

Multiple target file format

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1 Introduction

This document briefly outlines the format to use for defining multiple targets in a file which can be read in by the PIPT. This is a "comma separated values" file (although white space rather than a comma is used as separator).

The PIPT expects a correct file. In case the read in file is invalid, the behaviour of the PIPT is undefined.

2 Overall structure

The general structure of a multiple target definition file is as follows,

```
line for first target
line for second target
line for third target
...
```

Each target must be defined in a line of its own. In case you are using any non-English characters (which is *not* encouraged), bear in mind that you have to use UTF-8 as the encoding for the file. (If you are only using English characters, you shouldn't have to worry about the file encoding.)

Text following a hash sign (#) is treated as a comment and is ignored.

Leading and trailing white space is ignored. Empty lines are ignored.

You may indicate that a value is unknown by using `null`, `undef` or `undefined` instead. This is not allowed for finding charts, however.

3 Defining a target

A line for the definition of a target must have the format

```
"Name" Target.type RA_h RA_m RA_s Dec.deg Dec.arcmin Dec.arcsec Equinox Bandpass Vmin Vmax
or (in case of a non-sidereal target)
```

```
"Name" Target.type non-sidereal Equinox Bandpass Vmin Vmax
```

The various quantities are explained in Table 1.

If the target name contains quotes, these must be replaced with '"';

Note that the target type must be a standard name, as defined in Section 5. Also note that for the declination degrees +0 and -0 are *not* the same.

In addition to these mandatory quantities, you may also add optional quantities. First, you may provide a sidereal motion,

```
PM: Delta_RA Delta_Dec Epoch
```

Here `Delta_RA` is the change in the right ascension per time and must be given in arcseconds/year. Similarly `Delta_Dec` is the change in the declination per time, also given in arcseconds per year. `Epoch` is the epoch, for which the format

Quantity	Explanation
"Name"	target name (must be enclosed in quotes and must contain no quotes itself)
Target_type	target type (a standard name, as defined in Section 5)
RA_h	right ascension hours (an integer between 0 and 23)
RA_m	right ascension minutes (an integer between 0 and 59)
RA_s	right ascension seconds (a float value between 0 (inclusive) and 60 (exclusive))
Dec_deg	declination degrees ('+' or '-' followed by an integer between 0 and 89)
Dec_arcmin	declination arcminutes (an integer between 0 and 59)
Dec_arcsec	declination arcseconds (a float value between 0 (inclusive) and 60 (exclusive))
Equinox	equinox (a float value)
Bandpass	bandpass for the magnitude range (U, B, V, R or I)
Vmin	minimum ("brightest") V magnitude (a float value)
Vmax	maximum ("dimmiest") V magnitude (a float value)
non-sidereal	keyword indicating that the target is a non-sidereal one

Table 1: Mandatory quantities for a target definition.

CCYY-MM-DDThh:mm:ss.s

(or, more precisely, the format expected by the `xs:dateTime` type in an XML Schema) has to be used. Example values for the epoch are 2010-11-03T08:17:56 and 2009-05-30T23:12:18.9435.

Second, you may add a periodic target ephemeris,

EPH: TimeBase TO Period PeriodChange

The time base may be BJD (Baryocentric Julian Date), HJD (Heliocentric Julian Date) or JD (Julian Date). UTC is assumed as the time standard. The date `Date` must be given in that time base, the period `Period` must be given in days, and `PeriodChange`, the rate of change in the period, must be given in days/day.

Third, in case of a Phase 2 proposal you may specify a finding chart,

FC: path

`path` must be the absolute path of an existing finding chart. If you want to specify more than one finding chart, you need to prepend each file path with the "FC:",

FC: path1 FC: path2 FC: path3

Note that finding charts are *not* imported for a Phase 1 proposal.

Fourth, in case of a Phase 1 proposal you may specify the Moon condition for the observation,

MOON: MoonCondition.

The Moon condition must be "Bright", "Gray" or "Dark".

Fifth, again in case of a Phase 1 proposal, you may add a ranking (relative to the other targets),

RANK: ranking

The ranking must be "High", "Medium" or "Low".

Sixth, still in case of a Phase 1 proposal, you may supply an observing time for the target,

OT: ObservingTime

The observing time must be a positive integer and must be given in seconds.

You may add the optional quantities to the end of the line. Alternatively, you may put them on separate lines, provided each of these lines start with one of the identifiers "PM:", "EPH:", "FC:", "MOON:", "RANK:" or "OT:". So for example,

```
"QPO 6754" EllipticalG 08 14 53 -00 17 28 2000 R 18.3 18.3 FC: /Path/To/FC1.jpg MOON: Gray
```

and

```
"QPO 6754" EllipticalG 08 14 53 -00 17 28 2000 R 18.3 18.3
  FC: /Path/To/FC1.jpg
  MOON: Gray
```

are equivalent. The order of the optional data doesn't matter, and you may choose to add only a subset of them (such as a proper motion and a finding chart).

4 An example

Here is an example of a multiple target file (containing bogus targets, of course).

```
# This is an example file.
"AX 17 (20&quot;)" OpCl 12 53 42 -60 22 14.0 2000.0 V undefined undefined
"QPO 6754" EllipticalG 08 14 53 -00 17 28 2000 R 18.3 18.3
    FC: /Users/hettlage/FindingCharts/FC1.jpg
    MOON: Gray
"Pluto" Pluto non-sidereal V 15.1 15.1
"BX 45" Irregular_V* 13 45 57 +00 59 27 2000 B 16.6 19.0
    PM: 17.1 -28.3 2010-01-27T00:29:24
    FC: /Users/hettlage/FindingCharts/FC2.jpg
    FC: /Users/hettlage/FindingCharts/FC3.jpg
"NCT A" CataclyV* 16 01 null -45 17 57 2000.0 I 17 20.1
    EPH: 2455257 HJD 18 0.00003473
    MOON: Bright
    OT: 2345
    RANK: High
```

5 Target types

In the following, the available target types (and their explanation) are listed.

Target type	Explanation
Unknown	
Unknown	object of unknown nature
Radio sources	
Radio	radio-source
· Maser	maser
X-ray sources	
X	X-ray source
· SuperSoft	supersoft source
Gamma-ray sources	
gamma	gamma-ray source
· gammaBurst	gamma-ray burst
Inexistent	
Inexistent	inexistent objects
· Error	not an object (artefact)
Gravitation	
Gravitation	gravitational source
· LensingEv	(micro)lensing event
· Candidate.Lens	possible gravitational lens
· Possible.lensImage	possible gravitationally lensed image
· GravLens	gravitational lens
· GravLensSystem	gravitational lens system (lens+images)
Candidates	

Candidates	candidate objects
· Possible_SCIG	possible supercluster of galaxies
· Possible_CIG	possible cluster of galaxies
· Possible_GrG	possible Group of galaxies
· Candidate_**	physical binary candidate
· · Candidate_EB*	eclipsing binary candidate
· · Candidate_CV*	cataclysmic binary candidate
· · · Candidate_XB*	X-ray binary candidate
· · · · Candidate_LMXB	low-mass X-ray binary candidate
· · · · Candidate_HMXB	high-mass X-ray binary candidate
· Candidate_Pec*	possible peculiar star
· · Candidate_YSO	young stellar object candidate
· · Candidate_pMS*	pre-main sequence star candidate
· · · Candidate_TTau*	T Tau star candidate
· · Candidate_C*	possible carbon Star
· · Candidate_S*	possible S Star
· · Candidate_OH	possible star with envelope of OH/IR type
· · Candidate_CH	possible star with envelope of CH type
· · Candidate_WR*	possible Wolf-Rayet star
· · Candidate_Be*	possible Be star
· · Candidate_HB*	possible horizontal branch star
· · Candidate_RGB*	possible red giant Branch star
· · Candidate_RSG*	possible red supergiant star
· · Candidate_AGB*	possible asymptotic giant branch star
· · Candidate_post-AGB*	post-AGB star candidate
· · Candidate_BSS	candidate blue straggler Star
· · Candidate_WD*	white dwarf candidate
· · Candidate_NS	neutron star candidate
· · Candidate_BH	black hole candidate
· · Candidate_SN*	supernova candidate
· · Candidate_low-mass*	low-mass star candidate
· · Candidate_brownD*	brown dwarf candidate
Multiple objects	
multiple_object	composite object
· Region	region defined in the sky
· · Void	underdense region of the Universe
· SuperCIG	supercluster of galaxies
· CIG	cluster of galaxies
· GroupG	group of galaxies
· · Compact_Gr_G	compact group of galaxies
· · Gr_QSO	group of quasars
· PairG	pair of galaxies
· · IG	interacting galaxies
· GICl?	possible globular cluster
· Cl*	cluster of stars
· · GICl	globular cluster

· · OpCl	open (galactic) cluster
· Assoc*	association of stars
· **	double, binary or multiple star
· · EB*	eclipsing binary
· · · EB*Algol	eclipsing binary of Algol type
· · · EB*betLyr	eclipsing binary of beta Lyr type
· · · EB*WUMa	eclipsing binary of W UMa type
· · · EB*Planet	star showing eclipses by its planet
· · SB	spectroscopic binary
· · CataclyV*	cataclysmic variable star
· · · DQHer	cataclysmic var. DQ Her type
· · · AMHer	cataclysmic var. AM Her type
· · · Nova-like	nova-like star
· · · Nova	nova
· · · DwarfNova	dwarf nova
· · XB	X-ray binary
· · · LMXB	low mass X-ray binary
· · · HMXB	high mass X-ray binary
· ***	star field
Interstellar matter	
ISM	interstellar matter
· PartofCloud	part of cloud
· PN?	possible planetary nebula
· ComGlob	cometary globule
· Bubble	bubble
· EmObj	emission object
· Cloud	cloud or nebula
· · GalNeb	galactic nebula
· · BrNeb	bright nebula
· · DkNeb	dark cloud (nebula)
· · RfNeb	reflection nebula
· · MolCld	molecular cloud
· · · Globule	globule (low-mass dark cloud)
· · · denseCore	dense core inside a molecular cloud
· · HVCld	high-velocity cloud
· · BiNeb	bipolar nebula
· · GasNeb	gaseous nebula
· HII	HII (ionized) region
· PN	planetary nebula
· HIshell	HI shell
· SNR?	supernova remnant candidate
· SNR	supernova remnant
· Circumstellar	circumstellar matter
· · outflow?	outflow candidate
· · Outflow	outflow
· · OutflowJet	outflow or jet
· · HH	Herbig-Haro object
Stars	
Star	star
· *inCl	star in cluster
· *inNeb	star in nebula

· *inAssoc	star in association
· *in**	star in double system
· V*?	star suspected of variability
· Pec*	peculiar star
· · HB*	horizontal branch star
· · YSO	young stellar object
· · Em*	emission-line star
· · · Be*	Be star
· · BlueStraggler	blue straggler star
· · RGB*	red giant branch star
· · AGB*	asymptotic giant branch star (He-burning)
· · · C*	carbon star
· · · S*	S star
· · RSG*	red supergiant star
· · post-AGB*	post-AGB star (proto-PN)
· · WD*	white dwarf
· · · pulsWD*	pulsating white dwarf
· · low-mass*	low-mass star ($M_{\downarrow}1solMass$)
· · brownD*	brown dwarf ($M_{\downarrow}0.08solMass$)
· · OH/IR	star with envelope of OH/IR type
· · CH	star with envelope of CH type
· · pMS*	pre-main sequence star
· · · TTau*	T Tau-type star
· · WR*	Wolf-Rayet star
· · NS*	neutron star
· · BH*	black hole
· PM*	high proper-motion star
· · near*	nearby star
· HV*	high-velocity star
· V*	variable star
· · Irregular_V*	variable star of irregular type
· · · Orion_V*	variable star of Orion type
· · · Rapid_Irreg_V*	variable star with rapid variations
· · Eruptive*	eruptive variable star
· · · Flare*	flare star
· · · FUOr	variable star of FU Ori type
· · · Erupt*RCrB	variable star of R CrB type
· · RotV*	rotationally variable star
· · · RotV*alf2CVn	variable star of alpha2 CVn type
· · · RotV*Ell	ellipsoidal variable star
· · · Pulsar	pulsar
· · · BYDra	variable of BY Dra type
· · · RSCVn	variable of RS CVn type
· · PulsV*	pulsating variable star
· · · RRLyr	variable star of RR Lyr type
· · · Cepheid	Cepheid variable star
· · · PulsV*delSct	variable star of delta Sct type
· · · PulsV*RVTau	variable star of RV Tau type
· · · PulsV*WVir	variable star of W Vir type
· · · PulsV*bCep	variable star of beta Cep type
· · · deltaCep	classical Cepheid (delta Cep type)

- · · gammaDor variable star of gamma Dor type
- · LPV* long-period variable star
- · · Mira variable Star of Mira Cet type
- · · semi-regV* semi-regular pulsating star
- · SN supernova
- · Symbiotic* symbiotic star
- Sub-stellar sub-stellar object
- Planet? extra-solar planet candidate
- ExG* isolated star (not a member of a particular galaxy)

Galaxies

- Galaxy galaxy
- EllipticalG elliptical galaxy
- SpiralG spiral galaxy
- DwarfG dwarf galaxy
- IrregG irregular galaxy
- PartofG part of a galaxy
- GinCl galaxy in cluster of galaxies
- · BCIG brightest galaxy in a cluster (BCG)
- GinGroup galaxy in group of galaxies
- GinPair galaxy in Pair of galaxies
- High_z_G galaxy with high redshift
- AbsLineSystem absorption line system
- · Ly-alpha_ALS Ly alpha absorption line system
- · DLy-alpha_ALS damped Ly-alpha absorption line system
- · metal_ALS metallic absorption line system
- · Ly-limit_ALS Lyman limit system
- · Broad_ALS broad absorption line system
- RadioG radio galaxy
- HII_G HII galaxy
- LSB_G low surface brightness galaxy
- AGN_Candidate possible active galactic nucleus
- · QSO_Candidate possible quasar
- · Blazar_Candidate possible blazar
- · BLLac_Candidate possible BL Lac
- EmG emission-line galaxy
- StarburstG starburst galaxy
- BlueCompG blue compact galaxy
- LensedImage gravitationally lensed image
- · LensedG gravitationally lensed image of a galaxy
- · LensedQ gravitationally lensed image of a quasar
- AGN active galactic nucleus
- · LINER LINER-type active galactic nucleus
- · Seyfert Seyfert galaxy
- · · Seyfert_1 Seyfert 1 galaxy
- · · Seyfert_2 Seyfert 2 galaxy
- · Blazar blazar
- · · BLLac BL Lac - type object
- · · OVV optically violently variable object
- · QSO quasar
- GSN galaxy with supernova

Solar system objects

Solar_System	Solar System object
· Planet	planet
· · Mercury	Mercury
· · Venus	Venus
· · Earth	Earth
· · Moon	Moon
· · Mars	Mars
· · Jupiter	Jupiter
· · Saturn	Saturn
· · Uranus	Uranus
· · Neptune	Neptune
· DwarfPlanet	dwarf planet
· · Pluto	Pluto
· · Ceres	Ceres
· · Haumea	Haumea
· · MakeMake	MakeMake
· · Eris	Eris
· sSSBody	small Solar System body
· · Comet	comet
· · Asteroid	asteroid
· TNO	Trans-Neptunian object
· PMoon	planetary moon
· PRing	planetary ring
Calibration	
Calib	calibration
Calib_S	standard
Calib_aS	astrometric standard
Calib_phS	photometric standard
Calib_sS	spectroscopic standard
Cal_polS	polarimetric standard
Cal_spS	spectropolarimetric standard
Cal_rvS	radial velocity standard
Cal_Flat	flat
Cal_SFlat	sky flat
Cal_DFlat	dome flat
Cal_Guide*	guide star
Man-made object	
mmObj	man-made object