UBV Photoelectric Photometry Catalogue (1986)

(Mermilliod 1987)

Documentation for the Computer-Readable Version

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September 1987

Doc. No. STX-T-25-3002-0016-87

Contract NAS 5-28752

Prepared for:

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Abstract

This document describes the computer-readable version of the *UBV Photoelectric Photometry Catalogue (1986)* (Mermilliod 1987) distributed by the Astronomical Data Center, NASA Goddard Space Flight Center. This catalog is a compilation of *UBV* photoelectric photometry in the Johnson and Morgan system and in closely related systems published between 1953 and the end of 1985. Listed are identification, V, $B-V$, $U-B$, number of measurements, and references for 136,719 entries concerning 87,267 stars.

The catalog is in seven files: the first lists data for stars published in the system of Johnson and Morgan (1953); the second file lists the same information for measurements in several closely related systems; the third file combines the data of the first two into a single file; the fourth file lists the full forms of the references cited by code number in the first three files; the fifth file contains a list of the references of the fourth file sorted by journal and volume; the sixth file lists data and additional comments for 933 stars not known to be variable but which have shown a significant difference in magnitude between two observations; and the seventh file contains a description of the numbering system of Mermilliod (1978) used to identify objects in this catalog. The present document describes the overall file structure and the individual data fields.

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1 Introduction

A copy of this document should be distributed with every copy of the computer-readable catalog.

1.1 Description

The *UBV Photoelectric Photometry Catalogue (1986)* (UBV86; Mermilliod 1987) is a compilation of *UBV* photoelectric photometry in the system of Johnson and Morgan (1953) and closely related systems published between 1953 and the end of 1985. Listed are identification, V, $B-V$, $U-B$, number of measurements, and references for a total of 136,719 entries concerning 87,267 stars.

The catalog is in seven files: the first lists data for stars published in the system of Johnson and Morgan (1953); the second file lists the same information for measurements in closely related systems; the third file combines the data of the first two into a single file; the fourth file lists the full forms of the references cited by code number in the first three files; the fifth file contains a list of the references of the fourth file sorted by journal and volume; the sixth file lists data and additional comments for 933 stars not known to be variable but which have shown a significant difference in magnitude between two observations; and the seventh file contains a description of the numbering system of Mermilliod (1978) used to identify objects in this catalog.

1.2 Reference

Mermilliod, J.-C. 1987, *Astron. Astrophys. Suppl. Ser.*, **71**, 413.

2 Structure

2.1 Each File as a Whole

The UBV86 consists of seven files. Table 1 gives the tape-file attributes that are the same no matter what computer the catalog is copied for. All records are of fixed length. The first file lists measurements in the system of Johnson and Morgan (1953); the second file lists measurements in closely related systems; the third file lists the combined data of the the previous two (Table 2); the fourth file lists the full forms of the references cited by code number in the first three files (Table 3); the fifth file lists the references sorted by journal and volume number; the sixth file lists data and comments for stars with inconsistent measurements (Table 4); and the seventh file contains a description of the numbering system of Mermilliod (1978) used to identify objects in this catalog. Detailed descriptions of each file are given in the following sections.

Quotations in any of the following descriptions come from Mermilliod (1987) unless otherwise noted.

UBV Photoelectric Photometry Catalogue (1986) (Mermilliod 1987)				
File	Contents	Record Format	Record Length	Number of Records
1	Johnson System	Fixed	48	109,294
2	Related Systems	Fixed	48	27,425
3	Merged Data	Fixed	48	136,719
4	References	Fixed	80	4,986
5	Sorted References	Fixed	80	5,215
6	Inconsistencies	Fixed	80	3,703
7	Numbering	Fixed	80	2,462

Table 1: Summary Description of Catalog Files

There are also attributes that will change from computer to computer. You will probably have to know these in order to use your copy of the catalog; therefore, they should have been supplied with your tape. These attributes are as follows:

- Number of tracks
- Density in bytes per inch
- Block size in bytes
- Number of records in a block
- Number of blocks
- Character code (ASCII or EBCDIC)

You may wish to write down the values for your tape in the list above.

2.2 Measurements (Files 1, 2, and 3 of 7)

The format for these three files is identical. The first file includes data in the standard system of Johnson and Morgan (1953):

> All data that have been explicitly referred to the Johnson and Morgan *UBV* system have been considered as such. The catalogue also includes the *(U)BV* data from the *(U)BVRI* systems of Kron and Cousins and the *UBV* observations from Johnson's *UBVRI* system when the observation and reduction have been done separately for the *UBV* and a separate number of measurements indicated.

The second file includes measurements "through UBV filters in closely related systems." Mermilliod (1987) lists the follwing sources for these data:

BV data from the $U_C BV$ Cape system (Nicolet 1975)

UBV_E data from Eggen (Mermilliod and Mermilliod 1986)

UBV from the various $UBVRI$ systems as compiled by Lanz (1986)

$UBViyz$ photometry (Jennens and Helfer 1975)

The third file contains the merged data of the first two files.

Bytes	Units	Suggested Format	Data
1-11		I11	Identification
12		A1	Multiplicity flag
13		A1	Variability flag
14-20	mag	F7.3	V
21-27	mag	F7.3	B-V
28-34	mag	F7.3	U-B
35-36		2X	Blank
37		A1	Count flag
38-40		A3	Number of obs.
41-43		3X	Blank
44-48		I5	Reference number

Table 2: Measurement Record Format

Identification Code number of the star in the system of Mermilliod (1978) [bytes 1-11, format I11]

Multiplicity flag Single-character code: "D" indicates an unresolved binary system; a number identifies one component of a multiple system [byte 12, format A1]

Variability flag "V" if the star is variable [byte 13, format A1]

V In magnitudes [bytes 14-20, format F7.3]

B-V In magnitudes [bytes 21-27, format F7.3]

U-B In magnitudes [bytes 28-34, format F7.3]

Count flag Single-character code qualifying the number in bytes 38-40. The following codes are used:

/ Indicates that the actual number of observations was not listed in the source reference; "1" has been assumed.

***** Indicates that there were at least as many observations as indicated in bytes 38-40.

[byte 37, format A1]

Number of obs. Number of observations of this object. For standard stars this field contains instead the letters "STD." [bytes 38-40, format A3]

Reference number Code number of the source reference of this data. The full forms of these references are listed by code number in the fourth file, and by journal and volume number in the fifth file. References for the "related systems" listed above begin with a two-digit prefix:

02XXX *BV*, Cape (Nicolet 1975)

14XXX *UBV*, Eggen (Mermilliod and Mermilliod 1986)

37XXX *UBViyz*, Jennens and Helfer (1975)

08XXX *UBV(RI)*, Johnson standards (Johnson and Morgan 1953)

68XXX *UBV(RI)*, Kunkel and Rydgren (1979)

72XXX *UBV(RI)*, Moffet and Barnes (1979)

73XXX *UBV(RI)*, Neckel and Chini (1980)

[bytes 44-48, format I5]

2.3 References (File 4 of 7)

This file lists the full forms of the references cited by code number in the first three files, sorted by number. Each reference has three or more records: the first record contains the reference number and authors; the second record holds the year, journal name, volume and page number; and the third and following records contain the full title of the paper.

Bytes	Suggested Format	Data
1- 5	I5	Number
6- 8	3X	Blank
9-80	A72	Text

Table 3: Reference Record Format

Number Code number by which this reference is cited in the data files [bytes 1-5, format I5]

Text Full form of the reference. When bytes 1-5 are blank, this field continues the reference of the previous record. [bytes 9-80, format A72]

2.4 Sorted References (File 5 of 7)

This file contains a list of the references of the fourth file sorted by journal and volume number and includes header records to separate references from different journals. This file is useful for determining the reference number assigned to a given paper. It is formatted as 80-byte lines of text which may be read and printed out with a FORTRAN A80 format.

2.5 Inconsistencies (File 6 of 7)

This file lists data for those stars not known to be variable, but which show a difference of > 0.20 mag in V, $B - V$, or $U - B$ between two or more different sources. All observations are listed for each of 933 stars. A blank record separates successive objects.

Bytes	Units	Suggested Format	Data
1-11		I11	Identification
12		A1	Multiplicity flag
13-19	mag	F7.3	V
20-26	mag	F7.3	B-V
27-33	mag	F7.3	U-B
34		1X	Blank
35		A1	Count flag
36-38		A3	Number of obs.
39-40		2X	Blank
41-45		I5	Reference number
46		1X	Blank
47		A1	Error flag
48		1X	Blank
49-80		A32	Comment

Table 4: Inconsistencies Record Format

Identification Code number of the star in the system of Mermilliod (1978) [bytes 1-11, format I11]

Multiplicity flag Single-character code: "D" indicates an unresolved binary system; a number identifies one component of a multiple system [byte 12, format A1]

V In magnitudes [bytes 13-19, format F7.3]

B-V In magnitudes [bytes 20-26, format F7.3]

U-B In magnitudes [bytes 27-33, format F7.3]

Count flag Single-character code qualifying the number in bytes 36-38. The following codes are used:

/ Indicates that the actual number of observations was not listed in the source reference; "1" has been assumed.

* Indicates that there were at least as many observations as indicated in bytes 36-38.

[byte 35, format A1]

Number of obs. Number of observations of this object. For standard stars this field contains instead the letters "STD." [bytes 36-38, format A3]

Reference number Code number of the source reference of this data. The full forms of these references are listed by code number in the fourth file, and by journal and volume number in the fifth file. [bytes 41-45, format I5]

Error flag "*" indicates that the data of this record have been identified as faulty. [byte 47, format A1]

Comment [bytes 49-80, format A32]

2.6 Numbering (File 7 of 7)

This file contains a description of the numbering system of Mermilliod (1978) used to identify objects in this catalog. It includes references as well as a number of tables listing special code numbers, and is formatted as 80-byte lines of text which may be read and printed out with a FORTRAN A80 format.

Two ranges of object numbers not defined in this file are described below.

-40ZZBBBBB These numbers represent CpD stars in the zones north of $-52°$ where CoD numbers are normally expected, but which have no CoD number. ZZ = zone number, BBBBB = star number.

-20ZZBBBB These numbers represent CoD stars in the zones south of $-51°$ where CpD numbers are normally expected, but which have no CpD number. ZZ = zone number, BBBB = star number.

3 History

3.1 Remarks and Modifications

The *UBV Photoelectric Photometry Catalogue (1986)* (UBV86) was received by the Astronomical Data Center (ADC), NASA Goddard Space Flight Center, from the Centre de Données Astronomiques, Strasbourg (CDS), in December 1986.

The original tape consisted of eight text files. The first contained a description of the seven catalog files and has been incorporated into this document; the remaining files were formatted as described in the preceding sections.

A FORTRAN program was run to check the validity of each field according to its data type and value. A number of errors were discovered, only some of which could be corrected. A list of all errors and corrections is included in Appendix A: "Errata."

3.2 References to the Documentation

Jennens, P. A. and Helfer, H. L. 1975, *Mon. Not. Roy. Astron. Soc.*, **172**, 667.
Johnson, H. L. and Morgan, W. W. 1953, *Astrophys. J.*, **117**, 313.
Kunkel, W. E. and Rydgren, A. E. 1979, *Astron. J.*, **84**, 633.
Lanz, T. 1986, *Astron. Astrophys. Suppl. Ser.*, **65**, 195.
Mermilliod, J.-C. 1987, *Astron. Astrophys. Suppl. Ser.*, **71**, 413.
Mermilliod, J.-C. 1986, unpublished documentation supplied with the catalog by the CDS.
Mermilliod, J.-C. 1978, *Bull. Inform. CDS*, **14**, 32.
Mermilliod, J.-C. and Mermilliod, M. 1986, in preparation.
Mermilliod, J.-C. 1987, private communication.
Moffett, T. J. and Barnes, T. G. 1979, *Astron. J.*, **84**, 627.
Neckel, Th. and Chini, R. 1980, *Astron. Astrophys. Suppl. Ser.*, **39**, 411.
Nicolet, B. 1975, *Astron. Astrophys. Suppl. Ser.*, **22**, 239.

A Errata

During preparation of the data several typographical errors were discovered in the first three files which were corrected where possible by referring to the indicated source reference. The following records were found to be in error in the first file (Johnson system data file). In all cases the identical errors were discovered in the corresponding record of the third file (merged data file):

Johnson Record Number	Merged Record Number	Error and Correction
2350	2488	Number of observations field blank. The value from the reference ("8") was inserted.
7695	8929	V, B-V, U-V, and number of observations misaligned. The numbers present were realigned. However, the value for V (.01 mag) is not reasonable. The object could not be located in the indicated reference. The value listed for V in the Bonner Durchmusterung is 9.5; V in this catalog has not been changed.
11414	13065	Reference number of "0". References 1-10 were checked, but the object could not be found. This field was left unchanged.
61036	81238	Typographical error in B-V. The object was found in the indicated reference and the value changed from "9.966" to "0.966".
83783	106937	Non-existent reference number. The object was found in reference 390. Reference number changed from "3900" to "390".
83784	106938	Non-existent reference number. The reference number has been changed from "4010" to "401", but the object could not be located in this reference. References 401-411 were also checked for this object, without success.
83785	106939	Non-existent reference number. The object was found in reference 411. Reference number changed from "4110" to "411".
91036	116341	Number of observations blank. The object was found in the indicated reference and the value "3" was inserted into this field.
104618	130715	B-V value unreasonable ("18.12"). The reference was consulted and it was discovered that this is actually the B magnitude, not B-V. The subtraction was performed and the field changed to "-0.29".

In addition, the following record was found to be in error in the file of related system measurements:

Related Record Number	Merged Record Number	Error and Correction
14822	60194	Misaligned data and non-existent reference number. The object was found in reference 8015. The data were re-aligned and the reference number was changed from "80150" to "8015".

Finally, during the course of checking out these problems, two errors were also discovered in the reference files. No attempt has been made to verify the references in these files, but those errors encountered incidentally are listed below. The corrections have been made in both reference files.

Reference Number	Error and Correction
100	Page number changed from "223" to "221".
1464	Page number changed from "1272" to "254". ("1272" is the number of the issue.)