Date: $Date$

OUTPUT JACOBIAN/DERIVATIVE FILES (in the AJ directory):

| | |
|---|---|
| RDderivDNW_xx_lll | Layer downwelling Jacobian/derivative files |
| RDderivUPW_xx_lll | Layer upwelling Jacobian/derivative files (includes downwelling and surface components) |
| LEV_RDderivDNW_xx_lll | Level downwelling Jacobian/derivative files |
| LEV_RDderivUPW_xx_lll | Level upwelling Jacobian/derivative files (includes downwelling and surface components) |

Files related to surface derivatives

| | |
|---|---|
| LEV_RDderivE-R_-1_000 | TOA radiance Jacobian wrt surface emittance/reflectance (with E + R = 1) |
| LEV_RDderivEMI_-1_000 | TOA radiance Jacobian wrt surface emittance |
| LEV_RDderivRFL_-1_000 | TOA radiance Jacobian wrt surface reflectance |
| LEV_RDderivTSF_-1_000 | TOA radiance Jacobian wrt surface temperature |

RECORD 1.1

CXID: 80 characters of user identification (80A1)

CXID(1) is the flag which determines program initialization and termination. The actual input data stream for LBLRTM commences with the record containing a '$' in CXID(1). Any record that are read prior to a record containing a '$' in CXID(1) are ignored. Since LBLRTM automatically recycles and reads Record 1.1 at the end of each run (this allows the stacking of multiple runs), each subsequent run of LBLRTM must also have a '$' in CXID(1) on Record 1.1. In order to effect a normal termination of LBLRTM, CXID(1) must be set to '%', on the final record of

RECORD 1.2 (Continued)

IMRG (Continued)

IMRG OPTIONS FOR MERGED OUTPUT

RECORD 1.2 (Continued)

IMRG (Continued)

IMRG OPTIONS FOR SEQUENTIAL OUTPUT

Monochromatic Input, calculated in current run.

IMRG =

| MERGE PATH: | space to ground | ground to space | tangent | Results |
|---|---|---|---|---|
| RADIAN9 MERGE | | nd | ground to space | tangent Results |

The actual results produced on MFILE or NFILE are determined by both IEMIT on Record 1.2 and JEMIT on either Record 6 (scanned results) or Record 7.1 (filtered results). The following table describes the options:

RECORD 1. or  (required if ICNTNM = 6)

XSELF, XFRGN, XCO2C, XO3CN, XO2CN, XN2CN, XRAYL

free format

XSELF  H2O self broadened continuum absorption multiplicative factor

XFRGN  H2O foreign broadened continuum absorption multiplicative factor

XO3CN  O3 continuum absorption multiplicative factor

XO2CN  O2 continuum absorption multiplicative factor

XN2CN  N2 continuum absorption multiplicative factor

XRAYL  Rayleigh extinction multiplicative factor

RECORD 1.2.1  (required if IEMIT = 2; otherwise omit)

NOTE: IEMIT = 2 requires binary solar radiance file SOLAR.RAD, containing extraterrestrial source spectra in units W/(m2 cm-1).

| INFLAG, | IOTFLG, | JULDAT |
|---|---|---|
| 1-5, | 6-10, | 13-15 |
| I5, | I5, | 2X, I3 |

INFLAG (0,1,2,3) input flag for solar radiance calculation

= 0 input previously calculated radiance and transmittance from TAPE12 (default)
= 1 input previously calculated optical depth from TAPE12
= 2 input previously calculated upwelling radiance and transmittance from TAPE12,

RECORD 1.3 (required if IHIRAC > 0; IAERSL > 0; IEMIT = 1; IATM = 1; or ILAS > 0; otherwise omit)

| V1, | V2, | SAMPLE, | DVSET, | ALFAL0, | AVMASS, | DPTMIN, | DPTFAC, | ILNFLG, | DVOUT, | NMOL_SCAL |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-10, | 11-20, | 21-30, | 31-40, | 41-50, | 51-60, | 61-70, | 71-80, | 85, | 90-100, | 105 |
| E10.3, | E10.3, | E10.3, | E10.3, | E10.3, | E10.3, | E10.3, | E10.3, | 4X(n0 0 8X,E10.3, | | 3x,I2)Tj ET |

RECORD 1.4  (required if IEMIT = 1, or both IEMIT=2 and IOTFLG=2; otherwise omit)

| TBOUND, | SREMIS(1), | SREMIS(2), | SREMIS(3), | SRREFL(1), | SRREFL(2), | SRREFL(3), | surf_refl |
|---|---|---|---|---|---|---|---|
| 1-10, | 11-20, | 21-30, | 31-40, | 41-50, | 51-60, | 61-70, | 75 |
| E10.3, | E10.3, | E10.3, | E10.3, | E10.3, | E10.3, | E10.3 | 4X,1A |

temperature and emissivity parameters for boundary at H2 (end of path)
(applies to downlooking, uplooking and tangent paths)

for down looking case, the effect of reflected atmospheric radiance above lower boundary included for SRREFL(I) > 0.
(reflected atmosphere from H1 to H2 included)

TBOUND  temperature of boundary (K)

SREMIS(I)  frequency dependent boundary emissivity coefficients (I = 1,2,3)

EMISSIVITY = SREMIS(1) + SREMIS(2)*V + SREMIS(3)*(V**2)

*** NOTE: Entering a value for SREMIS(1) < 0 allows for direct input of boundary emissivities from file 'EMISSIVITY'

SRREFL(I)  frequency dependent boundary reflectivity coefficients (I = 1,2,3)

REFLECTIVITY = SRREFL(1) + SRREFL(2)*V + SRREFL(3)*(V**2)

*** NOTE: Entering a value for SRREFL(1) < 0 allows for direct input of boundary reflectivities from file 'REFLECTIVITY'

surf_refl  specifies the surface type used in computing the reflected downward radiance

RECORD 1.6b, 1.6c, and 1.6d  (required if IMRG = 40,41 and IEMIT=3;  otherwise omit)

Note:  requires separate optical depth files for each layer (use IMRG = 10 prior to this run)

| | |
|---|---|
| PTHODL | |
| | 1-55 |
| | A55 |
| PTHODTupw | |
| | 1-55 |
| | A55 |
| PTHODTdnw | |
| | 1-55 |
| | A55 |

PTHODL = layer optical depth file (e.g., "ODint_")
PTHODTupw = upwelling total optical depth file (e.g., "ODtoupw_)

```
 ***************************************************************************
 ******  these records applicable only if LBLATM not selected (IATM=0)  ******

                      LAYER INPUT  (MOLECULES ONLY)

RECORD 2.1

          IFORM, NLAYRS, NMOL, SECNTO,        ZH1,       ZH2,    ZANGLE

            2     3-5,   6-10,  11-20,      41-48,     53-60,     66-73

          1X,I1    I3,    I5,   F10.2,  20X, F8.2,  4X, F8.2,  5X, F8.3


               IFORM      (0,1) column amount format flag

                         = 0  read PAVE(L), WKL(M,L), WBROADL(L) in F10.4, E10.3, E10.3 formats (default)
                         = 1  read PAVE(L), WKL(M,L), WBROADL(L) in E15.7 format

              NLAYRS      number of layers (maximum of 200)

                NMOL      value of highest molecule number used (default = 7; maximum of 35)
                                 See Table I for molecule numbers.

              SECNTO      user entered scale factor for the column amount for the layers defined by NLAYRS
                                 if positive, looking up
                                 if negative, looking down
                          normal value = 1.0

                 ZH1      observer altitude

                 ZH2      end point altitude

              ZANGLE      mean zenith angle for path calculation (degrees)

                          NOTE: With the surf_refl = 'l' option on Record 1.4
                                ZANGLE must be set.  (ZANGLE .gt.90 and .le.180 )

RECORD 2.1.1

            PAVE(L), TAVE(L), SECNTK(L), ITYL(L),  IPATH, ALTZ(L-1), PZ(L-1), TZ(L-1), ATLZ(L), PZ(L), TZ(L)

               1-10,   11-20,     21-30,   31-33,  34-35,     37-43,   44-51,   52-58,   59-65, 66-73, 74-80
```

RECORD 2.1.1 (Continued)

ITYL(L) overrides the LBLRTM internal calulation of ITYPE for the layer L.
ITYPE controls the DV ratio of the previous layer to the current layer.
A blank defaults to the internal calulation.
= 0 specifies 1/1

```
*****************************************************************************************************************
          ****  Note: all the quantites on thid Record, are for information only, LBLRTM will use the corresponding
****
```

RECORD 2.2.4

(XAMNT(I,L), I=1, 7), WBROADX(L)

(8E10.3)

XAMNT(I,L) column densities (molecules/cm**2) or mixing ratios (ppv) for 7 cross-section molecules

WBROADX(L) column density for broadening gases (molecules/cm**2), ** information only
**
should be the same as WBROADL, on Record 2.1.2

**NOTE** If IFRMX=1, then XAMNT(I,L) and WBROADX(L) are in 8E15.7 format

RECORD 2.2.5 only if (IXMOL .GT . 7) # records depends on IXMOL

(XAMNT(I,L), I=8, IXMOL)

(8E10.3)

**NOTE: If IFRMX=1 then XAMNT(I,L) in 8E15.7 format**

REPEAT RECORDS 2.2.3 through 2.2.5 for the remaining layers (up to NLAYXS)

RECORD 3.1 (Continued)

| | |
|---|---|
| RE | radius of earth (km)<br>defaults for RE=0:<br><br>a) MODEL 0,2,3,6 RE = 6371.23 km<br>b) 1 RE = 6378.39 km<br>c) 4,5 RE = 6356.91 km |
| HSPACE | altitude definition for space (default = 100 km)<br>internal models defined to 120 km |
| VBAR | frequency for refractive geometry calculation<br><br>(default: VBAR = (V1+V2) / 2 ) (V1,V2 from Record 1.3) |
| REF_LAT | latitude of location of calculation (degrees)<br>defaults for REF_LAT = 0:<br>a) MODEL 0,2,3,6 REF_LAT = 45.0 degrees<br>b) MODEL 1 REF_LAT = 15.0<br>c) MODEL 4,5 REF_LAT = 60.0 |

RECORD 3.3 options

RECORD 3.3A For IBMAX = 0 (from RECORD 3.1)

AVTRAT, TDIFF1, TDIFF2, ALTD1, ALTD2

1-10, 11-20, 21-30, 31-40, 41-50

F10.3, F10.3, F10.3, F10.3, F10.3

AVTRAT maximum Voigt Qidth ratio across a layer
(if zero, default = 1.5)

TDIFF1 maximum layer temperature difference at
ALTD1 (if zero, default = 5 K)

TDIFF2 maximum layer temperature difference at
ALTD2 (if zero, default = 8 K)

ALTD1 altitude of TDIFF1 (if zero, default = 0 Km)

ALTD2 altitude of TDIFF2 (if zero, default = 100 Km)

RECORD 3.3B For IBMAX > 0 (from RECORD 3.1)

TABLE I. Units and input options for the K'th molecule

TABLE I

USER OPTIONS FOR PRESSURE, TEMPERATURE, AND MOLECULAR DENSITY

JCHARP

| | | |
|---|---|---|
| PRESSURE (JCHARP) | 1-6 | default to value for specified model atmosphere |
| | " ",A | pressure in (mb) |
| | B | " " (atm) |
| | C | " " (torr) |

JCHART

| | | |
|---|---|---|
| TEMPERATURE (JCHART) | 1-6 | default to value for specified model atmosphere |
| | " ",A | ambient temperature in deg (K) |
| | B | " " " " " " (C) |

JCHAR(M)

| (M): AVAILABLE MOLECULAR SPECIES | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ( 1) | H2O | ( 2) | CO2 | ( 3) | O3 | ( 4) | N2O | ( 5) | CO | ( 6) | CH4 | ( 7) | O2 |
| | ( 8) | NO | ( 9) | SO2 | (10) | NO2 | (11) | NH3 | (12) | HNO3 | (13) | OH | (14) | HF |
| | (15) | HCL | (16) | HBR | (17) | HI | (18) | CLO | (19) | OCS | (20) | H2CO | (21) | HOCL |
| | (22) | N2 | (23) | HCN | (24) | CH3CL | (25) | H2O2 | (26) | C2H2 | (27) | C2H6 | (28) | PH3 |
| | (29) | COF2 | (30) | SF6 | (31) | H2S | (32) | HCOOH | (33) | EMPTY | (34) | EMPTY | (35) | EMPTY |

potential choice of units for above species:

| | |
|---|---|
| JCHAR = 1-6 | - default to value for specified model atmosphere |
| = " ",A | - volume mixing ratio (ppmv) |
| = B | - number density (cm-3) |
| = C | - mass mixing ratio (gm/kg) |
| = D | - mass density (gm m-3) |
| = E | - partial pressure (mb) |
| = F | - dew point temp (K) *H2O only* |
| = G | - dew point temp (C) *H2O only* |
| = H | - relative humidity (percent) *H2O only* |
| = I | - available for user definition |

JCHAR must be less than "J"

TABLE II. Structure of file FSCDXS. (Continued)

| | |
|---|---|
| V1X | Beginning wavenumber for the cross-section data (cm-1) |
| V2X | Ending wavenumber for the cross-section data (cm-1) |
| DVX | Wavenumber spacing for the cross-section data (cm-1) ** for information only ** |
| NTEMP | number of temperature dependent cross-section files to be read in. '1' indicates no temperature dependence. Maximum of '6' files (i.e. 6 temperatures) is allowed. ***** no default ***** |
| IFRM | is the format specifier<br>= 86 - HITRAN 86 format<br>= 90 - HITRAN 90 format ** default **<br><br>Note: the headers are different between HITRAN 86 and HITRAN 90 |
| CFRM | is the blocking specifier |

---

User Defined Atmospheric Profile

--- (IPRFL = 0) ---

RECORD 3.8

```
 LAYX,  IZORP,  XTITLE

    5,     10,   11-60

   I5,     I5      A50
```

LAYX — number of atmospheric profile boundaries

IZORP (0,1) — flag which determines value of ZORP on Record 3.8.1

= 0 ZORP is an altitude in KM
= 1 ZORP is a pressure in millibars

XTITLE — 50 character descmiption of profile

RECORD 3.8.1

```
ZORP,  (JCHAR(K),K =1,28)

1-10,    16  through  50

F10.3, 5X,           35A1
```

ZORP — boundary altitude (km) or pressure (millibars) as determined by IZORP on Record 3.8

JCHAR(K) — flag for units and input options for

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

                                AEROSOLS (IAERSL = 1,7)

-------------------------------------------------------------------------------------------
Subroutine LOWTRN

Stripped down version of LOWTRAN 7 run as a subroutine to supply
LBLRTM with the attenuation due to aerosols, clouds, fogs, and rain.

Further details of most of the aerosol parameters are contained in
the LOWTRAN7 User Guide (AFGL-TR-88-0177), the LOWTRAN6 Report (AFGL-TR-83-0187)
the LOWTRAN5 Report (AFGL-TR-80-0167) and the Millimeter Aerosol Report (AFGL-TR-79-0253)
*******************************************************************************************

Activated by IAERSL = 1 or 7 (on record 1.2)

** Note:(1) IAERSL=1 and CALT should be specified on RECORD 4.1 (TITLE)
**           model levels (ZBND or PBND from Record 3.3B)  **
**        2) MODEL is read in LBLATM                        **
**        3) M1, M2, and M3 are set depending on MODEL      **

RECORD sequence as follows

4.1    IHAZE,ISEASN,IVULCN,ICSTL,ICLD,IVSA,VIS,WSS,WHH,RAINRT,GNDALT

                                Format (6I5,5F10.3)

     ***Optional RECORDS***

     (if ICLD = 18,19, or 20)     RECORD 4.2        CTHIK,CALT,CEXT,ISEED
                                                  Format (3F10.3,I10)

     (if IVSA = 1)                RECORD 4.3        ZCVSA,ZTVSA,ZINVSA
                          ows
```

RECORD 4.1 IHAZE,ISEASN,IVULCN,ICSTL,ICLD,IVSA,VIS,WSS,WHH,RAINRT,GNDALT

RECORD 4.1 (Continued)

ICSTL is the air mass character (1 to 10); only used with
Navy maritime model (IHAZE=3) (default value = 3)

ICSTL = 1 open ocean
.
.
.
10 strong continental influence

ICLD determines the inclusion of cirrus cloud attenuation or gives
a choice of five cloud models and 5 rain models

ICLD for cloud and or rain

ICLD = 0 no clouds or rain

= 1 Cumulus cloud; base .66 km; top 3.0 km

RECORD 4.1 (Continued)

Optional input records after Record 4.1
Selected by parameters ICLD, IVSA, and IHAZE on Record 4.1

**********

RECORD 4.2  CTHIK,CALT,CEXT,ISEED  (if ICLD = 18, 19, or 20)

FORMAT (3F10.3,I1

Input record for cirrus altitude profile

```
*******************************************************************************
RECORD 4.4   ML,TITLE                        (if IAERSL = 7)

                FORMAT (I5,18A4)

          Additional aerosol profile
```

RECORD 6 (Continued)

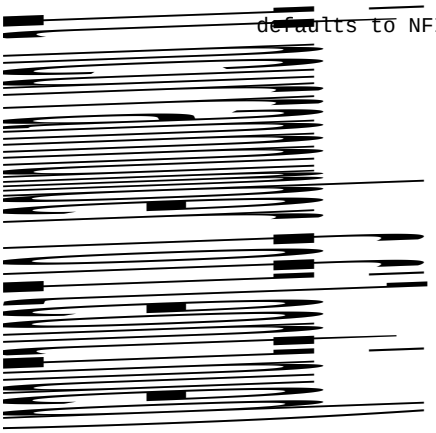
SAMPL number of sample points per half width

= 0 gives default value for each function

< 0 this variable specifies the output spectral spacing (DELVO cm-1)
The value of SAMPL is calculated internally as SAMPL = HWHM/DELVO

NNFILE unit number for scanned sequential output

defaults to NFILE (= 13) or previous value of NNFILE if doing multiple LBLRTM runs



FLTMRG ( for sequential results with filter; IMRG between 23 and 28 )

RECORD 7.1

| V1F, | DVF, | NPTS, | JEMIT, | NNFILE, | HEDDR |
|---|---|---|---|---|---|
| 1-10, | 11-20, | 21-25, | 26-30, | 31-35, | 46-80 |
| F10.3, | F10.4, | I5, | I5, | I5, 10X, | 8A4,A3 |

V1F wavenumber of initial filter value

DVF wavenumber increment between filter values

NPTS number of filter values

(if NPTS.LT.0, previous values of XF utilized XF 7tilized XF 7tilized XF7318 774 cm BT 33 0 0 -33 0

## SCANFN

(ISCAN = 1)

RECORD 8.1

| HWHM, | V1, | V2, | JEMIT, | JFN, | JVAR, | SAMPL, | IUNIT, | IFILST, | NIFILS, | JUNIT, | NPTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-10, | 11-20, | 21-30, | 34-35, | 39-40, | 44-45, | 46-55, | 59-60, | 64-65, | 69-70, | 74-75, | 76-80 |
| F10.3, | F10.3, | F10.3, | 3X,I2, | 3X,I2, | 3X,I2, | F10.4, | 3X,I2, | 3X,I2, | 3X,I2, | 3X,I2, | I5 |

HWHM (Half Width Half Maximum)

negative value terminates SCANFN option

Notes: 1. HWHM is first zero crossing of periodic functions for JV < 0.
HWHM is redefined as HWHM=(FIRST ZERO)/(PI/SCALE)
2. HWHM is instrument field of view half angle (in degrees) for JV=5,6
(e.g., for FOV of 10.0 degrees, HWHM=5.0)

V1 beginning wavenumber value for performing SCAN

V2 ending wavenumber value for performing SCAN

JEMIT = -1 SCANFN convolved with absorption (1.0 - transmission)

= 0 SCANFN convolved with transmission

= 1 SCANFN convolved with radiance

JV selects choice of scanning function

| | JV | Function | Half-width Bound | Default Sample |
|---|---|---|---|---|
| = | 0 | rectangular | 1.0 | 0.5 |
| = | 1 | triangular | 2.0 | 2.0 |
| = | 2 | gaussian | 4.0 | 4.0 |
| = | 3 | sinc squared | 54.1826 | 4.0 |
| = | 4 | sinc | 119.332818 | 4.0 |
| = | 5 | FOV correction | 1.0 | 0.5 |
| = | 6 | FOV correction | 1.0 | 0.5 |

## INTRPL

(ISCAN = 2)

RECORD 9.1

| DVO, | V1, | V2, | JEMIT, | I4PT, | IUNIT, | IFILST, | NIFILS, | JUNIT, | NPTS |
|---|---|---|---|---|---|---|---|---|---|
| 1-10, | 11-20, | 21-30, | 31-35, | 36-40, | 56-60, | 61-65, | 66-70, | 71-75, | 76-80 |
| F10.3, | F10.3, | F10.3, | I5 | I5, | 15X,I5, | I5, | I5, | I5, | I5 |

DVO wavenumber spacing for interpolated result

negative value terminates INTRPL option

V1 beginning wavenumber value for performing INTRPL

V2 ending wavenumber value for performing INTRPL

JEMIT

= -1 interpolation of absorption (1 - transmission)

= 0 interpolation of transmission

= 1 interpolation of radiance

I4PT

= 0 linear interpolation of data points

= 1 four-point interpolation of data points

IUNIT unit designation of file to be interpolated (default is MFILE)

IFILST initial file from IUNIT to be interpolated

NIFILS number of files to be interpolated starting at IFILST

JUNIT file containing interpolated results (default is JUNIT, file 11)

NPTS number of values to be printed for the beginning and ending of each panel for current interpolated file

REPEAT RECORD 9.1

A '-1.' within columns 1-10 will terminate interpolation.

FFTSCN

(ISCAN = 3)

RECORD 10.1

| HWHM, | V1, | V2, | JEMIT, | JFNin = 38R.nNuVOUT, | IUNIT, | IFILST, | NIFILS, | JUNIT, | IVX, | NOFIX |
|---|---|---|---|---|---|---|---|---|---|---|
| F10.3, | F10.3, | F10.3, | I5, | I5, | I5, | F10.3, | I5, | I5, | I5, | I3, | I2 |

M, (Half Width Half Maximum)

negative value terminates FFTSCN option

Note: M, is the maximum optical path difference of an equivalent interferometer for JFNin < 0.

V1 beginning wavenumber value for performing FFTSCN

V2 ending wavenumber value for performing FFTSCN

JEMIT = 0 convolve with transmittance

= 1 convolve with radiance

RECORD 10.1 (Continued)

JFNin selects choice of scanning function

| JFNin | Scanning Function | Apodization Function | a/HWHM | a/FZ | CR |
|---|---|---|---|---|---|
| = 0 | boxcar | | | | |
| = 1 | 1-v/a, \|v\|<a<br>0, \|v\|>a<br>(triangle) | (sin(pi*x*a)/pi*x*a))**2<br>(sinc squared) | 2.0 | 1.0 | 40 |
| = 2 | exp(-0.5*(v/a)**2)<br>(gauss) | exp(-2*pi*(a*x)**2)<br>(gauss) | 0.849322 | (NA) | 10 |
| = 3 | (sin(pi*x*a)/pi*x*a))**2<br>(sinc squared) | 1-x*a, \|x\|=<1/a<br>0, \|x\|>1/a<br>(triangle) | 2.257609 | 1.0 | 40 |
| = 4 | sin(u)/u<br>(sinc) | 1, \|x\|=<1/a<br>0, \|x\|>1/a<br>(rectangle) | 3.314800 | 2.0 | 160 |
| = 5 | J(5/2,u)/(u**(5/2))<br>(Beer) | (1-(x*a)**2)**2 | 2.100669 | 0.91728 | 20 |
| = 6 | sinc(u)+c1*(sinc(u+pi)+<br>sinc(u-pi))<br>(Hamming) | (1+2*c1*cos(pi*x*a))/<br>(1+2*c1) | 2.195676 | 1.0 | 20 |
| = 7 | sinc(u)+0.5*(sinc(u+pi)+<br>sinc(u-pi))<br>(Hanning) | (1+cos(pi*x*a))/2 | 2.0 | 1.0 | 20 |

NORTON-BEER FUNCTIONS:

| | | | | | |
|---|---|---|---|---|---|
| | | sum{Ci*(1-(x*a)**2)**i}<br>from i=0 to 4, for<br>0 =< x =< 1/a<br>and<br>0 for x > 1/a | | | |
| = 8 | weak | Ci = 0.384093,-0.087577,<br>0.703484, 0., 0. | 2.57027 | | 40 |

RECORD 10.1 (Continued)

| JFNin | Scanning Function | Apodization Function | a/HWHM | a/FZ | CR |
|---|---|---|---|---|---|

OTHER FUNCTIONS:-----a7m24*TR

RECORD 10.1 (Continued)

MRATin ratio of HWHM of the scanning function to the halfwidth of the boxcar; for prescanning with a

PLTLBL

RECORD 12.1

| CPRGID, | CEX |
|---|---|
| 1-60, | 79-80 |
| A60, 18X, | A2 |

```
********************************************************************************************
********************************************************************************************
****************        Use Records 12.2A and 12.3A for PLOT (IOPT = 0,1)         ******************
****************   Use Record1 *****   = 0,1)         ****************** 3 0 0 -33 0 437 Tm /F1.0 1 Tf( ****************
```

RECORD 12.3A (IOPT = 0,1)

| YMIN, | YMAX, | YSIZE, | DELY, | NUMSBY, | NOENDY, | IDEC, | JEMIT, | JPLOT, | LOGPLT, | JHDR, | JOUT, | JPLTFL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-10, | 11-20, | 21-30, | 31-40, | 45, | 50, | 55, | 60, | 65, | 70, | 72, | 77, | 80 |
| G10.4, | G10.4, | F10.3, | F10.3, | I5, | I5, | I5, | I5, | I5, | I5, | I2,3X, | I2, | I3 |

YMIN is Y value at bottom of Y-axis.

* IOPT = 1 will cause YMIN to determine the vertical offset (in Y)
* for the overlayed plot. YMIN is in the units of the previous plot
* axes and any offset is applied with respect to the previously
* defined axes. (i.e. YMIN = 10. will offset the new plot 10. units up)

YMAX is Y value at top of Y-axis.

(if log plot selected, YMIN and YMAX are the exponent values at the bottom and top of the plot).

YSIZE is the number of inches for the y-axis.

DELY is the number of y units per major division (= 1. when log plot is selected).

NUMSBY is the number of subdivisions per major division of y-axis.

NOENDY controls the plotting of the values at either end of y-axis (= 1 supresses plotting).

IDEC is number of figures after decimal point on linear y-axis.

JEMIT = 0 for transmission,
= 1 for radiance.

JPLOT = 0 plots transmission for JEMIT = 0
= 1 plots optical depth for JEMIT = 0
= 2 plots attenuation in decibels for JEMIT = 0

= 0 plots radiance in watts/(cm^2 sr cm^-1) for JEMIT = 1
(if YMIN and YMAX.GT.1, these values are interpreted as
brightness temperatures from which minimum and maximum
values of radiance are assigned).

= 1 plots radiance in equivalent brightness temperature for JEMIT = 1

LOGPLT = 0 for linear y-axis,
= 1 for log y-axis.

JHDR = 0 for plot of header data
= 1 for suppression of header data plot

PLTLBL (Continued)

RECORD 12.3A (Continued)

JOUT = ut8 70 43 eJt to system3 eJtfile/screenTj ET Q q 0.24 0 0 -0.24 18 774 cm BT 33 0 0 -33 0 324 cm /F

PLTLBL (Continued)

**********
********** USE RECORD 0t.2B FOR IOPT > 1 **********
**********

(IOPT = 2,3; CEX = 'EX')

RECORD 12.2.1B

CFILEN(1)

1-25

A25

CFILEN(1) is the external name for the data file associated with JFILE.

RECORD 12.2.2B

CFILEN(2)

1-25

A25

CFILEN(2) is the external name for the data file associated with LFILE.

RECORD 12.2.3B

CFILEN(3)

1-25

A25

CFILEN(3) is the external name for the data file associated with the difference/ratio file, MFILE.

---

REPEAT RECORD 12.2A or RECORD 12.2B

A '-1.' within columns 1-10 will terminate plotting.

TABLE III. Structure of file JPLTFL (standard LBLRTM structure).

TABLE III

| | | |
|---|---|---|
| record 1 | /PLTHDR/ | XID(10),SEC,P0,T0,HMOL(64),W(64),WBROAD,DVT,V1V,<br>V2V,TBOUND,EMISIV,FSCDID(17),NMOL,NLAYER, YID1,YID(10) |
| record 2 | /JPLTFL/ | V1P,V2P,DVP,NLIM |
| record 3 | | NLIM values of Y from V1P to V2P V2V,TBOUND,EMIM |

If the NLTE (IHIRAC = 4) option is selected a separate file (TAPE4) must be created.
The following instructions describe 4 -00ontents of a TAPE4 file.

Note : TAPE4 permits selection of vibrational states; only 4 -0states listed in Table IV
are allowed

Table IV

| Molecule | State | Energy (cm-1) | Degeneracies |
|---|---|---|---|
| H2O | 000 | 0. | 1 |
| --- | 010 | 1594.750 | 1 |
| | 020 | 3151.630 | 1 |

| | | | |
|---|---|---|---|
| | 1 | 2143.272 | 1 |
| | 2 | 4260.063 | 1 |

| NO | | | |
|---|---|---|---|
| -- | 0 | 0. | 1 |
| | 1 | 1878.077 | 1 |
| | 2 | 3724.067 | 1 |

TAPE4(RECORD 1.1)

TIT

1-80