Project Galileo

Software Interface Specification

Solid State Imaging
Raw Experiment Data Record
Compact Disc - Read Only Memory
(SSI REDR CD-ROM)

GLL Project Number 232-16

November 1, 1997

National Aeronautics and Space Administration

Jet Propulsion Laboratory

California Institute of Technology

Pasadena, California 91109-8099

Version 3.0

PROJECT GALILEO

SOFTWARE INTERFACE SPECIFICATION

DISTRIBUTION

•

NUMBER: SIS 232-16

DATE: NOVEMBER1, 1997

SIS NAME:

Solid State Imaging Raw Experiment Data Record Compact-Disc Read Only Memory (SSI REDR CD-ROM)

PROJECT GALILEO

SOFTWARE INTERFACE SPECIFICATION

COVER SHEET

•

NUMBER: SIS 232-16

FINAL

DATE: November 1, 1997

SIS NAME:

Solid State Imaging Raw Experiment Data Record Compact-Disc Read Only Memory (SSI REDR CD-ROM)

DOMAIN:

System	Subsystem	Program	Make/Use
MIPL	Realtime	GIMBUILD, SSIMERGE, CATLABEL, BADLABELS, GLLFILLIN, GLLBLEMCOR, ADESPIKE	Make

MIPL	Systematic	CATPRODUCTS, CATCD, CDGEN, DISCARCHITECT	Make

PURPOSE OF INTERFACE (SUMMARY):

This interface describes the content and format of the SSI REDR CD-ROM

INTERFACE MEDIUM:

Compact Disc - Read Only Memory (CD-ROM)

SIS COORDINATOR:

H. Mortensen

SIGNATURES

APPROVAL

M. Belton	S. LaVoie
SSI Team Leader	GLL IPS System Engineer
K. Klaasen	J. Johnson
SSI Science Coordinator	GLL SDT Chief

G. Yagi	W. Sible
MIPS Software Engineer	GLL Ground S/W System Engineer

CONCURRENCE

R. Bambery	T. Handley
MIPS Operations Supervisor	Science Instrument Services Manager

DISTRIBUTION:

D. Alexander	168-514
R. Bambery	168-427
S.Braun	264-829
A. Culver	168-514
R. Davis	264-211
D. Jensen	168-514
J. Johnson	264-744
E. Kay-Im	168-414
K. Klaasen	306-438
S. LaVoie	168-527
H. Mortensen	168-514
S. Noland	168-427
Tina Pauro	168-514
W. Sible	264-419
C. Stanley	168-514
G. Stufflebeam	264-419
Robin Vaughan	301-125L
Vellum Files (2)	111-B25
M. White	168-427
P. Woncik	168-514
G. Yagi	168-427
J. Yoshimizu	168-514

TABLE OF CONTENTS

Document Change Log

Change Order	Date	Affected Portions
Original	April 10, 1992	All
Update	July 20, 1993	Removed all references to EDRs and updated all PDS label information and appendix information.
Version 3	November 1, 1997	Phase 2 updates

TBD Items

Page	Closure Date	Item Description
none		

ACRONYMS & ABBREVIATIONS

ASCII.....American Standard Code for Information Interchange
CCT.....Computer Compatible Tape
CD.....Compact Disc
CD-ROM.....Compact Disc - Read Only Memory
DOS.....Disk Operating System
DPW.....Data Preparation Workbook
EDR.....Experiment Data Record
EOF.....End of File
HFS.....Hierarchical File System
ISO.....International Standards Organization
JPL.....Jet Propulsion Laboratory
Mbytes.....Megabytes
MIPL.....Multimission Image Processing Laboratory
MIPS.....Multimission Image Processing Subsystem
OPNAV.....Optical Navigation
PDS.....Planetary Data System
PSDD.....Planetary Science Data Dictionary
REDR.....Raw Experiment Data Record
SIS.....Software Interface Specification
SSI.....Solid State Imaging subsystem
SPIDS.....Standards for Preparation and Interchange of Data Sets
TBD.....To Be Determined
UDR.....Unprocessed Data Record
VICAR.....Video Image Communication and Retrieval software
VMS.....Virtual Memory System
WORM.....Write-Once Read-Many optical disk(s)
XAR.....Extended Attribute Record

1. INTRODUCTION

1.1 Content Overview

This Software Interface Specification (SIS) describes the form and content of the Raw Experiment Data Record Compact Disc - Read Only Memory (REDR CD-ROM).

The REDR CD-ROMs shall be generated by the Galileo Project in order to distribute the images acquired by the Solid State Imaging (SSI) camera to the scientists and later to the Planetary Data System (PDS).

A detached PDS label shall be included for each image. Documentation files shall be provided which inform the user about the organization and contents of each disk, the definition of the labels and also an index file containing information about all the images stored in the dataset.

All PDS label formats and documentation are based on the Planetary Data System Data Preparation Workbook (see reference 4). The VICAR label's format and documentation can be referenced in the VICAR User's Guide (see reference 5).

All data formats are based on the Planetary Science Data Dictionary Document (PSDD) and the Planetary Data System document DPW (see references 1 and 4) and are similar to the formats used in generating the Voyager CD-ROM set (see reference 2).

Section 1 of this document contains general information. Section 2 describes characteristics of the physical media (CD) used in transmitting REDRs, and Section 3 specifies their logical (media-independent) contents.

1.2 Scope

The specifications in this document apply to all REDR CD-ROMs that are produced during the Galileo mission.

1.3 Applicable Documents

The italicized trailers to each document citation (following the dash) indicate the applicability of the document to this product and/or SIS.

[1] Planetary Science Data Dictionary Document,***D-7116, rev D*** **.** July 15, 1996. *---Standard data product descriptions,*

[2] Voyagers to the Outer Planets, volumes 1-8 (on CD-ROMs), Planetary Data System, 1989.*---Data Format*

[3] ISO 9660-1988. April 1988*---CD-ROM format.*

[4] PDS Data Preparation Workbook (DPW). ***D-7669.*** February, 1995.*---PDS label and table formats.*

[5] VICAR User's Guide, ***D- 4186, rev A***, June 1, 1989. *---VICAR label formats.*

[6] SSI Raw Experiment Data Record Software Interface Specification (REDR SIS). ***232-15,*** September 25, 1997.*---Structure and content of REDRs.*

[7] SSI Unprocessed Data Record for Optical Navigation Software Interface Specification (UDR/OPNAV SIS). ***232-04,*** June 24, 1991.*---Structure and content of UDRs.*

2 INTERFACE CHARACTERISTICS

2.1 Operations Perspective

2.1.1 Data Source, Destinations, and Transfer Method

REDR CD-ROMs shall be produced by MIPS for distribution to the Galileo Project. MIPS shall use commercially available CD-ROM publishing software, which shall reside at MIPS, to produce premastered tapes for delivery and release to the mastering vendor for production of CD-ROMs. The mastering vendor will ship the discs to MIPS for distribution and archiving.

2.1.2 Generation Method and Frequency

The REDR CD-ROM data shall be generated by using a series of VICAR programs. The REDR data processing steps include: merging partial frames together, updating VICAR labels (optional), updating the Bad Data Value Label with bad data values (optional), applying blemish corrections to image data (optional), filling in missing data lines (optional), generating a PDS label and pre-mastering data to a CD-ROM.

The CD-ROMs shall be produced at the following rates: during cruise they shall be produced as rapidly as possible on a best efforts basis, during Jupiter Orbital Operations they shall be produced at the rate specified in the Image Processing Subsystem Functional Requirements Document.

2.2 Volume and Size

Each CD-ROM shall contain approximately 800 Galileo SSI images in the REDR format.

Each CD-ROM shall contain at most 650 Mbytes of data.

2.3 Interface Medium Characteristics

REDR CD-ROM physical characteristics shall conform to ISO-9660 industry standards [see reference 3].

2.4 Backup and Duplicate Copies

The CD-ROM contents shall be stored on magnetic disk until a validated master has been produced. REDR image data files, excluding the text and PDS labels, shall be retained on a CD write once at MIPS.

2.5 MIPS Label ID

Each REDR CD-ROM to be sent to the vendor will bear a label id using the following format:

PROJECT_SEQUENCE

PROJECT = GO_

SEQUENCE = sequence number consisting of four digits.

EXAMPLE = GO_0003

3 CD-ROM CONTENT AND FORMAT

This section describes in detail the format and content of the REDR CD-ROM.

3.1 Format

REDR CD-ROM data shall be formatted in accordance with Planetary Data System specifications [see references 1, 4]. The format is described below.

3.1.1 Disk Format

The REDR CD-ROM format shall be compatible with various computer systems including IBM PC, Apple Macintosh, Sun, Digital VAX. The REDR CD-ROM format shall be in accordance with ISO 9660 level 1 Interchange Standard [see reference 3], with file attributes specified by Extended Attribute Records (XARs) (logical blocks of 512 bytes), to provide a file system of directories, sub-directories, and data files. Computer systems that do not support XARs will either ignore them or append them to the beginning of the file. In the latter case, the user must ignore the first 512 bytes of each file.

3.1.2 File Formats

The following paragraphs describe file formats for the various kinds of files contained on the CD-ROMs.

3.1.2.1 Image Files

Image files (.IMG suffix) exist only in the target directories. The files contain a VICAR label, Binary Telemetry Header, Bad Label Header, a Binary Prefix and the imaging data. See the REDR SIS (Reference 7) for additional information regarding the image file data structure.

3.1.2.2 Document Files

Document files (.TXT suffix) exist in the root and document directories. They are ASCII files with embedded PDS labels. All document files contain stream files with ASCII carriage return and line feed characters at the end of each line. This allows the files to be read by the HFS, DOS, Unix, and VMS operating systems.

3.1.2.3 Tabular Files

Tabular files (.TAB suffix) exist in the index directory. Tabular files are ASCII files formatted for direct reading into many database management systems on various computers. All fields are separated by commas, and character fields are enclosed in double quotation marks ("). (Character fields are padded with spaces to keep quotation marks in the same columns.) Character fields are left justified, and numeric fields are right justified. The "start byte" and "bytes" values listed in the labels do not include the commas between fields or the quotation marks surrounding character fields. The records are of fixed length, and the last two bytes of each record contain the ASCII carriage return and line feed characters. This allows a table to be treated as a fixed length record file on computers that support this file type and as a normal text file on other computers.

All tabular files are described by detached PDS labels. The PDS label file has the same name as the data file it describes, with the extension .LBL; for example, the file IMGINDEX.TAB is accompanied by the detached label file IMGINDEX.LBL in the same directory.

3.1.2.4 PDS Label Files

PDS label files (.LBL suffix) are located in the target directories. They are descriptive labels [see reference 4 and paragraph 3.2.2] and are detached from their associated file. The PDS label file is an object-oriented file; the object to which the label refers (e.g. IMAGE, TABLE, etc.) is denoted by a statement of the form:

```
^object = location
```

in which the carat character (^, also called a pointer in this context) indicates that the object starts at the given location. The location denotes the name of the file containing the object, along with the starting record or byte number, if there is more than one object. For example:

```
^IMAGE_HEADER = ("7890R.IMG",1)
^IMAGE = ("7890R.IMG",3)
```

indicates that the IMAGE object begins at record 3 of the file 7890R.IMG, in the same directory as the detached label file. Below is a list of the possible formats for the ^object definition.

```
^object   = n
^object   = n<BYTES>
^object   = ("filename.ext")
^object   = ("filename.ext",n)
^object   = ("[dirlist]filename.ext",n)
^object   = ("filename.ext",n<BYTES>)
^object   = ("[dirlist]filename.ext",n<BYTES>)
```

where

`n`	is the starting record or byte number of the object, counting from the beginning of the file (record 1, byte 1),
`<BYTES>`	indicates that the number given is in units of bytes,
`filename`	is the upper-case file name,
`ext`	is the upper-case file extension,
`dirlist`	is a period-delimited path-list of parent directories, in upper case, that specifies the object file directory (used only when the object is not in the same directory as the label file). The list begins at directory level below the root directory of the CD-ROM. '[dirlist]' may be omitted when the object being described is located either in the same directory as the detached label, or in a subdirectory named 'label' that is located in a higher level of the directory tree, typically the CD-ROM root itself.

All detached labels contain 80-byte fixed-length records, with a carriage return character (ASCII 13) in the 79th byte and a line feed character (ASCII 10) in the 80th

byte. This allows the files to be read by the HFS, DOS, Unix, and VMS operating systems.

3.1.2.5 PDS Format Files

Format files (RLINEPRX .FMT and RTLMTAB.FMT) exist in the label directory. These files are PDS labels that describe the structure of the binary line prefixes and file headers of REDRs (RLINEPRX.FMT, RTLMTAB.FMT). They are descriptive label files [see reference 4 and paragraph 3.2.2] and are detached from their associated file.

3.2 Content

The following paragraphs describe the content of the CD-ROMs.

3.2.1 Directories

The REDR CD-ROM directory structure consists of one root directory, an index subdirectory, a document subdirectory, a catalog subdirectory, a calibration subdirectory, a label subdirectory, and subdirectories by target or activity of the REDRs.

Files in the root directory provide label and text describing the content and format of the REDR CD-ROMs. Files in the index directory provide a table of label items describing the observation of a respective REDR frame, and a PDS label which in turn describes the index table. The index table entry is generated after each REDR file is processed in the CD generation procedure. The index table on each CD-ROM shall only reflect those files contained on that CD-ROM, except for the final CD-ROM of each of the dataset, which shall contain a complete listing of the entire index table.

Files in the label, catalog, and document subdirectories are the same on all CD-ROMs and contain VICAR label and REDR binary header and line prefix information, detailed information about the mission, instrument and dataset, and applicable documents. Files in each of the target subdirectories consist of an REDR image file and an associated label file, organized in sub-directories by RIM count of the Spacecraft Clock (SCLK). The following tables describe the content and source of files in the REDR CD-ROM directories. (Source indicates group providing current version of file.)

3.2.1.1 Root Directory

The following table lists the files in the root directory.

File	Contents	Source
AAREADME.TXT	CD-ROM content and format information	MIPS
VOLDESC.CAT	VolumeObject describing the CD volume	MIPS
ERRATA.TXT	Summary of errors and discrepancies in specific images on the CD volume. Also includes newly identified errors on previous volumes.	MIPS

3.2.1.2 Index Directory

The following table lists the files in the index subdirectory.

File	Contents	Source
INDEXINFO.TXT	Describes the contents fo the directory	MIPS
IMGINDEX.TAB	A tabular listing of selected label items of each REDR observation/image file of the volume to be used for database cross-reference and search applications by CD end-users.	MIPS

IMGINDEX.LBL	A PDS detached label that describes IMGINDEX.TAB	MIPS
CUMINDEX.TAB	A cumulative tabular listing of selected label items of each REDR observation / image file of the dataset to be used for database cross-reference and search applications by CD end-users.	MIPS
CUMINDEX.LBL	A PDS detached label that describes CUMINDEX.TAB	MIPS

3.2.1.3 Label Directory

The label directory contains REDR binary line prefix and file header structural information in .FMT files. The following table lists the files in the label directory.

File	Contents	Source
RTLMTAB.FMT	PDS label describing the structure of an REDR binary file header (telemetry header) in a column and bit-column fashion.	MIPS
RLINEPRX.FMT	PDS label describing the structure of an REDR binary line prefix in a column and bit-column fashion.	MIPS

3.2.1.4 Document Directory

This directory contains the REDR VICAR image header descriptive information, bad data values of image binary header and a description of the PDS label.

File	Contents	Source
DOCINFO.TXT	Describes the contents of the directory	MIPS
REDRSIS.PDF	Adobe Acrobat PDF of the Software Interface Specification of the Raw EDR	MIPS
REDRSIS.HTM	HTML version of the Software Interface Specification of the Raw EDR	MIPS
CDVOLSIS.PDF	Adobe Acrobat PDF of the Software Interface Specification for the Raw EDR CD-REDR	MIPS
CDVOLSIS.HTM	HTML version of the Software Interface Specification for the Raw EDR CD-REDR	MIPS
BADDATA.TXT	Textual file describing the structure and organization of EDR and REDR bad data value headers.	MIPS
PDSLABEL.TXT	Textual file describing the structure and organization of EDR and REDR PDS label.	MIPS

VICAR2.TXT	Textual file describing the structure and organization of EDR and REDR image headers, known at MIPS as the VICAR labels.	MIPS

3.2.1.5 Catalog Directory

This directory contains files describing the data set, instrument, project, etc.

File	Contents	Source
CATINFO.TXT	Describes the contents of the directory	MIPS
DATASET.CAT	Describes the Raw EDR dataset	MIPS
INST.CAT	Describes the SSI instrument	PDS
INSTHOST.CAT	Describes the Galileo Orbiter Spacecraft	PDS
MISSION.CAT	Describes the Galileo Mission	PDS
PERSON.CAT	Includes contact information	MIPS
REF.CAT	Includes all pertinent reference information	MIPS

3.2.1.6 Target Directories

The target directories contain the actual image data. The image data has been sorted by target body, e.g. EARTH, MOON, VENUS, etc. and the directories named accordingly. Within each target directory, the observations have been grouped by common RIM count of the Spacecraft Clock (SCLK). These subdirectories are named `Crrrrrr`, where the r's represent the first six of eight digits of the RIM count in the SCLK, that has been padded with preceding zeros. (e.g. [Venus.C001806])

The REDR data and the matching detached PDS labels will be found within the RIM subdirectories, These files are named rrmmR.IMG, where rr is the remaining two digits of the RIM count, and mm is the MOD91 count in the SCLK. See the following table for examples and brief definitions of the REDR and PDS files.

File	Contents	Source
rrmmR.IMG (e.g. 5600R.IMG)	The byte, uncalibrated REDR image file of dimensions 800 lines by 800 samples and for the summation mode, 400 lines by 400 samples.	MIPS
rrmmR.LBL (e.g. 5600R.LBL)	A PDS detached label that describes rrmmR.IMG	MIPS

3.2.2 Files

The contents of the REDR CD-ROM files are described in the following paragraphs. Paragraphs 3.2.2.2, 3.2.2.3, 3.2.2.4 list PDS labels which describe files VOLDESC.CAT, image files and the index table. Format files (.FMT) describe the structure of the binary header and line prefix. The keywords on the left are static; the values on the right are variable, except for the .FMT files.

NOTE: The labels listed below are not literally reproduced. For the exact structure of PDS labels refer to DPW [see reference 4].

3.2.2.1 Image Data Files

The Image Data Files are in the REDR format. See the above table for a brief definition of the format. See reference 6 for additional information.

3.2.2.2 VOLDESC.CAT Label

```
PDS_VERSION_ID                  = PDS3
OBJECT                          = VOLUME
  DATA_SET_ID                   = "GO-J/JSA-SSI-2-REDR-V1.0"
  DESCRIPTION                   = "

This volume, titled Galileo Images From Jupiter Orbits 1-3
(GO_0017), is a part of the Galileo Jupiter Orbital Operations
Solid State Imaging Raw EDR data set which resides on volumes
GO_0017 thru GO_0019.  Included are all images of Jupiter,
its satellites, stars and calibrations, acquired during the
first three orbits of the Jupiter Orbital Operations Phase
of the mission.  Each volume of this data set also contains
documentation and errata files which support access to the
image files.

Contents of this volume include:
================================

Jupiter Pre-Orbit 1 (Jupiter 0)
-------------------------------
SCLK range:  346405900 - 349193900 (Optical Navigation-OPNAV)
ERT range:   96/155:17:47:18.857 - 96/175:07:41:11.980

Jupiter Orbit 1 (Ganymede 1)
----------------------------
SCLK ranges: 349542152 - 350029800
         356000600 - 359198400 (OPNAV)
ERT ranges:  96/183-07:38:25.928 - 96/231-13:43:20.690
         96/223:02:39:43.300 - 96/237:10:55:15.282 (OPNAV)

Jupiter Orbit 2 (Ganymede 2)
----------------------------
SCLK ranges: 359251000 - 359322300  (OPNAV)
         359402445 - 360361200
ERT ranges:  96/245:22:26:14.566 - 96/246:10:31:10.512 (OPNAV)
         96/255-14:03:53.827 - 96/301-02:37:09.523

Orbit 3 (Callisto 3)
--------------------
SCLK ranges: 368211900 - 368992339
         372343200 - 374037400 (OPNAV)
ERT ranges:  96/316-05:27:12.172 - 96/348-02:11:05.236
         96/337:20:50:32.231 - 96/349:18:46:37.142 (OPNAV)
"
```

```
  MEDIUM_TYPE                       = "CD-ROM"
  PUBLICATION_DATE                  = 1998-09-01
  VOLUME_FORMAT                     = "ISO-9660"
  VOLUME_ID                         = GO_0017
  VOLUME_NAME                       = "GALILEO IMAGES FROM JUPITER
ORBITS 1-3"
  VOLUME_SERIES_NAME                = "MISSION TO JUPITER"
  VOLUME_SET_NAME                   = "GALILEO SOLID STATE IMAGING
RAW EDR IMAGES"
  VOLUME_SET_ID                     = USA_NASA_JPL_GO_0001_TO_00XX
  VOLUME_VERSION_ID                 = "VERSION 1"
  VOLUMES                           = UNK
  MISSION_NAME                      = GALILEO
  SPACECRAFT_NAME                   = GALILEO_ORBITER

  OBJECT                            = CATALOG

   ^DATA_SET_CATALOG                = "DATASET.CAT"
   ^INSTRUMENT_CATALOG              = "INST.CAT"
   ^INSTRUMENT_HOST_CATALOG         = "INSTHOST.CAT"
   ^MISSION_CATALOG                 = "MISSION.CAT"
   ^PERSONNEL_CATALOG               = "PERSON.CAT"
   ^REFERENCE_CATALOG               = "REF.CAT"

   END_OBJECT                        = CATALOG

  OBJECT                            = DATA_PRODUCER
    INSTITUTION_NAME                = "JET PROPULSION LABORATORY"
    FACILITY_NAME                   = "MULTIMISSION IMAGE PROCESSING
SUBSYSTEM"
    FULL_NAME                       = "HELEN B. MORTENSEN"
    ADDRESS_TEXT                    = "JET PROPULSION LABORATORY /n
                                      4800 OAK GROVE DRIVE /n
                                      MAILSTOP 168-514 /n
                                      PASADENA, CA 91109 /n
                                      USA"
    DISCIPLINE_NAME                 = "IMAGE PROCESSING"
    NODE_NAME                       = "IMAGING"

  END_OBJECT                        = DATA_PRODUCER


END_OBJECT                          = VOLUME

END
```

3.2.2.3 PDS Image Label

```
CCSD3ZF0000100000001NJPL3IF0PDS200000001   = SFDU_LABEL

/* File Format and Length */
RECORD_TYPE                                = FIXED_LENGTH
RECORD_BYTES                               = 1000
FILE_RECORDS                               = 811

/* Pointers to Data Objects */
^IMAGE_HEADER                              = ("2000R.IMG",1)
^TELEMETRY_TABLE                           = ("2000R.IMG",4)
^BAD_DATA_VALUES_HEADER                    = ("2000R.IMG",6)
^IMAGE                                     = ("2000R.IMG",12)
^LINE_PREFIX_TABLE                         = ("2000R.IMG",12)

/* Description/Catalog Keywords */
DATA_SET_ID                                = "GO-J/JSA-SSI-2-REDR-V1.0"
SPACECRAFT_NAME                            = "GALILEO ORBITER"
INSTRUMENT_NAME                            = SOLID_STATE_IMAGING

/* Time tags and observation descriptors */
SPACECRAFT_CLOCK_CNT_PARTITION  = 1
SPACECRAFT_CLOCK_START_COUNT               = "03496320.00"
IMAGE_TIME                                 = 1996-06-26T08:45:09.457Z
```

```
IMAGE_ID                                = G1G0001
ORBIT_NUMBER                            = 1
OBSERVATION_ID                          = "G1GSGLOBAL01"
TARGET_NAME                             = "GANYMEDE"
NTV_TIME_FROM_CLOSEST_APPROACH          = "-001T15:46:52Z"
NTV_SAT_TIME_FROM_CLOSEST_APRH          = "-000T21:44:50Z"
NOTE                                    = "NOT APPLICABLE"

/* Camera and spacecraft state parameters */
FILTER_NAME                             = "RED"
FILTER_NUMBER                           = 2
EXPOSURE_DURATION                       =62.50
GAIN_MODE_ID                            = "100K"
FRAME_DURATION                          = 60.667
LIGHT_FLOOD_STATE_FLAG                  = "ON"
EXPOSURE_TYPE                           = "NORMAL"
BLEMISH_PROTECTION_FLAG                 = "OFF"
INVERTED_CLOCK_STATE_FLAG               = "NOT INVERTED"
ON_CHIP_MOSAIC_FLAG                     = "N"
COMPRESSION_TYPE                        = "INTEGER COSINE TRANSFORM "
ENTROPY                                 =3.726
TELEMETRY_FORMAT_ID                     = "HIM"
OBSTRUCTION_ID                          = "NOT POSSIBLE"
INSTRUMENT_MODE_ID                      = "N/A"

/* Viewing Geometry */
/* Note: These viewing geometry parameters are best estimates */
/* at the time this picture label was generated. */
POSITIVE_LONGITUDE_DIRECTION            = WEST

/* Spacecraft Geometry */
TARGET_CENTER_DISTANCE                  = 6.663678e+05
CENTRAL_BODY_DISTANCE                   = 1.690134e+06
SUB_SPACECRAFT_LATITUDE                 = -8.065
SUB_SPACECRAFT_LONGITUDE                =155.497
SUB_SPACECRAFT_LINE                     =271.123
SUB_SPACECRAFT_LINE_SAMPLE              =475.621
SUB_SPACECRAFT_AZIMUTH                  =120.403

/* Camera and Lighting Geometry*/
/* Resolution of HORIZONTAL_PIXEL_SCALE, */
/* VERTICAL_PIXEL_SCALE, and SLANT_DISTANCE*/
/* is calculated from the light source values in */
/* INTERCEPT_POINT_LATITUDE, INTERCEPT_POINT_LONGITUDE,*/
/* INTERCEPT_POINT_LINE and INTERCEPT_POINT_LINE_SAMPLE keywords*/
/* If the target is a Ring keyword RING_RADIUS */
/* is substituted for INTERCEPT_POINT_LATITUDE */
/* If the TARGET_NAME= J RINGS, viewing geometry was */
/* calculated using Jupiter as the target. */
TWIST_ANGLE                             = 68.374
CONE_ANGLE                              =149.024
RIGHT_ASCENSION                         =251.639
DECLINATION                             =-16.347
NORTH_AZIMUTH                           =104.344
SMEAR_AZIMUTH                           = "UNK"
SMEAR_MAGNITUDE                         = "UNK"
HORIZONTAL_PIXEL_SCALE                  = 6.738280e+03
VERTICAL_PIXEL_SCALE                    = 6.738840e+03
SLANT_DISTANCE                          = 6.637340e+05
SOLAR_DISTANCE                          = 7.782150e+08
SUB_SOLAR_LATITUDE                      = -1.873
SUB_SOLAR_LONGITUDE                     =125.604
SUB_SOLAR_AZIMUTH                       =184.195
INCIDENCE_ANGLE                         = 30.401
EMISSION_ANGLE                          =0.000
PHASE_ANGLE                             = 30.401
LOCAL_HOUR_ANGLE                        =150.106
INTERCEPT_POINT_LATITUDE                = -8.065
INTERCEPT_POINT_LONGITUDE               =155.497
INTERCEPT_POINT_LINE                    = 271.1
INTERCEPT_POINT_LINE_SAMPLE             = 475.6

/* Target radii */
A_AXIS_RADIUS                           = 2.634000e+03
```

```
B_AXIS_RADIUS                           = 2.634000e+03
C_AXIS_RADIUS                           = 2.634000e+03

/* Processing parameters */
MEAN_RADIANCE                           = "N/A"
MEAN_REFLECTANCE                        = "N/A"
REFLECTANCE_SCALING_FACTOR              = "N/A"
RADIANCE_SCALING_FACTOR                 = "N/A"
UNEVEN_BIT_WEIGHT_CORR_FLAG             = "N/A"
DARK_CURRENT_FILE_NAME                  = "N/A"
SLOPE_FILE_NAME                         = "N/A"
BLEMISH_FILE_NAME                       = "N/A"
SHUTTER_OFFSET_FILE_NAME                = "N/A"
DATA_TYPE                               = LSB_UNSIGNED_INTEGER
SOURCE_PRODUCT_ID                       =
{"S971125A.BSP","S971125A.BSP","N/A","CKG01AJH.PLT","NULL"}
PROCESSING_HISTORY_TEXT                 = "VICAR programs run:
SSIMERGE,CATLABEL,BADLABELS,CATLABEL,CATLABEL,CATLABEL."
PRODUCT_TYPE                            = "REDR"

/* ICT or Lossless compression */
ENCODING_COMPRESSION_RATIO              =6.554
ENCODING_MIN_COMPRESSION_RATIO          =4.257
ENCODING_MAX_COMPRESSION_RATIO          = 25.393
HUFFMAN_TABLE_TYPE                      = "SKEWED"
ICT_DESPIKE_THRESHOLD                   = 255
CUT_OUT_WINDOW                          = {129,1,672,784}
TRUTH_WINDOW                            = {801,801,672,784}
PRODUCT_VERSION_ID                      = 0
ICT_QUANTIZATION_STEP_SIZE              = 6
ICT_ZIGZAG_PATTERN                      = "ZIGZAG"
CMPRS_QUANTZ_TBL_ID                     = "UNIFORM"

/* VICAR IMAGE HEADER Object */
OBJECT                                  = IMAGE_HEADER
INTERCHANGE_FORMAT                      = BINARY
HEADER_TYPE                             = VICAR2
BYTES                                   = 3000
RECORDS                                 = 3
^DESCRIPTION                            = "VICAR2.TXT"
END_OBJECT

/* Table Object (for telemetry table) */
OBJECT                                  = TELEMETRY_TABLE
INTERCHANGE_FORMAT                      = BINARY
ROWS                                    = 1
COLUMNS                                 = 86
ROW_BYTES                               = 1800
^STRUCTURE                              = "RTLMTAB.FMT"
END_OBJECT

/* Bad Data Value Header Object */
OBJECT                                  = BAD_DATA_VALUES_HEADER
HEADER_TYPE                             = BDV
INTERCHANGE_FORMAT                      = BINARY
BYTES                                   = 6000
RECORDS                                 = 6
^DESCRIPTION                            = "BADDATA.TXT"
END_OBJECT

/* Image Object */
OBJECT                                  = IMAGE
LINES                                   = 800
LINE_SAMPLES                            = 800
SAMPLE_BITS                             = 8
SAMPLE_TYPE                             = UNSIGNED_INTEGER
INVALID                                 = "N/A"
LINE_PREFIX_BYTES                       = 200
^LINE_PREFIX_STRUCTURE                  = "RLINEPRX.FMT"
END_OBJECT
END
```

3.2.2.4 IMGINDEX Label

```
CCSD3ZF0000100000001NJPL3IF0PDS200000001 = SFDU_LABEL
RECORD_TYPE                = FIXED_LENGTH
RECORD_BYTES               = 740
FILE_RECORDS               = 380
^IMAGE_INDEX_TABLE         = "IMGINDEX.TAB"

OBJECT                     = IMAGE_INDEX_TABLE
 INTERCHANGE_FORMAT        = ASCII
 ROWS                      = 482
 ROW_BYTES                 = 740
 COLUMNS                   = 56

 OBJECT                    = COLUMN
  NAME                     = SPACECRAFT_CLOCK_START_COUNT
  DATA_TYPE                = CHARACTER
  START_BYTE               = 2
  BYTES                    = 11
  FORMAT                   = A11
  DESCRIPTION              = "The spacecraft clock at time of
     image acquisition. The SCLK is formatted as follows: RIM.MOD91 "
 END_OBJECT                = COLUMN

 OBJECT                    = COLUMN
  NAME                     = MISSION_NAME
  DATA_TYPE                = CHARACTER
  START_BYTE               = 16
  BYTES                    = 7
  FORMAT                   = A7
  DESCRIPTION              = "Spacecraft name associated with
     the image.  Valid name is GALILEO."
 END_OBJECT                = COLUMN

 OBJECT                    = COLUMN
  NAME                     = INSTRUMENT_ID
  DATA_TYPE                = CHARACTER
  START_BYTE               = 26
  BYTES                    = 3
  FORMAT                   = A3
  DESCRIPTION              = "ID of the Galileo Instrument
     which acquired the image data.  Valid name is SSI (Solid
     State Imaging subsystem)."
 END_OBJECT                = COLUMN

 OBJECT                    = COLUMN
  NAME                     = DATA_SET_ID
  DATA_TYPE                = CHARACTER
  START_BYTE               = 32
  BYTES                    = 28
  FORMAT                   = A28
  DESCRIPTION              = "Name that PDS has attached to
     this dataset. Valid id is GO-A/E-SSI-2-REDR-V1.0 where GO
     is Galileo Orbiter, A/E identifies the target of the dataset,
     SSI is the instrument which acquired the data, 2 is CODMAC
     level, REDR is the product that was created and V1.0 is the
     version of the data."
 END_OBJECT                = COLUMN

 OBJECT                    = COLUMN
  NAME                     = IMAGE_ID
  DATA_TYPE                = CHARACTER
  START_BYTE               = 63
  BYTES                    = 7
  FORMAT                   = A7
  DESCRIPTION              = "Image id which takes the form
     of XXYZZZZ.  XX is the orbit (A1, A2 etc is approach; C1,
     C2 is cruise). Y is the target body (J=Jupiter, A=Amalthea,
     I=Io, E=Europa, G=Ganymede, C=Callisto, S=Minor Satellites,
     R=ring, H=star, L=Moon, W=Earth, V=Venus, U=Ida, P=Gaspra).
     ZZZZ is the picture count which is generated in the sequence
     generation process and which is incremented separately for
     each target body in each orbit."
 END_OBJECT                = COLUMN
```

```
OBJECT                  = COLUMN
  NAME                  = OBSERVATION_ID
  DATA_TYPE             = CHARACTER
  START_BYTE            = 73
  BYTES                 = 20
  FORMAT                = A20
  DESCRIPTION           = "This is the Galileo activity id
    of each image which is in the form NNTIOOOOOOMM#SSSXXXX.  NN
    is the Orbit number. T is the scan platform target body
    initial (if applicable). I is the instrument. OOOOOO is the
    orbit planning guide objective mnemonic.  MM is the
    sequential OAPEL number for each value of NNTIOOOOOO. # is
    the multiple observation flag symbol (- or *). SSS is the PA
    set number.  XXXX is the MIPL Processing Code."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = PRODUCT_TYPE
  DATA_TYPE             = CHARACTER
  START_BYTE            = 96
  BYTES                 = 4
  FORMAT                = A4
  DESCRIPTION           = "Type of product.  Valid REDR
    (Raw Experiment Data Record) or EDR (Experiment Data
    Record)."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = TARGET_NAME
  DATA_TYPE             = CHARACTER
  START_BYTE            = 103
  BYTES                 = 10
  FORMAT                = A10
  DESCRIPTION           = "Observational target of the
    image."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = IMAGE_TIME
  DATA_TYPE             = CHARACTER
  START_BYTE            = 116
  BYTES                 = 24
  FORMAT                = A24
  DESCRIPTION           = "Time at which image data was
    acquired, in the format YYYY-MM-DDTHH:MM:SS:MMMZ.  The time
    system is Universl Time (UTC). 'YYYY' is year,' MM' is month,
    'DD'is day of month, 'HH' is hour, 'MM' is minute, 'SS' is
    second, 'MMM' is millisecond."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = FILTER_NAME
  DATA_TYPE             = CHARACTER
  START_BYTE            = 143
  BYTES                 = 7
  FORMAT                = A7
  DESCRIPTION           = "Optical filter used for the
    image. Valid filters include: CLEAR, GREEN, RED, VIOLET,
    IR-7560, IR-9680, IR-7270, IR-8890."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = FILTER_NUMBER
  DATA_TYPE             = INTEGER
  START_BYTE            = 152
  BYTES                 = 5
  FORMAT                = I5
  DESCRIPTION           = "Optical filter number,
    containing the unique number associated with the optical
    filter for the image. Valid 0-7."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = EXPOSURE_DURATION
```

```
  DATA_TYPE                = REAL
  START_BYTE               = 158
  BYTES                    = 8
  FORMAT                   = "F8.2"
  DESCRIPTION              = "Exposure duration for the
    image, in milliseconds."
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = GAIN_MODE_ID
  DATA_TYPE                = CHARACTER
  START_BYTE               = 168
  BYTES                    = 4
  FORMAT                   = A4
  DESCRIPTION              = "Gain mode of the camera.  Valid
     400K, 100K, 40K, 10K."
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = FRAME_DURATION
  DATA_TYPE                = REAL
  START_BYTE               = 174
  BYTES                    = 8
  FORMAT                   = "F8.3"
  DESCRIPTION              = "Scan rate of the camera read
     out in seconds.  Valid 2.333, 8.667, 30.333 60.667"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = OBSTRUCTION_ID
  DATA_TYPE                = CHARACTER
  START_BYTE               = 184
  BYTES                    = 17
  FORMAT                   = A17
  DESCRIPTION              = "Identifies if a boom or other
     type of obstruction were obscuring the view of the camera
     during the exposure.  Valid values include: POSSIBLE, NOT
     POSSIBLE, OR PRESENCE VERIFIED."
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = ORBIT_NUMBER
  DATA_TYPE                = INTEGER
  START_BYTE               = 204
  BYTES                    = 3
  FORMAT                   = I3
  DESCRIPTION              = "Identifies Jupiter Orbit
     number.  Applicable only during Jupiter Orbital
     Operations.  Prior to Jupiter Orbital Operations,
     UNK has been placed in the label "
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = NTV_TIME_FROM_CLOSEST_APPROACH
  DATA_TYPE                = CHARACTER
  START_BYTE               = 210
  BYTES                    = 14
  FORMAT                   = A14
  DESCRIPTION              = "Time from closest approach to
     central body in the form -dddThh:mm:ssZ.  If the value is
     missing or is the default, UNK has been placed in the label."
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = NTV_SAT_TIME_FROM_CLOSEST_APR
  DATA_TYPE                = CHARACTER
  START_BYTE               = 227
  BYTES                    = 14
  FORMAT                   = A14
  DESCRIPTION              = "Time from closest approach to
     the nearest satellite in the form -dddThh:mm:ssZ.  If the
     value is missing or is the default, UNK has been placed in
     the label."
```

```
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = PHASE_ANGLE
  DATA_TYPE             = REAL
  START_BYTE            = 243
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Phase angle in degrees"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = EMISSION_ANGLE
  DATA_TYPE             = REAL
  START_BYTE            = 252
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Emission angle in degrees"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = INCIDENCE_ANGLE
  DATA_TYPE             = REAL
  START_BYTE            = 261
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Incidence angle in degrees"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = LOCAL_HOUR_ANGLE
  DATA_TYPE             = REAL
  START_BYTE            = 270
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Local hour angle in degrees"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = TWIST_ANGLE
  DATA_TYPE             = REAL
  START_BYTE            = 279
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Twist angle in degrees"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = CONE_ANGLE
  DATA_TYPE             = REAL
  START_BYTE            = 288
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Cone angle in degrees"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = RIGHT_ASCENSION
  DATA_TYPE             = REAL
  START_BYTE            = 297
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Right Ascension in degrees"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = DECLINATION
  DATA_TYPE             = REAL
  START_BYTE            = 306
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Declination in degrees"
END_OBJECT              = COLUMN
```

```
OBJECT                  = COLUMN
  NAME                  = NORTH_AZIMUTH
  DATA_TYPE             = REAL
  START_BYTE            = 315
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "North Azimuth in degrees"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = SMEAR_AZIMUTH
  DATA_TYPE             = REAL
  START_BYTE            = 324
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Smear Azimuth in degrees"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = SMEAR_MAGNITUDE
  DATA_TYPE             = REAL
  START_BYTE            = 333
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Smear magnitude in pixels."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = HORIZONTAL_PIXEL_SCALE
  DATA_TYPE             = REAL
  START_BYTE            = 342
  BYTES                 = 12
  FORMAT                = "E12"
  DESCRIPTION           = "Horizontal pixel scale in
    meters/pixel."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = VERTICAL_PIXEL_SCALE
  DATA_TYPE             = REAL
  START_BYTE            = 355
  BYTES                 = 12
  FORMAT                = "E12"
  DESCRIPTION           = "Vertical pixel scale in
    meters/pixel."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = SLANT_DISTANCE
  DATA_TYPE             = REAL
  START_BYTE            = 368
  BYTES                 = 12
  FORMAT                = "E12"
  DESCRIPTION           = "Spacecraft to target slant
    range in km."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = LIGHT_SOURCE_LATITUDE
  DATA_TYPE             = REAL
  START_BYTE            = 381
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Latitude of center of frame in
    degrees."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = LIGHT_SOURCE_LONGITUDE
  DATA_TYPE             = REAL
  START_BYTE            = 390
  BYTES                 = 8
  FORMAT                = "F8.3"
  DESCRIPTION           = "Longitude of center of frame in
```

```
    degrees."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = TARGET_CENTER_DISTANCE
  DATA_TYPE                 = REAL
  START_BYTE                = 399
  BYTES                     = 12
  FORMAT                    = "E12"
  DESCRIPTION               = "Range from spacecraft to target
    center in km."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = CENTRAL_BODY_DISTANCE
  DATA_TYPE                 = REAL
  START_BYTE                = 412
  BYTES                     = 12
  FORMAT                    = "E12"
  DESCRIPTION               = "Distance from spacecraft to
    planet in km."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = SUB_SPACECRAFT_LATITUDE
  DATA_TYPE                 = REAL
  START_BYTE                = 425
  BYTES                     = 8
  FORMAT                    = "F8.3"
  DESCRIPTION               = "Planetocentric sub-spacecraft
    latitude of spacecraft position vector in degrees."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = SUB_SPACECRAFT_LONGITUDE
  DATA_TYPE                 = REAL
  START_BYTE                = 434
  BYTES                     = 8
  FORMAT                    = "F8.3"
  DESCRIPTION               = "West longitude of spacecraft
    position vector in degrees."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = SUB_SOLAR_AZIMUTH
  DATA_TYPE                 = REAL
  START_BYTE                = 443
  BYTES                     = 8
  FORMAT                    = "F8.3"
  DESCRIPTION               = "Sub-solar azimuth in degrees."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = SUB_SOLAR_LATITUDE
  DATA_TYPE                 = REAL
  START_BYTE                = 452
  BYTES                     = 8
  FORMAT                    = "F8.3"
  DESCRIPTION               = "Planetocentric sub-solar latitude
    in degrees."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = SUB_SOLAR_LONGITUDE
  DATA_TYPE                 = REAL
  START_BYTE                = 461
  BYTES                     = 8
  FORMAT                    = "F8.3"
  DESCRIPTION               = "Sub-solar west longitude in degrees"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = SOLAR_DISTANCE
  DATA_TYPE                 = REAL
```

```
  START_BYTE                = 470
  BYTES                     = 12
  FORMAT                    = "E12"
  DESCRIPTION               = "Distance from sun to target
    body in km."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = SUB_SPACECRAFT_LINE
  DATA_TYPE                 = INTEGER
  START_BYTE                = 483
  BYTES                     = 8
  FORMAT                    = "F8.3"
  DESCRIPTION               = "Line coordinate of sub-spacecraft
    point."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = SUB_SPACECRAFT_LINE_SAMPLE
  DATA_TYPE                 = INTEGER
  START_BYTE                = 492
  BYTES                     = 8
  FORMAT                    = "F8.3"
  DESCRIPTION               = "Sample coordinate of sub-spacecraft
    point."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = CENTER_RING_RADIUS
  DATA_TYPE                 = REAL
  START_BYTE                = 501
  BYTES                     = 12
  FORMAT                    = "E12"
  DESCRIPTION               = "Ring radius at center of frame
    in km. Not applicable until Jupiter Orbital Operations. For
    this delivery, a 0 has been placed in the label."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = MEAN_RADIANCE
  DATA_TYPE                 = REAL
  START_BYTE                = 514
  BYTES                     = 8
  FORMAT                    = "F8.3"
  DESCRIPTION               = " Not applicable for REDR
    data. For this delivery N/A has been placed in the label."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = MEAN_REFLECTANCE
  DATA_TYPE                 = REAL
  START_BYTE                = 523
  BYTES                     = 8
  FORMAT                    = "F8.3"
  DESCRIPTION               = "Not applicable for REDR
    data. For this delivery N/A has been placed in the label."
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = RADIANCE_SCALING_FACTOR
  DATA_TYPE                 = REAL
  START_BYTE                = 532
  BYTES                     = 8
  FORMAT                    = "F8.3"
  DESCRIPTION               = "Not applicable for REDR
    data. For this delivery N/A has been placed in the label. "
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = REFLECTANCE_SCALING_FACTOR
  DATA_TYPE                 = REAL
  START_BYTE                = 541
  BYTES                     = 8
  FORMAT                    = "F8.3"
```

```
  DESCRIPTION              = "Not applicable for REDR
    data. For this delivery N / A has been placed in the label."
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = VOLUME_ID
  DATA_TYPE                = CHARACTER
  START_BYTE               = 551
  BYTES                    = 7
  FORMAT                   = A7
  DESCRIPTION              = "CD-ROM volume on which the
    image file is recorded (e.g GO_0002)"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = FILE_SPECIFICATION_NAME
  DATA_TYPE                = CHARACTER
  START_BYTE               = 561
  BYTES                    = 43
  FORMAT                   = A33
  DESCRIPTION              = "File name for image file on
    CD-ROM.  Recorded in VAX directory format, with brackets
    indicating the directory hierarchy."
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = COMPRESSION_TYPE
  DATA_TYPE                = CHARACTER
  START_BYTE               = 607
  BYTES                    = 27
  FORMAT                   = A27
  DESCRIPTION              = " Compression type"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = ENCODING_MIN_COMPRESSION_RATIO
  DATA_TYPE                = REAL
  START_BYTE               = 636
  BYTES                    = 8
  FORMAT                   = "F8.3"
  DESCRIPTION              = "ICT or lossless minimum compression
                   ratio"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = ENCODING_MAX_COMPRESSION_RATIO
  DATA_TYPE                = REAL
  START_BYTE               = 645
  BYTES                    = 8
  FORMAT                   = "F8.3"
  DESCRIPTION              = "ICT or lossless maximum compression
                   ratio"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = ENCODING_COMPRESSION_RATIO
  DATA_TYPE                = REAL
  START_BYTE               = 654
  BYTES                    = 8
  FORMAT                   = "F8.3"
  DESCRIPTION              = "ICT or lossless mean compression
                   ratio"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = PROCESSING_HISTORY_TEXT
  DATA_TYPE                = CHARACTER
  START_BYTE               = 664
  BYTES                    = 75
  FORMAT                   = A47
  DESCRIPTION              = "Processing history text.  List of
                 all program names used to process image"
END_OBJECT                 = COLUMN
```

```
END_OBJECT                  = IMAGE_INDEX_TABLE
END
```

3.2.2.5 Format Files

3.2.2.5.1 RTLMTAB.FMT

This file describes the structure of the REDR binary telemetry header that follows the VICAR label and precedes the bad data value header and the image.

```
/* Table Object (for telemetry table) */
OBJECT = TELEMETRY_TABLE
INTERCHANGE_FORMAT = BINARY
ROWS = 1
COLUMNS = 85
ROW_BYTES = 1800

OBJECT = COLUMN
NAME = RECORD_ID
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 1
BYTES = 1
DESCRIPTION = "Is always 0 for the telemetry record"
END_OBJECT

OBJECT = COLUMN
NAME = FILLLER
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 2
BYTES = 1
DESCRIPTION = "Used for Phase 1 to store the tape file number.
   Not applicable for CD-ROMs."
END_OBJECT

OBJECT = COLUMN
NAME = MISSION_NAME
DATA_TYPE = CHARACTER
START_BYTE = 3
BYTES = 10
DESCRIPTION = "Mission name, valid is GALILEO."
END_OBJECT

OBJECT = COLUMN
NAME = INSTRUMENT_ID
DATA_TYPE = CHARACTER
START_BYTE = 13
BYTES = 6
DESCRIPTION = "Instrument identification, valid is SSI."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 19
BYTES = 2
DESCRIPTION = "Used during Phase 1 to store the tape physical sequence
   record counter. Not valid for CD-ROMs."
END_OBJECT

OBJECT = COLUMN
NAME = LOGICAL_SEQUENCE
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 21
BYTES = 2
DESCRIPTION = "Logical sequence record counter. Always 0 for the telemetry
   record"
END_OBJECT

OBJECT = COLUMN
NAME = FIRST_EARTH_RECEIVED_TIME_YEAR
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 23
BYTES = 2
```

```
DESCRIPTION = "Earth received time year of the first packet containing
   valid data."
END_OBJECT

OBJECT = COLUMN
NAME = FIRST_EARTH_RECEIVED_TIME_DAY
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 25
BYTES = 2
DESCRIPTION = "Earth received time day of the first packet containing
   valid data."
END_OBJECT

OBJECT = COLUMN
NAME = FIRST_EARTH_RECEIVED_TIME_HOUR
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 27
BYTES = 1
DESCRIPTION = "Earth received time hour of the first packet containing
   valid data."
END_OBJECT

OBJECT = COLUMN
NAME = FIRST_EARTH_RECEIVED_TIME_MIN
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 28
BYTES = 1
DESCRIPTION = "Earth received time minute of the first packet containing
   valid data."
END_OBJECT

OBJECT = COLUMN
NAME = FIRST_EARTH_RECEIVED_TIME_SEC
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 29
BYTES = 1
DESCRIPTION = "Earth received time second of the first packet containing
   valid data."
END_OBJECT

OBJECT = COLUMN
NAME = FIRST_EARTH_RECEIVED_TIME_MSEC
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 30
BYTES = 2
DESCRIPTION = "Earth received time millisecond of the first packet containing
   valid data."
END_OBJECT

OBJECT = COLUMN
NAME = LAST_EARTH_RECEIVED_TIME_YEAR
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 32
BYTES = 2
DESCRIPTION = "Earth received time year of the last packet containing valid
   data."
END_OBJECT

OBJECT = COLUMN
NAME = LAST_EARTH_RECEIVED_TIME_DAY
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 34
BYTES = 2
DESCRIPTION = "Earth received time day of the last packet containing valid
   data."
END_OBJECT

OBJECT = COLUMN
NAME = LAST_EARTH_RECEIVED_TIME_HOUR
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 36
BYTES = 1
DESCRIPTION = "Earth received time hour of the last packet containing valid
   data."
```

```
END_OBJECT

OBJECT = COLUMN
NAME = LAST_EARTH_RECEIVED_TIME_MIN
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 37
BYTES = 1
DESCRIPTION = "Earth received time minute of the last packet containing
   valid data."
END_OBJECT

OBJECT = COLUMN
NAME = LAST_EARTH_RECEIVED_TIME_SEC
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 38
BYTES = 1
DESCRIPTION = "Earth received time second of the last packet containing valid
   data."
END_OBJECT

OBJECT = COLUMN
NAME = LAST_EARTH_RECEIVED_TIME_MSEC
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 39
BYTES = 2
DESCRIPTION = "Earth received time millisecond of the last packet containing
   valid data."
END_OBJECT

OBJECT = COLUMN
NAME = FIRST_SPACECRAFT_CLK_CNT_RIM
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 41
BYTES = 4
DESCRIPTION = "Spacecraft clock RIM of the first record in the file
   containing valid data."
END_OBJECT

OBJECT = COLUMN
NAME = FIRST_SPACECRAFT_CLK_CNT_MOD91
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 45
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD91 of the first record in the file
   containing valid data."
END_OBJECT

OBJECT = COLUMN
NAME = FIRST_SPACECRAFT_CLK_CNT_MOD10
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 46
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD10 of the first record in the file
   containing valid data."
END_OBJECT

OBJECT = COLUMN
NAME = FIRST_SPACECRAFT_CLK_CNT_MOD8
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 47
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD8 of the first record in the file
   containing valid data."
END_OBJECT

OBJECT = COLUMN
NAME = LAST_SPACECRAFT_CLK_CNT_RIM
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 48
BYTES = 4
DESCRIPTION = "Spacecraft clock RIM of the last record in the file
   containing valid data."
END_OBJECT
```

```
OBJECT = COLUMN
NAME = LAST_SPACECRAFT_CLK_CNT_MOD91
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 52
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD91 of the last record in the file
  containing valid data."
END_OBJECT

OBJECT = COLUMN
NAME = LAST_SPACECRAFT_CLK_CNT_MOD10
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 53
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD10 of the last record in the file
  containing valid data."
END_OBJECT

OBJECT = COLUMN
NAME = LAST_SPACECRAFT_CLK_CNT_MOD8
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 54
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD8 of the last record in the file
  containing valid data."
END_OBJECT

OBJECT = COLUMN
NAME = SPACECRAFT_EVENT_TIME_YEAR
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 55
BYTES = 2
DESCRIPTION = "Spacecraft Event Time year at the middle of the shutter-open
  period."
END_OBJECT

OBJECT = COLUMN
NAME = SPACECRAFT_EVENT_TIME_DAY
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 57
BYTES = 2
DESCRIPTION = "Spacecraft Event Time day at the middle of the shutter-open
  period."
END_OBJECT

OBJECT = COLUMN
NAME = SPACECRAFT_EVENT_TIME_HOUR
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 59
BYTES = 1
DESCRIPTION = "Spacecraft Event Time hour at the middle of the shutter-open
  period."
END_OBJECT

OBJECT = COLUMN
NAME = SPACECRAFT_EVENT_TIME_MIN
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 60
BYTES = 1
DESCRIPTION = "Spacecraft Event Time minute at the middle of the shutter-open
  period."
END_OBJECT

OBJECT = COLUMN
NAME = SPACECRAFT_EVENT_TIME_SEC
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 61
BYTES = 1
DESCRIPTION = "Spacecraft Event Time second at the middle of the shutter-open
  period."
END_OBJECT

OBJECT = COLUMN
NAME = SPACECRAFT_EVENT_TIME_MSEC
```

```
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 62
BYTES = 2
DESCRIPTION = "Spacecraft Event Time millisecond at the middle of the
  shutter-open period."
END_OBJECT

OBJECT = COLUMN
NAME = OPERATING_SYSTEM_VERSION
DATA_TYPE = CHARACTER
START_BYTE = 64
BYTES = 8
DESCRIPTION = "MIPS operating system version number in the form of Vxxx.yyy.
  Currently not implemented."
END_OBJECT

OBJECT = COLUMN
NAME = COMPUTER_PROCESSING_UNIT
DATA_TYPE = CHARACTER
START_BYTE = 72
BYTES = 8
DESCRIPTION = "MIPS cpu name; e.g. CODA1.
  Currently not implemented."
END_OBJECT

OBJECT = COLUMN
NAME = GENERATION_DATE
DATA_TYPE = CHARACTER
START_BYTE = 80
BYTES = 11
DESCRIPTION = "MIPS generation date in the form DD-MMM-YYYY.
  Currently not implemented."
END_OBJECT

OBJECT = COLUMN
NAME = MIPS_PRD_RESERVED
DATA_TYPE = CHARACTER
START_BYTE = 91
BYTES =32
DESCRIPTION = "MIPS physical recording reserved words.
  Currently not implemented."
END_OBJECT

OBJECT = COLUMN
NAME = FORMAT_ID
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 123
BYTES = 2
DESCRIPTION = "The correct format ID for this image as identified in the
  Spacecraft Event File.  Valid is 5-HIS, 6-HMA, 7-HCA, 17-HIM, 22-IM8,
  23-AI8, and 25-IM4 for Phase 2."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 125
BYTES = 4
DESCRIPTION = "Used during Phase 1 to store the sum of all bad bits in the
  sync code contained in all the line records in the file which contain
  valid data."
END_OBJECT

OBJECT = COLUMN
NAME = BOOM_OBSCURATION_FLAG
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 129
BYTES = 1
DESCRIPTION = "Boom obscuration flag. 0:Boom present; 1:Boom may be present;
  2:Boom not present."
END_OBJECT

OBJECT = COLUMN
NAME = MISSING_LINES
```

```
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 130
BYTES = 2
DESCRIPTION = "Number of line records in the file with no valid pixels in
   the image line and the lines are within the defined cut out window."
END_OBJECT

OBJECT = COLUMN
NAME = PARTIAL_LINES
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 132
BYTES = 2
DESCRIPTION = "Total number of line records in the file which contain some
   valid pixels in the image line and the lines are within the defined cut
   out window."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 134
BYTES = 2
DESCRIPTION = "Used during Phase 1 to store the total number of records
   from the IDR and/or SDR which were unreadable and which fell within
   a time period for which data was required for this file."
END_OBJECT

OBJECT = COLUMN
NAME = SEQUENCE_BREAKS
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 136
BYTES = 2
DESCRIPTION = "Total number of packet gaps (indicated by a discontinuity
   in the packet sequence numbers) which occurred during the time data was
   required for this file."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 138
BYTES = 2
ITEMS = 3
DESCRIPTION = "Used during Phase 1 to store input source statistics."
END_OBJECT

OBJECT = COLUMN
NAME = STANDARD_FRMTD_DTA_UNT_FRMS
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 144
BYTES = 2
DESCRIPTION = "Total number of packets from which this file was derived."
END_OBJECT

OBJECT = COLUMN
NAME = PICTURE_NUMBER
DATA_TYPE = CHARACTER
START_BYTE = 146
BYTES = 7
DESCRIPTION = "Picture number of the form XXYZZZZ where XX is the orbit,
   (A1, A2 etc. is approach; C1, C2 is cruise).  Y is the target body
   id (J=Jupiter, A=Amalthea, I=Io, E=Europa, G=Ganymede, C=Callisto,
   S=Minor Satellites, R=ring, H=star, L=Moon, W=Earth, V=Venus, U=Ida,
   P=Gaspra) and ZZZZ is the picture count which is generated in the
   sequence generation process and which is incremented separately for
   each target body in each orbit."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 153
BYTES = 1
ITEMS = 12
```

```
DESCRIPTION = "Used during Phase 1 to store the first SSI low rate
   science packet during this image."
END_OBJECT

OBJECT = COLUMN
NAME = FLAGS
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 165
BYTES = 2

 OBJECT = BIT_COLUMN
 NAME = BARC_COMPRESSION_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 1
 BITS = 1
 DESCRIPTION = "Indicator of a BARC compressed imaging format: 0 - Not
    compressed; 1 = Compressed."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = BARC_COMPRESSION_MODE_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 2
 BITS = 1
 DESCRIPTION = "Compression mode: 0 - rate control; 1 - information
    preserving"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = EXPOSURE_MODE_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 3
 BITS = 1
 DESCRIPTION = "Exposure modes: 0 - normal; 1 - extended exposure."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = LIGHT_FLOOD_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 4
 BITS = 1
 DESCRIPTION = "Light flood status: 0 - off; 1 - on."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = BLEMISH_PROTECTION_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 5
 BITS = 1
 DESCRIPTION = "Blemish protection: 0 - off; 1 - on."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = PARALLEL_CLOCK_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 6
 BITS = 1
 DESCRIPTION = "Parallel clock state: 0 - normal; 1 - inverted."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = ICT_COMPRESSION_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 7
 BITS = 1
 DESCRIPTION = "Indicator if ICT (Integer Cosine Transform) compression
    was used: 0 - off; 1 - on."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = HUFFMAN_COMPRESSION_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 8
 BITS = 1
```

```
 DESCRIPTION = "Indicator if Huffman only (lossless) compression was
   used: 0 - off; 1 - on."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = RESERVED
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 9
 BITS = 1
 ITEMS = 8
 DESCRIPTION = "Eight bits to fill VAX short"
 END_OBJECT

END_OBJECT

OBJECT = COLUMN
NAME = MEAN_DATA_NUMBER
DATA_TYPE = CHARACTER
START_BYTE = 167
BYTES = 6
DESCRIPTION = "Mean DN level of all valid pixels available in the cut out
    window.  A real number represented as an ASCII string in the form
    123.45."
END_OBJECT

OBJECT = COLUMN
NAME = TRUNCATED_BITS_PER_PIXEL
DATA_TYPE = CHARACTER
START_BYTE = 173
BYTES = 6
DESCRIPTION = "Mean number of truncated bits/pixel during BARC data
    compression.  Real number represented as an ASCII string in the
    form 12.345."
END_OBJECT

OBJECT = COLUMN
NAME = TRUNCATED_PIXELS_PER_LINE
DATA_TYPE = CHARACTER
START_BYTE = 179
BYTES = 6
DESCRIPTION = "Mean number of truncated pixels/line during BARC data
    compression.  A real number represented as an ASCII string in the
    form 12.345."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = CHARACTER
START_BYTE = 185
BYTES = 12
DESCRIPTION = "Filler."
END_OBJECT

OBJECT = COLUMN
NAME = ENTROPY
DATA_TYPE = CHARACTER
START_BYTE = 197
BYTES = 7
DESCRIPTION = "Entropy level for the whole picture (bits/pixel). Real number
    represented as an ASCII string in the form 12.3456."
END_OBJECT

OBJECT = COLUMN
NAME = ENTROPIES
DATA_TYPE = CHARACTER
START_BYTE = 204
BYTES = 7
ITEMS = 15
DESCRIPTION = "Entropy level for 15 lines. First line is 50 and incremented
    by 50 to line 750.  15 real numbers represented as ASCII strings in the
    form 12.3456."
END_OBJECT

OBJECT = COLUMN
```

```
NAME = FILLER
DATA_TYPE = CHARACTER
START_BYTE = 309
BYTES = 24
DESCRIPTION = "Used during Phase 1 to store the Scan platform coordinates
   at direction middle of shutter-open period in J2000.  Right ascension,
   declination and twist.  Three real numbers represented as ASCII strings
   in the form 1234.567."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = CHARACTER
START_BYTE = 333
BYTES = 80
DESCRIPTION = "Filler."
END_OBJECT

OBJECT = COLUMN
NAME = ACTIVITY_ID
DATA_TYPE = CHARACTER
START_BYTE = 413
BYTES = 20
DESCRIPTION = "Activity id in the form NNTIOOOOOOMM#SSSXXXX where NN is
   the orbit number, T is the target body initial, I is the instrument,
   OOOOOO is the orbit planning guide objective mnemonic, MM is the
   sequential OAPEL number, # is multiple observation flag symbol
   (- or *), SSS is the PA set number and XXXX is the MIPL processing
   code."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 433
BYTES = 1
DESCRIPTION = "Filler."
END_OBJECT

OBJECT = COLUMN
NAME = FILTER_NUMBER
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 434
BYTES = 1
DESCRIPTION = "Filter number: 0 - clear; 1 - green; 2 - red;
   3 - violet; 4 - IR7560; 5 - IR9680; 6 - IR7270; 7 - IR8890."
END_OBJECT

OBJECT = COLUMN
NAME = EXPOSURE_NUMBER
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 435
BYTES = 1
DESCRIPTION = "Exposure number which corresponds to an exposure time."
END_OBJECT

OBJECT = COLUMN
NAME = IMAGING_MODE
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 436
BYTES = 1
DESCRIPTION = "Imaging mode. 0:60-2/3 sec.; 1:8-2/3 sec.; 2:30-1/3 sec.;
   3:2-1/3 sec.; 4:15-1/6 sec."
END_OBJECT

OBJECT = COLUMN
NAME = GAIN_MODE_ID
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 437
BYTES = 1
DESCRIPTION = "Gain mode. 0:Gain 1 - 400K; 1:Gain 2 - 100K; 2:Gain 3 - 40K;
   3:Gain 4 - 10K."
END_OBJECT
```

```
OBJECT = COLUMN
NAME = SOLAR_DISTANCE
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 438
BYTES = 4
DESCRIPTION = "Target's range to sun in kilometers."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 442
BYTES = 1
DESCRIPTION = "Used during Phase 1 to store the telemetry format number
  embedded in the SFDU."
END_OBJECT

OBJECT = COLUMN
NAME = CATALOG_VERSION
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 443
BYTES = 2
DESCRIPTION = "MIPS catalog image version number.  Reserved for MIPS"
END_OBJECT

OBJECT = COLUMN
NAME = STARTING_SC_CLK_CNT_RIM
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 445
BYTES = 4
DESCRIPTION = "Spacecraft clock RIM of the start of image which refers
  to the start of the SSI frame cycle. May not be available."
END_OBJECT

OBJECT = COLUMN
NAME = STARTING_SC_CLK_CNT_MOD91
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 449
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD91 of the start of image which refers
  to the start of the SSI frame cycle. May not be available."
END_OBJECT

OBJECT = COLUMN
NAME = STARTING_SC_CLK_CNT_MOD10
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 450
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD10 of the start of image which refers
  to the start of the SSI frame cycle. May not be available."
END_OBJECT

OBJECT = COLUMN
NAME = STARTING_SC_CLK_CNT_MOD8
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 451
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD8 of the start of image which refers
  to the start of the SSI frame cycle. May not be available."
END_OBJECT

OBJECT = COLUMN
NAME = ENDING_SC_CLK_CNT_RIM
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 452
BYTES = 4
DESCRIPTION = "Spacecraft clock RIM at the end of image which refers
  to the end of the SSI frame cycle. May not be available."
END_OBJECT

OBJECT = COLUMN
NAME = ENDING_SC_CLK_CNT_MOD91
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 456
```

```
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD91 of the end of image which refers
   to the end of the SSI frame cycle. May not be available."
END_OBJECT

OBJECT = COLUMN
NAME = ENDING_SC_CLK_CNT_MOD10
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 457
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD10 of the end of image which refers
   to the end of the SSI frame cycle. May not be available."
END_OBJECT

OBJECT = COLUMN
NAME = ENDING_SC_CLK_CNT_MOD8
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 458
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD8 of the end of image which refers
   to the end of the SSI frame cycle. May not be available."
END_OBJECT

OBJECT = COLUMN
NAME = RIGHT_ASCENSION
DATA_TYPE = CHARACTER
START_BYTE = 459
BYTES = 8
DESCRIPTION = "Scan platform coordinate for right ascension in EME50
   coordinate system. A real number represented as an ASCII string in
   the form 1234.12 and null terminated.  Value is from the SSI3
   Housekeeping packet for this file"
END_OBJECT

OBJECT = COLUMN
NAME = DECLINATION
DATA_TYPE = CHARACTER
START_BYTE = 467
BYTES = 8
DESCRIPTION = "Scan platform coordinate for declination in EME50
   coordinate system. A real number represented as an ASCII string in
   the form 1234.12 and null terminated.  Value is from the SSI3
   Housekeeping packet for this file"
END_OBJECT

OBJECT = COLUMN
NAME = TWIST_ANGLE
DATA_TYPE = CHARACTER
START_BYTE = 475
BYTES = 8
DESCRIPTION = "Scan platform coordinate for twist angle.  A real number
   represented as an ASCII string in the form 1234.12 and null terminated.
   Value is from the SSI3 Housekeeping packet for this file"
END_OBJECT

OBJECT = COLUMN
NAME = CLOCK_ANGLE
DATA_TYPE = CHARACTER
START_BYTE = 483
BYTES = 8
DESCRIPTION = "Scan platform coordinate for clock angle.  A real number
   represented as an ASCII string in the form 1234.12 and null terminated.
   Value is from the SSI3 Housekeeping packet for this file"
END_OBJECT

OBJECT = COLUMN
NAME = CCD_FINE_TEMPERATURE
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 491
BYTES = 1
DESCRIPTION = "A number between 0 and 255 identifying the CCD fine
   temperature.  This number can be translated into a temperature using
   the CCD Fine Temperature Translation Table.  Value is from the SSI3
   Standard Housekeeping Word 14 for this file"
```

```
END_OBJECT

OBJECT = COLUMN
NAME = CCD_COURSE_TEMPERATURE
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 492
BYTES = 1
DESCRIPTION = "A number between 0 and 255 identifying the CCD course
   temperature.  This number can be translated into a temperature using
   the CCD Course Temperature Translation Table.  Value is from the SSI3
   Standard Housekeeping Word 19 for this file"
END_OBJECT

OBJECT = COLUMN
NAME = PICTURE_COUNT
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 493
BYTES = 1
DESCRIPTION = "This number increments every non-zero exposure and dark
   current calibrations file.  Value is from the SSI3 Standard Housekeeping
   Word 22 for this file"
END_OBJECT

OBJECT = COLUMN
NAME = SSI3_WORD23_MODES
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 494
BYTES = 1

 OBJECT = BIT_COLUMN
 NAME = EXPOSURE_NUMBER
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 1
 BITS = 5
 DESCRIPTION = "Exposure number which corresponds to an exposure time.
   Value is from the SSI3 Standard Housekeeping Word 23 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = GAIN_MODE_ID
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 6
 BITS = 2
 DESCRIPTION = "Gain mode: 0:Gain 1 - 400K; 1:Gain 2 - 100K; 2:Gain 3 - 40K;
   3:Gain 4 - 10K.  Value is from the SSI3 Standard Housekeeping Word 23
   for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = LIGHT_FLOOD_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 8
 BITS = 1
 DESCRIPTION = "Light flood status: 0 - off; 1 - on.
   Value is from the SSI3 Standard Housekeeping Word 23 for this file"
 END_OBJECT

END_OBJECT

OBJECT = COLUMN
NAME = SSI3_WORD24_MODES
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 495
BYTES = 1

 OBJECT = BIT_COLUMN
 NAME = FILTER_NUMBER
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 1
 BITS = 3
 DESCRIPTION = "Commanded Filter position: 0 - clear; 1 - green; 2 - red;
   3 - violet; 4 - IR7560; 5 - IR9680; 6 - IR7270; 7 - IR8890.  From the
   SSI3 Standard Housekeeping Word 24 for this file"
 END_OBJECT
```

```
 OBJECT = BIT_COLUMN
 NAME = FILTER_STEP
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 4
 BITS = 1
 DESCRIPTION = "Commanded Filter Step: 0 - absolute; 1 - step.  From the
   SSI3 Standard Housekeeping Word 24 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = BLEMISH_PROTECTION_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 5
 BITS = 1
 DESCRIPTION = "Commanded Blemish protection: 0 - off; 1 - on.
   Value is from the SSI3 Standard Housekeeping Word 24 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = EXPOSURE_MODE_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 6
 BITS = 1
 DESCRIPTION = "Commanded Exposure modes: 0 - normal; 1 - extended exposure.
   Value is from the SSI3 Standard Housekeeping Word 24 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = EXPOSURE_CYCLE_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 7
 BITS = 1
 DESCRIPTION = "Commanded Exposure cycle: 0 - cycle 1; 1 - cycle 2.
   Value is from the SSI3 Standard Housekeeping Word 24 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = FILLER
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 8
 BITS = 1
 DESCRIPTION = "1 bit to fill VAX byte."
 END_OBJECT

END_OBJECT

OBJECT = COLUMN
NAME = SSI3_WORD25_MODES
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 496
BYTES = 1

 OBJECT = BIT_COLUMN
 NAME = GAIN_MODE_ID
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 1
 BITS = 2
 DESCRIPTION = "Gain mode used. 0:Gain 1 - 400K; 1:Gain 2 - 100K;
   2:Gain 3 - 40K; 3:Gain 4 - 10K.  Value from the SSI3 Standard
   Housekeeping Word 25 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = BARC_COMPRESSION_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 3
 BITS = 1
 DESCRIPTION = "Indicator of BARC compressed imaging format: 0 - Not
   compressed; 1 = Compressed.  From the SSI3 Standard Housekeeping Word
   25 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
```

```
 NAME = BARC_COMPRESSION_MODE_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 4
 BITS = 1
 DESCRIPTION = "BARC Compression mode: 0 - rate control; 1 - information
   preserving.  Value is from the SSI3 Standard Housekeeping Word 25
   for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = LONG_EXPOSURE_CYCLE_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 5
 BITS = 1
 DESCRIPTION = "Long Exposure cycle: 0 - cycle 2; 1 - cycle 2.
   Value is from the SSI3 Standard Housekeeping Word 25 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = IMAGING_MODE
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 6
 BITS = 3
 DESCRIPTION = "Imaging mode. 0:60-2/3 sec.; 2:8-2/3 sec.; 4:30-1/3 sec.;
   5:15-1/6 sec.;6:2-1/3 sec.  Value is from the SSI3 Standard Housekeeping
   Word 25 for this file"
 END_OBJECT

END_OBJECT

OBJECT = COLUMN
NAME = SSI3_WORD26_MODES
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 497
BYTES = 1

 OBJECT = BIT_COLUMN
 NAME = ODD_PARITY_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 1
 BITS = 1
 DESCRIPTION = "Odd parity flag. 0 - off; 1 - on.  Value from the SSI3
   Standard Housekeeping Word 26 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = FILTER_NUMBER
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 2
 BITS = 3
 DESCRIPTION = "Filter number: 0 - clear; 1 - green; 2 - red;
   3 - violet; 4 - IR7560; 5 - IR9680; 6 - IR7270; 7 - IR8890.
   From the SSI3 Standard Housekeeping Word 26 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = BLEMISH_PROTECTION_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 5
 BITS = 1
 DESCRIPTION = "Blemish protection: 0 - off; 1 - on.
   Value is from the SSI3 Standard Housekeeping Word 26 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = WATCH_DOG_TIMER
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 6
 BITS = 1
 DESCRIPTION = "Watch Dog Timer: 0 - not tripped; 1 - tripped.
   Value is from the SSI3 Standard Housekeeping Word 26 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
```

```
 NAME = PARALLEL_CLOCK_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 7
 BITS = 1
 DESCRIPTION = "Parallel clock state: 0 - normal; 1 - inverted.
   Value is from the SSI3 Standard Housekeeping Word 26 for this file"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = MEMORY_WRITE_PROTECT_FLAG
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 8
 BITS = 1
 DESCRIPTION = "Memory write protection flag. 0- write protection off;
   1 - write protection on.  Value is from the SSI3 Standard Housekeeping
   Word 26 for this file"
 END_OBJECT

END_OBJECT

OBJECT = COLUMN
NAME = RESERVED
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 498
BYTES = 1
ITEMS = 279
DESCRIPTION = "Reserved words"
END_OBJECT

OBJECT = COLUMN
NAME = HISTOGRAM
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 777
BYTES = 4
ITEMS = 256
DESCRIPTION = "256 32-bit binary valued histogram of the pixels for this
   file, including fill data."
END_OBJECT

END_OBJECT /* Table Object (for telemetry table) */
```

3.2.2.5.2 RLINEPRX.FMT

This file describes the structure of the REDR binary line prefix that precedes each image line.

```
OBJECT = LINE_PREFIX_TABLE
INTERCHANGE_FORMAT = BINARY
ROWS            = 800
COLUMNS         = 45
ROW_BYTES       = 200
ROW_SUFFIX_BYTES   = 800

OBJECT = COLUMN
NAME = RECORD_ID
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 1
BYTES = 1
DESCRIPTION = "Record id for line records. Always = 2."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 2
BYTES = 1
DESCRIPTION = "Used during phase 1.  Tape file number.  Always 0 if on disk."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 3
BYTES = 2
DESCRIPTION = "Used during phase 1.  Tape physical sequence counter.
Not valid for CD-ROMS."
END_OBJECT

OBJECT = COLUMN
NAME = LOGICAL_SEQUENCE
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 5
BYTES = 2
DESCRIPTION = "Logical sequence counter.  The telemetry header is zero and
   each line record is incremented by one.  This also corresponds to the
   image line number (1...800)."
END_OBJECT

OBJECT = COLUMN
NAME = EARTH_RECEIVED_TIME_YEAR
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 7
BYTES = 2
DESCRIPTION = "Earth received time year of the first bit of the telemetry
   frame which contained the first pixel of this line as interpolated from
   the ERT in the GCF block containing this bit.  (The first bit of the
   frame is the first bit of the sync code.)"
END_OBJECT

OBJECT = COLUMN
NAME = EARTH_RECEIVED_TIME_DAY
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 9
BYTES = 2
DESCRIPTION = "Earth received time day of the first bit of the telemetry
   frame which contained the first pixel of this line as interpolated from
   the ERT in the GCF block containing this bit.  (The first bit of the
   frame is the first bit of the sync code.)"
END_OBJECT

OBJECT = COLUMN
NAME = EARTH_RECEIVED_TIME_HOUR
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 11
BYTES = 1
```

```
DESCRIPTION = "Earth received time hour of the first bit of the telemetry
   frame which contained the first pixel of this line as interpolated from
   the ERT in the GCF block containing this bit.  (The first bit of the
   frame is the first bit of the sync code.)"
END_OBJECT

OBJECT = COLUMN
NAME = EARTH_RECEIVED_TIME_MIN
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 12
BYTES = 1
DESCRIPTION = "Earth received time minute of the first bit of the telemetry
   frame which contained the first pixel of this line as interpolated from
   the ERT in the GCF block containing this bit.  (The first bit of the
   frame is the first bit of the sync code.)"
END_OBJECT

OBJECT = COLUMN
NAME = EARTH_RECEIVED_TIME_SEC
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 13
BYTES = 1
DESCRIPTION = "Earth received time second of the first bit of the telemetry
   frame which contained the first pixel of this line as interpolated from
   the ERT in the GCF block containing this bit.  (The first bit of the
   frame is the first bit of the sync code.)"
END_OBJECT

OBJECT = COLUMN
NAME = EARTH_RECEIVED_TIME_MSEC
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 14
BYTES = 2
DESCRIPTION = "Earth received time millisecond of the first bit of the
   telemetry frame which contained the first pixel of this line as
   interpolated from the ERT in the GCF block containing this bit.
   (The first bit of the frame is the first bit of the sync code.)"
END_OBJECT

OBJECT = COLUMN
NAME = SPACECRAFT_CLK_CNT_RIM
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 16
BYTES = 4
DESCRIPTION = "Spacecraft clock RIM readout of the first minor frame of
   this line."
END_OBJECT

OBJECT = COLUMN
NAME = SPACECRAFT_CLK_CNT_MOD91
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 20
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD91 readout of the first minor frame of
   this line."
END_OBJECT

OBJECT = COLUMN
NAME = SPACECRAFT_CLK_CNT_MOD10
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 21
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD10 readout of the first minor frame of
   this line."
END_OBJECT

OBJECT = COLUMN
NAME = SPACECRAFT_CLK_CNT_MOD8
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 22
BYTES = 1
DESCRIPTION = "Spacecraft clock MOD8 readout of the first minor frame of
   this line."
END_OBJECT
```

```
OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = CHARACTER
START_BYTE = 23
BYTES = 59
DESCRIPTION = "Filler"
END_OBJECT

OBJECT = COLUMN
NAME = FORMAT_ID
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 82
BYTES = 2
DESCRIPTION = "Telemetry format id from the minor frame of this line.
   Valid is 5-HIS, 6-HMA, 7-HCA, 17-HIM, 22-IM8, 23-AI8, and 25-IM4"
END_OBJECT

OBJECT = COLUMN
NAME = INPUT_TYPE
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 84
BYTES = 1
DESCRIPTION = "Input type. 0:Spacecraft flight data MOS; 1:PTM data;
   2:Ext. Simulation; 3:Spacecraft flight data test; 4:Internal
   simulation; 5-255: Not used."
END_OBJECT

OBJECT = COLUMN
NAME = INPUT_SOURCE
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 85
BYTES = 1

 OBJECT = BIT_COLUMN
 NAME = SFDU_DATA
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 1
 BITS = 1
 DESCRIPTION = "Standard formatted data units. 0:not present; 1:present."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = WBDL_DATA
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 2
 BITS = 1
 DESCRIPTION = "Wide band data link. 0:not present; 1:present."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = SDR_TAPE
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 3
 BITS = 1
 DESCRIPTION = "System data record tape. 0:not present; 1:present."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = IDR_TAPE
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 4
 BITS = 1
 DESCRIPTION = "Intermediate data record tape. 0:not present; 1:present."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = EXPERIMENT_DATA_RECORD
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 5
 BITS = 1
 DESCRIPTION = "Experiment data record - reprocessed data.  0:not present;
   1:present."
 END_OBJECT
```

```
 OBJECT = BIT_COLUMN
 NAME = REALTIME
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 6
 BITS = 1
 DESCRIPTION = "Real time subsystem.  0:not present; 1:present."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = ASYNCHRONOUS_PLAYBACK
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 7
 BITS = 1
 DESCRIPTION = "Asynchronous playback. 0:not present; 1:present."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = FILLER
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 8
 BITS = 1
 DESCRIPTION = "Unused bit - filler"
 END_OBJECT

END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = CHARACTER
START_BYTE = 86
BYTES = 18
DESCRIPTION = "Used during phase 1.  "
END_OBJECT

OBJECT = COLUMN
NAME = BARC_TRUNCATED_BIT_PER_BLOCK
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 104
BYTES = 4

 OBJECT = BIT_COLUMN
 NAME = TRUNCATION_BLOCK_ZERO
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 1
 BITS = 2
 DESCRIPTION = "Number of truncated bits in block 0 due to BARC data
   compression"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = TRUNCATION_BLOCK_ONE
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 3
 BITS = 2
 DESCRIPTION = "Number of truncated bits in block 1 due to BARC data
   compression"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = TRUNCATION_BLOCK_TWO
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 5
 BITS = 2
 DESCRIPTION = "Number of truncated bits in block 2 due to BARC data
   compression"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = TRUNCATION_BLOCK_THREE
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 7
 BITS = 2
 DESCRIPTION = "Number of truncated bits in block 3 due to BARC data
```

```
  compression"
END_OBJECT

OBJECT = BIT_COLUMN
NAME = TRUNCATION_BLOCK_FOUR
BIT_DATA_TYPE = UNSIGNED_INTEGER
START_BIT = 9
BITS = 2
DESCRIPTION = "Number of truncated bits in block 4 due to BARC data
  compression"
END_OBJECT

OBJECT = BIT_COLUMN
NAME = TRUNCATION_BLOCK_FIVE
BIT_DATA_TYPE = UNSIGNED_INTEGER
START_BIT = 11
BITS = 2
DESCRIPTION = "Number of truncated bits in block 5 due to BARC data
  compression"
END_OBJECT

OBJECT = BIT_COLUMN
NAME = TRUNCATION_BLOCK_SIX
BIT_DATA_TYPE = UNSIGNED_INTEGER
START_BIT = 13
BITS = 2
DESCRIPTION = "Number of truncated bits in block 6 due to BARC data
  compression"
END_OBJECT

OBJECT = BIT_COLUMN
NAME = TRUNCATION_BLOCK_SEVEN
BIT_DATA_TYPE = UNSIGNED_INTEGER
START_BIT = 15
BITS = 2
DESCRIPTION = "Number of truncated bits in block 7 due to BARC data
  compression"
END_OBJECT

OBJECT = BIT_COLUMN
NAME = TRUNCATION_BLOCK_EIGHT
BIT_DATA_TYPE = UNSIGNED_INTEGER
START_BIT = 17
BITS = 2
DESCRIPTION = "Number of truncated bits in block 8 due to BARC data
  compression"
END_OBJECT

OBJECT = BIT_COLUMN
NAME = TRUNCATION_BLOCK_NINE
BIT_DATA_TYPE = UNSIGNED_INTEGER
START_BIT = 19
BITS = 2
DESCRIPTION = "Number of truncated bits in block 9 due to BARC data
  compression"
END_OBJECT

OBJECT = BIT_COLUMN
NAME = TRUNCATION_BLOCK_TEN
BIT_DATA_TYPE = UNSIGNED_INTEGER
START_BIT = 21
BITS = 2
DESCRIPTION = "Number of truncated bits in block 10 due to BARC data
  compression"
END_OBJECT

OBJECT = BIT_COLUMN
NAME = TRUNCATION_BLOCK_ELEVEN
BIT_DATA_TYPE = UNSIGNED_INTEGER
START_BIT = 23
BITS = 2
DESCRIPTION = "Number of truncated bits in block 11 due to BARC data
  compression"
END_OBJECT
```

```
 OBJECT = BIT_COLUMN
 NAME = TRUNCATION_BLOCK_TWELVE
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 25
 BITS = 2
 DESCRIPTION = "Number of truncated bits in block 12 due to BARC data
   compression"
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = FILLER
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 27
 BITS = 2
 ITEMS = 3
 DESCRIPTION = "Six bits to fill out the VAX unsigned integer"
 END_OBJECT

END_OBJECT

OBJECT = COLUMN
NAME = BARC_TRUNCATED_PIXELS
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 108
BYTES = 2
DESCRIPTION = "Total number of pixels truncated at end of line due to
   BARC data compression."
END_OBJECT

OBJECT = COLUMN
NAME = CATALOG_VERSION
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 110
BYTES = 2
DESCRIPTION = "Catalog version for identical images.  Reserved for MIPS."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 112
BYTES = 2
DESCRIPTION = "Used during Phase 1 to store the GCF symbol signal to noise
   ratio."
END_OBJECT

OBJECT = COLUMN
NAME = DEEP_SPACE_NETWORK_ID
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 114
BYTES = 1
DESCRIPTION = "Deep space network station id."
END_OBJECT

OBJECT = COLUMN
NAME = IMAGE_LINE_NUMBER
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 115
BYTES = 2
DESCRIPTION = "Image line number (1-800)."
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 117
BYTES = 1
DESCRIPTION = "Used during phase 1 to store the Reed/Solomon overflow
   error flag. 1 = Overflow occurred."
END_OBJECT

OBJECT = COLUMN
NAME = SEGMENT_STARTING_SAMP1
```

```
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 118
BYTES = 2
DESCRIPTION = "The starting sample for the first of up to two segments of an
   image line identifying where the data is present.  For OPNAV images with 3
   segments on a line, the first two segments are joined."
END_OBJECT

OBJECT = COLUMN
NAME = SEGMENT_ENDING_SAMP1
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 120
BYTES = 2
DESCRIPTION = "The ending sample for the first of up to two segments of an
   image line identifying where data is present.  For OPNAV images with 3
   segments on a line, the first two segments are joined."
END_OBJECT

OBJECT = COLUMN
NAME = SEGMENT_STARTING_SAMP2
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 122
BYTES = 2
DESCRIPTION = "The starting sample for the second of up to two segments of an
   image line identifying where data is present."
END_OBJECT

OBJECT = COLUMN
NAME = SEGMENT_ENDING_SAMP2
DATA_TYPE =  LSB_UNSIGNED_INTEGER
START_BYTE = 124
BYTES = 2
DESCRIPTION = "The ending sample for the second of up to two segments of an
   image line identifying where data is present."
END_OBJECT

OBJECT = COLUMN
NAME = PACKET_COUNT
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 126
BYTES = 1

 OBJECT = BIT_COLUMN
 NAME = FULL_PACKETS
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 1
 BITS = 4
 DESCRIPTION = "Number of full Telmetry packets needed to create this
    image line."
 END_OBJECT

 OBJECT = BIT_COLUMN
 NAME = PARTIAL_PACKETS
 BIT_DATA_TYPE = UNSIGNED_INTEGER
 START_BIT = 4
 BITS = 4
 DESCRIPTION = "Number of partial Telmetry packets needed to create this
    image line."
 END_OBJECT

END_OBJECT


OBJECT = COLUMN
NAME = APPLICATION_PACKET_ID
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 127
BYTES = 1
DESCRIPTION = "Application Packet ID. 30 for SSI1 (ICT) and 31 for SSI2 (BARC)."
END_OBJECT

OBJECT = COLUMN
NAME = PACKET_SEQUENCE_ID
DATA_TYPE = LSB_UNSIGNED_INTEGER
```

```
START_BYTE = 128
BYTES = 4
DESCRIPTION = "TIS assigned packet sequence id.  The packet sequence id is
   for the purpose of maintaining proper order of packets.  If more than
   one telemetry packet is used to reconstruct a line, only the packet
   sequence of the first packet is retained."
END_OBJECT

OBJECT = COLUMN
NAME = PACKET_STARTING_SAMP
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 132
BYTES = 2
DESCRIPTION = "Starting sample location for the pixel data from the
   the packet identified by the PACKET_SEQUENCE_ID."
END_OBJECT

OBJECT = COLUMN
NAME = TRUTH_WINDOW_START_SAMP
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 134
BYTES = 2
DESCRIPTION = "The starting sample location of the truth window located on
   this line.  0 indicates no truth window on this line."
END_OBJECT

OBJECT = COLUMN
NAME = TRUTH_WINDOW_END_SAMP
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 136
BYTES = 2
DESCRIPTION = "The ending sample location of the truth window located on
   this line.  0 indicates no truth window on this line."
END_OBJECT

OBJECT = COLUMN
NAME = RECORD_CREATION_TIME_YEAR
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 138
BYTES = 2
DESCRIPTION = "The TIS assigned Record Creation Time of the packet.  Year."
END_OBJECT

OBJECT = COLUMN
NAME = RECORD_CREATION_TIME_DAY
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 140
BYTES = 2
DESCRIPTION = "The TIS assigned Record Creation Time of the packet.  Day."
END_OBJECT

OBJECT = COLUMN
NAME = RECORD_CREATION_TIME_HOUR
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 142
BYTES = 1
DESCRIPTION = "The TIS assigned Record Creation Time of the packet.  Hour."
END_OBJECT

OBJECT = COLUMN
NAME = RECORD_CREATION_TIME_MIN
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 143
BYTES = 1
DESCRIPTION = "The TIS assigned Record Creation Time of the packet.  Minute."
END_OBJECT

OBJECT = COLUMN
NAME = RECORD_CREATION_TIME_SEC
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 144
BYTES = 1
DESCRIPTION = "The TIS assigned Record Creation Time of the packet.  Second."
END_OBJECT
```

```
OBJECT = COLUMN
NAME = RECORD_CREATION_TIME_MSEC
DATA_TYPE = LSB_UNSIGNED_INTEGER
START_BYTE = 145
BYTES = 2
DESCRIPTION = "The TIS assigned Record Creation Time of the packet.
   Millisecond."
END_OBJECT

OBJECT = COLUMN
NAME = DECOMPRESSION_ERROR_FLAG
DATA_TYPE = UNSIGNED_INTEGER
START_BYTE = 147
BYTES = 1
DESCRIPTION = "Decompression status/errors.  0: No errors detected.
         1: Incomplete data for compression."
END_OBJECT

OBJECT = COLUMN
NAME = COMPRESSION_RATIO
DATA_TYPE = ASCII
START_BYTE = 148
BYTES = 6
DESCRIPTION = "Compression ratio for the line.  Real number
          represented as an ascii string in the form 123.12"
END_OBJECT

OBJECT = COLUMN
NAME = FILLER
DATA_TYPE = CHARACTER
START_BYTE = 154
BYTES = 47
DESCRIPTION = "Reserved"
END_OBJECT


END_OBJECT
```

3.2.2.5.3 BADDATA.TXT

This is a textual file that describes the structure and content of the bad data value header which follows the telemetry header and precedes the image records. (See Appendix B).

3.2.2.6 VICAR2.TXT

This is a textual file that describes the structure and content of the image header which precedes the telemetry header and precedes the image records. (See Appendix C).

Appendix A

SUPPORT STAFF AND COGNIZANT PERSONS

The following table lists the support staff according to the information required by the user.

Information Required	Contact / Address
How to read the CD-ROM	Data Distribution Laboratory MS 525-3610 Jet Propulsion Laboratory 4800 Oak Grove Drive Pasadena, CA 91109 626-306-3603 Electronic mail addresses: Internet: DDL@stargate.jpl.nasa.gov
MIPS products	Helen Mortensen MS 168-514 Jet Propulsion Laboratory 4800 Oak Grove Drive Pasadena, CA 91109 626-354-0002 Electronic mail address: Helen.Mortensen@jpl.nasa.gov
Information abour other PDS Data Products:	PDS Operator MS 525-3610 Jet Propulsion Laboratory 4800 Oak Grove Drive Pasadena, CA 91109 818-306-6130 Electronic mail address: pds_operator@jplpds.jpl.nasa.gov

Appendix B

BAD DATA VALUE HEADER DESCRIPTIONS

This section defines the format and contents of the binary labels used to store SSI bad-data values.

There are two parts to the binary label: the binary header, and the binary prefix. The binary header precedes the image data (as do the ASCII labels) and contains information which pertain to the entire image. The binary prefix precedes each image line and contains information specific to each line. Binary labels are created by adding the U_NLB and U_NBB keywords to the XVOPEN call. Binary labels are accessed from a file already containing them by adding the CONDITION, BINARY keywords to the XVOPEN call. Note that since VICAR programs do not normally include these keywords in their XVOPEN calls, binary labels are usually ignored and disappear when new versions of an image are created. Binary labels were originally designed to support the generation of Voyager EDRs. The binary labels are written in VAX compatible (least significant byte first) format.

The binary header consists of an arbitrary number of records. The first record contains ancillary telemetry information. The remaining binary header records contain bad-data information,stored as a sequence of "objects" in 16-bit integer format for EDRs and 8-bit integers for REDRs. The following types of objects have been defined:

Object Type	Code	Format
Single Pixels	1	Line, sample
Line segments	2	line, starting-sample, number-of-samples
Column segments	3	sample, starting-line, number-of-lines

These objects are used to encode the following bad-data types:

Bad Data Type	Record ID	Created By
Data dropout	3	GALSOS or BADLABELS
Saturated pixels	4	GALSOS or BADLABELS
Low-full-well pixels	5	GALSOS or GLL BLEMCOR
Single-pixel spikes	6	ADESPIKE
Reed-Solomon overflow	7	GALSOS or BADLABELS

Single-pixel spikes are stored as single pixels, data drop-outs, saturated pixels, and Reed-Solomon overflow records are stored as line segments, and low-full-well pixels as column segments.

Note: For compressed image data, all pixels to the right of the first bit error will be corrupted. Since it is not possible to determine where this bit error occurs, the entire line is flagged as bad.

Each record will be in 16-bit integer data format and will contain only one type of object. The first three integers of each record contain the record ID, object code (CODE), and the number of objects in the record (N), respectively. The remainder of the record will contain a sequence of N objects. The maximum number of objects which can be stored on a record is a function of the EDR record length and object code. Full-frame and summation-mode EDRs have record lengths of 1800 bytes and 1000 bytes, respectively:

Code	Full-Frame Max. Objects	Summation-Mode Max. Objects
1	448	248
2	299	165
3	299	165

If more objects of a certain type exist, they are written on subsequent records. The records are not necessarily written in any particular order, although they must all precede the image line records.

Example 1: Let a binary header record contain the sequence of integers 6,1,3,211,104,322,111,401,233. The record contains single-pixel spikes (6) encoded as single-pixels (1). There are three objects encoded as line-sample coordinates: (211,104), (322,111), and (401,233).

Example 2: Let a binary header record contain the sequence of integers 4,2,2,110,216,105,789,420,381. The record contains saturated pixels (4) encoded as line segments (2). There are two objects. The first line segment is on line 110 and from sample 216 to 320. The second line segment is on line 789 and from sample 420 to 800.

Example 3: Let a binary header record contain the sequence of integers 5,3,2,299,710,91,521,72,729. The record contains low-full-well pixels (5) encoded as column segments (3). There are two objects. The first column segment is on sample 299 and from lines 710 to 800. The second column segment is on sample 521 and from lines 72 to 800.

The following is an example of a program which reads an image containing bad-data information, does something with this information, and outputs an image which does not contain any binary labels (all subroutines other than XV routines are fictitious):

```
COMMON / HDRREC / RECORDID,CODE,NOBJECTS,SPIX(2,448)!Binary header
record
INTEGER*2 RECORDID,CODE,NOBJECTS,SPIX
INTEGER*2 BUF(900),LSEG(3,299),CSEG(3,299)
EQUIVALENCE (BUF,RECORDID),(SPIX,LSEG,CSEG)

COMMON / IMGREC / LHDR(100),PIXELS(800) !Image line record
INTEGER*2 LHDR,PIXELS,LBUF(900)
EQUIVALENCE (LBUF,LHDR)

CALL XVUNIT(IUNIT,'INP',1,IND)
CALL XVOPEN(IUNIT,IND,'COND','BINARY')
CALL XVGET(IUNIT,IND,'NL',NL,'NS',NS,'NLB',NLB)

DO L=2,NLB !Loop through the binary header records
CALL XVREAD(IUNIT,BUF,IND,'LINE',L)
IF (CODE.EQ.1) CALL SINGLE_PIXEL(SPIX,RECORDID,NOBJECTS)
```

```
IF (CODE.EQ.2) CALL LINE_SEGMENT(LSEG,RECORDID,NOBJECTS)
IF (CODE.EQ.3) CALL COLUMN_SEGMENT(CSEG,RECORDID,NOBJECTS)
ENDDO

CALL XVUNIT(OUNIT,'OUT',1,IND)
CALL XVOPEN(OUNIT,IND,'OP','WRITE')

DO L=1,NL!Loop through each image line record
CALL XVREAD(IUNIT,LBUF,IND)!Read a line record
CALL PROCESS_LINE(PIXELS,NS)!Process the image line
CALL XVWRIT(OUNIT,PIXELS,IND)  !Write the image line
ENDDO
```

Appendix C

GALILEO SSI FLIGHT LABEL

The following is the VICAR2.TXT file which describes the SSI VICAR label of the Galileo REDR images.

INTRODUCTION

This file describes the organization and content of the Galileo SSI flight label for REDR and EDR images. This label is based on the Video Image Communication and Retrieval (VICAR) image processing label standard. Label items, their meanings and values, are described in this document.

ACRONYMS

ASCII	American Standard Code for Information Interchange
CD	Compact Disc
EDR	Experiment Data Record
GLL	Galileo Project
MIPS	Multimission Image Processing Subsystem
REDR	Raw Experiment Data Record
RTS	MIPS Realtime system
SPICE	MIPS Navigation software based on NAIF SPICE kernels
SSI	Solid State Imaging camera
VICAR	Video Image Communication and Retrieval
VIEW	MIPS Galileo SSI Image Catalog

VICAR LABEL STRUCTURE

The VICAR label is a string of ASCII characters consisting of free-field items of the form "keyword = value" separated by spaces. It contains data set description system information regarding the dimensions, organization and data format. This information is written to the label with the following keywords:

LBLSIZE	Size of the label in bytes
FORMAT	Data format (byte, halfword, real, fullword, etc.)
TYPE	Data set type (image, parameter, histogram, plot, etc.)
BUFSIZ	Internal blocksize VICAR will use during input/output
DIM	Data set dimension
EOL	End-of-dataset label
RECSIZE	Data set record size
ORG	Data set organization: BSQ - Band Sequential BIL - Band Interleaved by Line BIP - Band Interleaved by Pixel

NL	Number of lines or records
NS	Number of samples or record length
NB	Number of bands or number of data planes
NBB	Number of binary prefix bytes
NLB	Number of binary header records
N1	Equal to NS
N2	Equal to NL for BSQ, NB for BIL and NS for BIP
N3	Equal to NB for BSQ, or NL for BIL and BIP
N4	Not used
HOST	Type of computer used to generate the image.
INTFMT	The format used to represent integers in the file.
REALFMT	The format used to represent floating numbers.
BHOST	Type of computer used to generate the binary information.
BINTFMT	The format used to represent binary integers in the file.
BREALFMT	The format used to represent binary floating numbers.
BLTYPE	The binary label type. Currently not implemented.

The VICAR label also contains processing history information on the file describing the application programs or procedures which have processed the data set, the user parameters of the respective programs or procedures, the user identification and processing date and time. The following VICAR label items are used to describe history information for each program or procedure executed:

TASK	Program or procedure that has processed the data set
USER	User identification
DAT_TIM	Processing date and time
opt. items	VICAR label items added by application program or procedure listed under the respective task

GALILEO SSI FLIGHT LABEL

The following is the latest memorandum describing the SSI VICAR label for Jupiter Orbiatal Operations (Phase 2) and retains Cruise (Phase 1) information. The memorandum describes both the SSI Ground-Calibration label and the Flight label. PDS labels contained in this CD-ROM data set are flight labels.

JET PROPULSION LABORATORY

INTEROFFICE MEMORANDUM
MSD:388-97-001
1 August 1997

To: Distribution
From: Gary Yagi, Helen Mortensen
Subject: Galileo SSI Picture Label, Revision 5

References:

1) "Preliminary Mask Definition for Galileo SSI Systematic Color Hardcopy Products", Ken Klaasen and Jim Anderson, 13 October 1987.
2) "Designing the Galileo VICAR image label", Doug Alexander, IOM, 18 April 1988.
3) "MIPS Phase 2 Software Requirements for SSI, Revision 2", Gary Yagi, IOM March 7, 1994
4) "SSI Raw Experiment Data Record (REDR) for Phase 2 SIS", D-11805

INTRODUCTION: This memo documents the format and contents of the Galileo SSI ground-calibration label and flight image label for both cruise (Phase 1) and Jupiter Obital Operations (Phase 2). The purpose of these labels and requirements for label maintenance are also addressed.

PURPOSE OF THE PROJECT LABEL: All digital images stored in standard VICAR format are preceded by a picture label. The label consists of picture descriptors and processing history information stored in ASCII.

Flight projects have traditionally designed special label formats to identify the mission, spacecraft, instrument, target, and frame, and to include various camera and image geometry information pertinent to the interpretation of the image. The project labels are attached to each new image received via the real-time system, or ground-calibration tapes. Consequently, these labels normally precede all other labels. This memo is concerned specifically with these project labels, and does not address other labels added by VICAR or application programs during processing.

During systematic and science processing, individual programs may extract and use various image identifiers and camera parameters stored in the label. The image geometry information included in the label is ignored during processing, since more accurate information is available in the project SEDR or SPICE files.

As each new version of an image is produced, the VICAR system will automatically copy the picture label and add the program name, user name, and date to the processing history. In addition, individual programs may add processing information to the label.

The image label may be printed by executing LABLIST or LABEL-LIST on the image. Unless a rigid file-name nomenclature is adhered to, this image label is the only means of identifying an image stored on disk.

GALILEO SSI GROUND-CALIBRATION LABEL: The ground-calibration picture label is generated by program VGLLOG, which reads tapes generated by the Galileo Sensor Test Set (STS) and converts the file to standard VICAR image format.

```
LAB01=GLL/SSI S/N=F29 LEVEL=SUBSYSTEM  10:59:15  MAY  19, 1985 FRAME61          C
LAB02=TEST=LIGHT TRANSFER C TARGET=TUNG L SOURCE=LC 70VR  FR.RATE=8 2/3  C
LAB03=EXP=0       MSEC(***) GAIN=1(400K) PNI=    BPM=OFF  FILTER=0(CLR)          C
LAB04=BARC=OUT(RAT) SUM=OFF     EXPAND=OFF  IN=GL0353/61 OUT=GC1109/61     C
LAB05= CCDTF=119  CCDTC=50    INN=**  +50VDC=**  +15VDC=**                    C
LAB06=-15VDC=**  +10VDC=**  +5VDC=**   -5VDC=**  CCDHEV=**  BLSCV=**          C
LAB07=ADCRFV=**    VDD=**  VREF=**    VCC=**    VEF=**   ROPT=**              C
LAB08=DESCRIPTOR=DARK FRAME, 8 C, 8 2/3 SEC, 100K, INVERTED                   L
NLABS=8
```

Appendix 1 presents a brief description of each label item. The ground-calibration label follows a convention used to support old label formats originally used on the IBM (before 1984). The project labels are stored as label items LAB01, LAB02, LAB03, etc. Each LABXX item consists of a 72-character ASCII strings. The 71st character is a label type flag used by some programs (e.g. MASKV) to control which labels are displayed or printed. The last character in each string is a 'C' (for continue) or 'L' (for last). However, note that the additional label item NLABS should be used to indicate how many project labels are present.

GALILEO SSI FLIGHT LABEL: The flight label is in free format, with each label item stored in the form "keyword=value". A brief description of each label item is provided in Appendix 2 for Phase 1 and for Phase 2.

Summation-mode frames can be identified by their 2 1/3 frame rate and 15-1/6 frame rate (added for Phase 2). The majority of the label items are generated by the Real-Time subsystem's Image-Builder program. Label items DC, CAL, SO, BLM, IOF, CNV, and UBWC are added by GALSOS. If the image is read from an EDR tape, label items EDRTAPE and EDRFILE are added by GEDREAD. EDRTAPE and EDRFILE are no longer used with files archived on CD-ROM.

When an image is map-projected, the following label items relating to image geometry must be updated (by MAP3): SUNAZ, SMRAZ, SCAZ, NORAZ, SMR, LAT, LON, HSCL, VSCL. This is not currently implemented.

The program LABLIST has been written to list the label items in a

standard format at the terminal or on hardcopy. (NOTE: See Appendix 2 for a complete list of Phase 2 label-items. At publication time, the program LABLIST had not been modified to read and format the most recent additions.) The following is the format for a Phase 1 image:

```
GLL/SSI PICNO=12A0001          FILTER=3(VIO)  TLMFMT=XXX  TARGET=CALLISTO
RIM=16777215:90:9:7            EXP=51200.00   FIBE=1001    TCA=-003 23:13:00
SCET=95.123 12:23:56           GAIN=1(400K)   BARC=RC      TRUNC BITS/PXL=2.34
PA=NNIOOOOOO#MMSSSSXXXX        RATE=60 2/3    ENTRPY=2.23  TRUNC PXLS/LNE=123
INA= 89.12  TWST=359.99        SUNAZ=359.99   BOOM=NO      HSCL=1.2345E5 M/PXL
EMA=180.00  CONE=179.          SMRAZ=359.99   SMEAR=99.99  VSCL=1.2345E5 M/PXL
PHA=179.33  RA=359.99          S/CAZ=359.99   LAT=-90.00   PLANETRNG=123456789
HRA=130.31  DEC=-90.00         NORAZ=359.99   LON=359.99   SLANT RNG=123456789
CAL=RADIOMETRIC-FILENAME       IOF=1.0000E-3  UBWC=YES     SOLAR RNG=123456789
DC=DARKCURRENT-FILENAME        CNV=3.5135E-2
BLM=BLEMISH-FILENAME           SO=SHUT-OFFSET-FILENAME EDR=GLL6622/066
```

For a Phase 2 BARC image:

```
GLL/SSI PICNO=G1G0021          FILTER=0(CLR)          TLMFMT=IM4     TARGET=GANYMEDE
RIM=1/03497590:13:0:0          EXP=  12.50            MOFIBE=001000  TCA=-000T11:21:40
SCET=96.179 06:09:19:383       GAIN=2(100K)           ETYPE=RC       TRUNC BITS/PXL=2.26
PA=G1GSGREGIO01                RATE=8 2/3             ENTROPY=4.32   TRUNC PXLS/LNE=156
INA= 29.53  TWST=253.89        SUNAZ=  6.23           BOOM=NO        HSCL=1.1283e+02 M/PXL
EMA= 47.54  CONE=201.24        SMRAZ=-999.0           SMEAR= 0.10    VSCL=8.2259e+01 M/PXL
PHA= 20.89  RA=260.87          S/CAZ=341.74           LAT= 19.05     PLANETRNG=1.0822e+06
HRA= 13.41  DEC=-20.83         NORAZ=282.79           LON=149.25     SLANT RNG=7.6605e+03
CAL=******************         IOF=**********         UBWC=***       SOLAR RNG=7.7771e+08
DC=******************          CNV=**********
BLM=******************         SO=******************                 REDR=***********/***
SUB_SOLAR_LAT= -1.87           SUB_SOLAR_LONG=170.45                 SUB_SPCFT_LAT=  1.54
SUB_SPCFT_LONG=181.26
```

For a Phase 2 ICT compressed image that has been radiometrically corrected:

```
GLL/SSI PICNO=G1G0001          FILTER=2(RED)          TLMFMT=HIM     TARGET=GANYMEDE
RIM=1/03496320:00:0:0          EXP=  62.50            MOFIBE=001000  TCA=-001T08:45:50
SCET=96.178 08:45:09:457       GAIN=2(100K)           ETYPE=ICT      COMP-RATIO=  6.55
PA=G1GSGLOBAL01                RATE=60 2/3            ENTROPY=3.72   HUF=SKEWED
MAX_C RATIO= 25.39             MIN_C RATIO=  4.26                    THW=(801,801, 96, 96)
QSTEP=6    QM=UNIFORM          ZZ=ZIGZAG              ROI=(129,  1,672,784)
INA= 30.31  TWST= 68.37        SUNAZ=184.06           BOOM=NO        HSCL=6.7383e+03 M/PXL
EMA=  0.09  CONE=149.02        SMRAZ=-999.0           SMEAR= 0.10    VSCL=6.7388e+03 M/PXL
PHA= 30.40  RA=251.64          S/CAZ=120.40           LAT= -8.06     PLANETRNG=1.6902e+06
HRA= 10.32  DEC=-16.35         NORAZ=104.34           LON=155.40     SLANT RNG=6.6373e+05
CAL=redf.cal03                 IOF=1.0000e+00         UBWC=OFF       SOLAR RNG=7.7791e+08
DC=2f60.dc03                   CNV=1.8164e-01         SEQNO=0        DSPK_THRESH=255
BLM=red2f.blm02                SO=calibration.so02                   EDR=***********/***
SUB_SOLAR_LAT= -1.87           SUB_SOLAR_LONG=125.60                 SUB_SPCFT_LAT= -8.06
SUB_SPCFT_LONG=155.50
```

For a Phase 2 Huffman compressed image:

```
GLL/SSI PICNO=G1J0065     FILTER=4(756)          TLMFMT=HIS     TARGET=JUPITER
RIM=1/03496741:01:0:0     EXP= 262.50            MOFIBE=001000  TCA=-001T01:40:15
SCET=96.178 15:50:44:874  GAIN=1(400K)           ETYPE=HUF      COMP-RATIO= 1.73
PA=G1JSGRSEM401           RATE=15 1/6            ENTROPY=3.03   HUF=UNIFORM
MAX_C RATIO= 1.79         MIN_C RATIO= 1.67
INA= 20.79 TWST= 75.15    SUNAZ=183.51           BOOM=NO        HSCL=5.4607e+04 M/PXL
EMA= 58.67 CONE=139.20    SMRAZ=-999.0           SMEAR= 0.10    VSCL=3.2332e+04 M/PXL
PHA= 40.42 RA=239.30      S/CAZ=198.32           LAT=-11.15     PLANETRNG=1.4819e+06
HRA= 14.10 DEC=-20.82     NORAZ= 92.89           LON=334.98     SLANT RNG=1.4434e+06
CAL=******************    IOF=**********         UBWC=***       SOLAR RNG=7.7879e+08
DC=******************     CNV=**********         SEQNO=1        DSPK_THRESH=255
BLM=******************    SO=******************                 REDR=***********/***
SUB_SOLAR_LAT= -1.80      SUB_SOLAR_LONG=352.84                 SUB_SPCFT_LAT= -2.54
SUB_SPCFT_LONG= 30.98
```

For a Phase 2 OPtical NAVigation image:

```
GLL/SSI PICNO=OPN0196     FILTER=0(CLR)          TLMFMT=IM8     TARGET=GANYMEDE
RIM=1/03491551:00:0:0     EXP= 25.00             MOFIBE=010000  TCA=002T00:23:05Z
SCET=96.175 00:23:04:952  GAIN=3(40K)            ETYPE=NONE     TRUNC BITS/PXL=0.00
PA=J0GSOPNAV196           RATE=8 2/3             ENTROPY=0.00   TRUNC PXLS/LNE= 0
INA=-999.0 TWST= 65.85    SUNAZ=******           BOOM=POSSIBLE  HSCL=-9.9900e+0 M/PXL
EMA=-999.0 CONE= 0.00     SMRAZ=******           SMEAR= 0.10    VSCL=-9.9900e+0 M/PXL
PHA=-999.0 RA=207.10      S/CAZ=******           LAT=-999.0     PLANETRNG=7.0354e+06
HRA=-999.0 DEC= -8.14     NORAZ=******           LON=-999.0     SLANT RNG=-9.9900e+0
CAL=******************    IOF=**********         UBWC=***       SOLAR RNG=7.7974e+08
DC=******************     CNV=**********         SEQNO=******   DSPK_THRESH=********
BLM=******************    SO=******************                 REDR=***********/***
SUB_SOLAR_LAT= -1.88      SUB_SOLAR_LONG=316.59                 SUB_SPCFT_LAT= -5.11
SUB_SPCFT_LONG= 50.19     NSTARS=4                              STAR1=(371,606, 16, 31)
STAR2=(387,606, 16, 31)   STAR3=(505,187, 16, 31)               STAR4=(521,187, 16, 31)
```

APPLICATION PROGRAM/LABEL INTERFACES: Label items may be stored, retrieved, or deleted via subroutines XLADD, XLGET, or XLDEL, respectively. Subroutine VIC1LAB may be used to retrieve all ground-calibration labels. The subroutine ABLE86 will extract specific information from either flight or ground-calibration labels and return the results in an array (e.g. filter position). Note that programs that support more than one mission (e.g. Voyager and Galileo) should not call ABLE86 directly, but use GETLABCON instead.

APPENDIX 1: DESCRIPTION OF GLL SSI GROUND-CALIBRATION LABEL ITEMS

LABEL ITEM	DESCRIPTION
S/N=F29	CCD identifier (F29=flight unit)
LEVEL=SUBSYSTEM	Test level: component or subsystem
FRAME61	Frame number (0-99)
TEST=LIGHT TRANSFER C	Test name (16 characters)
TARGET=TUNG	Target name (6 characters)
SOURCE=LC 70VR	Light source/veeder-root
FR.RATE=60 2/3	Frame rate (sec)
EXP=51200.00 MSEC(EXT)	Exposure time (msec), extended or normal
GAIN=1(400K)	Gain state (1-4)
PNI=NOR	Parallel clock (INV=inverted, NOR=normal)
BPM=OFF	Blem-protect (ON or OFF)
FILTER=3(VIO)	Filter position: 0(CLR), 1(GRN), 2(RED), 3(VLT), 4(756), 5(968), 6(727), 7(889)
BARC=OUT(RAT)	Data compressor ON or OUT, (RAT=rate control, IP=information preserving, OFF=compressor off)
SUM=OFF	Summation-mode (ON or OFF)
EXPAND=OFF	(obsolete field)
IN=GL0353/61	Input STS tape/fileno
OUT=GC1109/61	VICAR output tape/fileno
CCDTF=119	CCD faceplate temperature
CCDTC=50	CCD camera temperature
DESCRIPTOR=...	Frame descriptor

NOTE: The remaining fields were never implemented.

APPENDIX 2: VICAR LABEL KEYWORDS AND DESCRIPTIONS

(*-added or modified for Phase 2,
#-Phase 1 only)

LABEL ITEM	DESCRIPTION	SOURCE
#BARC=string	Data compression mode RC=rate control IP=information preserving OFF=off	RTS
BLM=string	Blemish file name.	GALSOS
BOOM=string	Boom obscuration (P=possible,N=not possible, V=presence verified)	RAW
CAL=string	Radiometric file name	GALSOS
CNV=real	DN to radiance conversion factor	GALSOS
*COMPRESSION_RATIO=real	ICT or lossless compression ratio	RTS
CONE=real	Cone angle (-90 to +210)	RAW
*CUT_OUT_WINDOW= integer (sl,ss,nl,ns)	Cut-out window size field. See notes. (sl=starting line; ss=starting sample; nl=number of lines; ns=number of samples)	ICT
DC=string	Dark-current file name	GALSOS
DEC=real	Declination of pointing vector at shutter open. Valid is -90 to 90.	VIEW, SPICE
DIRBLM=string	Blemish file directory	GALSOS
DIRCAL=string	Radiometric file directory	GALSOS
DIRDC=string	Dark current file directory	GALSOS
DIROFF=string	Shutter-offset file directory	GALSOS
*ERTDAY=integer	Earth received day of year of 1st packet received for this image	RTS
*ERTHOUR=integer	Earth received hour of 1st packet received for this image	RTS
*ERTMIN=integer	Earth received minute of 1st packet received for this image	RTS
*ERTMSEC=integer	Earth received milli-second of 1st packet received for this image	RTS
*ERTSEC=integer	Earth received second of 1st packet received for this image	RTS
*ERTYEAR=integer	Earth received year of 1st	RTS

	packet received for this image	
EMA=real	Emission angle (0-180)	VIEW, SPICE
*ENCODING_TYPE=string	Type of Compression used. (integer cosine transform, huffman, barc rate control, barc information preserving, or none).	RTS
ENTROPY=real	Average entropy level (bits/pixel)	GALSOS, BADLABELS
EXP=real	Exposure time (msec)	VIEW
#FIBE=string	Camera flags (4 characters) F=light flood (1=on, 0=off) I=clock (1=inverted, 0=non-inverted) B=blemish protect (1=on, 0=off) E=ext-exposure (1=extended, 0=normal)	RTS
FILTER=integer	Filter position (0=CLEAR, 1=GREEN 2=RED, 3=VIOLET, 4=IR-7560, 5=IR-9680, 6=IR-7270, 7=IR-8890)	VIEW
GAIN=integer	Gain state code (1=400K, 2=100K 3=40K, 4=10K)	VIEW, RTS
HRA=real	Hour angle (0-360)	VIEW, SPICE
HSCL=real	Horizontal picture scale (m/pixel)	VIEW, SPICE
*HUFFMAN_TABLE_NAME=string	Name of Huffman table (7 haracters) (SKEWED or UNIFORM) See notes.	ICT
*ICT_DESPIKE_THRESHOLD= integer	ICT despike threshold. See notes.	ICT
INA=real	Incidence angle (0-180)	VIEW, SPICE
IOF=real	DN to reflectance conversion factor	GALSOS
LAT=real	Latitude at which the picture scale and lighting geometry is alculated. See notes. (-90-+90)	VIEW, SPICE
LIGHT_SOURCE_LINE=real	The line in the image at which the picture scale and lighting geometry is calculated.	SPICE
LIGHT_SOURCE_LINE_SAMPLE= real	The sample in the image at which the picture scale and lighting geometry is calculated.	SPICE
LON=real	West longitude at which the picture scale and lighting geometry is calculated. See	VIEW, SPICE

	notes. (0-360)	
*MAXIMUM_COMPRESSION_RATIO ICT =real		
	or lossless maximum compression ratio. See notes.	RTS
*MINIMUM_COMPRESSION_RATIO ICT =real		
	or lossless minimum compression ratio. See notes.	RTS
MISSION=string	Mission ID (GALILEO)	RTS
MOD10=integer	MOD10 count for the beginning of the frame cycle	RTS
MOD8=integer	MOD8 count for the beginning of the frame cycle	RTS
MOD91=integer	MOD91 count for the beginning of the frame cycle	RTS
*MOFIBE=string	Camera flags (5 characters)	
	M=on-chip mosaic (1=yes, 0=no)	VIEW
	O=Opnav image (1=opnav, 0=SSI)	VIEW
	F=light flood (1=on, 0=off)	RAW, RTS
	I=clock (1=inverted, 0=non-inverted)	RAW, RTS
	B=blemish protect (1=on, 0=off)	RAW, RTS
	E=ext-exposure (1=extended, 0=normal)	RAW, RTS
NORAZ=real	North azimuth (0-360) of the target body (projected spin axis). See notes.	SPICE, VIEW
*NSTARS=integer	Number of OPNAV star areas	OPNAV
PA=string	Profile Activity (20 characters) See Appendix C	VIEW
PARTITION=integer	Count of number of times RIM is reset	RTS
PHA=real	Phase angle (0-180)	VIEW, SPICE
PICNO=string	Picture number (7 characters)	VIEW
PLRANGE=real	Distance from spacecraft to planet (km)	VIEW, SPICE
*QUANTIZATION_MATRIX_NAME =string		
	Name of ICT quantization matrix. (7 characters) UNIFORM (also called VG0); . See notes.	ICT
QUANTIZATION_STEP_SIZE= integer		
	Integer value by which ICT transform is divided. See notes.	ICT
RA=real	Right-ascension of pointing vector (0-360)	VIEW, SPICE
RAD=real	Ring radius of center of frame (km). Ring images only.	SPICE, VIEW
RATE=integer	Frame rate code (1=2-1/3 sec, 2=8-2/3, 3=30-1/3, 4=60-2/3,	VIEW

	5=15-1/6)	
*READOUTMODE=string	Camera readout mode. (SAMPLE or CONTIGUOUS) for HMA or HCA else NOT APPLICABLE	VIEW
RIM=integer	RIM count for the beginning of the frame cycle	RTS
SCAZ=real	Spacecraft azimuth (0-360). See notes.	SPICE, VIEW
SCETDAY=integer	Spacecraft-Event-Time day-of-year for shutter center	VIEW
SCETHOUR=integer	Spacecraft-Event-Time hour-of-day for shutter center	VIEW
SCETMIN=integer	Spacecraft-Event-Time minute-of-hour for shutter center	VIEW
SCETMSEC=integer	Spacecraft-Event-Time msec-of-second for shutter center	VIEW
SCETSEC=integer	Spacecraft-Event-Time second-of-minute for shutter center	VIEW
SCETYEAR=integer	Spacecraft-Event-Time year for shutter center	VIEW
SENSOR=string	Sensor ID (SSI)	RTS
SEQNO=integer	ICT Image version sequence number	ICT
SLRANGE=real	S/C-to-target slant range (km)	VIEW,SPICE
SMEAR=real	Smear magnitude (pixels). Not calculated because angular velocity is not available in the SPICE CK. Will always be 0.1	VIEW
SMRAZ=real	Smear azimuth (0-360). See notes. Not calulated because angular velocity is not available in the SPICE CK. Will always be -999.0.	SPICE, VIEW
*SPICE_C_ID=string	4-char name of C-matrix source	SPICE,VIEW
SO=string	Shutter-offset file name	GALSOS
SOLRANGE=real	Distance from sun to target-body (km)	VIEW, SPICE
*STAR1=(sl,ss,nl,ns) sl=integer ss=integer nl=integer ns=integer samples)	Size field for first OPNAV star area. See notes. (sl=starting line; ss=starting sample; nl=number of lines; ns=number of	OPNAV
*STAR2=(sl,ss,nl,ns) sl=integer ss=integer nl=integer ns=integer	Size field for second OPNAV star area. See notes. (sl=starting line; ss=starting sample; nl=number of lines; ns=number of samples)	OPNAV
*STAR3=(sl,ss,nl,ns) sl=integer	Size field for third OPNAV star area. See notes.	OPNAV

ss=integer	(sl=starting line;	
nl=integer	ss=starting sample; nl=number	
ns=integer	of lines; ns=number of samples)	
*STAR4=(sl,ss,nl,ns)	Size field for fourthOPNAV	OPNAV
sl=integer	star area. See notes.	
ss=integer	(sl=starting line;	
nl=integer	ss=starting sample; nl=number	
ns=integer	of lines; ns=number of samples)	
*STAR5=(sl,ss,nl,ns)	Size field for fifthOPNAV star	OPNAV
sl=integer	area. See notes.	
ss=integer	sl=starting line; ss=starting	
nl=integer	sample; nl=number of lines;	
ns=integer	ns=number of samples)	
*SUB_SOLAR_LATITUDE=real		
	Planetocentric latitude of the sub-solar point	VIEW, SPICE
*SUB_SOLAR_LONGITUDE=real		
	West longitude of the sub-solar point	VIEW, SPICE
*SUB_SPACECRAFT_LATITUDE= read		
	Planetocentric latitude of the sub-spacecraft point	VIEW, SPICE
*SUB_SPACECRAFT_LINE=real		
	Sub-spacecraft line coordinate	VIEW,SPICE
*SUB_SPACECRAFT_LONGITUDE= real		
	West longitude of the sub-spacecraft point	VIEW, SPICE
*SUB_SPACECRAFT_SAMP=real		
	Sub-spacecraft sample coordinate	VIEW, SPICE
SUNAZ=real	Sun azimuth (0-360). See notes	VIEW, SPICE
TARGET=string	Target-body name (12 characters)	VIEW
*TARGET_CENTER_DISTANCE= real		
	Distance from spacecraft to target center(km)	SPICE
TBPPXL=real	Mean number of truncated bits / pixel, BARC only	RTS
TCA=string	Time from closest approach (13 chars) in the format + or - dddThh:mm:ssZ to Jupiter.	VIEW
TLMFMT=string	Telemetry format (3 characters)	VIEW
TPPLNE=real	Mean number of truncated pixels / line, BARC only	RTS
*TRUTH_WINDOW= integer (sl,ss,nl,ns)	Starting line and starting sample, and number of lines	ICT

	and number of samples of an up to 96x96 pixel truth window. See notes.	
TWIST=real	Twist angle (0-360)	VIEW,SPICE
UBWC=string	Uneven-bit-weight correction (ON or OFF)	GALSOS
VSCL=real	Vertical picture scale (m/pixel)	VIEW, SPICE
*ZIGZAG_PATTERN=string (7 characters)	Name of ICT zigzag coding pattern (ZIGZAG or ALT) See notes.	ICT

Notes:

1) Sources are:
   RAW=ssiraw table of database
   RTS=real time system,
   VIEW=ssioverview table of database,
   ICT=ssiict table of database,
   OPNAV=ssiopnav table of database,
   GALSOS=radiometric correction program,
   SPICE=SPICE kernels, typically via the CATLABEL program.
2) The SCET refers to the shutter center of the shutter event.
3) If the target is the ring-plane of Jupiter, label items LAT and LON are replaced by RAD and LON.
4) Prior to JOI, MOFIBE was FIBE and ENCODING_TYPE was BARC.
5) TBPPXL, TPPLNE apply to BARC compression only.
6) QUANTIZATION_STEP_SIZE, QUANTIZATION_MATRIX_NAME, TRUTH_WINDOW, ICT_DESPIKE_THRESHOLD and ZIGZAG_PATTERN apply to ICT Compression only and are defaulted for Huffman (lossless) compressed images. COMPRESION_RATIO, MINIMUM_COMPRESSION_RATIO, and MAX_COMPRESSION_RATIO apply to ICT and Huffman only (lossless) images. CUT_OUT_WINDOW applies to both ICT compression and BARC compression
7) HUFFMAN_TABLE applies to Huffman only (lossless) and ICT compression images. Note that ICT compressed images are also HUFMAN compressed but are identified as ICT.
8) NSTARS,STAR1,STAR2,STAR3,STAR4 and STAR5 apply to OPNAV images only.
9) All azimuth angles are measured clockwise from right in the image.
10) An image "size field" defines the location and size of an image area. It consists of four numbers: starting line, starting sample, number of lines, and number of samples. The origin of the image coordinate system is at (LINE,SAMPLE)=(1,1) for the upper-left corner, with samples increasing to the right and lines increasing downwards.
11) INA, EMA, PHA, HRA, SMEAR, HSCL, VSCL, LAT, LON, and RAD are for the center of the image if all four corner lie on the target, otherwise it is at the target center if visible, otherwise the image is scanned at 20 pixel intervals for a point at highest resolution.
12) The J2000 coordinate system is used for all orientation calculations.

Application program label interface: Label items may be stored, retrieved, or deleted via subroutines XLADD, XLGET, or XLDEL, respectively. Subroutine VIC1LAB may be used to retrieve all ground-calibration labels. The subroutine

ABLE86 will extract data from either flight or ground-calibration labels and return the values in an array. Note that programs intended for multimission support should not call ABLE86 directly, but use GETLABCON instead.

When an image is map-projected, the following label items relating to image geometry are updated by MAP3: SUNAZ, SMRAZ, SCAZ, NORAZ, SMRAZ, LAT, LON, HSCL, VSCL. This is not yet implemented.

SAMPLE OF GALILEO SSI VICAR LABEL

Below is a listing of a sample SSI flight label of a Phase 1 REDR with a spacecraft clock value of 165192000. MIPS VICAR program LABEL was used to produce this formatted version of the VICAR label.

```
************************************************************

      ************  File S0165192000.1 ************
           3 dimensional IMAGE file
           File organization is BSQ
           Pixels are in BYTE format from a VAX-VMS host
          1 bands
          800 lines per band
          800 samples per line
          2 lines of binary header
          200 bytes of binary prefix per line
---- Task: CATLABEL -- User: XXX999 -- Wed Mar 31 12:07:34 1993 ----
MISSION='GALILEO'
SENSOR='SSI'
PICNO='E2W0914'
PA='E2WSZOOMMV01-000WDTL'
PARTITION=0
RIM=1651920
MOD91=0
MOD10=1
MOD8=0
TCA='731T10:38:28Z'
TARGET='EARTH'
SCETYEAR=1992
SCETDAY=344
SCETHOUR=7
SCETMIN=13
SCETSEC=1
SCETMSEC=11
FILTER=3
EXP=8.333
GAIN=3
RATE=3
TLMFMT='HCM'
BOOM='P'
FIBE='1000'
BARC='RC'
TBPPXL=0.0
TPPLNE=0.0
INA=60.3112
EMA=19.7927
PHA=80.1038
```

```
HRA=-999.0
TWIST=113.394
CONE=0.0
RA=-5.05283
DEC=5.47921
SUNAZ=178.903
NORAZ=66.6094
SCAZ=27.3903
SMRAZ=0.0
SMEAR=-999.0
HSCL=5666.0
VSCL=5332.76
LAT=-12.3842
LON=352.885
RAD=0.0
PLRANGE=531069.0
SLRANGE=525184.0
SOLRANGE=1.473261e+08

************************************************************
```

Below is a listing of a sample SSI flight label of a Phase 2 REDR with a spacecraft clock value of 349632000 and ICT compressed. MIPS VICAR program LABEL was used to produce this formatted version of the VICAR label.

```
************************************************************

      ************  File S0349632000.R ************
          3 dimensional IMAGE file
          File organization is BSQ
          Pixels are in BYTE format from a AXP-VMS host
         1 bands
         800 lines per band
         800 samples per line
          8 lines of binary header
          200 bytes of binary prefix per line
---- Task: SSIMERGE -- User: ADC040 -- Fri May  2 11:57:04 1997 ----
MISSION='GALILEO'
SENSOR='SSI'
PICNO='G1G0001'
RIM=3496320
MOD91=0
MOD10=0
MOD8=0
PARTITION=1
PA='G1GSGLOBAL01'
TCA='-001T08:45:50Z'
TARGET='GANYMEDE'
SCETYEAR=1996
SCETDAY=178
```

SCETHOUR=8
SCETMIN=45
SCETSEC=9
SCETMSEC=457
ERTYEAR=1996
ERTDAY=193
ERTHOUR=6
ERTMIN=58
ERTSEC=29
ERTMSEC=691
FILTER=2
EXP=62.5003
GAIN=2
RATE=4
TLMFMT='HIM'
BOOM='N'
MOFIBE='001000'
ICT_DESPIKE_THRESHOLD=255
ENCODING_TYPE='INTEGER COSINE TRANSFORM '
TBPPXL=0.0
TPPLNE=0.0
INA=30.309
EMA=0.0931004
HRA=10.3176
TWIST=68.3739
CONE=149.024
RA=251.639
DEC=-16.3465
SMEAR=0.1
SEQNO=0
CUT_OUT_WINDOW=(129, 1, 672, 784)
TRUTH_WINDOW=(801, 801, 96, 96)
HUFFMAN_TABLE_NAME='SKEWED'
QUANTIZATION_STEP_SIZE=6
QUANTIZATION_MATRIX_NAME='UNIFORM'
ZIGZAG_PATTERN='ZIGZAG'
COMPRESSION_RATIO=6.55417
MAXIMUM_COMPRESSION_RATIO=25.3927
MINIMUM_COMPRESSION_RATIO=4.25726
PHA=30.4014
HSCL=6738.28
VSCL=6738.84
LAT=-8.05967
LON=155.404
PLRANGE=1.6902e+06
SLRANGE=663734.0
SOLRANGE=7.78215e+08
SUB_SOLAR_LATITUDE=-1.87338
SUB_SOLAR_LONGITUDE=125.604
SUB_SPACECRAFT_LATITUDE=-8.06495
SUB_SPACECRAFT_LONGITUDE=155.497

SUNAZ=184.062
NORAZ=104.344
SCAZ=120.403
SMRAZ=-999.0
RAD=-999.0
SPICE_C_ID='M905'
TARGET_CENTER_DISTANCE=666368.0
SUB_SPACECRAFT_LINE=271.123
SUB_SPACECRAFT_SAMPLE=475.621
READOUTMODE='NOT APPLICABLE'
ENTROPY=3.72596
LIGHT_SOURCE_LINE=271.0
LIGHT_SOURCE_LINE_SAMPLE=475.0
---- Task: CATLABEL -- User: ADC040 -- Fri Jun 20 10:36:22 1997 ----
---- Task: BADLABEL -- User: ADC040 -- Fri Jun 20 10:36:31 1997 ----
REDR_EXT='1'
---- Task: CATLABEL -- User: DLC040 -- Thu Sep 11 12:40:36 1997 ----
---- Task: CATLABEL -- User: DLC040 -- Thu Sep 25 14:50:47 1997 ----

****