the desired color scheme. If the user does not want to input the name of a standard color file, an "N" will be input following the warning query. By implication this is taken to mean that a standard color file is not to be used in processing the current image and the standard color file flag will be set to zero.
CCBAR	**** WARNING **** COULD NOT READ THE COLORS IN THE RAMTEK VLT BACK TO THE HOST PROCESSOR. The IIGS was attempting to read the data in the Ramtek Video Lookup Table (VLT) back to the Interdata 7/32 in order to store the data in core storage. This data is at a later point going to be stored in a color report tabulation format for the user.

Routine	Warning Message and Meaning
CCBAR(Cont.)	Processing will continue after this warning is output. However, preceeding error messages output by Ramtek FIPP modules should be closely examined as the system is definitely not functioning properly and a hard restart might be necessary.

APPENDIX D

IIGS PRE-PROCESSING

Preprocessing to be defined.