Description of the

File Formats

used within CoRoT/ESTA

`Http://www.astro.up.pt/corot/`

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Contents

1 Introduction

This document describes briefly the file formats used within the Evolution and Seismic Tools Activity in order to help the exchange of data. The formats described here correspond to files produced by the different codes (evolution and/or oscillations), namely;

CESAM:	*Code d'Évolution Stellaire Adaptatif et Modulaire*, by Morel (1997)
ASTEC:	*Aarhus Stellar Evolution Code*, by Christensen-Daslgaard (1982)
STAROX:	*Roxburgh's Stellar Evolution Code*, by Roxburgh
ADIPLS:	*Aarhus Adiabatic Pulsation Package*, by Christensen-Daslgaard (1982)

More file formats for other codes will be included in this document as soon as they are made available.

The latest version of this file and related documentation are available at the following URL:

`http://www.astro.up.pt/corot/ntools/`

1.1 Notation

The notation employed here is standard, but some of the more commonly used symbols are given here for convenience. Further notation is introduced later, when necessary.

Some of the most relevant functions are:

r	radial distance to the centre
m	mass interior to radius r
T	temperature
p	pressure
ρ	density
μ	mean molecular weight
μ_n	mean molecular weight of nuclei
μ_e	mean molecular weight per electron
N_e	number of free electrons per unit mass
$X,\ Y,\ Z$	abundance by mass of hydrogen, helium and heavy elements
κ	opacity
ε	rate of energy generation per unit mass
L_r	luminosity through sphere with radius r
r_X	rate of change of X
c_p	specific heat at constant pressure
δ	$\equiv -\left(\frac{\partial \ln \rho}{\partial \ln T}\right)_p$; expansion coefficient
Γ_1	$\equiv \left(\frac{\partial \ln p}{\partial \ln \rho}\right)_{\rm ad}$; adiabatic exponent
$\nabla_{\rm ad}$	$\equiv \left(\frac{\partial \ln T}{\partial \ln p}\right)_{\rm ad}$; adiabatic gradient
$\nabla_{\rm rad}$	$\equiv \frac{3}{16\pi acG}\,\frac{\kappa\, L_r\, p}{m\, T^4}$; radiative gradient
∇	$\equiv \frac{{\rm d} \ln T}{{\rm d} \ln p}$; temperature gradient

$$H_p \equiv \left| \frac{1}{p} \frac{\mathrm{d}P}{\mathrm{d}r} \right|^{-1}; \text{ pressure scale height}$$

$X(i)$ abundance by mass of element i

Some of the commonly used stellar parameters are:

M	total stellar mass
$T_{\rm eff}$	effective temperature
R	photospheric radius (where $T = T_{\rm eff}$)
L	surface luminosity
X_0	initial hydrogen abundance
Z_0	initial heavy elements abundance
α	$= \frac{\ell}{H_p}$; mixing length parameter

In here and in the tables below we use the following definitions:

- $\ln x$ – is the natural logarithm of x (having base e),
- $\log x$ – is the common logarithm of x (having base 10), being given by $\log x = \frac{\ln x}{\ln 10}$.

1.2 Properties of the present Sun

In order to be consistent when comparing the outputs from different codes we include here a list of the relevant reference values. In particular we need to specify the values to use for the present Sun. These clearly also have to be the same for all the calculations.

It is proposed that the following values are adopted:

$R_\odot = 6.9599 \times 10^{10}$ cm — Allen (1973)

$L_\odot = 3.846 \times 10^{33}$ erg s^{-1} — Willson et. al (1986)

$(GM)_\odot = 1.32712438 \times 10^{26}$ cm^{-3}s^{-2} — Lide et. al (1994)

$M_\odot = 1.98919 \times 10^{33}$ g

$\Rightarrow \quad G = 6.6716823 \times 10^{-8}$ cm^{-3} g^{-1}s^{-2}

The value $R_\odot$ should refer to the radius at the point where $T = T_{\rm eff,\odot} (= 5777.54)$.

1.3 Physical constants

Some of the physical constants necessary for the calculation of a stellar model are listed here with the corresponding values (Cohen & Taylor, 1987; Lide et. al, 1994). The units are cgs, except where otherwise noted.

Boltzmann's constant	k	= 1.380658×10^{-16} erg K^{-1}
Atomic mass unit	amu	= $1.6605402 \times 10^{-24}$ g
Perfect gas constant	$\mathcal{R}$	= $\frac{k}{m_u}$ (= 8.3145111×10^{7} erg K^{-1} mole^{-1})
Electron mass	m_e	= $9.1093897 \times 10^{-28}$ g
Electron charge	e	= $1.60217733 \times 10^{-19}$ C
		= $4.80320680 \times 10^{-10}$ ESU
Planck's constant	h	= $6.6260755 \times 10^{-27}$ erg s

Speed of light	c	= 2.99792458$\times 10^{10}$ cm s^{-1}
Gravitational constant (see above)	G	= $\dfrac{(GM)_\odot}{M_\odot} = 6.6716823 \times 10^{-8}$ cm^{-3} g^{-1}s^{-2}
Radiation density constant	a	= $\dfrac{8\pi^5 k^4}{15c^3h^3}$ ($= 7.5659122 \times 10^{-15}$ erg cm^{-3} K^{-4})
Stefan-Boltzmann constant	σ	= $\dfrac{ac}{4}$ ($= 5.67051 \times 10^{-5}$ erg cm^{-2} K^{-4} s^{-1})
Conversion from eV to erg	1 eV	= 1.60217733$\times 10^{-12}$ erg
Ionisation potential for hydrogen	χ_H	= 13.595 eV
First ionisation potential for helium	χ_{He}	= 24.580 eV
Second ionisation potential for helium	χ_{He^+}	= 54.403 eV

For the atomic masses, in “amu”, a reference set of values is:

Neutron	= 1.00866500
^{1}H	= 1.00782500
^{2}H	= 2.01410180
^{3}He	= 3.01602930
^{4}He	= 4.00260330
^{6}Li	= 7.01600400
^{7}Li	= 6.01512100
^{7}Be	= 7.01692920
^{9}Be	= 9.01218210
^{12}C	= 12.0000000
^{13}C	= 13.0033548
^{13}N	= 13.0057386
^{14}N	= 14.0030740
^{15}N	= 15.0010890
^{16}O	= 15.9949146
^{17}O	= 16.9991315

2 File formats for stellar models

The exchange of models will take place by means of formatted files. A tool, **MODCONV**, is available to help convert the different formats available. The latest version of this tool and associated information and documentation are available at the following URL:

`http://www.astro.up.pt/corot/ntools/modconv/`

Here we describe each one of the formats used in writing a stellar model. For each model the file consists of a header, with descriptive information, a set of global variables, and a set of variables given at each mesh point.

2.1 Format FGONG

This is the format that has been adopted to exchange solar models under the GONG model comparison scheme and is used as the official output format for code **ASTEC** (Christensen-Daslgaard, 1982). The description given in this section has been adapted from the documents on the *GONG solar model project* by Christensen-Daslgaard (1996, 2005).

For each model the file consists of a header, with descriptive information, a set of global variables, and a set of variables given at each mesh point.

The total number of global parameters, mesh-points and variables at each mesh-point are given in the header, so that the information required to read the file is available.

2.1.1 Header

The first record contains the name of the model, its date, and an identification of its origin (such as name or institute). In addition the header may contain text further describing the calculation, and information about the remaining data.

An example of a header is the following:

```
L5BI.D.15.PRES.950912.AARHUS
Level 5 physics, present Sun.  (OPAL, LivermoreEOS). He, Z diffusion.
Comparison model 5.b.
Date:
```

The line after these 4 lines of text, provides the key dimensions of the data vectors that follow. By column, the numbers given are:

1:	`NN`	number of mesh points of the model
2:	`ICONST`	number of global parameters
3:	`IVAR`	number of variables given in the `NN` mesh points
4:	`IVERS`	version number of the model

2.1.2 Global parameters

The set of global parameters made available as `GLOB`(i), with i=1:`ICONST`, are the following:

1: M
2: R
3: L
4: Z

5:	X_0	
6:	α	
7:	ϕ	another convection theory parameter
8:	ξ	yet another convection theory parameter
9:	β	parameter in surface pressure condition
10:	λ	parameter in surface luminosity condition
11:	$\left(\frac{R^2}{p}\frac{\mathrm{d}^2 p}{\mathrm{d}r^2}\right)_{\mathrm{c}}$	second derivative of the pressure at the centre
12:	$\left(\frac{R^2}{\rho}\frac{\mathrm{d}^2 \rho}{\mathrm{d}r^2}\right) c$	second derivative of the density at the centre
13:	t	age (in years)
14-15:		unused

The parameters (β, λ, ϕ, ξ) are defined in Christensen-Daslgaard (1996).

2.1.3 Model variables at each mesh point

The file contains the following functions at each mesh point of the model (as defined for `IVERS`=300), as given by `VAR`(j, n) with j=1:`IVAR` and n=1:`NN`. The `IVAR` functions included in the file are (the notation is the same as introduced above):

1:	r	
2:	$\ln\left(\frac{m}{M}\right)$	
3:	T	
4:	p	
5:	ρ	
6:	X	
7:	L_r	
8:	κ	
9:	ε	
10:	Γ_1	
11:	∇_{ad}	
12:	δ	
13:	c_p	
14:	$\mu_e^{-1} = N_e m_u$	
15:	$\frac{1}{\Gamma_1}\frac{\mathrm{d}\ln p}{\mathrm{d}\ln r} - \frac{\mathrm{d}\ln\rho}{\mathrm{d}\ln r}$	
16:	r_X	rate of change in X from nuclear reactions
17:	Z	
18:	$R - r$	
19:	ε_g	rate of gravitational energy release
20:	L_g	local gravitational luminosity
21:	$X(^3\mathrm{He})$	
22:	$X(^{12}\mathrm{C})$	
23:	$X(^{13}\mathrm{C})$	
24:	$X(^{14}\mathrm{N})$	
25:	$X(^{16}\mathrm{O})$	

26: $\left(\frac{\partial \ln \Gamma_1}{\partial \ln \rho}\right)_{\rm p,Y}$

27: $\left(\frac{\partial \ln \Gamma_1}{\partial \ln p}\right)_{\rho,\rm Y}$

28: $\left(\frac{\partial \ln \Gamma_1}{\partial Y}\right)_{\rm p,\rho}$

29: $X(^2\rm H)$

30: $X(^4\rm He)$

31: $X(^7\rm Li)$

32: $X(^7\rm Be)$

33: $X(^{15}\rm N)$

34: $X(^{17}\rm O)$

35: $X(^{18}\rm O)$

36: $X(^{20}\rm Ne)$

37-40: currently not used

Note: if one variable is not available its value is set to zero. In **MODCONV**, when converting from other model formats, the values of ∇ and $\nabla_{\rm rad}$ are stored in columms 37 and 38, respectively.

2.1.4 Format for data transfer

The data are provide as a formatted file with the following structure:

Record 1-4: Name of model and explanatory text
Record 5: `NN`, `ICONST`, `IVAR`, `IVERS`
Record 6: $\left[\texttt{GLOB}(i);\ i\text{=1:}\texttt{ICONST}\right]$
Record 7- : $\left[\texttt{VAR}(j,n);\ j\text{=1:}\texttt{IVAR}\right];\ n\text{=1:}\texttt{NN}$

With the presently available version `IVERS` = 300, the values are `ICONST` = 15 and `IVAR` = 40.

The format adopted for registering each record is:

Format 1-4: text in free format
Format 5: `4I10`
Format 6-: `1P5E16.9`

2.2 Format OSC

This is the format that is currently adopted to exchange models produced by the **CESAM** code (Morel, 1997, 2005). The format has been defined to provide the necessary quantities for the calculation of adiabatic oscillation frequencies.

2.2.1 Header

The first four lines contain text with the name of the model and information describing the calculation, and the options adopted for the physics. An example of an header is the following:

```
Fichier pour oscillations adiabatiques:  star_2.00ov_4-ad.osc
CESAM2k version 0.0.0.0 lagr colloc 1 2 rg no diffus, 27 Aout 2004 00h30
Physique utilisie:  etat_opalZ, opa_yveline, conv_jmj, ppcno12Be, NACRE
solaire_gn, lim_atm, hopf, perte_ext, diffm_mp, difft_nu, ctes_94
```

The line after these 4 lines of text, provides the number `IABUND` and the list of the elements whose abundances are followed in the evolution. An example of such a line is:

```
14 H1 H2 He3 He4 Li7 Be7 C12 C13 N14 N15 O16 O17 Be9 Si28
```

The line following these provides the dimensions of the data vectors that contain the model:

1:	`NN`	number of mesh points of the model
2:	`ICONST`	number of global parameters
3:	`IVAR`	number of variables given in the `NN` mesh points
4:	`IABUND`	number of chemical elements followed in the evolution
5:	`IVERS`	version number of the model

2.2.2 Global parameters

The set of global parameters made available as `GLOB`(i), with i=1:`ICONST`, are the following:

1:	M	
2:	R	
3:	L	
4:	Z_0	initial heavy element abundance
5:	X_0	
6:	α	
7:	$X_{\rm cz}$	hydrogen abundance in the convection zone
8:	$Y_{\rm cz}$	helium abundance in the convection zone
9:	$\left(\frac{R^2}{p}\frac{{\rm d}^2 p}{{\rm d}r^2}\right)_{\rm c}$	
10:	$\left(\frac{R^2}{\rho}\frac{{\rm d}^2 \rho}{{\rm d}r^2}\right)_{\rm c}$	
11:	t	age in Myrs
12:	$\bar{\omega}_{\rm rot}$	global rotation velocity
13:	$\bar{\omega}_{\rm rot,i}$	initial global rotation velocity
14-:		unused

2.2.3 Model variables at each mesh point

The actual model is described by the following functions at each mesh point as given by `VAR`(j, n) with j=1:`IVAR` and n=1:`NN`. The `IVAR` functions included in the file are (the notation is the same as introduced above):

1:	r	
2:	$\ln\left(\frac{m}{M}\right)$	the value at the centre is: -10^{-38}
3:	T	
4:	p	
5:	ρ	
6:	∇	
7:	L_r	
8:	κ	

9: $\varepsilon_t = \varepsilon_{nuc} + \varepsilon_g$ nuclear plus gravitational energy production
10: Γ_1
11: ∇_{ad}
12: δ
13: c_p
14: μ_e^{-1}
15: $\frac{1}{\Gamma_1}\frac{d\ln p}{d\ln r} - \frac{d\ln\rho}{d\ln r}$
16: ω_{rot} angular velocity in radian/sec
17: $\frac{d\ln\kappa}{d\ln T}$
18: $\frac{d\ln\kappa}{d\ln\rho}$
19: $\frac{d\varepsilon_{nuc}}{d\ln T}$
20: $\frac{d\varepsilon_{nuc}}{d\ln\rho}$
21: $\frac{P_{tot}}{P_{gas}}$ ratio of total pressure P_{tot} by the gas pressure P_{gas}
22: ∇_{rad}
23-: $X(i)$ abundance by mass of the `IABUND` species in line 5 of the header

`IABUND` = 6: $i = {}^1\mathrm{H}, {}^3\mathrm{He}, {}^{12}\mathrm{C}, {}^{13}\mathrm{C}, {}^{14}\mathrm{N}, {}^{16}\mathrm{O}$
`IABUND` = 10: $i = {}^1\mathrm{H}, {}^3\mathrm{He}, {}^4\mathrm{He}, {}^{12}\mathrm{C}, {}^{13}\mathrm{C}, {}^{14}\mathrm{N}, {}^{15}\mathrm{N}, {}^{16}\mathrm{O}, {}^{17}\mathrm{O}, {}^{28}\mathrm{Si}$
`IABUND` = 14: $i = {}^1\mathrm{H}, {}^2\mathrm{H}, {}^3\mathrm{He}, {}^4\mathrm{He}, {}^7\mathrm{Li}, {}^7\mathrm{Be}, {}^{12}\mathrm{C}, {}^{13}\mathrm{C}, {}^{14}\mathrm{N}, {}^{15}\mathrm{N}, {}^{16}\mathrm{O}, {}^{17}\mathrm{O}, {}^9\mathrm{Be}, {}^{28}\mathrm{Si}$

2.2.4 Format for data transfer

The data is provided as a formatted file with the following structure:

Record 1-4: Name of model and explanatory text
Record 5: `IABUND`, $\left[\texttt{ELEMENT}(i);\ i=1:\texttt{IABUND}\right]$
Record 6: `NN`, `ICONST`, `IVAR`, `IABUND`, `IVERS`
Record 7: $\left[\texttt{GLOB}(j),\ j=1:\texttt{ICONST}\right]$
Record 8- : $\left[\texttt{VAR}(j,n):\ j=1:\texttt{IVAR+IABUND}\right];\ n=1:\texttt{NN}$

For version 2K the values are `ICONST` = 15 and `IVAR` = 22.

The number format adopted for each record is:

Format 1-4: text in free format
Format 5: `I3`, `IABUND*(1X,A4)`
Format 6: `5I10`
Format 7-: `1P5E19.12`

2.3 Format FAMDL

This is the format adopted to provide a stellar model for the code **ADIPLS** by Christensen-Daslgaard (1982), in order to calculate adiabatic oscillation frequencies.

2.3.1 Header

The first line provides the following numbers:

- **1:** NMOD identification number of the model
- **2:** NN number of mesh points of the model
- **3:** IVAR number of variables for the model at each point

2.3.2 Global parameters

The set of 8 global parameters made available as DATA(i), with i=1:8, are the following:

- **1:** M
- **2:** R
- **3:** p_c pressure at the centre
- **4:** ρ_c density at the centre
- **5:** $-\left(\frac{1}{\Gamma_1}\,\frac{R^2}{p}\,\frac{\mathrm{d}^2 p}{\mathrm{d}r^2}\right)_{\mathrm{c}}$
- **6:** $-\left(\frac{R^2}{\rho}\,\frac{\mathrm{d}^2 \rho}{\mathrm{d}r^2}\right)_{\mathrm{c}}$
- **7:** μ
- **8:** flag for non-standard versions

2.3.3 Model variables at each mesh point

The actual model is described by the following IVAR=6 functions at each mesh point, as given by A(j, n) with j=1:IVAR+1 and n=1:NN.

The IVAR+1 functions included in the file are (the notation is the same as introduced above):

- **1:** $\frac{r}{R}$
- **2:** $\frac{m}{M}\left(\frac{R}{r}\right)^3$
- **3:** $-\frac{1}{\Gamma_1}\,\frac{\mathrm{d}\ln p}{\mathrm{d}\ln r} = \frac{Gm}{r}\,\frac{\rho}{\Gamma_1 p}$
- **4:** Γ_1
- **5:** $\frac{1}{\Gamma_1}\,\frac{\mathrm{d}\ln p}{\mathrm{d}\ln r} - \frac{\mathrm{d}\ln \rho}{\mathrm{d}\ln r}$
- **6:** $\frac{4\pi r^3 \rho}{m}$

2.3.4 Format for data transfer

The data is provided as a formatted file with the following structure:

Record 1: NMOD, NN, IVAR
Record 2: $\Big[$DATA(i); i=1:8$\Big]$, $\Big\{\Big[$A(j, n); j=1:IVAR+1$\Big]$; n=1:NN $\Big\}$

For the standard version IVAR = 5.

The format adopted for each record is:

Format 1: `3I10`
Format 2: `1P4E20.13`

2.4 Format SROX

This is the format adopted to write out a stellar model by the code **STAROX** (Roxburgh, 2005) and the format to read in the model by **OSCROX** in order to calculate adiabatic oscillation frequencies.

2.4.1 Global parameters

The set of 16 global parameters made available as `NN` mesh points (plus the mesh point at the center) and `DATA`(i), with i=1:15, are the following:

0: `NN` number of mesh points (without the center)
1: G
2: R
3: M
4: $\left(\frac{R^2}{\rho}\frac{\mathrm{d}^2\rho}{\mathrm{d}r^2}\right)_\mathrm{c}$
5: $\left(\frac{R^2}{\Gamma_1 p}\frac{\mathrm{d}^2 p}{\mathrm{d}r^2}\right)_\mathrm{c}$
6: X_c
7: X_0
8: Z
9: $\frac{L}{L_\odot}$
10: T_eff
11: t age in Myrs
12: $\frac{M_\mathrm{core}}{M}$ mass of the convective core
13: $\frac{r_\mathrm{env}}{R}$ radial location of the base of the convective envelope
14: α
15: τ

2.4.2 Model variables at each mesh point

The actual model is described by the following `IVAR`=25 functions at each mesh point, as given by `VAR`(j, n) with j=1:`IVAR` and n=0:`NN`.

The `IVAR` functions included in the file are (the notation is the same as introduced above):

0: i
1: $\frac{r}{R}$
2: $\frac{m}{M}$
3: p
4: ρ
5: Γ_1
6: $\frac{1}{\Gamma_1} - \frac{\mathrm{d}\ln\rho}{\mathrm{d}\ln p}$

7: $\frac{m_i - m_{i-1}}{M}$
8: L_r
9: T
10: $\nabla_{\rm ad}$
11: $\nabla_{\rm rad}$
12: ∇
13: c_p
14: $\left(\frac{{\rm d}\ln\rho}{{\rm d}\ln T}\right)_p$
15: κ
16: ε
17: $X(^1{\rm H})$
18: $X(^3{\rm He})$
19: $X(^4{\rm He})$
20: $X(^{12}{\rm C})$
21: $X(^{13}{\rm C})$
22: $X(^{14}{\rm N})$
23: $X(^{15}{\rm N})$
24: $X(^{16}{\rm O})$
25: $X(^{17}{\rm O})$

2.4.3 Format for data transfer

The data is provided as a formatted file with the following structure:

Record 1: `NMOD`, $\Big[$`DATA`(i); i=1:15$\Big]$
Record 2-: $\Big\{$ $n{-}1$, $\Big[$`A`(j,n); j=1:`IVAR`$\Big]$; n=1:`NN+1` $\Big\}$

For the version used in the comparison `IVAR` = 25, while the standard version has `IVAR` = 15.

The format adopted for each record is:

Format 1: `I8`, `1P15E17.9`
Format 2-: `I8`, `1P9E17.9`, `1P6E13.5`

3 File formats for evolution sequences

Here we describe the formats used in writing a sequence of evolution models. For each model the file consists of a header, with descriptive information and a set of variables given at each age.

3.1 Format HRDAT

This is the format used by the files produced for comparing stellar evolution sequences in *ESTA*.

The typical name of one of these files is `hr_1.00.dat`, corresponding to a file containing the evolution sequence for a M=1.00 $M_\odot$ star.

3.1.1 Header

The first four lines contain descriptive information on how the sequence of points have been produced and what are the contents of the file. An example of such an header is:

```
# Output from DIAGHR V0.1:  for M = 1.00 M_sun
# Built for an evolutionary sequence produced by CESAM.
#M/M_sun log(L/L_sun) log(Teff) R/R_sun age Xc log(g) nbd type (r_c/R)_i
#---------------------------------------------------------------------
```

3.1.2 Model parameters for each age

The actual values describing the evolutionary sequence correspond to the following data per line:

1:	$\frac{M}{M_\odot}$	
2:	$\log \frac{L}{L_\odot}$	
3:	$\log T_{\rm eff}$	
4:	$\frac{R}{R_\odot}$	
5:	t	age in Myrs
6:	X_c	central hydrogen abundance
7:	$\log g_s$	surface gravity
8:	`NBD`	number of convective borders/transitions
9:	`ITYPE`	type of transitions (see below)
10-:	$\frac{r_i}{R}$	radial location of the `NBD` transitions

The number `ITYPE` indicates if the jump - coming from the centre of the star - for each of the `NBD` borders located at r_i, is:

"`1`" - from radiative stratification to convection: beginning of a *Convection Zone*

"`2`" - from convection to radiative stratification: ending of a *Convection Zone*

The number `ITYPE` contains all classifications of the transitions, being ordered such as *first-...-last* (coming from the centre of the star) corresponds to *units-tenths-hundreds-thousands*.

An example is `NBD`=3 with `ITYPE`=212: this corresponds to a star with a convective core (between the centre and r_1) and a convective envelope (between r_2 and r_3). Another example is `NBD`=2 with `ITYPE`=21: this corresponds to a star with a convective envelope (between r_1 and r_2).

3.1.3 Format for data transfer

The data is provided as a formatted file with the following structure:

Record 1-4: Description of the evolution sequence and of the contents of the file
Record 5-: $\left[\texttt{PAR}(j,n);\ j\text{=1:7}\right]$, NBD($n$), ITYPE($n$), $\left[\texttt{PAR}(j,n);\ j\text{=7+1:7+}\texttt{NBD}(n)\right]$; n=1:-

The number format adopted for each record is:

Format 1-4: free text with the first character being '#'
Format 5-: `F5.2, 1P2E15.7, F11.7, 1P1E14.7, F9.6, 1P1E15.7, I2, I5, 6F12.7`

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