Appendix B

Shopping lists

B.1 Introduction

This appendix contains the one line descriptions of each of the AIPS system subroutines that may be called from applications software arrainged by category (a given routine may have several entries). Not all of the subroutines described in the following lists may be called for all applications software. In particular, routines in directory AIPSUB may only be called from program AIPS or other tasks in the AIPPGM directory. Z2 and Y3 routines may only be called from other "Z" or "Y" routines.

This list should simplify finding the appropriate routine inside the AIPS system. Each routine name is prefixed with the logical name of the directory in which it resides. A summary of the categories is given below.

- AP-APPL These are routines that use "Array Processor" routines for a particular operation.
- AP-FFT These are routines that use "Array Processor" routines for FFT (Fast Fourier Transform) operation.
- AP-UTIL These are utility routines that use "Array Processor" routines.
- BATCH These routines are related to AIPS batch functions.
- BINARY These routines process external binary format data.
- CALIBRATION These routines are related to the calibration package of routines.
- CATALOG These routines are related to the AIPS catalog.
- CHARACTER There routines are AIPS character manipulating functions.
- COORDINATES These routines manipulate astronomical coordinate systems.
- EXT-APPL These are applications routines for extension files; generally tables.
- EXT-UTIL These are utility routines for extension files.
- FITS These routine are for processing data in FITS files.
- GRAPHICS These are the AIPS graphics routines.
- HEADER These routines process AIPS catalog header records.
- HISTORY These routines process AIPS history files or records.
- IO-APPL These are applications routines for the AIPS I/O system.
- IO-BASIC These are the basic routines for the AIPS I/O system.

- IO-TV These are the routines that communicate with the image display.
- IO-UTIL These are utility routines for the AIPS I/O system.
- IO-WAWA These are the "WAWA" or "Easy IO" package of routines.
- MAP These routines deal with images.
- MAP-UTIL These are utility routines dealing with images.
- MATH These are basic mathematical routines.
- MESSAGES These routines deal with sending messages to the user.
- MODELING These routine involve model fitting or calculation.
- PARSING These routine involve parsing information from character strings.
- PLOT-APPL These are applications plotting routines.
- PLOT-UTIL These are utility plotting routines.
- POPS-APPL These are POPS applications routines (verbs).
- POPS-LANG These are parts of the POPS language processor.
- POPS-UTIL These are POPS utility routines.
- PRINTER These are routines related to printers.
- SDISH These are routines for processing single dish data.
- SERVICE These are various service routines.
- SLICE These are routines that deal with slices through images.
- SORT These are sorting routines.
- SPECTRAL These are routine related to spectroscopy.
- SYSTEM These are AIPS system functions.
- TAPE These are routines related to reading tape or other external binary files.
- TERMINAL These are routines for I/O to user terminals
- TEXT These are routines related to text files.
- TV These are routines related to the image display.
- TV-APPL These are applications routines related to the image display.
- TV-BASIC These are basic image display routines.
- TV-IO These are I/O applications routines related to the image display.
- TV-UTIL These are utility routines related to the image display.
- UTILITY These are general utility routines.
- UV These routines deal with uv (interferometer) data.
- UV-UTIL These utility routines deal with uv (interferometer) data.
- VLA These are routines that are specific to the VLA (NRAO Very Large Array)

- Y0 These are the main top level TV (image display) routines.
- Y1 These are the second level TV routines.
- Y2 These are the IIS specific TV routines; these are unlikely to be supported on othe displays.
- Y3 These are “Y” routines that can only be called from other “Y” routines.
- Z These are routines which may contain system dependent functions.
- Z-2 These are routines which may contain system dependent functions but may only be called from other “Z” routines.

B.1.1 AP-APPL

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QNOT:ALGSUB.FOR        Interpolates model visibility grom a grid and subtracts from uv data.
QNOT:APCONV.FOR        Disk based 2-D convolution using FFTs.
QNOT:CONV.FOR          *TESS routine: Convolve a map with a beam.
QNOT:DISPTV.FOR        *TESS routine: Display an image on a TV
QPSAP:Q1FIN.FOR        Finish gridding a row of uv data.
QPSAP:Q1GRD.FOR        Grid a uv data.
QPSAP:QBAKSU.FOR       Back substitution.
QPSAP:QBOXSU.FOR       Boxcar sum of a vector.
QPSAP:QCLNSU.FOR       Low level Clark CLEAN routine.
QPSAP:QCRVMU.FOR       Complex-real vector multiply.
QPSAP:QCSQTR.FOR       inplace transpose of square, complex matrix.
QPSAP:QCTLUT.FOR       Initialize cosine lookup table etc.
QPSAP:QCVCMU.FOR       Scalar complex times conjugate of vector to real.
QPSAP:QCVCON.FOR       Complex conjugate of a vector.
QPSAP:QCVEXP.FOR       Vector complex exponential.
QPSAP:QCVJAD.FOR       Complex vector conjugate of vector add.
QPSAP:QCVMAG.FOR       Complex vector magnitude squared.
QPSAP:QCVMMA.FOR       Max. square of modulus of complex vector.
QPSAP:QCVMOV.FOR       Complex vector move.
QPSAP:QCVMUL.FOR       Complex vector multiply.
QPSAP:QCVSDI.FOR       Divide weighted complex vector by complex scalar.
QPSAP:QCVSMS.FOR       Subtract real vector*complex scalar from vector.
QPSAP:QDIRAD.FOR       Directed vector add.
QPSAP:QFINGR.FOR       Finish gridding row of uv data.
QPSAP:QGADIV.FOR       Divide Gaus. model vis. into uv data.
QPSAP:QGASUB.FOR       Subtract Gaus. model vis. from uv data.
QPSAP:QGET.FOR         Move data from pseudo-AP memory to "host".
QPSAP:QGRD1.FOR        Convolves visibility data onto a grid.
QPSAP:QGRD2.FOR        Convolves linear polarization data onto a grid.
QPSAP:QGRD3.FOR        Convolve visibility data onto a grid.
QPSAP:QGRD4.FOR        Convolves visibility data onto a grid.
QPSAP:QGRDCC.FOR       Grid and FT Clean components.
QPSAP:QGRDFI.FOR       Finish griding a row of uv data.
QPSAP:QGRDMI.FOR       Combined complex vector in gridding uv data.
QPSAP:QGRID.FOR        Grid uv data into row.
QPSAP:QGRIDA.FOR       Grid visibility data.
QPSAP:QHIST.FOR        Make histogram of a vector.
QPSAP:QINT.FOR         Interpolates model visibilities from a grid.
QPSAP:QINTP.FOR        Interpolates model visibilities from a grid.
QPSAP:QLVGT.FOR        Vector logical greater than.
QPSAP:QMAKMS.FOR       Make mask depending on vector, scalar comparison.
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QPSAP:QMAXMI.FOR	Find maximum and minimum of a vector.
QPSAP:QMAXV.FOR	Find maximum value element of a vector.
QPSAP:QMCALC.FOR	Compute model visibility from point model.
QPSAP:QMENT.FOR	MEM routine
QPSAP:QMINV.FOR	Find minimum value element of a vector
QPSAP:QMTRAN.FOR	matrix transpose.
QPSAP:QMTYP.FOR	Chose DFT or gridded interpolation method.
QPSAP:QMULCL.FOR	High level Clark CLEAN routine
QPSAP:QPHSRO.FOR	Add phase gradient to a complex array.
QPSAP:QPOLAR.FOR	Vector rectangular-to-polar conversion.
QPSAP:QPTDIV.FOR	Divide point model visibility into uv data.
QPSAP:QPTFAZ.FOR	Compute phase in model visibilities.
QPSAP:QPTSUB.FOR	Subtract point model visibility from uv data.
QPSAP:QRECT.FOR	Vector polar-to-rectangular conversion.
QPSAP:QRFT.FOR	Does real, inverse FT with arbitrary spacing.
QPSAP:QSEARC.FOR	VLBI fringe search with FFT.
QPSAP:QSPDIV.FOR	Divide Gaussian model visibility into uv data.
QPSAP:QSPSUB.FOR	Subtract Gaussian model visibility from uv data.
QPSAP:QSVE.FOR	Sum the elements of a vector.
QPSAP:QSVESQ.FOR	Sum the squares of the elements of a vector.
QPSAP:QUVIN.FOR	Interpolate visibility model from a grid.
QPSAP:QUVINT.FOR	Interpolate model visibility from grid.
QPSAP:QVABS.FOR	Vector absolute value.
QPSAP:QVADD.FOR	Vector add.
QPSAP:QVCLIP.FOR	Vector clip.
QPSAP:QVCLR.FOR	Vector zero.
QPSAP:QVCOS.FOR	Vector cosine.
QPSAP:QVDIV.FOR	Vector divide.
QPSAP:QVEXP.FOR	Vector exponentiate.
QPSAP:QVFILL.FOR	Vector fill.
QPSAP:QVFIX.FOR	Vector fix.
QPSAP:QVFLT.FOR	Vector float.
QPSAP:QVIDIV.FOR	Divide a vector by the product of two integers.
QPSAP:QVINDE.FOR	Vector index (gather)
QPSAP:QVLN.FOR	Vector natural logrithm
QPSAP:QVMA.FOR	Vector multiply and vector add.
QPSAP:QVMOV.FOR	Vector move.
QPSAP:QVMUL.FOR	Vector multiply.
QPSAP:QVNEG.FOR	Negate the elements of a vector.
QPSAP:QVRVRS.FOR	Reverse the elements of a vector.
QPSAP:QVSADD.FOR	Vector scalar add.
QPSAP:QVSIN.FOR	Vector sine.
QPSAP:QVSMA.FOR	Vector scalar multiply and vector add.
QPSAP:QVSMAF.FOR	Scalar multiply and and round.
QPSAP:QVSMSA.FOR	Vector scalar multiply and scalar add.
QPSAP:QVSMUL.FOR	Vector scalar multiply.
QPSAP:QVSQ.FOR	Square vector.
QPSAP:QVSQRT.FOR	Vector square root.
QPSAP:QVSUB.FOR	Vector subtract.
QPSAP:QVSWAP.FOR	Vector swap.
QPSAP:QVTRAN.FOR	Inplace transpose of a matrix of vectors.
QPSAP:QVTSMU.FOR	Vector table scalar multiply.
QPSAP:QXXPTS.FOR	Subtract point model visibility from uv data.
QNOT:VISDFT.FOR	Compute DFT of model and subtract/divide from/into uv data.

B.1.2 AP-FFT

APLSUB:AP2SIZ.FOR	returns largest power of 2 not exceeding 1024 times first argument
QSUB:APXPOS.FOR	In place transpose of complex array.
QNOT:CONV1.FOR	First of four routines to convolve two real images.
QNOT:CONV2.FOR	Second of four routines to convolve two real images.
QNOT:CONV3.FOR	Third of four routines to convolve two real images.
QNOT:CONV4.FOR	Fourth of four routines to convolve two real images.
APLNOT:DSKFFT.FOR	2-D disk based FFT using AP.
APLNOT:EMPTY1.FOR	DSKFFT utility routine
APLNOT:EMPTY2.FOR	DSKFFT utility routine
QNOT:FFTIM.FOR	FFTs an image for uv interpolation.
APLNOT:FILL1.FOR	DSKFFT utility routine
APLNOT:FILL2.FOR	DSKFFT utility routine.
QNOT:MAKMAP.FOR	Makes image or beam from uv data set.
APLSUB:MINSK.FOR	Inits use of MSKIP to read noncontiguous, evenly spaced rows in a map
APLSUB:MSKIP.FOR	Reads noncontiguous, but evenly spaced rows in a map (see also MINSK)
QSUB:PASS1.FOR	First of two routines to FFT an image file.
QSUB:PASS2.FOR	Second of two routines to FFT an image file.
QPSAP:QCFFT.FOR	Complex 1-D FFT.
QPSAP:QRFFT.FOR	Real-half plane complex FFT

B.1.3 AP-UTIL

QNOT:APIO.FOR	Copies image-like data between disk and "AP memory".
QSUB:APROLL.FOR	Copies AP "memory" to disk, gives up AP then reloads AP
QNOT:CCSGRD.FOR	Transforms CLEAN components to a grid.
QNOT:CONVFN.FOR	Computes convolving fn. kernels and stores them in "AP memory"
QNOT:GRDCOR.FOR	Normalizes and corrects image for gridding convolution fn.
QNOT:GRDCRM.FOR	Loads CLEAN components into AP for uv model computation.
QNOT:GRDSUB.FOR	Subtracts transform of CLEAN components from uv data.
QNOT:GRDTAB.FOR	Computes Fourier transform of gridding convolution function.
QNOT:INTPFN.FOR	Computes interpolation kernals and put them into "AP memory".
QNOT:MAKMAP.FOR	Makes image or beam from uv data set.
QPSAP:QGSP.FOR	Read "S-pad" register
QPSAP:QINIT.FOR	Initialize "AP".
QPSAP:QPUT.FOR	Move data from "host" to "AP" memory.
QPSAP:QRLSE.FOR	Release "AP".
QSUB:QROLL.FOR	Determines if time to roll AP, if so calls APROLL.
QPSAP:QWAIT.FOR	Suspend host until AP done.
QPSAP:QWD.FOR	Suspend host until AP data transfer done.
QPSAP:QWR.FOR	Suspend host until AP computations complete.
QNOT:UVGRID.FOR	Grids uv data to be FFTed.
QNOT:UVMDIV.FOR	Divides a uv data set by the Fourier transform of a model.
QNOT:UVMSUB.FOR	Subtracts the Fourier transform of a model from a uv data set.
QNOT:UVMTYP.FOR	Determines relative CPU times for DFT or gridded interpolation.
QNOT:UVTBGD.FOR	Grids uv data in arbitrary sort order to be FFTed.
QNOT:UVTBUN.FOR	Determines and applies uniform weighting to uv data in arb. order.
QNOT:UVUNIF.FOR	Determines and applies uniform weighting to a uv data set.

B.1.4 BATCH

AIPSUB:AUA.FOR	verb to submit batch jobs to AIPSC and the QMNGR queues
AIPSUB:AUB.FOR	verbs to prepare, edit, and review batch jobs and queues
APLSUB:BATPRT.FOR	prints header/trailer messages for printer tasks when run in batch

APLSUB:BATQ.FOR	performs operations on batch queue control file such as OPEN RUN CLOS
AIPSUB:BBUILD.FOR	reads input lines and adds them to the text file for a batch job

B.1.5 BINARY

APLGEN:ZBYMOV.FOR	move 8-bit bytes from in-buffer to out-buffer
APLGEN:ZBYTFL.FOR	interchange bytes in buffer if needed to go between local & standard
APLGEN:ZC8CL.FOR	convert packed ASCII buffer to local character string
APLGEN:ZCLC8.FOR	convert local character string to packed ASCII buffer
APLGEN:ZDHPRL.FOR	convert 64-bit HP floating buffer to local DOUBLE PRECISION values
APLGEN:ZGETCH.FOR	get a character from a REAL word
APLGEN:ZI16IL.FOR	convert FITS-standard 16-bit integers to local integers
APLGEN:ZI32IL.FOR	convert FITS-standard 32-bit integers from buffer into local integers
APLGEN:ZI8IL.FOR	convert 8-bit unsigned integers in buffer to local integers
APLGEN:ZILI16.FOR	convert local integers to 16-bit FITS integers in a buffer
APLGEN:ZILI32.FOR	convert local integer into FITS-standard 32-bit integers
APLGEN:ZPUTCH.FOR	inserts 8-bit "character" into a word
APLGEN:ZR32RL.FOR	convert 32-bit IEEE floating buffer to local REAL values
APLGEN:ZR64RL.FOR	convert 64-bit IEEE floating-point buffer to local "DOUBLE PRECISION"
APLGEN:ZR8P4.FOR	converts pseudo I*4 to double precision - for tape handling only
APLGEN:ZRDMF.FOR	convert DEC Magtape Format (36 bits data in 40 bits) to 2 integers
APLGEN:ZRHPRL.FOR	convert 32-bit HP floating buffer to local REAL values
APLGEN:ZRLR32.FOR	converts buffer of local REAL values to IEEE 32-bit floating-point
APLGEN:ZRLR64.FOR	convert buffer of local double precision values to IEEE 64-bit float.
APLGEN:ZRM2RL.FOR	convert Modcomp to local single precision floating point
APLGEN:ZUVPAK.FOR	Pack visibility data, 1 correlator per real with magic value blank.
APLGEN:ZUVXPN.FOR	Expands packed visibility data and adds weight

B.1.6 CALIBRATION

APLNOT:BLGET.FOR	Sets up for interpolation in baseline (BL) table
APLNOT:BLINI.FOR	Create/open/init I/O to BL table
APLNOT:BLREFM.FOR	Checks existence of BL table, changes format if necessary
APLNOT:BLSET.FOR	Fills current baseline calibration table
APLNOT:BPASET.FOR	Sets up the bandpass table array for use by DATBND.
APLNOT:BPGET.FOR	Sets bandpass correction arrays in common
APLNOT:BPINI.FOR	Create/open/initialize bandpass (BP) table
APLNOT:BPREFM.FOR	Checks existence of BP table, changes format if necessary
APLNOT:CALADJ.FOR	Adjusts solution (SN) table phases to a common reference antenna.
APLNOT:CALCOP.FOR	Copies selected uv data with calibration and editing
APLNOT:CALINI.FOR	Creates/opens/initializes calibration (CL) table
APLNOT:CALREF.FOR	Adjusts the reference antenna in an SN table.
APLNOT:CGASET.FOR	Maintains calibration values in an array in common
APLNOT:CHNCOP.FOR	Copies selected portions of the IF table
APLNOT:CHNDAT.FOR	Creates/Opens/Reads/Writes/Closes an IF table.
APLNOT:CLREFM.FOR	Checks existence of CL table, changes format if necessary
APLNOT:CLUPDA.FOR	Concatenates, rereferences, smooths SN tables and applies it to CL.
APLNOT:CMPARM.FOR	Determines blocks of data in a vis. record to decompress
APLNOT:CSINI.FOR	Create/Open/Init Single dish calibration (CS) table
APLNOT:CSLGET.FOR	Reads CL (or SN) table and sets up for interpolation.
APLNOT:DATBND.FOR	Applies the bandpass correction to data.
APLNOT:DATCAL.FOR	Applies calibration to data
APLNOT:DATFLG.FOR	Flags data specified in flagging table
APLNOT:DATGET.FOR	Reads, selects, calibrates and edits data.

APLNOT:DATPOL.FOR	Apply polarization corrections to data.
APLNOT:DCALSD.FOR	Apply Single dish calibration to data.
APLNOT:DGETSD.FOR	Reads, selects single dish data, calibrates and edits.
APLNOT:DGGET.FOR	Selects uv data and changes Stokes
APLNOT:DGHEAD.FOR	Fills output CATBLK for UVGET
APLNOT:DGINIT.FOR	Sets arrays for selecting data and changing Stokes
APLNOT:FLAGUP.FOR	Updates the Flag (FG) table.
APLNOT:FLGINI.FOR	Create/Open/Init Flag (FG) table.
APLNOT:FLGSTK.FOR	Set Stokes flag for uv flagging.
APLNOT:FNDSOU.FOR	Find source numbers for a list of sources.
APLNOT:FQINI.FOR	Create/open/initialize frequency (FQ) table
APLNOT:FQMATC.FOR	Check if selection criteria match FQ table entries.
APLNOT:GACSIN.FOR	Initializes CS file, and prepares table to be applied.
APLNOT:GAINI.FOR	Creates and initializes gain (GA) extension tables.
APLNOT:GAININ.FOR	Initializes calibration table for application.
APLNOT:GETFQ.FOR	Find info on a given frequency id.
APLNOT:GETSOU.FOR	Find info on a given source id.
APLNOT:INDXIN.FOR	Initializes index (NX) file, finds first scan selected.
APLNOT:IOBSRC.FOR	Search for antennas in the current bandpass buffer.
APLNOT:LXYPOL.FOR	Fills polarization correction table for AT like linear polarization.
APLNOT:MULSDB.FOR	Determines if a uv file is multi- or single- source.
APLNOT:NDXINI.FOR	Create/open/init index (NX) table
APLNOT:NXTFLG.FOR	Manages flagging info in tables in common.
APLNOT:PARANG.FOR	Computes antenna parallactic angles
APLNOT:POLSET.FOR	Fills polarization correction table from info in AN table.
APLNOT:SCINTP.FOR	Interpolates bandpass tables in time.
APLNOT:SCLOAD.FOR	Copies part of one bandpass scratch file to another for efficiency.
APLNOT:SDCGET.FOR	Sets up to interpolate in Single dish calibration (CS) table.
APLNOT:SDCSET.FOR	Interpolates single dish calibration data for current time.
APLNOT:SDGET.FOR	Reads single dish data with optional calibration and flagging
APLNOT:SELINI.FOR	Initialize data selection and control in commons in DSEL.INC
APLNOT:SELSMG.FOR	Selects calibrator data, smooths solutions.
APLNOT:SET1VS.FOR	Sets up pointer and weights arrays for selecting uv data.
APLNOT:SETSM.FOR	Determines type of spectral smoothing and sets up look up table.
APLNOT:SETSTK.FOR	Sets STOKES parameters correctly for plotting routines
APLNOT:SMOSP.FOR	Convolves a spectrum with a tabulated function.
APLNOT:SN2CL.FOR	Apply an SN to a CL table.
APLNOT:SNAPP.FOR	Append SN tables and keep track of reference antennas.
APLNOT:SNINI.FOR	Create/open/initialize solution (SN) tables.
APLNOT:SNREFM.FOR	Checks existence of SN table, changes format if necessary
APLNOT:SNSMO.FOR	Smooths solution (SN) tables
APLNOT:SOUELV.FOR	Computes source hour angles and elevations
APLNOT:SOUFIL.FOR	Fills in arrays of source numbers to be included or excluded.
APLNOT:SOURNU.FOR	Look up source numbers for a list of names.
APLNOT:TABBL.FOR	Do IO to Baseline (BL) table after setup by BLINI.
APLNOT:TABBP.FOR	Does I/O to bandpass (BP) table opened by BPINI
APLNOT:TABCAL.FOR	Does I/O to Calibration (CL) table opened by CALINI
APLNOT:TABCS.FOR	Does I/O to single dish calibration (CS) table opened by CSINI
APLNOT:TABFLG.FOR	Does I/O to Flag (FG) table opened by FLGINI
APLNOT:TABFQ.FOR	Does I/O to frequency (FQ) table opened by FQINI
APLNOT:TABGA.FOR	Does I/O to GAIN (GA) table opened by GAINI
APLNOT:TABNDX.FOR	Does I/O to Index (NX) table opened by NDXINI
APLNOT:TABSN.FOR	Does I/O to Solution (SN) table opened by SNINI
APLNOT:TABSOU.FOR	Does I/O to Source (SU) table opened by SOUINI

APLNOT:TABTY.FOR	Does I/O to Tsys (TY) table opened by TYINI
APLNOT:TYINI.FOR	Create/open/initialize Tsys (TY) table
APLNOT:UVGET.FOR	Read UV data with optional calibration, editing, selection, etc.
APLNOT:VISCNT.FOR	Determines number of visibility records requested of UVGET

B.1.7 CATALOG

AIPSUB:AU3.FOR	Verbs to display contents of catalogs and headers: CATA, IMHE ...
AIPSUB:AU7.FOR	Verbs to print history, rescale image, alter axis descriptions
AIPSUB:AU8.FOR	Verbs to get or clear name adverbs, destroy extension files
AIPSUB:CATCR.FOR	Create and initialize catalog (CA) files
APLSUB:CATDIR.FOR	Manipulates the catalog directory: OPEN, CLOS, various SRCHs, ...
APLSUB:CATIME.FOR	Stores current, or recovers previous, date and time in packed format
APLSUB:CATIO.FOR	Reads/writes header blocks in the catalog file
APLSUB:CATKEY.FOR	Reads/writes the Keyword section of an AIPS header file
AIPSUB:CATLST.FOR	List the contents of the catalog directory file
APLSUB:CATOPN.FOR	Opens the catalog directory file and returns its size
APLSUB:CHSTAT.FOR	Changes numeric code used to record the status of the catalog entry
APLSUB:CHWMAT.FOR	Matches a pattern string having wild-card chars with a test string
AIPSUB:DESCR.FOR	Destroys all scratch files for tasks which are no longer active
APLSUB:HDRBUF.FOR	Translates AIPS header to/from FITS-standard integer form
APLSUB:ICOPEN.FOR	Opens image catalog for the specified image plane (call from Y only)
APLSUB:IMA2MP.FOR	Converts pixel numbers in a TV-image into real image pixels
APLSUB:MADDEX.FOR	Adds extension file to catalog header
APLSUB:MAKOUT.FOR	Convert input and output names to actual output names in standard way
APLSUB:MAPCLR.FOR	Clears status flags in catalog and deletes lists of files
APLSUB:MAPCLS.FOR	Closes cataloged file, updating header and catalog status if needed
APLSUB:MAPOPN.FOR	Open file pointed to by catalog entry and mark the entry busy
APLSUB:MCREAT.FOR	Create and catalog a map file
APLSUB:MDESTR.FOR	Deletes a catalog entry and all files assocated with it
APLSUB:MP2IMA.FOR	Convert image pixel positions to TV pixel positions
APLSUB:NXTMAP.FOR	Opens next catalog entry matching the input parameters
APLSUB:PSFORM.FOR	Analyses a wild-card string, preparing an array for pattern matching
AIPSUB:RENUMB.FOR	Renumbers an entry in the catalog (CA) file
APLSUB:STXT.FOR	Translates catalog status code into a character string
APLSUB:TKCATL.FOR	Performs operations on the Graphics image catalog
APLSUB:UVCREA.FOR	Create and catalog a uv data base file

B.1.8 CHARACTER

APLSUB:CH2NUM.FOR	converts string containing an integer in ASCII form into the integer
APLSUB:CHBLNK.FOR	returns position of first non-blank character in portion of string
APLSUB:CHCOMP.FOR	compares two HOLLERITH strings
APLSUB:CHCOPY.FOR	moves characters from one HELLERITH string to another
APLSUB:CHFILL.FOR	fills portion of HOLLERITH string with a specified character
APLSUB:CHLTOU.FOR	converts a CHARACTER string to all upper case letters
APLSUB:CHMATC.FOR	searches one HOLLERITH string for the occurrence of another
APLSUB:CHR2H.FOR	converts a Fortran CHARACTER variable to an AIPS HOLLERITH string
APLSUB:CHWMAT.FOR	matches a pattern string having wild-card chars with a test string
APLSUB:FILZCH.FOR	replaces blank characters with
APLSUB:H2CHR.FOR	convert AIPS Hollerith string to Fortran CHARACTER variable
APLSUB:IFPC.FOR	returns the number of HOLLERITH locations needed to hold N characters
APLSUB:ITRIM.FOR	returns length of CHARACTER variable to last non-blank
APLSUB:JTRIM.FOR	clears nulls, returns length of CHARACTER variable to last non-blank

APLSUB:NAMEST.FOR	packs image name in string with leading and trailing blanks removed
APLSUB:PSFORM.FOR	analyses a wild-card string, preparing an array for pattern matching
APLSUB:SPFIL.FOR	fills HOLLERITH string with blanks beginning at first null
APLSUB:STLTOU.FOR	converts any characters beween single quotes to upper case
APLSUB:TRIM.FOR	removes leading and trailing blanks, returns actual length of string
APLSUB:UNPACK.FOR	converts a packed character buffer into one with 1 character/integer

B.1.9 COORDINATES

APLNOT:ATFPNT.FOR	Routine to calculate X-Y coords from galactic coords
AIPSUB:AU7.FOR	verbs to print history, rescale image, alter axis descriptions
APLSUB:AXSTRN.FOR	encodes axis type and value in a string
APLNOT:BDN.FOR	Computes Besselian day numbers of Julian date.
APLSUB:COORDD.FOR	converts angles between degrees and sexagesimal format
APLSUB:COORDT.FOR	translates between celestial, galactic, and eccliptic coordinates
APLNOT:DA13.FOR	Computes arguments A1, A2 and A3 of the mean motion of the sun.
APLNOT:DA46.FOR	Computes arguments A4, A5 and A6 of the mean motion of the moon
APLNOT:DAPM.FOR	Converts apparent to mean positions.
APLSUB:DIRCOS.FOR	determines direction cosines between ref position and test position
APLSUB:DIRDEC.FOR	finds longitude pixel and latitude given latitude pixel and longitude
APLSUB:DIRRA.FOR	finds latitude pixel and longitude given longitude pixel and latitude
APLNOT:DMAP.FOR	Compute apparent position from mean position
APLSUB:FNDX.FOR	returns X-axis coordinate value given X pixel and Y coordinate value
APLSUB:FNDY.FOR	returns Y-axis coordinate value given Y pixel and X coordinate value
APLNOT:GRD.FOR	Compute the general relativity displacements in RA and DEC.
APLSUB:JABER.FOR	Compute vectors needed for J2000 aberation and GR light bending.
APLSUB:JNUT.FOR	Computes nutation from IAU 1980 series
APLSUB:JPOLAR.FOR	Correct rectangular position for polar motion.
APLSUB:JPRECS.FOR	Precess between apparent and J2000 epoch positions.
APLSUB:JPRENU.FOR	Compute rotation matrix for precession and nutation IAU 1980 series.
APLSUB:LABINI.FOR	initializes commons for labeling of plots (calls SETLOC)
APLSUB:LMPIX.FOR	returns pixel location corresponding to specified coordinates
APLSUB:METSCA.FOR	scale a value to the range 1-999 and provide a metric prefix to match
APLSUB:MP2SKY.FOR	calls SETLOC, XYVAL to convert image pixel to physical coordinates
APLSUB:NEWPOS.FOR	returns astronomical coordinates given direction cosines, projection
APLNOT:NUT2.FOR	Computes nutation in longitude and obliquity for a Julian date.
APLNOT:NUT4.FOR	Computes nutation using a non ridgid earth model
APLNOT:PARANG.FOR	Computes antenna parallactic angles
APLNOT:PRECES.FOR	Convert between mean and apparent positions (B1950 only)
APLSUB:SETLOC.FOR	sets location common for coordinate computations and display
APLSUB:SKY2MP.FOR	calls SETLOC, XYPIX to convert sky coordinates to map pixel locations
APLSUB:SKYFRM.FOR	returns string with character representation of a corrdinate
APLSUB:SLAEVP.FOR	Earth position and motion ephemeris (J2000)
APLSUB:SLBINI.FOR	initializes labeling for slice plots
APLNOT:SOUELV.FOR	Computes source hour angles and elevations
APLSUB:XYPIX.FOR	returns pixel position corresponding to given coordinates
APLSUB:XYVAL.FOR	returns coordinate values corresponding to specified pixel position

B.1.10 EXT-APPL

APLSUB:ANTDAT.FOR	Returns the reference date and frequency for each array in uv dataset
APLSUB:ANTINI.FOR	creates and intializes antenna tables
APLNOT:BLINI.FOR	Create/open/init I/O to BL table
APLNOT:BLREFM.FOR	Checks existence of BL table, changes format if necessary

APLNOT:BLSET.FOR	Fills current baseline calibration table
APLNOT:BPASET.FOR	Sets up the bandpass table array for use by DATBND.
APLNOT:BPREFM.FOR	Checks existence of BP table, changes format if necessary
APLNOT:CALADJ.FOR	Adjusts solution (SN) table phases to a common reference antenna.
APLNOT:CALINI.FOR	Creates/opens/initializes calibration (CL) table
APLSUB:CCINI.FOR	creates and/or opens a CC (components) extension table
APLNOT:CCMERG.FOR	Compresses a CLEAN component (CC) table
APLNOT:CLREFM.FOR	Checks existence of CL table, changes format if necessary
APLNOT:CLUPDA.FOR	Concatenates, rereferences, smooths SN tables and applies it to CL.
APLNOT:CSLGET.FOR	Reads CL (or SN) table and sets up for interpolation.
APLSUB:EXTHIS.FOR	adds to history file for contents of FITS extension file being read
APLSUB:EXTREQ.FOR	parse FITS tape record for required extension file FITS keywords
APLNOT:FLAGUP.FOR	Updates the Flag (FG) table.
APLNOT:FNDSOU.FOR	Find source numbers for a list of sources.
APLNOT:GACSIN.FOR	Initializes CS file, and prepares table to be applied.
APLNOT:GAININ.FOR	Initializes calibration table for application.
APLNOT:GETANT.FOR	Reads AN table and stores the info in common.
APLNOT:GETFQ.FOR	Find info on a given frequency id.
APLNOT:GETSOU.FOR	Find info on a given source id.
APLNOT:GNFSMO.FOR	Boxcar smooths and ASCAL solution (GA) file.
APLNOT:GNSMO.FOR	Optimized spline smoothing of amplitudes in ASCAL (GN) file.
APLNOT:GRDAT.FOR	Getn info about CLEAN components for GRDSUB.
QNOT:GRDCRM.FOR	Loads CLEAN components into AP for uv model computation.
APLNOT:INDXIN.FOR	Initializes index (NX) file, finds first scan selected.
APLNOT:ITBSRT.FOR	Read a table and write a scratch file to be sorted.
APLNOT:LXYPOL.FOR	Fills polarization correction table for AT like linear polarization.
APLNOT:MULSDB.FOR	Determines if a uv file is multi- or single- source.
APLNOT:NXTFLG.FOR	Manages flagging info in tables in common.
APLNOT:OTBSRT.FOR	Copies sorted table from scratch file to table form
APLNOT:POLSET.FOR	Fills polarization correction table from info in AN table.
APLNOT:SDCGET.FOR	Sets up to interpolate in Single dish calibration (CS) table.
APLNOT:SELSMG.FOR	Selects calibrator data, smooths solutions.
APLNOT:SETSTK.FOR	Sets STOKES parameters correctly for plotting routines
APLNOT:SN2CL.FOR	Apply an SN to a CL table.
APLNOT:SNAPP.FOR	Append SN tables and keep track of reference antennas.
APLNOT:SNREFM.FOR	Checks existence of SN table, changes format if necessary
APLNOT:SNSMO.FOR	Smooths solution (SN) tables
APLNOT:SOUFIL.FOR	Fills in arrays of source numbers to be included or excluded.
APLNOT:SOURNU.FOR	Look up source numbers for a list of names.
APLNOT:SUMARY.FOR	Accumulates and lists CLEAN components
APLSUB:TABAN.FOR	I/O to antenna tables (following initialization by ANTINI)
APLNOT:TABAXI.FOR	parse FITS tape record for required extension file FITS keywords
APLSUB:TABLIN.FOR	reads a line from the data portion of a FITS extension of type TABLE
APLNOT:TYINI.FOR	Create/open/initialize Tsys (TY) table
APLNOT:VISCNT.FOR	Determines number of visibility records requested of UVGET

B.1.11 EXT-UTIL

APLSUB:ALLTAB.FOR	Copies all table extension files from one catalog slot to another
AIPSUB:AU8.FOR	verbs to get or clear name adverbs, destroy extension files
APLNOT:BPINI.FOR	Create/open/initialize bandpass (BP) table
APLNOT:CHNCOP.FOR	Copies selected portions of the IF table
APLNOT:CHNDAT.FOR	Creates/Opens/Reads/Writes/Closes an IF table.
APLNOT:CSINI.FOR	Create/Open/Init Single dish calibration (CS) table

APLSUB:DELEXT.FOR	removes an extension file from the header in the catalog file
APLSUB:EXTCOP.FOR	copies extension file of the EXTINI/EXTIO variety
APLSUB:EXTINI.FOR	creates and/or opens an extension file of the EXTINI/EXTIO type
APLSUB:EXTIO.FOR	does random access IO to extension files of the EXTINI/EXTIO type
APLNOT:FLGINI.FOR	Create/Open/Init Flag (FG) table.
APLSUB:FNDCOL.FOR	locvates logical column numbers for given titles in a Table
APLSUB:FNDEXT.FOR	returns latest version number of specified extension file type
APLNOT:FQINI.FOR	Create/open/initialize frequency (FQ) table
APLNOT:GAINI.FOR	Creates and initializes gain (GA) extension tables.
APLSUB:GETCOL.FOR	returns value and type found at specified column and row in a table
APLSUB:GETHUT.FOR	returns column titles, units, types, lengths in logical column order
APLNOT:GETNAN.FOR	Find number of antennas and subarrays from AN tables.
APLNOT:GTPAIR.FOR	Returns specified Keyword-value pair from an open AIPS table
APLSUB:ISTAB.FOR	finds if an extension file exists and whether it is a standard table
APLSUB:MADDEX.FOR	adds extension file to catalog header
APLNOT:MAKTAB.FOR	Create and initialize table from data in common /TABHDR/ (FITS)
APLNOT:NDXINI.FOR	Create/open/init index (NX) table
APLSUB:OPEXT.FOR	opens a specified extension file
APLSUB:PUTCOL.FOR	returns value and type found at specified column and row in a table
APLNOT:R3DTAB.FOR	Read data from FITS 3-D table and write AIPS table.
APLSUB:RESCSL.FOR	Rescale flux-like data in any SLice files.
APLNOT:RWTAB.FOR	Read FITS ASCII table data and write AIPS table file.
APLNOT:SDTCRD.FOR	Parse "SINGLDSH" FITS table headers, get some keywords.
APLSUB:SELSTR.FOR	builds string displaying the functions applied to columns of table
APLNOT:SNINI.FOR	Create/open/initialize solution (SN) tables.
APLNOT:SOUINI.FOR	Create/initialize/open source (SU) table
APLNOT:TABAPP.FOR	Appends one table to the end of a similar table.
APLNOT:TABBL.FOR	Do IO to Baseline (BL) table after setup by BLINI.
APLNOT:TABBP.FOR	Does I/O to bandpass (BP) table opened by BPINI
APLNOT:TABCAL.FOR	Does I/O to Calibration (CL) table opened by CALINI
APLSUB:TABCOP.FOR	copies one or all tables extension files of specified type
APLNOT:TABCS.FOR	Does I/O to single dish calibration (CS) table opened by CSINI
APLNOT:TABF3D.FOR	Determines repeat count and data type for FITS 3-D tables entries.
APLNOT:TABFLG.FOR	Does I/O to Flag (FG) table opened by FLGINI
APLNOT:TABFQ.FOR	Does I/O to frequency (FQ) table opened by FQINI
APLNOT:TABFRM.FOR	Parses format for FITS ASCI table entries.
APLNOT:TABGA.FOR	Does I/O to GAIN (GA) table opened by GAINI
APLNOT:TABHDK.FOR	Reads a FITS table header.
APLNOT:TABHDR.FOR	Reads a FITS table header.
APLSUB:TABINI.FOR	create/open a table extension file
APLSUB:TABIO.FOR	reads/writes tables extension files
APLSUB:TABKEY.FOR	reads/writes the Keyword section of an AIPS table file
APLSUB:TABMRG.FOR	merges rows of an an input table file
APLNOT:TABNDX.FOR	Does I/O to Index (NX) table opened by NDXINI
APLNOT:TABSN.FOR	Does I/O to Solution (SN) table opened by SNINI
APLNOT:TABSOU.FOR	Does I/O to Source (SU) table opened by SOUINI
APLNOT:TABSPC.FOR	Determines repeat count and data type for FITS 3-D tables entries.
APLNOT:TABSRT.FOR	Sorts the entries in an AIPS table.
APLNOT:TABTY.FOR	Does I/O to Tsys (TY) table opened by TYINI

B.1.12 FITS

APLNOT:ATCONV.FOR	Fix AIPS FITS tables
APLSUB:CHAVRT.FOR	converts between local HOLL and local INT binary forms for transport

APLNOT:CHKTAB.FOR	Check fields of known FITS table types.
APLSUB:EXTHIS.FOR	adds to history file for contents of FITS extension file being read
APLSUB:EXTREQ.FOR	parse FITS tape record for required extension file FITS keywords
APLSUB:FPARSE.FOR	interprets card image from FITS header into AIPS header format
AIPSUB:FWRITE.FOR	converts FITS header to AIPS header and displays it with MSGWRT
APLSUB:GETCRD.FOR	parses card image from FITS header, returns recognized keyword
APLSUB:GETLOG.FOR	returns value of logical variable from character buffer
APLSUB:GETNUM.FOR	returns numeric field from character buffer
APLSUB:GETSTR.FOR	returns a string value (was enclosed by quotes) from character buffer
APLSUB:GETSYM.FOR	returns next symbol in character-form card image
APLSUB:GTWCRD.FOR	returns allowed keyword from FITS header card image
APLSUB:IDWCRD.FOR	returns allowed keyword from FITS header card image
APLSUB:JULDAY.FOR	converts a character-encoded calendar date to Julian day number
APLNOT:MAKTAB.FOR	Create and initialize table from data in common /TABHDR/ (FITS)
AIPSUB:MSGHDR.FOR	lists header contents for standard header plus random parameters
APLNOT:PTF3D.FOR	Copies 8-bit bytes to tape.
APLNOT:R3DTAB.FOR	Read data from FITS 3-D table and write AIPS table.
APLSUB:REAVRT.FOR	converts between local REAL and local INT binary forms for transport
APLNOT:RWTAB.FOR	Read FITS ASCII table data and write AIPS table file.
APLNOT:SDTCRD.FOR	Parse "SINGLDSH" FITS table headers, get some keywords.
APLSUB:SETBSC.FOR	determines scaling/offset parameters to convert image to integer
APLSUB:SETDEF.FOR	fills FITS reader area for table-file extensions with defaults
APLSUB:SKPBLK.FOR	find next non-blank card image in a FITS header, read tape if needed
APLSUB:SKPEXT.FOR	finishes reading FITS extension header, skips the extension data
APLNOT:TABAXI.FOR	parse FITS tape record for required extension file FITS keywords
APLNOT:TABF3D.FOR	Determines repeat count and data type for FITS 3-D tables entries.
APLNOT:TABFRM.FOR	Parses format for FITS ASCI table entries.
APLNOT:TABHDK.FOR	Reads a FITS table header.
APLNOT:TABHDR.FOR	Reads a FITS table header.
APLSUB:TABLIN.FOR	reads a line from the data portion of a FITS extension of type TABLE
APLNOT:TABSPC.FOR	Determines repeat count and data type for FITS 3-D tables entries.
APLNOT:TPIOHD.FOR	Reads tape header and tests if FITS, tape labels etc.
APLGEN:ZBYTF2.FOR	interchange bytes in buffer if needed to go between local & standard
APLGEN:ZBYTFL.FOR	interchange bytes in buffer if needed to go between local & standard
APLGEN:ZTPMID.FOR	pseudo-tape disk read/write for 2880-bytes records
APLGEN:ZTPOPD.FOR	open a pseudo-tape, sequential disk file for FITS
APLGEN:ZTPWAD.FOR	"wait" for IO operation to complete on pseudo-tape disk file (ZTPMID)
APLGEN:ZX8XL.FOR	convert FITS table bit array to AIPS bit array
APLGEN:ZXLX8.FOR	convert AIPS bit array to FITS binary table bit array

B.1.13 GRAPHICS

AIPSUB:AU9A.FOR	verbs to read TEK cursor and display pixel, sky, image values
AIPSUB:AU9B.FOR	verbs to plot slices and models on graphics
AIPSUB:AU9C.FOR	verbs to set initial guesses for slice model fits using TEK graphics
AIPSUB:SET1DG.FOR	sets initial guess parameters with the TEK for fitting slices
APLNOT:SETSTK.FOR	Sets STOKES parameters correctly for plotting routines
AIPSUB:SLOCIN.FOR	initialize location common for slice (on the TEK) model fitting
APLSUB:TEKFLS.FOR	writes any remaining buffer to the TK graphics device, zeros buffer
APLSUB:TEKVEC.FOR	write bright or dark, scaled or unscaled vector to TK graphics device
APLSUB:TKCATL.FOR	performs operations on the Graphics image catalog
APLSUB:TKCHAR.FOR	writes characters to a TK graphics device
APLSUB:TKCLR.FOR	clears the TK graphics screen
APLSUB:TKCURS.FOR	turns on, reads, turns off the TK graphics cursor

APLSUB:TKDVEC.FOR	converts vector command to TK graphics commands
AIPSUB:TKGGPL.FOR	plots model slice on Graphics
AIPSUB:TKGMPL.FOR	plot model fit to slice on the graphics terminal
APLSUB:TKLAB.FOR	labels axes on plot directly to a TK graphics device, draw ticks
AIPSUB:TKRSPL.FOR	plots residuals between slice and its model on Graphics device
AIPSUB:TKSLAC.FOR	activates and reads TEK cursor, converts result to image coordinates
APLSUB:TKSLIN.FOR	initialize parameters for plotting a slice directly on a TK graphics
AIPSUB:TKSLPL.FOR	plot a slice on graphics device
APLSUB:TKTICS.FOR	writes tick marks and labels directly to TK graphics device
APLGEN:ZTKBUF.FOR	flush TK buffer if needed, then store 8-bit byte in buffer
APLGEN:ZTKCL2.FOR	close a Tektronix device
APLGEN:ZTKCLS.FOR	close the TK device
APLGEN:ZTKFI2.FOR	read/write from/to a Tektronix device
APLGEN:ZTKOP2.FOR	read/write from/to a Tektronix device
APLGEN:ZTKOPN.FOR	open a TK device

B.1.14 HEADER

AIPSUB:AU3.FOR	verbs to display contents of catalogs and headers: CATA, IMHE ...
AIPSUB:AU7.FOR	verbs to print history, rescale image, alter axis descriptions
AIPSUB:AU7A.FOR	verbs to put/get header values, to put values into images
APLSUB:AXEFND.FOR	finds axis number for specified axis type
APLSUB:BLDSNM.FOR	builds a name for a scratch file
APLSUB:CATIO.FOR	reads/writes header blocks in the catalog file
APLSUB:CATKEY.FOR	reads/writes the Keyword section of an AIPS header file
APLNOT:COINC.FOR	Checks if two maps are exactly coincident.
APLNOT:DGHEAD.FOR	Fills output CATBLK for UVGET
APLNOT:FRQTAB.FOR	Fill Frequency table in common for IFs and channels
APLNOT:GETCTL.FOR	Determine Stokes' type of Clean map and other modeling info.
APLNOT:IMCREA.FOR	Fills catalog header for an image and optionally creates and catalogs
APLSUB:JULDAY.FOR	converts a character-encoded calendar date to Julian day number
AIPSUB:KWIKHD.FOR	list header contents in abbreviated, image centered form
APLSUB:LMPIX.FOR	returns pixel location corresponding to specified coordinates
APLSUB:LSTHDR.FOR	lists header contents in standard form with MSGWRT
AIPSUB:MSGHDR.FOR	lists header contents for standard header plus random parameters
APLSUB:NAMEST.FOR	packs image name in string with leading and trailing blanks removed
APLSUB:ROTFND.FOR	find the coordinate rotation angle from the catalog header
APLSUB:SUBHDR.FOR	changes input to output header correcting for subimaging
APLSUB:SWAPAX.FOR	swaps the values for two axes
APLSUB:UVPGET.FOR	determines pointers to UV data from the header
APLSUB:VHDRIN.FOR	computes pointers (subscripts) to address components of the header

B.1.15 HISTORY

AIPSUB:AU7.FOR	verbs to print history, rescale image, alter axis descriptions
APLSUB:EXTHIS.FOR	adds to history file for contents of FITS extension file being read
APLSUB:HENCO1.FOR	Adds INNAME, INCLASS, INSEQ, INDISK to an open history file
APLSUB:HENCO2.FOR	Adds IN2NAME, IN2CLASS, IN2SEQ, IN2DISK to an open history file
APLSUB:HENCO3.FOR	Adds IN3NAME, IN3CLASS, IN3SEQ, IN3DISK to an open history file
APLSUB:HENCOO.FOR	adds OUTNAME, OUTCLASS, OUTSEQ, OUTDISK to an open history file
APLSUB:HIAD80.FOR	puts an 80-character card image into a history file as required
APLSUB:HIADD.FOR	adds a history record ("card" = 72 characters) to a history file
APLSUB:HIADDN.FOR	Writes one history line to several history files
APLSUB:HICLOS.FOR	closes a history file, flushing the buffer if desired

APLSUB:HICOPY.FOR	copies one history file to the end of a second
APLSUB:HICREA.FOR	open a history file, creating one if needed
APLSUB:HIINIT.FOR	initializes the history common area - must be called before history
APLSUB:HIIO.FOR	does IO and file expansion (if needed) on HI files
APLSUB:HILOCT.FOR	manipulates the history table, opening, closing, located an entry
APLSUB:HIMERG.FOR	creates several new history files by merging several old ones.
APLSUB:HIOPEN.FOR	opens a history file, preparing common pointers and reading record 1
APLSUB:HIPLOT.FOR	places a record in the history file concerning a plot file creation
APLNOT:HIREAD.FOR	Reads next history card from a history file
APLSUB:HISCOP.FOR	creates new history file and copies an old one to it

B.1.16 IO-APPL

APLNOT:FQMATC.FOR	Check if selection criteria match FQ table entries.
APLNOT:MAKGAU.FOR	*TESS routine: Make a Gaussian convolution function.
APLNOT:MLTMAP.FOR	*TESS routine: multiplies an image by a value, writes another.
APLNOT:PLNPUT.FOR	Copies a subregion of a scratch file image to a cataloged image.
APLNOT:RESID.FOR	*TESS routine: Computes residual image.
APLNOT:SDGET.FOR	Reads single dish data with optional calibration and flagging
APLNOT:SDTCRD.FOR	Parse "SINGLDSH" FITS table headers, get some keywords.
APLNOT:STEP.FOR	*TESS routine: adds a fraction of one image to another.
APLNOT:SUBMAP.FOR	*TESS Routine: Subtract two images.
APLNOT:TVFOAD.FOR	TVFLG routine to load and image with smoothing converting to display.
APLNOT:UVDOUT.FOR	Divides uv model in one half of a record into other, writes result.
APLNOT:UVDPAD.FOR	Reformat UV data record, doubling size and zero extra words.
APLNOT:UVGET.FOR	Read UV data with optional calibration, editing, selection, etc.

B.1.17 IO-BASIC

APLSUB:FSERCH.FOR	determines type and number of entries in the common file table (FTAB)
APLSUB:IAMOK.FOR	decides if a disk file type is allowed for the user on a disk
APLSUB:LSERCH.FOR	opens, locates, closes entries in the common file table (FTAB)
APLSUB:MDISK.FOR	reads or writes a row from an image
APLSUB:MINIT.FOR	intializes IO and pointers for quick-return image IO via MDISK
APLSUB:UVDISK.FOR	reads/writes records of arbitrary length, esp UV data, see UVINIT
APLSUB:UVINIT.FOR	initializes IO for arbitrary length records via UVDISK, esp UV data
APLGEN:ZCLOSE.FOR	closes open devices: disk, line printer, terminal
APLGEN:ZCMPR2.FOR	truncate a disk file, returning blocks to the system
APLGEN:ZCMPRS.FOR	release space from the end of an open disk file
APLGEN:ZCREA2.FOR	create the specified disk file
APLGEN:ZCREAT.FOR	creates a disk file
APLGEN:ZDACLS.FOR	close a disk file
APLGEN:ZDAOPN.FOR	open the specified disk file
APLGEN:ZDEST2.FOR	destroy a closed disk file
APLGEN:ZDESTR.FOR	destroy a closed disk file
APLGEN:ZEXIS2.FOR	return size of disk file and if it exists
APLGEN:ZEXIST.FOR	return file size and, consequently, whether file exists
APLGEN:ZEXPN2.FOR	expand an open disk file
APLGEN:ZEXPND.FOR	expand an open disk file --- either map or non-map now allowed
APLGEN:ZFI2.FOR	read/write one 256-integer record from/to a non-map disk file
APLGEN:ZFIO.FOR	reads and writes single 256-integer records to non-map disk files
APLGEN:ZFRE2.FOR	return AIPS data disk free space information
APLGEN:ZMI2.FOR	read/write large blocks of data from/to disk, quick return
APLGEN:ZMIO.FOR	random-access, quick return (double buffer) disk IO for large blocks

APLGEN:ZMKTMP.FOR	convert a "temporary" file name into a unique name
APLGEN:ZMSGCL.FOR	close Message file or terminal
APLGEN:ZMSGDK.FOR	disk IO to message file
APLGEN:ZMSGOP.FOR	open a message file or message terminal
APLGEN:ZMSGXP.FOR	expand the message file
APLGEN:ZOPEN.FOR	open binary disk files and line printer and TTY devices
APLGEN:ZPATH.FOR	convert a file name
APLGEN:ZPHFIL.FOR	construct a physical file or device name from AIPS logical parameters
APLGEN:ZPHOLV.FOR	construct a physical file - version for UPDAT
APLGEN:ZRENA2.FOR	rename a file
APLGEN:ZTFILL.FOR	zero-fill, initialize a file IO table (FTAB) entry
APLGEN:ZTPOP2.FOR	open a tape device for double-buffer, asymchronous IO
APLGEN:ZTPWA2.FOR	wait for read/write from/to a tape device
APLGEN:ZWAI2.FOR	wait for read/write large blocks of data from/to disk
APLGEN:ZWAIT.FOR	wait for asynchronous ("MAP") IO to finish

B.1.18 IO-TV

APLGEN:ZARGC2.FOR	close an ARGS TV device
APLGEN:ZARGCL.FOR	close an ARGS TV device
APLGEN:ZARGMC.FOR	issues a master clear to an ARGS TV
APLGEN:ZARGO2.FOR	open ARGS TV device
APLGEN:ZARGOP.FOR	open ARGS TV device
APLGEN:ZIPACK.FOR	pack/unpack long integers into short integer buffer
APLGEN:ZM70CL.FOR	close an IIS Model 70 TV device, flushing any buffer
APLGEN:ZM70M2.FOR	issues a master clear to an IIS Model 70 TV
APLGEN:ZM70MC.FOR	issues a master clear to an IIS Model 70 TV
APLGEN:ZM70OP.FOR	open IIS Model 70 TV device
APLGEN:ZM70XF.FOR	read/write data to IIS Model 70 TV with buffering
APLGEN:ZV20CL.FOR	close a Comtal Vision 1/20 TV device
APLGEN:ZV20OP.FOR	open Comtal Vision 1/20 TV device
APLGEN:ZV20XF.FOR	read/write data to Comtal Vision 1/20 TV device

B.1.19 IO-UTIL

APLNOT:AKCESS.FOR	*TESS routine to read or write files
APLNOT:AKCLOS.FOR	*TESS routine to close files
APLNOT:AKOPEN.FOR	*TESS I/O routine to open files.
QNOT:APIO.FOR	Copies image-like data between disk and "AP memory".
APLNOT:APPLPB.FOR	*TESS routine to apply a taper to an image
QSUB:APROLL.FOR	Copies AP "memory" to disk, gives up AP then reloads AP
APLNOT:BGTOSM.FOR	*TESS routine to copy a subset of a large image to a small one
APLSUB:COMOFF.FOR	determines start block number of a plane in an N-dimensional image
APLNOT:COPMAP.FOR	*TESS routine to copy an image.
APLSUB:DBINIT.FOR	checks map window and initializes for map double buffer IO
APLSUB:DIE.FOR	closes down tasks which use DFIL.INC to maintain status of files
APLNOT:DIVMAP.FOR	Tim Corwell routine: Divide one image by another.
APLNOT:FILSWP.FOR	*TESS routine: switch file info
APLNOT:FLAT.FOR	*TESS routine: initialize an image to a value.
APLSUB:FSWTCH.FOR	switches names and addresses of two files
APLNOT:GETROW.FOR	Read row of an image opened with INTMIO
APLNOT:GTBWRT.FOR	Routine used by GRIDTB to write buffers.
APLNOT:GTF3D.FOR	Copies real-world bytes from a tape buffer, reading if necessary.
APLNOT:HIREAD.FOR	Reads next history card from a history file

APLNOT:INTMIO.FOR	Open an image file for use with GETROW
APLNOT:LINIO.FOR	Reads/writes line to/from an image.
APLNOT:MAKCVM.FOR	*TESS routine: Make image with residuals added.
APLSUB:MAPCLS.FOR	closes cataloged file, updating header and catalog status if needed
APLSUB:MAPOPN.FOR	open file pointed to by catalog entry and mark the entry busy
APLSUB:MDESTR.FOR	deletes a catalog entry and all files assocated with it
APLNOT:REIMIO.FOR	Reinitialize for image I/O using INTMIO
APLNOT:SCINTP.FOR	Interpolates bandpass tables in time.
APLNOT:SCLOAD.FOR	Copies part of one bandpass scratch file to another for efficiency.
APLSUB:SCREAT.FOR	create an AIPS-standard scratch file w common DFIL.INC, ...
APLNOT:SMTOBG.FOR	*TESS routine: Copies small image to a large one.
APLSUB:SNDY.FOR	closes all files, then deletes all scratch files
APLNOT:TABSRT.FOR	Sorts the entries in an AIPS table.
APLNOT:TPIOHD.FOR	Reads tape header and tests if FITS, tape labels etc.
APLNOT:VECWIN.FOR	Interpretes BLC and TRC into useable values as a vector.
APLGEN:ZDIR.FOR	build a full path name to files in AIPS-standard areas (HE, RU, ...)
APLGEN:ZFULLN.FOR	convert file name to full pathname with no logicals
APLGEN:ZRENAM.FOR	rename a disk file

B.1.20 IO-WAWA

APLSUB:A2WAWA.FOR	packs WaWa IO NameString from its components
APLSUB:CLENUP.FOR	closes all open files and deletes all scratch files for this task
APLSUB:FILCLS.FOR	close file opened by FILOPN, flushing write buffers, clearing catalog
APLSUB:FILCR.FOR	create associated or scratch non-map file
APLNOT:FILDEF.FOR	Fills in default values in WAWA namestring
APLSUB:FILDES.FOR	destroy the specified file or associated file
APLSUB:FILIO.FOR	reads/writes 256-integer record to non-map file opened by FILOPN
APLSUB:FILNUM.FOR	finds the FILTABle entry number for an open file
APLSUB:FILOPN.FOR	open image, associated, or scratch file (WaWa system)
APLSUB:GETHDR.FOR	get the catalog header for an open file (WaWa)
APLNOT:GETWIN.FOR	Get current window of file open in WAWA IO system.
APLNOT:GTNAME.FOR	WAWA IO routine to fill in a namestring for an open file
APLSUB:H2WAWA.FOR	packs AIPS adverb values into WaWa IO NameString
APLSUB:HDRINF.FOR	returns consecutivew items of specified type from header for WaWa
APLSUB:HDRWIN.FOR	sets image corners via WINDOW, revises header to that of output
APLNOT:IMOPEN.FOR	Open the TV under the system set up by IOSET
APLNOT:IMWIN.FOR	Set up window on TV device
APLSUB:IOSET.FOR	initialize tables and set buffer space for WaWa IO
APLNOT:MADD.FOR	Routine to add windows of open images.
APLNOT:MAKNAM.FOR	Constructs WAWA namestring (Now use H2WAWA or A2WAWA)
APLSUB:MAPCOP.FOR	Copy a map
APLSUB:MAPCR.FOR	create and catalog an image in the WaWa package
APLSUB:MAPIO.FOR	reads or writes a file opened by FILOPN (WaWa IO)
APLSUB:MAPMAX.FOR	determine extrema of image opened by FILOPN and update header
APLSUB:MAPWIN.FOR	set/reset the window parameters for an open file (in WaWa)
APLSUB:MAPXY.FOR	sets WaWa windows for a window in the top plane of an image
APLNOT:MCOPY.FOR	Copies a window in one image to another.
APLNOT:MFILL.FOR	Fill a window in an image with a given value.
APLSUB:OPENCF.FOR	opens a cataloged file (main file only), simplifies call to FILOPN
APLSUB:PRENAM.FOR	checks name-string for WaWa IO package - fills in some defaults
APLNOT:PRTERR.FOR	Prints standard WaWa error message and namestring of file.
APLSUB:PRTNAM.FOR	prints the contents of a WaWa-IO file Namestring
APLNOT:SAVHDR.FOR	Save catalog header for an open file.

APLSUB:SCRNAM.FOR	build scratch file name string in the WaWa form
APLSUB:TSKBEG.FOR	task start up operations (common inits, GTPARM, RELPOP) for WaWa
APLSUB:TSKEND.FOR	closes down a task and its files in the WaWa system
APLSUB:UNSCR.FOR	delete all scratch files belonging to this tasl
APLSUB:WAWA2A.FOR	unpacks WaWa IO NameString into its components

B.1.21 MAP

QNOT:APCONV.FOR	Disk based 2-D convolution using FFTs.
QNOT:APIO.FOR	Copies image-like data between disk and "AP memory".
AIPSUB:AU9.FOR	verbs to fit or interpolate the image intensity (MAXFIT, IMVAL)
APLNOT:BMSHP.FOR	*TESS routine to fit an elliptical Gaussian to a dirty beam
QNOT:CCSGRD.FOR	Transforms CLEAN components to a grid.
APLNOT:COINC.FOR	Checks if two maps are exactly coincident.
APLNOT:COMCLR.FOR	Scale and map complex array into RBG space, amp=inten. phase=hue.
QNOT:CONV.FOR	*TESS routine: Convolve a map with a beam.
QNOT:CONV1.FOR	First of four routines to convolve two real images.
QNOT:CONV2.FOR	Second of four routines to convolve two real images.
QNOT:CONV3.FOR	Third of four routines to convolve two real images.
QNOT:CONV4.FOR	Fourth of four routines to convolve two real images.
APLNOT:COPMAP.FOR	*TESS routine to copy an image.
QNOT:DISPTV.FOR	*TESS routine: Display an image on a TV
APLNOT:DSKFFT.FOR	2-D disk based FFT using AP.
QNOT:FFTIM.FOR	FFTs an image for uv interpolation.
APLNOT:GETCTL.FOR	Determine Stokes' type of Clean map and other modeling info.
APLNOT:GETROW.FOR	Read row of an image opened with INTMIO
QNOT:GRDCOR.FOR	Normalizes and corrects image for gridding convolution fn.
QNOT:GRDCRM.FOR	Loads CLEAN components into AP for uv model computation.
APLNOT:GRDFLT.FOR	Sets default gridding convolution functions.
QNOT:GRDSUB.FOR	Subtracts transform of CLEAN components from uv data.
QNOT:GRDTAB.FOR	Computes Fourier transform of gridding convolution function.
APLNOT:GRIDTB.FOR	Makes a gridded image of the UV data in TB order.
APLNOT:IMCREA.FOR	Fills catalog header for an image and optionally creates and catalogs
APLNOT:INTMIO.FOR	Open an image file for use with GETROW
QNOT:INTPFN.FOR	Computes interpolation kernals and put them into "AP memory".
APLNOT:LINIO.FOR	Reads/writes line to/from an image.
APLNOT:MADD.FOR	Routine to add windows of open images.
APLNOT:MAKCVM.FOR	*TESS routine: Make image with residuals added.
APLNOT:MAKGAU.FOR	*TESS routine: Make a Gaussian convolution function.
QNOT:MAKMAP.FOR	Makes image or beam from uv data set.
APLNOT:MCOPY.FOR	Copies a window in one image to another.
APLNOT:MFILL.FOR	Fill a window in an image with a given value.
APLNOT:MLTMAP.FOR	*TESS routine: multiplies an image by a value, writes another.
QSUB:PASS1.FOR	First of two routines to FFT an image file.
QSUB:PASS2.FOR	Second of two routines to FFT an image file.
APLNOT:PLNPUT.FOR	Copies a subregion of a scratch file image to a cataloged image.
APLNOT:REIMIO.FOR	Reinitialize for image I/O using INTMIO
APLNOT:RESID.FOR	*TESS routine: Computes residual image.
APLNOT:SAVHDR.FOR	Save catalog header for an open file.
APLNOT:SMTOBG.FOR	*TESS routine: Copies small image to a large one.
APLNOT:SUBMAP.FOR	*TESS Routine: Subtract two images.
APLNOT:SUMARY.FOR	Accumulates and lists CLEAN components
QNOT:UVMDIV.FOR	Divides a uv data set by the Fourier transform of a model.
QNOT:UVMSUB.FOR	Subtracts the Fourier transform of a model from a uv data set.

```
APLNOT:VECWIN.FOR      Interpretes BLC and TRC into useable values as a vector.
QNOT:VISDFT.FOR        Compute DFT of model and subtract/divide from/into uv data.
APLNOT:VMBLKD.FOR      *TESS Routine: Initialize constants in common.
APLNOT:VTTELL.FOR      *TESS Routine: checks TELL file.
```

B.1.22 MAP-UTIL

```
APLNOT:ADDMAP.FOR      *TESS routine to add images
APLNOT:APLPBI.FOR      *TESS routine to apply a taper to an image. VLA only!
APLSUB:BLTGLE.FOR      returns angle from A through a test position to B
APLSUB:BLTLIS.FOR      lists any segments of current row which fall inside blotch regions
APLSUB:COMOFF.FOR      determines start block number of a plane in an N-dimensional image
AIPSUB:CUBINT.FOR      does 2-dimensional cubic interpolation of array values to position
APLSUB:DBINIT.FOR      checks map window and initializes for map double buffer IO
APLSUB:HDRWIN.FOR      sets image corners via WINDOW, revises header to that of output
APLSUB:MAPSIZ.FOR      returns the file size needed to hold the specified image in AIPS
APLSUB:MAPSNC.FOR      creates a scratch image file of specified dimensionality
APLSUB:MCREAT.FOR      create and catalog a map file
APLSUB:MDISK.FOR       reads or writes a row from an image
APLSUB:MINIT.FOR       intializes IO and pointers for quick-return image IO via MDISK
APLSUB:MINSK.FOR       inits use of MSKIP to read noncontiguous, evenly spaced rows in a map
APLSUB:MSKIP.FOR       reads noncontiguous, but evenly spaced rows in a map (see also MINSK)
APLSUB:PEAKFN.FOR      returns location of maximum within 5 pixels of image plane center
APLSUB:PLNGET.FOR      reads subimage of a plane and writes it to scratch file with shifts
APLSUB:RESCAL.FOR      Scales and offsets a cataloged image, updates CATBLK
APLSUB:SETBSC.FOR      determines scaling/offset parameters to convert image to integer
APLSUB:SNRVAL.FOR      substitutes specified value for magic blank value in a buffer
APLSUB:SUBHDR.FOR      changes input to output header correcting for subimaging
APLSUB:WINDOW.FOR      translates user BLC, TRC parameters into usable window arrays
APLSUB:WRBLNK.FOR      write blanked pixels at all pixels corresponding to specified pixel
APLSUB:WRPLAN.FOR      copies an N dimensional plane to a N or N+1 dimensional image
```

B.1.23 MATH

```
APLNOT:APPLPB.FOR      *TESS routine to apply a taper to an image
APLNOT:BOXBSM.FOR      Box car smoothing of an irregularly spaced array with blanking
APLNOT:BOXSMO.FOR      Does boxcar smoothing of an irregularly spaced array.
APLNOT:BSC.FOR         Computes Besselian star constants
APLNOT:CALRES.FOR      *TESS routine to calculate the residuals of an image.
APLNOT:CAXPY.FOR       Linpack routine: Complex constant times a vector plus a vector
APLNOT:CD.FOR          Computes Besselian day numbers C and D for aberration
APLNOT:CGEDI.FOR       Linpack routine: Determinant and inverse of a complex matrix
APLNOT:CGEFA.FOR       Linpack routine: Factors complex matrix by Gaussian Elimination
APLNOT:CLD.FOR         Converts Julian date to civil date
QNOT:CONV.FOR          *TESS routine: Convolve a map with a beam.
QNOT:CONV1.FOR         First of four routines to convolve two real images.
QNOT:CONV2.FOR         Second of four routines to convolve two real images.
QNOT:CONV3.FOR         Third of four routines to convolve two real images.
QNOT:CONV4.FOR         Fourth of four routines to convolve two real images.
QNOT:CONVFN.FOR        Computes convolving fn. kernels and stores them in "AP memory"
APLSUB:COVAR.FOR       Determines the covariance matrix of an M x N matrix
APLNOT:CSCAL.FOR       Linpack routine: Complex constant times vector
APLNOT:CSWAP.FOR       Linpack routine: Swaps two complex vectors
AIPSUB:CUBINT.FOR      does 2-dimensional cubic interpolation of array values to position
```

APLNOT:DA13.FOR	Computes arguments A1, A2 and A3 of the mean motion of the sun.
APLNOT:DA46.FOR	Computes arguments A4, A5 and A6 of the mean motion of the moon
APLNOT:DAPM.FOR	Converts apparent to mean positions.
APLNOT:DCUV.FOR	Computes unit vector for a given celestial position.
APLNOT:DDOT.FOR	Linpack routine: Form dot product of two vectors (DOUBLE)
APLNOT:DERF.FOR	Double precision erf function
APLNOT:DIVMAP.FOR	Tim Corwell routine: Divide one image by another.
APLNOT:DMACH.FOR	Linpack? routine: Sets machine precision parameters. (DOUBLE)
APLNOT:DMAP.FOR	Compute apparent position from mean position
APLNOT:DNRM2.FOR	Compute Euclidean norm of N-Vector
APLSUB:DPMPAR.FOR	returns machine precision or smallest or largest magnitude
APLNOT:DPRE.FOR	Compute General precession matrix
APLNOT:DTRC.FOR	Transforms spherical coordinates given transform matrix.
APLNOT:DUVC.FOR	Converts unit vector to celestial coordinates.
APLNOT:DVDMIN.FOR	Davidon
APLSUB:ENORM.FOR	computes the Euclidean norm of a N-vector
APLNOT:EPS.FOR	Computes mean obliquity of the Ecliptic for a Julian date.
APLNOT:ERF.FOR	error function.
APLNOT:FNDVAR.FOR	*TESS routine: Convert errors in Jy/beam to Jy per cell
APLNOT:FOURG.FOR	Cooley-Tukey fast fourier transform.
APLNOT:FOURYF.FOR	Fast Fourier transform by W. Newman - vectorizes.
APLNOT:GNFSMO.FOR	Boxcar smooths and ASCAL solution (GA) file.
APLNOT:GNSMO.FOR	Optimized spline smoothing of amplitudes in ASCAL (GN) file.
APLNOT:GRD.FOR	Compute the general relativity displacements in RA and DEC.
QNOT:GRDCOR.FOR	Normalizes and corrects image for gridding convolution fn.
APLNOT:GRDFLT.FOR	Sets default gridding convolution functions.
QNOT:GRDTAB.FOR	Computes Fourier transform of gridding convolution function.
APLNOT:GSTROT.FOR	Computes GST at UT=0 and earth rotation rate.
APLNOT:ICAMAX.FOR	Linpack routine: Index of complex element with max. abs. value
APLNOT:ICSORT.FOR	Two key in memory sort by one of several methods
APLSUB:JABER.FOR	Compute vectors needed for J2000 aberation and GR light bending.
APLSUB:JNUT.FOR	Computes nutation from IAU 1980 series
APLSUB:JPOLAR.FOR	Correct rectangular position for polar motion.
APLSUB:JPRECS.FOR	Precess between apparent and J2000 epoch positions.
APLSUB:JPRENU.FOR	Compute rotation matrix for precession and nutation IAU 1980 series.
APLNOT:L1.FOR	Compute L1 solution to an overdetermined system of linear equations
APLNOT:LG2BIT.FOR	Converts between bit arrays and logical arrays
APLSUB:LMDER.FOR	minimize the sum of squares of M nonlinear functions in N variables
APLSUB:LMDER1.FOR	minimize the sum of squares of M nonlinear functions in N variables
APLSUB:LMSTR.FOR	minimize sum of squares of M nonlinear functions in N variables
APLSUB:LMSTR1.FOR	minimize sum of squares of M nonlinear functions in N variables
APLNOT:MACHIN.FOR	Returns the smallest positive value that added to 1.0 is .gt. 1.0.
APLNOT:MAKGAU.FOR	*TESS routine: Make a Gaussian convolution function.
APLSUB:MATVMU.FOR	multiplies a matrix and a vector
APLNOT:MLTMAP.FOR	*TESS routine: multiplies an image by a value, writes another.
APLNOT:NULB.FOR	Finds a root of a function in an interval.
APLNOT:NUT2.FOR	Computes nutation in longitude and obliquity for a Julian date.
APLNOT:NUT4.FOR	Computes nutation using a non ridgid earth model
APLNOT:PARANG.FOR	Computes antenna parallactic angles
QSUB:PASS1.FOR	First of two routines to FFT an image file.
QSUB:PASS2.FOR	Second of two routines to FFT an image file.
APLSUB:PERMAT.FOR	permutes rows or columns of matrix according to permutation vector
APLNOT:PRECES.FOR	Convert between mean and apparent positions (B1950 only)
APLNOT:QKSORT.FOR	Two key "quick" sort routine to sort arrays.

APLSUB:QRFAC.FOR	computes a QR factorization of an MxN matrix
APLSUB:QRSOLV.FOR	completes the least squares matrix solution
APLSUB:RANDIN.FOR	initializes tables for random number routine RANDUM
APLSUB:RANDUM.FOR	generates random number between 0 and 1; initialized by RANDIN
APLNOT:RESID.FOR	*TESS routine: Computes residual image.
APLNOT:RFFTF.FOR	Vectorizable, table lookup Fast Fourier transform (non-AP)
APLSUB:RWUPDT.FOR	computes the QR decomposition of an upper triangular matrix + a row
APLSUB:SLAEVP.FOR	Earth position and motion ephemeris (J2000)
APLNOT:SOUELV.FOR	Computes source hour angles and elevations
APLNOT:SPHFN.FOR	Evaluate rational approx. to selected spheriodial functions.
APLNOT:STEP.FOR	*TESS routine: adds a fraction of one image to another.
APLNOT:SUBMAP.FOR	*TESS Routine: Subtract two images.

B.1.24 MESSAGES

APLGEN:ZMSGCL.FOR	close Message file or terminal

B.1.25 MODELING

QNOT:ALGSUB.FOR	Interpolates model visibility grom a grid and subtracts from uv data.
APLNOT:BMSHP.FOR	*TESS routine to fit an elliptical Gaussian to a dirty beam
QNOT:CCSGRD.FOR	Transforms CLEAN components to a grid.
APLSUB:COVAR.FOR	Determines the covariance matrix of an M x N matrix
APLSUB:DECONV.FOR	deconvolves two gaussians
QNOT:FFTIM.FOR	FFTs an image for uv interpolation.
APLNOT:FRQTAB.FOR	Fill Frequency table in common for IFs and channels
APLSUB:GETERR.FOR	calculates the errors on the fitted parameters
APLNOT:GRDAT.FOR	Getn info about CLEAN components for GRDSUB.
QNOT:GRDCRM.FOR	Loads CLEAN components into AP for uv model computation.
APLNOT:GRDSET.FOR	Creates scratch files and sets up for GRDSUB
QNOT:GRDSUB.FOR	Subtracts transform of CLEAN components from uv data.
QNOT:INTPFN.FOR	Computes interpolation kernals and put them into "AP memory".
APLSUB:LMDER.FOR	minimize the sum of squares of M nonlinear functions in N variables
APLSUB:LMDER1.FOR	minimize the sum of squares of M nonlinear functions in N variables
APLSUB:LMPAR.FOR	completes solution of the MxN matrix least squares problem
APLSUB:LMSTR.FOR	minimize sum of squares of M nonlinear functions in N variables
APLSUB:LMSTR1.FOR	minimize sum of squares of M nonlinear functions in N variables
APLSUB:MOM.FOR	calculates moments in a 16x16 data array
AIPSUB:PFIT.FOR	parabolic fit to 3x3 matrix
APLSUB:QRFAC.FOR	computes a QR factorization of an MxN matrix
APLSUB:QRSOLV.FOR	completes the least squares matrix solution
APLSUB:RWUPDT.FOR	computes the QR decomposition of an upper triangular matrix + a row
APLNOT:SETGDS.FOR	Sets up for UV model computation, fills common in DGDS.INC
APLNOT:UVDOUT.FOR	Divides uv model in one half of a record into other, writes result.
APLNOT:UVDPAD.FOR	Reformat UV data record, doubling size and zero extra words.
QNOT:UVMDIV.FOR	Divides a uv data set by the Fourier transform of a model.
QNOT:UVMSUB.FOR	Subtracts the Fourier transform of a model from a uv data set.
QNOT:VISDFT.FOR	Compute DFT of model and subtract/divide from/into uv data.

B.1.26 PARSING

APLSUB:CH2NUM.FOR	converts string containing an integer in ASCII form into the integer
APLSUB:CHLTOU.FOR	converts a CHARACTER string to all upper case letters
APLNOT:CITC2D.FOR	KEYIN routine: parses Double precision value from a character string

APLNOT:CITC2I.FOR	KEYIN routine: parse an integer from a character string.
APLNOT:CITC2R.FOR	KEYIN routine: parses a floating value from a character string
APLNOT:CITCPR.FOR	KEYIN routine: character compare with wild cards.
APLNOT:CITEXP.FOR	KEYIN routine: evaluate an expression in a character string
APLNOT:CITSKP.FOR	KEYIN routine: Find next non blank character in a string.
APLNOT:DCODEF.FOR	Decodes data from a character string using a format.
APLSUB:FPARSE.FOR	interprets card image from FITS header into AIPS header format
APLSUB:GETCRD.FOR	parses card image from FITS header, returns recognized keyword
APLNOT:GETKEY.FOR	Parses symbol = value from a character string.
APLSUB:GETLOG.FOR	returns value of logical variable from character buffer
APLSUB:GETNUM.FOR	returns numeric field from character buffer
APLSUB:GETSTR.FOR	returns a string value (was enclosed by quotes) from character buffer
APLSUB:GETSYM.FOR	returns next symbol in character-form card image
APLSUB:GTWCRD.FOR	returns allowed keyword from FITS header card image
APLSUB:IDWCRD.FOR	returns allowed keyword from FITS header card image
APLNOT:KEYIN.FOR	AIPS version of CIT parsing routine
APLNOT:SDTCRD.FOR	Parse "SINGLDSH" FITS table headers, get some keywords.
APLNOT:TABF3D.FOR	Determines repeat count and data type for FITS 3-D tables entries.
APLNOT:TABFRM.FOR	Parses format for FITS ASCI table entries.
APLNOT:TABSPC.FOR	Determines repeat count and data type for FITS 3-D tables entries.

B.1.27 PLOT-APPL

APLNOT:AITOFF.FOR	writes vectors for Aitoff projection grid to plot file
AIPSUB:AU8A.FOR	verb EXTLIST to list contents of plot files and other extension files
APLNOT:COMCLR.FOR	Scale and map complex array intp RBG space, amp=inten. phase=hue.

B.1.28 PLOT-UTIL

APLSUB:AXSTRN.FOR	encodes axis type and value in a string
APLSUB:CHNTIC.FOR	counts characters to the left of a plot (for labeling vertical axis)
APLSUB:CLAB1.FOR	puts axis labels in plot file and calls CTICS to draw and label ticks
APLSUB:CLAB2.FOR	puts axis labels in plot file and calls CTICS to draw and label ticks
APLSUB:COMLAB.FOR	initializes line drawing and labels plot with text, contour levels
APLSUB:CONDRW.FOR	writes contour plot to a plot file
APLSUB:CTICS.FOR	writes tick marks and tick labels to a plot file
APLSUB:GCHAR.FOR	writes a draw character string command record into a plot file
APLSUB:GFINIS.FOR	writes the end of plot record into a plot file and closes it down
APLSUB:GINIT.FOR	creates, opens, initializes plot file (does not catalog it)
APLSUB:GINITG.FOR	writes an initialize-for-grey-scale record into a plot file
APLSUB:GINITL.FOR	writes an initialize-for-line-drawing command into a plot file
APLSUB:GMCAT.FOR	writes a copy-misc-image-catalog-info records into a plot file
APLSUB:GPHWRT.FOR	write plot buffer to file, prepares buffer for more commands
APLSUB:GPOS.FOR	write a position-"pen" command into a plot file
APLSUB:GRAYPX.FOR	writes an array of grey values into a plot file
APLSUB:GVEC.FOR	writes a move-pen-down (or write vector) command in a plot file
APLSUB:HIPLOT.FOR	places a record in the history file concerning a plot file creation
APLSUB:INTEDG.FOR	returns intersections of a line with the edges of a box
APLSUB:ISCALE.FOR	scale a buffer by various functions to an integer buffer (ie for TV)
APLSUB:LABINI.FOR	initializes commons for labeling of plots (calls SETLOC)
APLSUB:LABNO.FOR	write a tick mark numeric label in a plot file
APLSUB:LINLIM.FOR	clips X,Y values at edges of rectangular area with interpolation
APLNOT:PLEND.FOR	End-of-plot clean-up functions: Gary plot package.
APLSUB:PLGRY.FOR	draws grey scale commands in the plot file: Gary plot package

APLNOT:PLMAKE.FOR	creates & opens plot file, puts into map header, writes first record
APLSUB:PLPOS.FOR	puts a position vector command in a plot file: Gary plot package
APLSUB:PLVEC.FOR	puts a draw vector command in a plot file: Gary plot package
APLSUB:RNGSET.FOR	set plat intensity range from image header and user parameters
APLSUB:SETLOC.FOR	sets location common for coordinate computations and display
APLSUB:SCALMM.FOR	computes plot scaling factors and plot scale in arc sec per mm
APLSUB:SLBINI.FOR	initializes labeling for slice plots
APLSUB:STARPL.FOR	adds to plot plus signs at coordinates given in an ST (star) file
APLSUB:TICCOR.FOR	correct tick lengths from increments in dir cosines to coordinates
APLSUB:TICINC.FOR	determines tick mark lengths and increments for CTICS, ...
APLSUB:TKLAB.FOR	labels axes on plot directly to a TK graphics device, draw ticks
APLSUB:TKSLIN.FOR	initialize parameters for plotting a slice directly on a TK graphics
APLSUB:TKTICS.FOR	writes tick marks and labels directly to TK graphics device
APLGEN:ZDOPRT.FOR	reads bit file and causes it to be plotted on printer/plotter
APLGEN:ZLASC2.FOR	spool a closed laser printer print/plot file
APLGEN:ZLASCL.FOR	close and spool a laser printer print/plot file
APLGEN:ZLASIO.FOR	open, write to, close and spool a laser printer print/plot file
APLGEN:ZLASOP.FOR	open a laser printer print/plot file
APLGEN:ZLWIO.FOR	open, write to, close and spool a PostScript print/plot file
APLGEN:ZLWOP.FOR	open a PostScript (LaserWriter) print/plot file

B.1.29 POPS-APPL

AIPSUB:AU1.FOR	prints and clears the message file, sets up for EXIT and RESTART
AIPSUB:AU1A.FOR	does parameter display: INPUTS, SHOW, HELP, EXPLAIN
AIPSUB:AU2.FOR	handles task-related activities: GO, TELL, WAIT, ABORT, SPY, TPUT
AIPSUB:AU2A.FOR	verb functions on task save and Save/Get files: TGET, SGdestr, index
AIPSUB:AU3.FOR	verbs to display contents of catalogs and headers: CATA, IMHE ...
AIPSUB:AU3A.FOR	verbs for disk management: FREE, ALLDEST, TIMDEST, etc.
AIPSUB:AU3B.FOR	verbs to rearrange the entries in the catalog file: RECAT, RENUMBER
AIPSUB:AU4.FOR	verbs to handle basic tape operations: TPHEAD, MOUNT, AVFILE, ...
AIPSUB:AU5.FOR	basic TV verbs to do on/off, read cursor position, init the TV, ...
AIPSUB:AU5A.FOR	verbs to load images to the TV including ROAM
AIPSUB:AU5B.FOR	verbs to anotate TV images
AIPSUB:AU5C.FOR	verbs to draw wedges on TV, erase images, set corners with TV cursor
AIPSUB:AU5D.FOR	verbs to load and run TV movie sequences
AIPSUB:AU6.FOR	verbs to manipulate TV scroll, zoom, color tables, and TVHUEINT
AIPSUB:AU6A.FOR	verbs to set the TV blank and white LUT linearly and to blink planes
AIPSUB:AU6B.FOR	verb to display image value at pixel indicated by TV cursor (CURVAL)
AIPSUB:AU6C.FOR	verb to alter zoom and enhance image in standard way: TVFIDDLE
AIPSUB:AU6D.FOR	verbs to do image statistics in blotch regions: TVSTAT, IMSTAT
AIPSUB:AU7.FOR	verbs to print history, rescale image, alter axis descriptions
AIPSUB:AU7A.FOR	verbs to put/get header values, to put values into images
AIPSUB:AU8.FOR	verbs to get or clear name adverbs, destroy extension files
AIPSUB:AU8A.FOR	verb EXTLIST to list contents of plot files and other extension files
AIPSUB:AU9.FOR	verbs to fit or interpolate the image intensity (MAXFIT, IMVAL)
AIPSUB:AU9A.FOR	verbs to read TEK cursor and display pixel, sky, image values
AIPSUB:AU9B.FOR	verbs to plot slices and models on graphics
AIPSUB:AU9C.FOR	verbs to set initial guesses for slice model fits using TEK graphics
AIPSUB:AUA.FOR	verb to submit batch jobs to AIPSC and the QMNGR queues
AIPSUB:AUB.FOR	verbs to prepare, edit, and review batch jobs and queues
AIPSUB:AUC.FOR	verbs to enter, list, drop gripes, enter password
AIPSUB:AUT.FOR	site-specific test verbs
AIPSUB:PRTALN.FOR	prints line on CRT orprinter, handles page full AND POPS type-ahead

AIPSUB:TASKWT.FOR	waits for tasks to begin, send resumption signal, and/or terminate

B.1.30 POPS-LANG

AIPSUB:BCLEAN.FOR	Pops items from B-stack to A-stack until BPR-stack precedence < NEXTP
AIPSUB:CHUNT.FOR	searches symbol table for character string accepting min match
AIPSUB:COMPIL.FOR	parses line of input with GETFLD, builds stacks for execution
AIPSUB:CONCAT.FOR	creates temporary literal on stack = concatanation of 2 strings
AIPSUB:EDITOR.FOR	does operations needed at start and end of editing existing procedure
AIPSUB:EQUIV.FOR	checks whether two variables are logically equivalent
AIPSUB:GETFLD.FOR	finds the next symbol in KARBUF and determines its pointers
AIPSUB:GETNME.FOR	gets the next name in the input character buffer
AIPSUB:HELPS.FOR	executes "pseudoverb name" -> hidden verb w name on stack (INP, RUN)
AIPSUB:HUNT.FOR	searches a linked list for words to be matched
AIPSUB:INIT.FOR	initializes symbol, procedure text tables, and commons for POPS
AIPSUB:KWICK.FOR	verbs: math, assignment, comparison, looping, branching, proc calls
AIPSUB:LLOCAT.FOR	allocates space in linked-list array and handles link pointers
AIPSUB:LTSTOR.FOR	allocate storage for literal if needed, return pointer in any case
AIPSUB:MASSGN.FOR	handles array = value(s) constructs
AIPSUB:OERROR.FOR	gives user error message, resets parameters to read next input line
AIPSUB:POLISH.FOR	parses the input text buffer, building stacks; executes pseudoverbs
AIPSUB:POP.FOR	pops item from stack
AIPSUB:PREAD.FOR	reads an input line from current input source (CRT, RUN file, batch)
AIPSUB:PSEUDO.FOR	compiles pseudoverbs: PROC, declarations, IF, THEN, WHILE, FINISH, ..
AIPSUB:PUSH.FOR	pushes item onto stack advancing the stack pointer
AIPSUB:RLOCAT.FOR	allocates space in linked-list array and handles link pointers
AIPSUB:SETTYP.FOR	replaces the symbol type code in the data description structure
APLSUB:STLTOU.FOR	converts any characters beween single quotes to upper case
AIPSUB:STORES.FOR	stores proc code; pseudoverbs: SAVE, GET, RESTORE, STORE, LIST, ...
AIPSUB:SUBS.FOR	converts variable with subscript to the appropriate scalar
AIPSUB:SYMBOL.FOR	obtains symbol identification from symbol table; creates new symbols
AIPSUB:VERBS.FOR	calls verbs subroutines (AUnc) by verb number - interactive version
AIPSUB:VERBSB.FOR	calls verbs subroutines (AUnc) by verb number - batch version
AIPSUB:VERBSC.FOR	calls verbs subroutines (AUnc) by verb number - Checker version

B.1.31 POPS-UTIL

AIPSUB:ASSGN.FOR	performs the assignment functions of scalar/vector = scalar/vector
AIPSUB:CONFRM.FOR	asks user to respond yes or no to some question
APLSUB:GETNUM.FOR	returns numeric field from character buffer
APLSUB:GETSTR.FOR	returns a string value (was enclosed by quotes) from character buffer
AIPSUB:PRTMSG.FOR	prints and deletes messages from the MS file
AIPSUB:RDUSER.FOR	reads the user number from the terminal
AIPSUB:SCHOLD.FOR	wait for user input on screen full, allows type ahead, quit, continue
AIPSUB:SGLAST.FOR	does a SAVE or GET of the K array cataloged as LASTEXIT.
AIPSUB:SGLOCA.FOR	locates a Save/Get file by name in catalog of SG files
AIPSUB:UINIT.FOR	general, non-language initialization routine; only calls VHDRIN

B.1.32 PRINTER

APLSUB:BATPRT.FOR	prints header/trailer messages for printer tasks when run in batch
APLSUB:DATDAT.FOR	converts "DD/MM/YY" form of date to "dd-mmm-yyyy" for printing
AIPSUB:PRTALN.FOR	prints line on CRT orprinter, handles page full AND POPS type-ahead
APLSUB:PRTLIN.FOR	prints line on printer or terminal with page-full handling, headers

APLGEN:ZDOPRT.FOR	reads bit file and causes it to be plotted on printer/plotter
APLGEN:ZENDPG.FOR	advance printer if needed to avoid electrostatic-printer "burn-out"
APLGEN:ZLASC2.FOR	spool a closed laser printer print/plot file
APLGEN:ZLASCL.FOR	close and spool a laser printer print/plot file
APLGEN:ZLASIO.FOR	open, write to, close and spool a laser printer print/plot file
APLGEN:ZLASOP.FOR	open a laser printer print/plot file
APLGEN:ZLPCL2.FOR	queue a file to the line printer and delete
APLGEN:ZLPCLS.FOR	close an open printer device
APLGEN:ZLPOP2.FOR	open a line-printer text file - actual OPEN call
APLGEN:ZLPOPN.FOR	open a line-printer text file
APLGEN:ZLWIO.FOR	open, write to, close and spool a PostScript print/plot file
APLGEN:ZLWOP.FOR	open a PostScript (LaserWriter) print/plot file

B.1.33 SDISH

APLNOT:CSINI.FOR	Create/Open/Init Single dish calibration (CS) table
APLNOT:DCALSD.FOR	Apply Single dish calibration to data.
APLNOT:DGETSD.FOR	Reads, selects single dish data, calibrates and edits.
APLNOT:GACSIN.FOR	Initializes CS file, and prepares table to be applied.
APLNOT:SDCGET.FOR	Sets up to interpolate in Single dish calibration (CS) table.
APLNOT:SDCSET.FOR	Interpolates single dish calibration data for current time.
APLNOT:SDGET.FOR	Reads single dish data with optional calibration and flagging
APLNOT:SDTCRD.FOR	Parse "SINGLDSH" FITS table headers, get some keywords.
APLNOT:TABCS.FOR	Does I/O to single dish calibration (CS) table opened by CSINI

B.1.34 SERVICE

AIPSUB:AIPINI.FOR	does all AIPS initializations for a stand-alone program
AIPSUB:DESCR.FOR	destroys all scratch files for tasks which are no longer active
APLSUB:INQFLT.FOR	inquire of the user for specified number of floating-point values
APLSUB:INQGEN.FOR	inquire of user for specified list of integer, float, & char values
APLSUB:INQINT.FOR	inquire of user for specified number of integer values
APLSUB:INQSTR.FOR	request character string from user (1st N characters of line)
APLGEN:ZADDR.FOR	determine if 2 addresses inside computer are the same
APLGEN:ZDELA2.FOR	delay current process a specified interval
APLGEN:ZDELAY.FOR	delay current process a specified interval
APLGEN:ZERRO2.FOR	return system error message for given system error code
APLGEN:ZGTBIT.FOR	get array of bits from a word
APLGEN:ZHEX.FOR	encode an integer into hexadecimal characters
APLGEN:ZKDUMP.FOR	display portions of an array in various Fortran formats
APLGEN:ZMSGWR.FOR	call MSGWRT based on call arguments - for C routines to call MSGWRT
APLGEN:ZMYVER.FOR	returns OLD, NEW, or TST based on translation of logical AIPS_VERSION
APLGEN:ZPTBIT.FOR	put array of bits into a word
APLGEN:ZTIME.FOR	return the local time of day

B.1.35 SLICE

AIPSUB:AU9B.FOR	verbs to plot slices and models on graphics
AIPSUB:AU9C.FOR	verbs to set initial guesses for slice model fits using TEK graphics
AIPSUB:SET1DG.FOR	sets initial guess parameters with the TEK for fitting slices
AIPSUB:SLOCIN.FOR	initialize location common for slice (on the TEK) model fitting
AIPSUB:TKGGPL.FOR	plots model slice on Graphics
AIPSUB:TKGMPL.FOR	plot model fit to slice on the graphics terminal
AIPSUB:TKRSPL.FOR	plots residuals between slice and its model on Graphics device

APLSUB:TKSLIN.FOR	initialize parameters for plotting a slice directly on a TK graphics
AIPSUB:TKSLPL.FOR	plot a slice on graphics device

B.1.36 SORT

APLSUB:LSORT.FOR	sort a data buffer minimizing number times records are switched
APLSUB:MERGE.FOR	sorts by merging previously sorted blocks of records
APLSUB:OSORT.FOR	does quick sort on array of vectors, then reorders by calling PERMAT
APLSUB:PERMAT.FOR	permutes rows or columns of matrix according to permutation vector
APLSUB:SHSORT.FOR	Shell sort of an array or records on two keys

B.1.37 SPECTRAL

APLNOT:DATBND.FOR	Applies the bandpass correction to data.
APLNOT:FQMATC.FOR	Check if selection criteria match FQ table entries.
APLNOT:FRQTAB.FOR	Fill Frequency table in common for IFs and channels
APLNOT:IOBSRC.FOR	Search for antennas in the current bandpass buffer.
APLNOT:SCINTP.FOR	Interpolates bandpass tables in time.
APLNOT:SCLOAD.FOR	Copies part of one bandpass scratch file to another for efficiency.
APLNOT:SETSM.FOR	Determines type of spectral smoothing and sets up look up table.
APLNOT:SMOSP.FOR	Convolves a spectrum with a tabulated function.
APLNOT:TABBP.FOR	Does I/O to bandpass (BP) table opened by BPINI
APLNOT:UVGET.FOR	Read UV data with optional calibration, editing, selection, etc.

B.1.38 SYSTEM

APLSUB:ACOUNT.FOR	Writes beginning and final entries in the AIPS accounting file
AIPSUB:AIPINI.FOR	does all AIPS initializations for a stand-alone program
APLSUB:BATQ.FOR	performs operations on batch queue control file such as OPEN RUN CLOS
APLSUB:DIE.FOR	closes down tasks which use DFIL.INC to maintain status of files
APLSUB:DIETSK.FOR	closes a task: restarting AIPS, settling the accounting, issuing msg
APLSUB:PASENC.FOR	encrypts a 12-character password into 3 Holleriths
APLSUB:PASWRD.FOR	prompts for and checks password if the user has a non-blank PW entry
APLSUB:RELPOP.FOR	places a return code in the task data file, thereby resuming AIPS
APLSUB:WHOAMI.FOR	given root task name, gets actual task name and finds NPOPS number
APLGEN:ZABOR2.FOR	establishes or carries out (when appropriate) abort handling
APLGEN:ZABORT.FOR	establishes or carries out (when appropriate) abort handling
APLGEN:ZACTV8.FOR	activate the requested program, returning process ID information
APLGEN:ZCPU.FOR	return current process CPU time and IO count
APLGEN:ZDATE.FOR	return the local date
APLGEN:ZDCHI2.FOR	initialize device and Z-routine characteristics commons - local vals
APLGEN:ZDCHIC.FOR	set more system parameters; make them available to C routines
APLGEN:ZDCHIN.FOR	initialize message, device and Z-routine characteristics commons
APLGEN:ZFREE.FOR	display available disk space
APLGEN:ZGNAME.FOR	get name of current process
APLGEN:ZPRI2.FOR	raise or lower the process priority
APLGEN:ZPRIO.FOR	raise or lower the process priority
APLGEN:ZPRPAS.FOR	prompt user and read 12-character password (invisible) from CRT
APLGEN:ZSETUP.FOR	performs system-level operations after VERNAM, TSKNAM, NPOPS known
APLGEN:ZSTAI2.FOR	does any system cleanup needed at the end of interactive AIPS session
APLGEN:ZSTAIP.FOR	does any system cleanup needed at the end of interactive AIPS session
APLGEN:ZTACT2.FOR	inquires if a task is currently active on the local computer
APLGEN:ZTACTQ.FOR	inquires if a task is currently active on the local computer
APLGEN:ZTKILL.FOR	deletes (or kills) the specified process

APLGEN:ZTQSP2.FOR	display AIPS account or all processes running on the system
APLGEN:ZTQSPY.FOR	display AIPS account or all processes running on the system
APLGEN:ZTRLOG.FOR	translate a logical name
APLGEN:ZWHOMI.FOR	determines AIPSxn task name; sets NPOPS, assigns TV and TK devices

B.1.39 TAPE

APLSUB:DWRITE.FOR	translate "DEC" format map header and display parameters
APLSUB:EXTHIS.FOR	adds to history file for contents of FITS extension file being read
APLSUB:EXTREQ.FOR	parse FITS tape record for required extension file FITS keywords
APLSUB:FNDEOT.FOR	advances tape to logical end of information (2 consecutive EOFs)
AIPSUB:FWRITE.FOR	converts FITS header to AIPS header and displays it with MSGWRT
APLNOT:GTF3D.FOR	Copies real-world bytes from a tape buffer, reading if necessary.
APLSUB:MLREOF.FOR	advances tape to end of file and reports records read in TAPIO system
APLNOT:PTF3D.FOR	Copies 8-bit bytes to tape.
APLNOT:R3DTAB.FOR	Read data from FITS 3-D table and write AIPS table.
APLNOT:RWTAB.FOR	Read FITS ASCII table data and write AIPS table file.
APLNOT:SDTCRD.FOR	Parse "SINGLDSH" FITS table headers, get some keywords.
APLSUB:SKPBLK.FOR	find next non-blank card image in a FITS header, read tape if needed
APLSUB:SKPEXT.FOR	finishes reading FITS extension header, skips the extension data
APLNOT:TABAXI.FOR	parse FITS tape record for required extension file FITS keywords
APLNOT:TABF3D.FOR	Determines repeat count and data type for FITS 3-D tables entries.
APLNOT:TABFRM.FOR	Parses format for FITS ASCI table entries.
APLSUB:TABLIN.FOR	reads a line from the data portion of a FITS extension of type TABLE
APLNOT:TABSPC.FOR	Determines repeat count and data type for FITS 3-D tables entries.
APLSUB:TAPIO.FOR	read/writes tape and FITS disk files
APLSUB:TPHEAD.FOR	reads a tape record, advances over label file, decides if it
APLNOT:TPIOHD.FOR	Reads tape header and tests if FITS, tape labels etc.
AIPSUB:UWRITE.FOR	writes summary of UV Export-format tape
APLSUB:VBOUT.FOR	writes variable length, blocked records of 16-bit integers to tape
APLGEN:ZBKLD1.FOR	initialize environment for BAKLD
APLGEN:ZBKLD2.FOR	does BACKUP operation: load images from tape to directory
APLGEN:ZBKLD3.FOR	clean up system things for BAKLD ending
APLGEN:ZBKTP1.FOR	initialize BACKUP to tape operation for BAKTP
APLGEN:ZBKTP2.FOR	write a cataloged file plus extensions to BACKUP tape in BAKTP
APLGEN:ZBKTP3.FOR	clean up host environment at end of BAKTP
APLGEN:ZBYTF2.FOR	interchange bytes in buffer if needed to go between local & standard
APLGEN:ZBYTFL.FOR	interchange bytes in buffer if needed to go between local & standard
APLGEN:ZMCACL.FOR	convert Modcomp compressed ASCII to Hollerith characters (for FILLR)
APLGEN:ZMOUN2.FOR	mount or dismount magnetic tape device
APLGEN:ZMOUNT.FOR	mount or dismount magnetic tape device
APLGEN:ZR8P4.FOR	converts pseudo I*4 to double precision - for tape handling only
APLGEN:ZRDMF.FOR	convert DEC Magtape Format (36 bits data in 40 bits) to 2 integers
APLGEN:ZRM2RL.FOR	convert Modcomp to local single precision floating point
APLGEN:ZTAP2.FOR	position (forward/back record/file), write EOF, etc. for tapes
APLGEN:ZTAPE.FOR	mount, dismount, position, write EOF, etc. for tapes
APLGEN:ZTAPIO.FOR	tape operations for IMPFIT (compressed FITS transport tape)
APLGEN:ZTPCL2.FOR	close a tape device
APLGEN:ZTPCLD.FOR	close pseudo-tape disk file
APLGEN:ZTPCLS.FOR	closes a tape device (real or pseudo-tape disk)
APLGEN:ZTPMI2.FOR	tape read/write
APLGEN:ZTPMID.FOR	pseudo-tape disk read/write for 2880-bytes records
APLGEN:ZTPMIO.FOR	read/write tape devices with quick return IO methods
APLGEN:ZTPOP2.FOR	open a tape device for double-buffer, asymchronous IO

APLGEN:ZTPOPD.FOR	open a pseudo-tape, sequential disk file for FITS
APLGEN:ZTPOPN.FOR	open tape or pseudo-tape device
APLGEN:ZTPWA2.FOR	wait for read/write from/to a tape device
APLGEN:ZTPWAD.FOR	"wait" for IO operation to complete on pseudo-tape disk file (ZTPMID)
APLGEN:ZTPWAT.FOR	wait for asynchronous IO to finish on tape or pseudo-tape disk

B.1.40 TERMINAL

APLGEN:ZPRMPT.FOR	prompt user and read 80-characters from CRT screen
APLGEN:ZPRPAS.FOR	prompt user and read 12-character password (invisible) from CRT
APLGEN:ZTTBUF.FOR	reads terminal input with no prompt or wait - simulates TV trackball
APLGEN:ZTTCLS.FOR	close a terminal device
APLGEN:ZTTOP2.FOR	open a message terminal
APLGEN:ZTTOPN.FOR	open a terminal device
APLGEN:ZTTYIO.FOR	read/write buffer to terminal

B.1.41 TEXT

APLSUB:TXTMAT.FOR	min match handling for text files (calls ZTXMAT, does messages)
APLSUB:VERMAT.FOR	min match handling for text file names incl sequence of directories
APLGEN:ZDIR.FOR	build a full path name to files in AIPS-standard areas (HE, RU, ...)
APLGEN:ZTCLOS.FOR	close text file opened with ZTOPEN
APLGEN:ZTOPE2.FOR	open text file for ZTOPEN
APLGEN:ZTOPEN.FOR	open text file - logical area, version, member name as arguments
APLGEN:ZTREAD.FOR	read next 80-character record in sequential text file (ZTOPEN type)
APLGEN:ZTXCLS.FOR	clos text file opened via ZTXOPN
APLGEN:ZTXIO.FOR	read/write a line to a text file
APLGEN:ZTXMA2.FOR	find all file names matching a given wildcard specification
APLGEN:ZTXMAT.FOR	return list of files in specified area beginning with specified chars
APLGEN:ZTXOP2.FOR	translate the file name and open a text file
APLGEN:ZTXOPN.FOR	open a text file for read or write

B.1.42 TV

APLNOT:IMWIN.FOR	Set up window on TV device

B.1.43 TV-APPL

AIPSUB:AU5.FOR	basic TV verbs to do on/off, read cursor position, init the TV, ...
AIPSUB:AU5A.FOR	verbs to load images to the TV including ROAM
AIPSUB:AU5B.FOR	verbs to anotate TV images
AIPSUB:AU5C.FOR	verbs to draw wedges on TV, erase images, set corners with TV cursor
AIPSUB:AU5D.FOR	verbs to load and run TV movie sequences
AIPSUB:AU6.FOR	verbs to manipulate TV scroll, zoom, color tables, and TVHUEINT
AIPSUB:AU6A.FOR	verbs to set the TV blank and white LUT linearly and to blink planes
AIPSUB:AU6B.FOR	verb to display image value at pixel indicated by TV cursor (CURVAL)
AIPSUB:AU6C.FOR	verb to alter zoom and enhance image in standard way: TVFIDDLE
AIPSUB:AU6D.FOR	verbs to do image statistics in blotch regions: TVSTAT, IMSTAT
QNOT:DISPTV.FOR	*TESS routine: Display an image on a TV
YSUB:GRBOXS.FOR	sets rectangular boxes or diagonal line with TV cursor and graphics
AIPSUB:GRLUTS.FOR	interactive piecewise linear LUT using graphic plane and cursor
AIPSUB:HIENH.FOR	interactive linear enhancement of 2-image hue-intensity TV display
AIPSUB:HILUT.FOR	calculates new LUTs for hue-intensity display and sends them to TV
YSUB:IAXIS1.FOR	draws axis labels and tick marks (via ITICS) on TV

APLNOT:IMOPEN.FOR	Open the TV under the system set up by IOSET
YSUB:ITICS.FOR	draws tick marks and labels on TV
AIPSUB:TVBLNK.FOR	blinks two TV channels, cursor controls rate
APLNOT:TVFOAD.FOR	TVFLG routine to load and image with smoothing converting to display.
AIPSUB:TVMOVI.FOR	runs movie algorithm on pre-loaded images, with interactions
AIPSUB:TVROAM.FOR	does interactive multi-channel "ROAM" display on pre-loaded images
YGEN:YCUCOR.FOR	correct cursor position for scroll; return image coordinates, header
YGEN:YISDRM.FOR	read/write data memory of NRAO-ISU device
YGEN:YISDSC.FOR	read/write micro-processor memory of NRAO-ISU device
YGEN:YISJMP.FOR	cause microprocessor jump toaddress in NRAO-ISU device
YGEN:YISLOD.FOR	loads/unloads program memory of NRAO-ISU device
YGEN:YISMPM.FOR	reads/writes microprocessor memory of the NRAO-ISU device
YGEN:YMKCUR.FOR	selects the form of the cursor to be displayed

B.1.44 TV-BASIC

YGEN:YALUCT.FOR	drives the TV arithmetic logic unit - not to be used much
YGEN:YCONST.FOR	controls the constant registers added to the TV picture - not used
YGEN:YCRCTL.FOR	controls the TV cursor visibility, position; reads trackball buttons
YGEN:YFDBCK.FOR	causes a feedback operation in the TV
YGEN:YGGRAM.FOR	controls the TV graphics color assignments
YGEN:YGRAFE.FOR	controls the graphics control register (IIS function)
YGEN:YGRAPH.FOR	turns TV graphics planes on and off
YGEN:YIFM.FOR	read/write TV Input look-up-table
YGEN:YIMGIO.FOR	read/write data to the TV grey and graphics memories
YGEN:YINIT.FOR	initialize everything about the TV
YGEN:YLUT.FOR	read/write channel-based look-up-table
YGEN:YMNMAX.FOR	read 3 min/max values from TV data paths (IIS only, not used)
YGEN:YOFM.FOR	read/write all-channel look-up-table ("output function memory")
YGEN:YRHIST.FOR	read the histogram of the selected TV output color
YGEN:YSCROL.FOR	write the scroll registers (shift location of 1 or more TV channels)
YGEN:YSHIFT.FOR	read/write the shift (bias) registers of the TV (IIS M70, not used)
YGEN:YSPLIT.FOR	set channel selection by split-screen quadrant
YGEN:YSTCUR.FOR	reads/writes the cursor pattern array
YGEN:YTVCIN.FOR	initialize TV characteristics common (not needed much - see TVOPEN)
YGEN:YTVCLS.FOR	close the TV, including TV device and TV control/parameter disk file
YGEN:YTVOPN.FOR	open the TV device and the TV disk control/parameter file.
YGEN:YZOOMC.FOR	set the TV zoom magnification and center

B.1.45 TV-IO

YGEN:YTVCL2.FOR	close actual TV device (called by YTVCLS)
YGEN:YTVMC.FOR	issue a master clear to reinitialize IO to the TV
YGEN:YTVOP2.FOR	open actual TV device (called by YTVOPN)
APLGEN:ZARGS.FOR	sends command to/from the ARGS TV device
APLGEN:ZARGXF.FOR	translates IIS Model 70 commands into calls to ZARGS for ARGS TV
APLGEN:ZDEAC2.FOR	close DeAnza TV device
APLGEN:ZDEACL.FOR	close DeAnza TV device
APLGEN:ZDEAMC.FOR	issue a master clear to the TV - for DeAnzas this is a No-Op
APLGEN:ZDEAO2.FOR	opens DeAnza TV device
APLGEN:ZDEAOP.FOR	opens DeAnza TV device
APLGEN:ZDEAX2.FOR	do actual read/write from/to DeAnza device
APLGEN:ZDEAXF.FOR	do IO to DeAnza TV
APLGEN:ZIVSOP.FOR	opens IVAS TV device - using the IIS package

APLGEN:ZM70C2.FOR	close IIS Model 70/75 TV device
APLGEN:ZM70O2.FOR	opens IIS Model 70.75 TV device
APLGEN:ZM70X2.FOR	read/write from/to IIS Model 70/75 device
APLGEN:ZTTBUF.FOR	reads terminal input with no prompt or wait - simulates TV trackball
APLGEN:ZV20C2.FOR	close Comtal Vision 1/20 TV device
APLGEN:ZV20MC.FOR	issue a master clear to the TV - for Comtal this is a No-Op
APLGEN:ZV20O2.FOR	opens Comtal Vision 1/20 TV device
APLGEN:ZV20X2.FOR	does I/O to Comtal Vision 1/20 TV device
APLGEN:ZVTVC2.FOR	close virtual TV connection to remote, real-TV computer
APLGEN:ZVTVC3.FOR	close connection in real-TV computer to client, virtual-TV computer
APLGEN:ZVTVCL.FOR	close connection in client (virtual-TV) to server (remote, real-TV)
APLGEN:ZVTVGC.FOR	close & reopen connection in server (real-TV) to client (virtual-tv)
APLGEN:ZVTVO3.FOR	open connection in server (real-TV) to client (virtual-TV)
APLGEN:ZVTVOP.FOR	opens connection from client (virtual-TV) to server (real-TV)
APLGEN:ZVTVRC.FOR	closes channel in server (real-TV) to client (virtual-TV)
APLGEN:ZVTVRO.FOR	open socket in server (real-TV) to any client (virtual-TV)
APLGEN:ZVTVRX.FOR	does IO for server (real TV) to client (Virtual-TV) incl close/reopen
APLGEN:ZVTVX2.FOR	writes/reads to/from server for the client (virtual TV) machine
APLGEN:ZVTVX3.FOR	reads/writes from/to client (virtual TV) for the server (real TV)
APLGEN:ZVTVXF.FOR	sends data from the client (virtual TV) to server (real TV)

B.1.46 TV-UTIL

YSUB:BLTFIL.FOR	fills in closed polygons on a tv "blotch" plane
APLSUB:CHAVRT.FOR	converts between local HOLL and local INT binary forms for transport
APLSUB:DECBIT.FOR	converts decimal coded number to bit coded (e.g. 13 -> 0000101)
YSUB:DLINTR.FOR	interactive delays, cursor tests, prevent wraparound
AIPSUB:GRPOLY.FOR	uses TV graphics to let user develop polygonal blotch regions
APLSUB:HDRBUF.FOR	translates AIPS header to/from FITS-standard integer form
YSUB:IENHNS.FOR	interactive linear enhancement of TV black & white LUTs
YSUB:ILNCLR.FOR	computes and loads a piecewise linear OFM to the TV
APLSUB:IMA2MP.FOR	converts pixel numbers in a TV-image into real image pixels
YSUB:IMANOT.FOR	draws a character string with black background to graphics
YSUB:IMCCLR.FOR	write color contour OFM to TV from standard sets
YSUB:IMCHAR.FOR	writes character string to TV
YSUB:IMLCLR.FOR	continuous colors fom blue thru green to red (or rotations thereof)
YSUB:IMPCLR.FOR	writes OFM with color contour helix in lightness-hue-saturation space
YSUB:IMVECT.FOR	draws connected line segments on TV
APLSUB:ISCALE.FOR	scale a buffer by various functions to an integer buffer (ie for TV)
APLSUB:MKYBUF.FOR	packages a command line into machine-independent form
APLSUB:MOVIST.FOR	sets/resets the movie status parameters in the TV common
APLSUB:MP2IMA.FOR	convert image pixel positions to TV pixel positions
APLSUB:REALOG.FOR	converts numbers between floating and an integer version of their log
APLSUB:REAVRT.FOR	converts between local REAL and local INT binary forms for transport
YSUB:TVCLOS.FOR	does error checks on device open, then closes the TV via YTVCLS
YSUB:TVFIDL.FOR	standard, simple interactive B&W LUT and color enhancements, zooming
AIPSUB:TVFIND.FOR	determines which of the visibile images on the TV the user desires
YSUB:TVLOAD.FOR	load image to a TV memory from open MA file
YSUB:TVOPEN.FOR	sets LUNs, calls YTVOPN to open the TV device, does error messages
YSUB:TVWHER.FOR	turns on cursor, waits for button, returns quadrant, position, button
APLSUB:TVWIND.FOR	determines image windows for TV, including for interpolation & Roam
APLSUB:UNYBUF.FOR	unpacks a machine-independent integer buffer into local command line
YGEN:YCHRW.FOR	writes characters into image and graphics planes
YGEN:YCINIT.FOR	initialize image catalog for specified TV memory plane

YGEN:YCNECT.FOR	write line segment between 2 points on TV
YGEN:YCOVER.FOR	checks for overlapped images on the TV by quadrant
YGEN:YCREAD.FOR	read the image catalog, return image header for TV only
YGEN:YCURSE.FOR	read and control TV cursor
YGEN:YCWRIT.FOR	write image header to image catalog, update image catalog directory
YGEN:YFILL.FOR	fill rectangle of TV memory with a constant value
YGEN:YFIND.FOR	determines the unique TV image of desired type, returns catalog block
YGEN:YGYHDR.FOR	builds basic TV IO header to write gray scale data
YGEN:YLOCAT.FOR	return TV positions for set of image positions
YGEN:YLOWON.FOR	select least on bit in a bit mask integer
YGEN:YMAGIC.FOR	initialize graphics, zoom, scroll units for IIS Model 75 (level 3)
YGEN:YMKHDR.FOR	builds standard TV-IO header, used for IIS Models 70 and 75
YGEN:YSLECT.FOR	turn gray and graphics planes on and off
YGEN:YTCOMP.FOR	decide if a parameter has changed
YGEN:YZERO.FOR	fill a TV memory plane with zeros
APLGEN:ZVTV02.FOR	open connection in client (virtual-TV) to server (remote, real-TV)

B.1.47 UTILITY

APLSUB:AP2SIZ.FOR	returns largest power of 2 not exceeding 1024 times first argument
APLSUB:BLDSNM.FOR	builds a name for a scratch file
APLSUB:BLDTNM.FOR	constructs full task name by appending NPOPS to task root name
APLSUB:BLTGLE.FOR	returns angle from A through a test position to B
APLSUB:BOUNDS.FOR	prints message if 1 or 2 values are outside a specified range
APLSUB:CATIME.FOR	stores current, or recovers previous, date and time in packed format
APLSUB:COMPAR.FOR	compares two integer arrays and returns .TRUE. if they are equal
APLSUB:COORDD.FOR	converts angles between degrees and sexagesimal format
APLSUB:COPY.FOR	copies integer words from one array to another
APLSUB:DAT2JD.FOR	converts date and time to a Julian date
APLSUB:DATDAT.FOR	converts "DD/MM/YY" form of date to "dd-mmm-yyyy" for printing
APLSUB:DTINIT.FOR	inits parameters for displaying elapsed CPU and real time w DTTIME
APLSUB:DTTIME.FOR	displays elapsed CPU and real times since last call to DTINIT
APLSUB:FILL.FOR	fills an integer array with an integer constant
APLSUB:FMATCH.FOR	returns pointer to location of small array in a bigger array
APLSUB:FRMT.FOR	encode floating number removing trailing zeros, alter accuracy if nec
APLSUB:GETRLS.FOR	returns the name of the current release (edited each quarter in CV)
APLSUB:GREG.FOR	converts Julian day number to date in character form
APLSUB:GTPARM.FOR	starts tasks, getting parameters and task ID number, does accounting
APLSUB:GTTELL.FOR	gets any parameters sent to task by AIPS verb TELL
APLSUB:H2CHR.FOR	convert AIPS Hollerith string to Fortran CHARACTER variable
APLSUB:IROUND.FOR	rounds a REAL to the nearest INTEGER
APLSUB:ITRIM.FOR	returns length of CHARACTER variable to last non-blank
APLSUB:JD2DAT.FOR	converts Julian day number to calendar date and time
APLSUB:JTRIM.FOR	clears nulls, returns length of CHARACTER variable to last non-blank
APLSUB:JULDAY.FOR	converts a character-encoded calendar date to Julian day number
APLSUB:LINTER.FOR	does linear interpolation of a 1-D INTEGER array
APLSUB:LSORT.FOR	sort a data buffer minimizing number times records are switched
APLSUB:METSCA.FOR	scale a value to the range 1-999 and provide a metric prefix to match
APLSUB:MSGWRT.FOR	writes messages to log file and/or terminal - a fundamental routine!
APLSUB:NAMEST.FOR	packs image name in string with leading and trailing blanks removed
APLSUB:NMATCC.FOR	returns next character in a string not matching a specified constant
APLSUB:NMATCH.FOR	returns next word in INTEGER array not matching a specified constant
APLSUB:RCOPY.FOR	copies one real array into another
APLSUB:REALOG.FOR	converts numbers between floating and an integer version of their log

APLSUB:RFILL.FOR	fills a real array with a constant
APLSUB:SETUP.FOR	does several task start up chores for non-interactive tasks
APLSUB:STRLIN.FOR	computes integer array as linear interpolation between two points
APLSUB:TIMDAT.FOR	convert integer time and date to character form for display
APLGEN:ZERROR.FOR	prints strings associated with system error codes for Z routines
APLGEN:ZMSGER.FOR	prints strings associated with system error codes for ZMSG routines

B.1.48 UV

QNOT:ALGSUB.FOR	Interpolates model visibility grom a grid and subtracts from uv data.
APLNOT:CALREF.FOR	Adjusts the reference antenna in an SN table.
QNOT:CCSGRD.FOR	Transforms CLEAN components to a grid.
APLNOT:DGGET.FOR	Selects uv data and changes Stokes
APLNOT:DGHEAD.FOR	Fills output CATBLK for UVGET
APLNOT:DGINIT.FOR	Sets arrays for selecting data and changing Stokes
QNOT:FFTIM.FOR	FFTs an image for uv interpolation.
APLNOT:FQMATC.FOR	Check if selection criteria match FQ table entries.
APLNOT:GAININ.FOR	Initializes calibration table for application.
APLNOT:GET1VS.FOR	Extract desired uv data, 1 value per freq. channel.
APLNOT:GETANT.FOR	Reads AN table and stores the info in common.
APLNOT:GETCTL.FOR	Determine Stokes' type of Clean map and other modeling info.
APLNOT:GETFQ.FOR	Find info on a given frequency id.
APLNOT:GETSOU.FOR	Find info on a given source id.
APLNOT:GETSTN.FOR	Reads the VLB station list opened in VBLIN and VBCIT
APLNOT:GNFSMO.FOR	Boxcar smooths and ASCAL solution (GA) file.
APLNOT:GNSMO.FOR	Optimized spline smoothing of amplitudes in ASCAL (GN) file.
QNOT:GRDCRM.FOR	Loads CLEAN components into AP for uv model computation.
APLNOT:GRDFLT.FOR	Sets default gridding convolution functions.
APLNOT:GRDSET.FOR	Creates scratch files and sets up for GRDSUB
QNOT:GRDSUB.FOR	Subtracts transform of CLEAN components from uv data.
APLNOT:GRIDTB.FOR	Makes a gridded image of the UV data in TB order.
APLNOT:INDXIN.FOR	Initializes index (NX) file, finds first scan selected.
QNOT:INTPFN.FOR	Computes interpolation kernals and put them into "AP memory".
APLNOT:IOBSRC.FOR	Search for antennas in the current bandpass buffer.
APLNOT:LXYPOL.FOR	Fills polarization correction table for AT like linear polarization.
QNOT:MAKMAP.FOR	Makes image or beam from uv data set.
APLNOT:MULSDB.FOR	Determines if a uv file is multi- or single- source.
APLNOT:NDXINI.FOR	Create/open/init index (NX) table
APLNOT:NXTFLG.FOR	Manages flagging info in tables in common.
APLNOT:PARANG.FOR	Computes antenna parallactic angles
APLNOT:POLSET.FOR	Fills polarization correction table from info in AN table.
QPSAP:Q1FIN.FOR	Finish gridding a row of uv data.
QPSAP:Q1GRD.FOR	Grid a uv data.
QPSAP:QFINGR.FOR	Finish gridding row of uv data.
QPSAP:QGADIV.FOR	Divide Gaus. model vis. into uv data.
QPSAP:QGASUB.FOR	Subtract Gaus. model vis. from uv data.
QPSAP:QGRD1.FOR	Convolves visibility data onto a grid.
QPSAP:QGRD2.FOR	Convolves linear polarization data onto a grid.
QPSAP:QGRD3.FOR	Convolve visibility data onto a grid.
QPSAP:QGRD4.FOR	Convolves visibility data onto a grid.
QPSAP:QGRDFI.FOR	Finish griding a row of uv data.
QPSAP:QGRDMI.FOR	Combined complex vector in gridding uv data.
QPSAP:QGRID.FOR	Grid uv data into row.
QPSAP:QGRIDA.FOR	Grid visibility data.

QPSAP:QINT.FOR	Interpolates model visibilityes from a grid.
QPSAP:QINTP.FOR	Interpolates model visibilities from a grid.
QPSAP:QMCALC.FOR	Compute model visibility from point model.
QPSAP:QPTDIV.FOR	Divide point model visibility into uv data.
QPSAP:QPTFAZ.FOR	zCompute phase in model visibilities.
QPSAP:QPTSUB.FOR	Subtract point model visibility from uv data.
QPSAP:QSPDIV.FOR	Divide Gaussian model visibility into uv data.
QPSAP:QSPSUB.FOR	Subtract Gaussian model visibility from uv data.
QPSAP:QUVIN.FOR	Interpolate visibility model from a grid.
QPSAP:QUVINT.FOR	Interpolate model visibility from grid.
QPSAP:QXXPTS.FOR	Subtract point model visibility from uv data.
APLNOT:SCINTP.FOR	Interpolates bandpass tables in time.
APLNOT:SCLOAD.FOR	Copies part of one bandpass scratch file to another for efficiency.
APLNOT:SELINI.FOR	Initialize data selection and control in commons in DSEL.INC
APLNOT:SELSMG.FOR	Selects calibrator data, smooths solutions.
APLNOT:SET1VS.FOR	Sets up pointer and weights arrays for selecting uv data.
APLNOT:SETGDS.FOR	Sets up for UV model computation, fills common in DGDS.INC
APLNOT:SETGRD.FOR	Sets up for gridding uv data.
APLNOT:SETSM.FOR	Determines type of spectral smoothing and sets up look up table.
APLNOT:SETSTK.FOR	Sets STOKES parameters correctly for plotting routines
APLNOT:SMOSP.FOR	Convolves a spectrum with a tabulated function.
APLNOT:SN2CL.FOR	Apply an SN to a CL table.
APLNOT:SNAPP.FOR	Append SN tables and keep track of reference antennas.
APLNOT:SNINI.FOR	Create/open/initialize solution (SN) tables.
APLNOT:SNSMO.FOR	Smooths solution (SN) tables
APLNOT:SOUELV.FOR	Computes source hour angles and elevations
APLNOT:SOUFIL.FOR	Fills in arrays of source numbers to be included or excluded.
APLNOT:SOURNU.FOR	Look up source numbers for a list of names.
APLNOT:TABBL.FOR	Do IO to Baseline (BL) table after setup by BLINI.
APLNOT:TABBP.FOR	Does I/O to bandpass (BP) table opened by BPINI
APLNOT:TABCAL.FOR	Does I/O to Calibration (CL) table opened by CALINI
APLNOT:TABCS.FOR	Does I/O to single dish calibration (CS) table opened by CSINI
APLNOT:TABFLG.FOR	Does I/O to Flag (FG) table opened by FLGINI
APLNOT:TABFQ.FOR	Does I/O to frequency (FQ) table opened by FQINI
APLNOT:TABGA.FOR	Does I/O to GAIN (GA) table opened by GAINI
APLNOT:TABNDX.FOR	Does I/O to Index (NX) table opened by NDXINI
APLNOT:TABSN.FOR	Does I/O to Solution (SN) table opened by SNINI
APLNOT:TABSOU.FOR	Does I/O to Source (SU) table opened by SOUINI
APLNOT:TABTY.FOR	Does I/O to Tsys (TY) table opened by TYINI
APLNOT:TYINI.FOR	Create/open/initialize Tsys (TY) table
APLNOT:UVDOUT.FOR	Divides uv model in one half of a record into other, writes result.
APLNOT:UVDPAD.FOR	Reformat UV data record, doubling size and zero extra words.
APLNOT:UVGET.FOR	Read UV data with optional calibration, editing, selection, etc.
QNOT:UVGRID.FOR	Grids uv data to be FFTed.
QNOT:UVMDIV.FOR	Divides a uv data set by the Fourier transform of a model.
QNOT:UVMSUB.FOR	Subtracts the Fourier transform of a model from a uv data set.
QNOT:UVTBGD.FOR	Grids uv data in arbitrary sort order to be FFTed.
QNOT:UVTBUN.FOR	Determines and applies uniform weighting to uv data in arb. order.
QNOT:UVUNIF.FOR	Determines and applies uniform weighting to a uv data set.
APLNOT:VISCNT.FOR	Determines number of visibility records requested of UVGET
QNOT:VISDFT.FOR	Compute DFT of model and subtract/divide from/into uv data.

B.1.49 UV-UTIL

APLNOT:AN1ORS.FOR	Determines a list of antenna pairs from adverbs ANTANNA, BASELINE
APLSUB:ANTDAT.FOR	Returns the reference date and frequency for each array in uv dataset
APLNOT:CALCOP.FOR	Copies selected uv data with calibration and editing
APLSUB:GETVIS.FOR	uses setup from SETVIS to get and reformat a visibility sample
APLSUB:MERGE.FOR	sorts by merging previously sorted blocks of records
APLSUB:OSORT.FOR	does quick sort on array of vectors, then reorders by calling PERMAT
APLSUB:REQBAS.FOR	Apply ANTENNA and BASELINE selection adverbs to a baseline
APLSUB:SETVIS.FOR	initializes pointers to select/convert uv data to desired form
APLSUB:SHSORT.FOR	Shell sort of an array or records on two keys
APLSUB:UVCREA.FOR	create and catalog a uv data base file
APLSUB:UVDISK.FOR	reads/writes records of arbitrary length, esp UV data, see UVINIT
APLSUB:UVINIT.FOR	initializes IO for arbitrary length records via UVDISK, esp UV data
APLSUB:UVPGET.FOR	determines pointers to UV data from the header
AIPSUB:UWRITE.FOR	writes summary of UV Export-format tape
APLSUB:VISCHK.FOR	checks if UV data sample is desired, returns it in RR, LL, RL, LR

B.1.50 VLA

APLNOT:APLPBI.FOR	*TESS routine to apply a taper to an image. VLA only!
APLNOT:APPLPB.FOR	*TESS routine to apply a taper to an image

B.1.51 Y0

YGEN:YCINIT.FOR	initialize image catalog for specified TV memory plane
YGEN:YCNECT.FOR	write line segment between 2 points on TV
YGEN:YCOVER.FOR	checks for overlapped images on the TV by quadrant
YGEN:YCREAD.FOR	read the image catalog, return image header for TV only
YGEN:YCUCOR.FOR	correct cursor position for scroll; return image coordinates, header
YGEN:YCURSE.FOR	read and control TV cursor
YGEN:YCWRIT.FOR	write image header to image catalog, update image catalog directory
YGEN:YFILL.FOR	fill rectangle of TV memory with a constant value
YGEN:YFIND.FOR	determines the unique TV image of desired type, returns catalog block
YGEN:YLOCAT.FOR	return TV positions for set of image positions
YGEN:YLOWON.FOR	select least on bit in a bit mask integer
YGEN:YSLECT.FOR	turn gray and graphics planes on and off
YGEN:YTCOMP.FOR	decide if a parameter has changed

B.1.52 Y1

YGEN:YCRCTL.FOR	controls the TV cursor visibility, position; reads trackball buttons
YGEN:YGRAPH.FOR	turns TV graphics planes on and off
YGEN:YIMGIO.FOR	read/write data to the TV grey and graphics memories
YGEN:YINIT.FOR	initialize everything about the TV
YGEN:YLUT.FOR	read/write channel-based look-up-table
YGEN:YOFM.FOR	read/write all-channel look-up-table ("output function memory")
YGEN:YSCROL.FOR	write the scroll registers (shift location of 1 or more TV channels)
YGEN:YSPLIT.FOR	set channel selection by split-screen quadrant
YGEN:YTVCIN.FOR	initialize TV characteristics common (not needed much - see TVOPEN)
YGEN:YTVCLS.FOR	close the TV, including TV device and TV control/parameter disk file
YGEN:YTVMC.FOR	issue a master clear to reinitialize IO to the TV
YGEN:YTVOPN.FOR	open the TV device and the TV disk control/parameter file.
YGEN:YZERO.FOR	fill a TV memory plane with zeros
YGEN:YZOOMC.FOR	set the TV zoom magnification and center

B.1.53 Y2

YGEN:YALUCT.FOR	drives the TV arithmetic logic unit - not to be used much
YGEN:YCONST.FOR	controls the constant registers added to the TV picture - not used
YGEN:YFDBCK.FOR	causes a feedback operation in the TV
YGEN:YIFM.FOR	read/write TV Input look-up-table
YGEN:YMNMAX.FOR	read 3 min/max values from TV data paths (IIS only, not used)
YGEN:YRHIST.FOR	read the histogram of the selected TV output color
YGEN:YSHIFT.FOR	read/write the shift (bias) registers of the TV (IIS M70, not used)

B.1.54 Y3

YGEN:YGGRAM.FOR	controls the TV graphics color assignments
YGEN:YGRAFE.FOR	controls the graphics control register (IIS function)
YGEN:YGYHDR.FOR	builds basic TV IO header to write gray scale data
YGEN:YISDRM.FOR	read/write data memory of NRAO-ISU device
YGEN:YISDSC.FOR	read/write micro-processor memory of NRAO-ISU device
YGEN:YISJMP.FOR	cause microprocessor jump toaddress in NRAO-ISU device
YGEN:YISLOD.FOR	loads/unloads program memory of NRAO-ISU device
YGEN:YISMPM.FOR	reads/writes microprocessor memory of the NRAO-ISU device
YGEN:YMAGIC.FOR	initialize graphics, zoom, scroll units for IIS Model 75 (level 3)
YGEN:YMKCUR.FOR	selects the form of the cursor to be displayed
YGEN:YMKHDR.FOR	builds standard TV-IO header, used for IIS Models 70 and 75
YGEN:YSTCUR.FOR	reads/writes the cursor pattern array
YGEN:YTVCL2.FOR	close actual TV device (called by YTVCLS)
YGEN:YTVOP2.FOR	open actual TV device (called by YTVOPN)

B.1.55 Z

APLGEN:ZABORT.FOR	establishes or carries out (when appropriate) abort handling
APLGEN:ZACTV8.FOR	activate the requested program, returning process ID information
APLGEN:ZADDR.FOR	determine if 2 addresses inside computer are the same
APLGEN:ZARGCL.FOR	close an ARGS TV device
APLGEN:ZARGMC.FOR	issues a master clear to an ARGS TV
APLGEN:ZARGOP.FOR	open ARGS TV device
APLGEN:ZARGXF.FOR	translates IIS Model 70 commands into calls to ZARGS for ARGS TV
APLGEN:ZBKLD1.FOR	initialize environment for BAKLD
APLGEN:ZBKLD2.FOR	does BACKUP operation: load images from tape to directory
APLGEN:ZBKLD3.FOR	clean up system things for BAKLD ending
APLGEN:ZBKTP1.FOR	initialize BACKUP to tape operation for BAKTP
APLGEN:ZBKTP2.FOR	write a cataloged file plus extensions to BACKUP tape in BAKTP
APLGEN:ZBKTP3.FOR	clean up host environment at end of BAKTP
APLGEN:ZBYMOV.FOR	move 8-bit bytes from in-buffer to out-buffer
APLGEN:ZBYTFL.FOR	interchange bytes in buffer if needed to go between local & standard
APLGEN:ZC8CL.FOR	convert packed ASCII buffer to local character string
APLGEN:ZCLC8.FOR	convert local character string to packed ASCII buffer
APLGEN:ZCLOSE.FOR	closes open devices: disk, line printer, terminal
APLGEN:ZCMPRS.FOR	release space from the end of an open disk file
APLGEN:ZCPU.FOR	return current process CPU time and IO count
APLGEN:ZCREAT.FOR	creates a disk file
APLGEN:ZDATE.FOR	return the local date
APLGEN:ZDCHIN.FOR	initialize message, device and Z-routine characteristics commons
APLGEN:ZDEACL.FOR	close DeAnza TV device
APLGEN:ZDEAOP.FOR	opens DeAnza TV device
APLGEN:ZDEAXF.FOR	do IO to DeAnza TV

APLGEN:ZDELAY.FOR	delay current process a specified interval
APLGEN:ZDESTR.FOR	destroy a closed disk file
APLGEN:ZDHPRL.FOR	convert 64-bit HP floating buffer to local DOUBLE PRECISION values
APLGEN:ZDM2DL.FOR	convert Modcomp REAL*6 and REAL*8 to local double precision
APLGEN:ZENDPG.FOR	advance printer if needed to avoid electrostatic-printer "burn-out"
APLGEN:ZERROR.FOR	prints strings associated with system error codes for Z routines
APLGEN:ZEXIST.FOR	return file size and, consequently, whether file exists
APLGEN:ZEXPND.FOR	expand an open disk file --- either map or non-map now allowed
APLGEN:ZFIO.FOR	reads and writes single 256-integer records to non-map disk files
APLGEN:ZFREE.FOR	display available disk space
APLGEN:ZGETCH.FOR	get a character from a REAL word
APLGEN:ZGNAME.FOR	get name of current process
APLGEN:ZGTBIT.FOR	get array of bits from a word
APLGEN:ZHEX.FOR	encode an integer into hexadecimal characters
APLGEN:ZIPACK.FOR	pack/unpack long integers into short integer buffer
APLGEN:ZKDUMP.FOR	display portions of an array in various Fortran formats
APLGEN:ZLASIO.FOR	open, write to, close and spool a laser printer print/plot file
APLGEN:ZLPCLS.FOR	close an open printer device
APLGEN:ZLPOPN.FOR	open a line-printer text file
APLGEN:ZLWIO.FOR	open, write to, close and spool a PostScript print/plot file
APLGEN:ZM70MC.FOR	issues a master clear to an IIS Model 70 TV
APLGEN:ZM70OP.FOR	open IIS Model 70 TV device
APLGEN:ZM70XF.FOR	read/write data to IIS Model 70 TV with buffering
APLGEN:ZMIO.FOR	random-access, quick return (double buffer) disk IO for large blocks
APLGEN:ZMKTMP.FOR	convert a "temporary" file name into a unique name
APLGEN:ZMOUNT.FOR	mount or dismount magnetic tape device
APLGEN:ZMSGCL.FOR	close Message file or terminal
APLGEN:ZMSGDK.FOR	disk IO to message file
APLGEN:ZMSGER.FOR	prints strings associated with system error codes for ZMSG routines
APLGEN:ZMSGOP.FOR	open a message file or message terminal
APLGEN:ZMSGXP.FOR	expand the message file
APLGEN:ZOPEN.FOR	open binary disk files and line printer and TTY devices
APLGEN:ZPHFIL.FOR	construct a physical file or device name from AIPS logical parameters
APLGEN:ZPHOLV.FOR	construct a physical file - version for UPDAT
APLGEN:ZPRIO.FOR	raise or lower the process priority
APLGEN:ZPRMPT.FOR	prompt user and read 80-characters from CRT screen
APLGEN:ZPRPAS.FOR	prompt user and read 12-character password (invisible) from CRT
APLGEN:ZPTBIT.FOR	put array of bits into a word
APLGEN:ZPUTCH.FOR	inserts 8-bit "character" into a word
APLGEN:ZRDMF.FOR	convert DEC Magtape Format (36 bits data in 40 bits) to 2 integers
APLGEN:ZRENAM.FOR	rename a disk file
APLGEN:ZRLR64.FOR	convert buffer of local double precision values to IEEE 64-bit float.
APLGEN:ZRM2RL.FOR	convert Modcomp to local single precision floating point
APLGEN:ZSTAIP.FOR	does any system cleanup needed at the end of interactive AIPS session
APLGEN:ZTACTQ.FOR	inquires if a task is currently active on the local computer
APLGEN:ZTAPE.FOR	mount, dismount, position, write EOF, etc. for tapes
APLGEN:ZTAPIO.FOR	tape operations for IMPFIT (compressed FITS transport tape)
APLGEN:ZTIME.FOR	return the local time of day
APLGEN:ZTOPEN.FOR	open text file - logical area, version, member name as arguments
APLGEN:ZTPWAT.FOR	wait for asynchronous IO to finish on tape or pseudo-tape disk
APLGEN:ZTQSPY.FOR	display AIPS account or all processes running on the system
APLGEN:ZTTBUF.FOR	reads terminal input with no prompt or wait - simulates TV trackball
APLGEN:ZTXCLS.FOR	clos text file opened via ZTXOPN
APLGEN:ZTXIO.FOR	read/write a line to a text file

APLGEN:ZTXMAT.FOR	return list of files in specified area beginning with specified chars
APLGEN:ZTXOPN.FOR	open a text file for read or write
APLGEN:ZV20CL.FOR	close a Comtal Vision 1/20 TV device
APLGEN:ZV20MC.FOR	issue a master clear to the TV - for Comtal this is a No-Op
APLGEN:ZV20OP.FOR	open Comtal Vision 1/20 TV device
APLGEN:ZV20XF.FOR	read/write data to Comtal Vision 1/20 TV device
APLGEN:ZWHOMI.FOR	determines AIPSxn task name; sets NPOPS, assigns TV and TK devices

B.1.56 Z2

APLGEN:ZABOR2.FOR	establishes or carries out (when appropriate) abort handling
APLGEN:ZARGC2.FOR	close an ARGS TV device
APLGEN:ZARGO2.FOR	open ARGS TV device
APLGEN:ZARGS.FOR	sends command to/from the ARGS TV device
APLGEN:ZBYTF2.FOR	interchange bytes in buffer if needed to go between local & standard
APLGEN:ZCMPR2.FOR	truncate a disk file, returning blocks to the system
APLGEN:ZCREA2.FOR	create the specified disk file
APLGEN:ZDACLS.FOR	close a disk file
APLGEN:ZDAOPN.FOR	open the specified disk file
APLGEN:ZDCHI2.FOR	initialize device and Z-routine characteristics commons - local vals
APLGEN:ZDCHIC.FOR	set more system parameters; make them available to C routines
APLGEN:ZDEAC2.FOR	close DeAnza TV device
APLGEN:ZDEAO2.FOR	opens DeAnza TV device
APLGEN:ZDELA2.FOR	delay current process a specified interval
APLGEN:ZDEST2.FOR	destroy a closed disk file
APLGEN:ZDIR.FOR	build a full path name to files in AIPS-standard areas (HE, RU, ...)
APLGEN:ZERRO2.FOR	return system error message for given system error code
APLGEN:ZEXIS2.FOR	return size of disk file and if it exists
APLGEN:ZEXPN2.FOR	expand an open disk file
APLGEN:ZFI2.FOR	read/write one 256-integer record from/to a non-map disk file
APLGEN:ZFRE2.FOR	return AIPS data disk free space information
APLGEN:ZLASC2.FOR	spool a closed laser printer print/plot file
APLGEN:ZLASCL.FOR	close and spool a laser printer print/plot file
APLGEN:ZLASOP.FOR	open a laser printer print/plot file
APLGEN:ZLPCL2.FOR	queue a file to the line printer and delete
APLGEN:ZLPOP2.FOR	open a line-printer text file - actual OPEN call
APLGEN:ZM70C2.FOR	close IIS Model 70/75 TV device
APLGEN:ZM70O2.FOR	opens IIS Model 70.75 TV device
APLGEN:ZMI2.FOR	read/write large blocks of data from/to disk, quick return
APLGEN:ZMOUN2.FOR	mount or dismount magnetic tape device
APLGEN:ZMSGWR.FOR	call MSGWRT based on call arguments - for C routines to call MSGWRT
APLGEN:ZPATH.FOR	convert a file name
APLGEN:ZPRI2.FOR	raise or lower the process priority
APLGEN:ZRENA2.FOR	rename a file
APLGEN:ZSTAI2.FOR	does any system cleanup needed at the end of interactive AIPS session
APLGEN:ZTACT2.FOR	inquires if a task is currently active on the local computer
APLGEN:ZTAP2.FOR	position (forward/back record/file), write EOF, etc. for tapes
APLGEN:ZTKCL2.FOR	close a Tektronix device
APLGEN:ZTKOP2.FOR	read/write from/to a Tektronix device
APLGEN:ZTOPE2.FOR	open text file for ZTOPEN
APLGEN:ZTPCL2.FOR	close a tape device
APLGEN:ZTPMI2.FOR	tape read/write
APLGEN:ZTPMID.FOR	pseudo-tape disk read/write for 2880-bytes records
APLGEN:ZTPOP2.FOR	open a tape device for double-buffer, asymchronous IO

APLGEN:ZTPOPD.FOR	open a pseudo-tape, sequential disk file for FITS
APLGEN:ZTPWA2.FOR	wait for read/write from/to a tape device
APLGEN:ZTQSP2.FOR	display AIPS account or all processes running on the system
APLGEN:ZTTCLS.FOR	close a terminal device
APLGEN:ZTTOP2.FOR	open a message terminal
APLGEN:ZTTOPN.FOR	open a terminal device
APLGEN:ZTXMA2.FOR	find all file names matching a given wildcard specification
APLGEN:ZTXOP2.FOR	translate the file name and open a text file
APLGEN:ZV20C2.FOR	close Comtal Vision 1/20 TV device
APLGEN:ZV20O2.FOR	opens Comtal Vision 1/20 TV device
APLGEN:ZV20X2.FOR	does I/O to Comtal Vision 1/20 TV device
APLGEN:ZWAI2.FOR	wait for read/write large blocks of data from/to disk

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