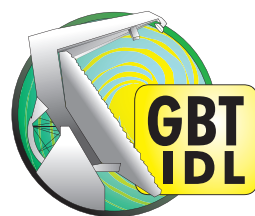




continued

Other	
boxcar, width, [buffer, /decimate]	Boxcar smoothing
clip, datamin, datamax, [buffer, /blank]	Truncate spectrum to a min and max data value
decimate, [nchan, startat, buffer, ok]	Decimate the spectrum by paring channels
gconvol, kernel, [scale_factor, buffer, ok, /normalize, /center, /edge_wrap, /edge_truncate, missing, /nan, /normalize]	Convolve the spectrum in the PDC with an array
gfft, [real_buffer, imag_buffer, /inverse, bdrop, edrop]	FFT or inverse FFT the spectrum
ginterp, [buffer, bchan, echan, /linear, /quadratic, /lsquadratic, /spline]	Interpolate across blanked channels
gmeasure, mode, fract, [brange, erange, rms, /chan, lefthorn, righthorn, /quiet, ret]	Find parameters of a galaxy profile
gmoment, [bmoment, emoment, /chan, /full, /quiet, ret]	Find moments of the data in the PDC
gsmooth, newres, [buffer, /decimate]	Gaussian smooth the spectrum in the PDC to the newres resolution (channels)
gstatus, [/full]	Summarize status of GBIDL
hanning, [buffer, /decimate, ok]	Hanning smooth the spectrum in the PDC
invert, [buffer]	Flip the data end-to-end
mediansub, width, [buffer]	Subtract the median filtered values of the given width from the data
molecule, [/doprint]	Show molecular transition frequencies on the plotter
powspec, [buffer]	Compute power spectrum of the specified DC
recomball, [/doprint]	Plot the H alpha, beta, gamma; He alpha, beta and C alpha recombination lines
recombc, [dn, /doprint]	Compute and plot frequencies of Carbon recombination lines
recombhe, [dn, /doprint]	Compute and plot frequencies of Helium recombination lines
recombh, [dn, /doprint]	Compute and plot frequencies of Hydrogen recombination lines
recombn, [dn, /doprint]	Compute and plot frequencies of Nitrogen recombination lines
recombo, [dn, /doprint]	Compute and plot frequencies of Oxygen recombination lines
replace, [bchan, echan, /zero, /blank]	Replace bad data values with interpolated or zero values
resample, newinterval, [keychan, buffer, /nearest, /linear, /lsquadratic, /quadratic, /spline]	Resample the spectrum in the PDC at the new interval (channels)
stats, [brange, erange, /full, /chan, /quiet, ret]	Provide statistics
usage, proname, [/verbose, /source]	Print out usage information on the named procedure or function

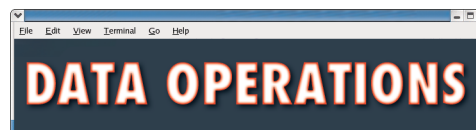
Product website: <http://gbtidl.sourceforge.net/>



For help with a routine from the gbtidl command line, use the 'usage' command, for example: GBIDL -> usage, "show" or for more information: GBIDL -> usage, "show", /verbose or to view the IDL source: GBIDL -> usage, "show", /source

GUIDE starts in spectral line mode. To switch to continuum mode, type "cont" at the GBIDL prompt. To switch to line mode, type "line" at the GBIDL prompt.

Product website: <http://gbtidl.sourceforge.net/>



In the following tables, optional arguments are in [brackets]. IDL parameters are in normal font, keywords are in **boldface**. The **parameters** argument refers to the selection parameters listed in the "Parameters for Data Retrieval and Selection" table below.

Retrieving and Saving Data	
dirin, [dir_name, /new_index]	Input from the given directory
filein, [file_name, /new_index]	Input from the given SDFITS file
fileout, file_name [/new]	Open an SDFITS file for writing
files, [/full]	Lists the input and output files currently in use
flag, [scan, intnum, plnum, ifnum, fdnum, sampler, bchan, echan, chans, chanwidth, idstring, scanrange, /keep]	Add a flag rule to the line data file
flagrec, record, [bchan, echan, chans, chanwidth, idstring, /keep]	Add a record-based flag rule to the line data file
get, [useflag, skipflag, parameters]	Retrieve a record from the input file
getchunk ([count, useflag, skipflag, indices, /keep, parameters])	Retrieve multiple data containers at a time
getdata ([buffer, elements, count])	Returns the data into an IDL array
getrec, index [useflag, skipflag]	Retrieve a record at the given index
getscan, scan [useflag, skipflag]	Retrieve the first record with the given scan number
keep, [dc]	Save a spectrum to the output SDFITS file
kget, [useflag, skipflag, parameters]	Retrieve a record from the output file
kgetrec, index, [useflag, skipflag]	Retrieve a record at the given index from the output file
kgetscan, scan, [useflag, skipflag]	Retrieve the first record with the given scan number from the output file
nget, nsave, [buffer, /infile, useflag, skipflag, ok]	Retrieve a record with a given nsave identifier
nsave, nsave, [buffer, dc, ok]	Save to the output file, with an nsave identifier
offline, project, [/acs, /sp]	A shortcut for filein, used only in Green Bank
online, [/acs, /sp]	Connect to the online data file, used only in Green Bank
putchunk, chunk	Save multiple data containers to the output file
setdata, value, [elements, buffer]	Replaces the data in a DC with the values in an IDL array
set_data_container, data, [buffer, /ignore_line, /noshow]	Copy a data container into a global buffer
sprotect_off	Turns off write protection for nsave entries
sprotect_on	Turns on write protection for nsave entries
unflag, id, [/keep, /all]	Remove all flag rules with the same idstring or id number

Using the Stack	
addstack, first, [last, step]	Add enumerated entries to the stack
appendstack, index	Append array of entries to the stack
astack([elem, count])	Returns the value of a given entry or all entries in the stack
avgstack, [/noclear, /keep useflag, skipflag]	Average spectra identified by entries in the stack
clearfind, [param]	Clear selection parameters used by find
delete, index	Remove individual entries from the stack
deselect, [/keep, parameters]	Remove entries from the stack based on the given selection criteria
emptystack, [/reset, /shrink]	Clear the stack
find, [/append, /keep]	Put selections in the stack using previously set parameters (selfind)
listfind, [param]	List selection parameters used by find
liststack, [start, finish, sortcol, columns, /user, /keep, parameters]	List records from the input data file that correspond to entries in the stack
select, [count, /keep, /quiet, parameters]	Add entries to the stack based on the given selection criteria
selfind, [param, val1, val2, /append]	Set a selection parameter used by find
tellstack	List the stack entries

Parameters for Data Retrieval and Selection				
listcols	Lists the available search parameters. In line mode, these are:			
index	e2escan	int	latitude	freqres
project	procseqn	numchn	trgtlong	dateobs
file	scan	sig	trgtlat	subref
timestamp	extension	polarization	cal	lst
bandwidth	row	plnum	sampler	centfreq
exposure	source	ifnum	azimuth	restfreq
tsys	procedure	feed	elevation	velocity
nsave	obsid	fdnum	longitude	freqint
In continuum mode, these are:				
index	firstrow	procedure	scan	trgtlat
project	numrows	obsid	polarization	sig
file	stride	e2escan	ifnum	cal
extension	source	procseqn	trgtlong	nsave

Using Data Containers	
add, [in1, in2, out]	Adds DC's based on buffer numbers. out = in1+in2
bias, factor, [buffer]	Add a bias to the spectrum in the buffer
copy, in, out	Copies a data container to another buffer
divide, [in1, in2, out]	out=in1/in2
move, in, out	Moves a data container to another buffer
multiply, [in1, in2, out]	out=in1*in2
scale, factor, [buffer]	Scale the spectrum in the PDC
subtract, [in1, in2, out]	out=in1-in2

DATA OPERATIONS

continued

Getting Information about Scans and Files

get_scan_numbers ([count, /keep, /unique, parameters])	Get a list of scan numbers from the input data file
header, [dc]	Show the record header
lastrec([/keep])	Record number of the most recently retrieved data container
lastscan([/keep])	Scan number of the most recently retrieved data container.
list, [start, finish, sortcol, columns, file, /user, /keep, parameters]	List records from the input file
listflags,[idstring, /summary, /keep]	List the flag rules
listids,[/keep]	List the unique idstrings in the current set of flag rules
ls, [pattern, options]	List FITS files (default) or any other files in the directory
nrecords([/keep])	Returns the number of records in the input or output file
scan_info (scan,[file, /keep, /quiet, count])	Returns some info such as num IFs, num integrations, etc.
summary, [file]	Gives a summary of scans in the input file
table, [buffer, brange, erange]	List data in tabular form



PLOTTER OPERATIONS

annotate, x, y, text, [color, charsize, /normal, /noshow]	Add text annotation to a plot
bdrop, nchan	Drop initial channels from spectrum display
chan	Set X-axis units to channels
chantox(chans, [type, dc])	Returns X-values for given list of channels
clear	Erase the plotter
clearannotations, [/noshow]	Clear annotations
clearmarks, [/noshow]	Clear marks (the "+" markers)
clearplots, [index, idstring]	Clear overplots
clearoshows	Clear oshows
clearovers	Clear oshows and oplots
clearvlines, [/noshow,idstring]	Clear vlines
click([frame, veldef, /nocrosshair, /noshow, label])	Returns position of a mouse click
crosshair, [/on, /off]	Toggle crosshair cursor
edrop, nchan	Drop end channels from spectrum display
freex	Sets the X-axis range to autoscale
freexy	Sets X- and Y-axis to autoscale (equivalent to unzoom)
freey	Sets the Y-axis range to autoscale
freeze	Freeze the plotter, i.e. set auto update off
freq	Set the X-axis units to frequency
gbtoplot, [x], y, [color, /chan, index, idstring]	Overplot a set of X, Y points
getplotterdc([/copy])	Get the currently displayed data container
getxarray([count])	Get the xarray values for the currently displayed data
getxframe()	Get the current reference frame (LSR, TOPO, etc)
getxoffset()	Get the current X-offset (0.0 unless relative X-axis has been toggled)
getxrange([empty])	Get the current X-range
getxunits()	Get the current X-axis units (counts, km/s, GHz, etc)
getxveldef()	Get the current velocity definition (RADIO, OPTICAL, TRUE)

getxvoffset()	Get the current velocity offset in m/s
getyarray([count])	Get the data values for the currently displayed data
getyrange([empty])	Get the current Y-range
histogram, [/on, /off]	Toggles between histogram-style and connected-points style plots
oshow, [dc, color]	Overlay spectrum on the displayed plot
print_ps, [filename, device, /portrait]	Send the plot to the printer
reshow	Re-draw everything known to the plotter
setabsrel, absrel	Sets X-axis in Absolute (absrel='Abs') or Relative (absrel='Rel') units
setframe, frame	Sets reference frame for X-axis
setmarker, x, y, [text]	Places a marker on the plot at the desired location
setveldef, veldef	Sets velocity definition for X-axis
setvoffset, voffset, [veldef]	Sets the offset velocity
setx, [x1, x2]	Sets the range on the X-axis
setxunit, unit [/noshow]	Sets the units for the X-axis
setxy, [xmin, xmax, ymin, ymax]	Sets the range on the X- and Y-axes
sety, [y1, y2]	Sets the range on the Y-axis
show, [dc, color, /defaultx, /smallheader, /noheader]	Displays a data container on the plotter
showregion, [/off]	Turn on and off the display of baseline region boxes
toggleovers, [/on, /off]	Toggles overlays
unfreeze	Unfreeze the plotter, i.e. set auto update on
unzoom, [/onestep]	Unzoom the plot
velo	Set the x-axis units to velocity
vline, x, [ylabel, label, /noshow, /ynorm, idstring]	Draw a vertical line on the plot
write_ascii, [filename, /prompt, brange, erange]	Writes the data in PDC to an ASCII file
write_ps, [filename, /portrait, /prompt]	Writes the displayed plot to a postscript file
xtochan(xvalues, [dc])	Returns channel number that corresponds to the given x-values
zline, [/on, /off]	Toggles the zero line



ANALYSIS PROCEDURES

Averaging	
accum, [accumnum, weight, dc]	Add a spectrum to the accumulator
ave, [accumnum, warray, count, /noclear, /quiet]	Average data in the accumulator
avgstack, [/noclear, /keep, useflag, skipflag]	Average entries in the stack
fshift ([accumnum, buffer, frame])	Determine a shift to align in frequency
gshift, offset, [buffer, /wrap, fitol, /nowelsh, /nopad, /linear, /quadratic, /lsquadratic, /spline, /cubic, ok]	Apply a shift to align spectra
sclear, [accumnum]	Clear the accumulator buffer
vshift ([accumnum, buffer, frame, veldef, voffset])	Determine a shift to align in velocity
xshift ([accumnum, buffer])	Determine a shift to align in current X-axis units

Baselines	
baseline, [nfit, modelbuffer, ok]	Fits and subtracts a baseline from the PDC spectrum
bmodel, [modelbuffer, nfit, ok]	Writes a baseline model into a DC using coeffs from a previous fit
bshape, [nfit, /noshow, modelbuffer, ok, color]	Fit and display a baseline as an overplot without subtracting it
bshow, [nfit, ok, color]	Overplot the most recently fit baseline
bsubtract, [nfit, ok]	Subtracts a baseline determined from the stored coeffs
clearregion	Clear all baseline regions
getbasemodel ([nfit, ok])	Return a baseline polynomial evaluated at all channels in the PDC
nfit, order	Sets the order of the (orthogonal) polynomial to be fit
nregion, regions	Defines the regions to be used for a baseline fit
setregion	Interactive use of the cursor to define the baseline region

Calibration	
fold, [sig, ref, ftol]	Fold a frequency-switched scan (also done in getfs)
getbs, scan, [ifnum, intnum, plnum, sampler, trackfdnum, bswitch, tsys, tau, ap_eff, smthoff, units, tcal, /eqweight, /quiet, /keepints, useflag, skipflag, instance, file, timestamp, status]	Retrieves and calibrates a total power nod beamswitched scan pair
getcal, scan, [ifnum, intnum, plnum, fdnum, sampler, tcal, sig_state, /eqweight, /quiet, /keepints, useflag, skipflag, instance, file, timestamp, status]	Retrieves the "cal" signal from a cal-switched scan.
getfs, scan, [ifnum, intnum, plnum, fdnum, sampler, tsys, tau, ap_eff, smthoff, units, tcal, /nofold, /eqweight, /quiet, /keepints, useflag, skipflag, instance, file, timestamp, status]	Retrieves and calibrates a frequency switched scan
getnod, scan, [ifnum, intnum, plnum, sampler, trackfdnum, tsys, tau, ap_eff, smthoff, units, tcal, /eqweight, /quiet, /keepints, useflag, skipflag, instance, file, timestamp, status]	Retrieves and calibrates a total power nod scan pair
getps, scan, [ifnum, intnum, plnum, fdnum, sampler, tsys, tau, ap_eff, smthoff, units, tcal, /eqweight, /quiet, /keepints, useflag, skipflag, instance, file, timestamp, status]	Retrieves and calibrates a total power position switched scan pair
getsigref, sigscan, refscan, [ifnum, intnum, plnum, fdnum, sampler, tsys, tau, ap_eff, smthoff, units, tcal, /eqweight, /quiet, /avgref, /keepints, useflag, skipflag, siginstance, sigfile, sigtimestamp, refinstance, reffile, reftimestamp, status]	Retrieves and calibrates a total power position switched pair, with the user identifying the sig scan and ref scan separately
gettp, scan, [ifnum, intnum, plnum, fdnum, sampler, tcal, sig_state, cal_state, /eqweight, /quiet, /keepints, useflag, skipflag, instance, file, timestamp, status]	Retrieves and calibrates a single total power scan

Gaussians	
fitgauss, [fit, fitrms, modelbuffer, highlightcolor]	Interactive procedure to fit Gaussians to the spectrum
gauss, [fit, fitrms, buffer, modelbuffer, ok, /quiet]	Fits Gaussians to the spectrum, based on initial values set by procedures gregion, ngauss, gmaxiter, and gparamvalues
gmaxiter, maxiter	Sets max number of iterations for Gauss fitter
gparamvalues, gauss_index, values	Sets initial guesses for Gauss fitter
gregion, regions	Sets the regions used for Gauss fitter
gshow, [modelbuffer, /parts, color]	Displays the Gaussian fits on the plotter
ngauss, ng	Sets the number of Gaussians to be fit
report_gauss, [/fits, /params]	Prints the results of a Gaussian fit on terminal