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DOCUMENTATION FOR THE MACHINE-READABLE VERSION

OF THE

MORPHOLOGICAL CATALOGUE OF GALAXIES (MCG)

OF VORONTSOV-VELYAMINOV *ET AL.* 1962-1968

Wayne H. Warren Jr.

December 1982

National Space Science Data Center (NSSDC)/
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National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

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ABSTRACT

Detailed descriptions of modifications, corrections and the record format are provided for the machine-readable version of the *Morphological Catalogue of Galaxies* (Vorontsov-Velyaminov *et al.* 1962-68). In addition to hundreds of individual corrections, a detailed comparison of the machine-readable with the published catalogue resulted in the addition of 116 missing objects, the deletion of 10 duplicate records, and a format modification to increase storage efficiency.

SECTION 1 - INTRODUCTION AND SOURCE REFERENCES

The *Morphological Catalogue of Galaxies (MCG)* is a compilation of information for approximately 34,000 galaxies found and examined on the Palomar Observatory Sky Survey (POSS). Individual identifiers are assigned for about 29,000 galaxies and information on the remaining 5,000 is present in the extensive notes of the published catalogues (Vorontsov-Velyaminov *et al.* 1962-1968). The catalogue is structured according to the POSS zones and is numbered from +15 (corresponding to +90°) to +01 (+06° zone) and +00 (equatorial zone) to -05 (-30° zone); the fields are numbered with increasing right ascension. The original goal of the compilation was to be complete for galaxies brighter than magnitude 15.1, but the final catalogue lists many objects considerably fainter.

Information given in the original printed volumes includes: cross-identifications to the NGC (Dreyer 1888) and IC (Dreyer 1895, 1908) catalogues, equatorial coordinates for 1950.0, magnitude, estimated sizes and intensities of the bright inner region and the entire object, estimated inclination, and coded description (by symbols) of the appearance of the galaxy. Each field is then followed by notes on individual objects. All of the above data except the coded description are included in the machine version, except that special coding (e.g. for uncertainty or source designation) is not present (other than for the NGC/IC cross identifications [added at the Astronomical Data Center for this machine version]). Although the notes are not computerized, the presence of a note in the original is flagged in the machine version.

This document describes in detail the machine-readable version of the *MCG* currently being distributed from the Astronomical Data Center. It is intended to enable users to read and process the data without problems or guesswork. For additional details concerning the galaxy classifications, measurements, and descriptions, the source references should be consulted. A copy of this document should accompany any machine-readable copy of the catalogue.

SOURCE REFERENCES

Vorontsov-Velyaminov, B. A. and Krasnogorskaya, A. A. 1962, *Morphological Catalogue of Galaxies, Part I, Catalogue of 7200 Galaxies from +90° to +45° Declination* (Moscow: Sternberg Institute 32).

Vorontsov-Velyaminov, B. A. and Arhipova, A. A. 1963, *Morphological Catalogue of Galaxies, Part III, Catalogue of 6740 Galaxies from +15° to -9° Declination* (Moscow: Sternberg Institute 33).

Vorontsov-Velyaminov, B. A. and Arhipova, A. A. 1964, *Morphological Catalogue of Galaxies, Part II, Catalogue of 9650 Galaxies from +45° to +15° Declination* (Moscow: Sternberg Institute 34).

Vorontsov-Velyaminov, B. A. and Arhipova, A. A. 1968, *Morphological Catalogue of Galaxies, Part IV, Catalogue of 5410 Galaxies from -9° to -33° Declination* (Moscow: Sternberg Institute 38).

SECTION 2 - TAPE CONTENTS

A byte-by-byte description of the contents of the machine-readable *MCG* is given in Table 1. The suggested format specifications are for FORTRAN formatted read statements and can be modified depending upon individual programming and processing requirements. Since all data fields contain blanks for missing data (only the *MCG* and coordinate fields are never blank) care must be exercised when processing the catalogue for search or computational purposes (the situation is simplified here because there are no data with valid zero values). Alternate format specifications are given in parentheses.

Table 1. Tape Format. *Morphological Catalogue of Galaxies*

Byte(s)	Units	Suggested Format	Description
1-13	---	13A1	*MCG* number. Bytes 1-3 contain the characters "MCG", bytes 4-6 denote the Palomar Observatory Sky Survey (POSS) field in which the galaxy is located, numbered in 6° zones (from +15° at the North Celestial Pole to +00 at the equator and to -05 in the southern sky). The sign of the field is always in byte 4. Bytes 7 and 10 contain hyphens. Bytes 8-9 give the number of the field in increasing right ascension (from a minimum of 1 field at +90° to 60 fields at +00°); bytes 11-13 contain the number of this galaxy in the field.
14	---	A1	a, b, ... for components of multiple systems.
15	---	A1	Asterisk (*) if there is a note for this galaxy at the end of the field in the published edition; otherwise blank.
16-19	---	I4	Catalogue number from the *NGC* (Dreyer 1888) or the *IC* (Dreyer 1895, 1908); otherwise blank.
20	---	A1	a, b, c for components of *NGC* or *IC* object; slash (/) to denote *NGC(IC)* and *NGC(IC)* + 1 numbers together (e.g. NGC 5906/7); a colon (:) indicates an uncertain identification according to the authors (? in published catalogue) [a / occurs in byte 23 in one case

Table 1. (continued)

Byte(s)	Units	Suggested Format	Description
			(MCG+10-23-065) where a : occurs in byte 22].
21	---	A1	Asterisk (*) if bytes 16-19 contain an *IC* identification; otherwise blank.
22-23	hours	I2	Right ascension (α) for equinox 1950.0.
24-28	min	F5.2	α. Precision reported varies from whole minutes to hundredths of a minute. The greater precision is used to discriminate objects close together, but does not indicate greater accuracy.
29-31	°	I3 (A1,I2)	Declination (δ) for equinox 1950.0. The sign is always in byte 29.
32	---	1X	Blank
33-35	'	F3.0 (I2,A1)	δ. A decimal point can occur in byte 35, denoting that the original measurement had a 5 in the tenths column.
36-40	mag	F5.2 (A5)	Magnitude taken from various sources in order of preference (Holmberg 1958; Humason, Mayall and Sandage 1956; Pettit 1954; Reiz 1941; Bigay 1951). In the published version, various symbols are used to indicate the sources above, e.g. surrounded by (), [], or //. These codes are not present in the machine version; however, magnitudes from Holmberg (1958) are reported to a hundredth and Humason *et al.* (1956) to a tenth. Any other coding is indistinguishable in the present machine version. Blank for missing data.
41-45	0'1	F5.1	Diameter of the major axis of the bright inner port of the galaxy. Blank if absent. The special coding (: for uncertainty) is not present in this machine version. If only one number is given in the published version, it is given in this field and bytes 46-50 are blank. (To clarify the units, the reporting of all diameters in tenths

Table 1. (continued)

Byte(s)	Units	Suggested Format	Description
			means that MCG+15-01-001 has inner region dimensions of 0!2 x 0!05 and overall dimensions of 1!6 x 1!3 [divide diameters by ten to obtain arcminutes].)
46-50	0'1	F5.1	Diameter of the minor axis of the bright inner part of the galaxy. Blank if absent or if only one diameter is reported.
51-55	0'1	F6.1	Diameter of the major axis of the entire galaxy. Blank if no data. The special coding (e.g. : for uncertainty) used in the published catalogue is not present in the machine version. If only one number is given in the published edition (object round) it is given in this field and bytes 57-61 are blank. (The larger data field is required to accommodate M 31 at 1600' [MCG+07-02-016].)
57-61	0'1	F5.1	Diameter of the minor axis of the entire galaxy. Blank if absent or if only one diameter is reported.
62	---	I1 (A1)	Intensity of the inner region of the galaxy (I_d) on a scale from 1 (completely black image) to 6 (image barely visible). Blank if absent.
63	---	I1 (A1)	Intensity of the outer region (I_D) on same scale as above. Blank if absent.
64	---	I1 (A1)	Inclination (i) of the principal plane estimated on a scale from 1 (face on) to 5 (edge on). Blank if absent.

SECTION 3 - TAPE CHARACTERISTICS

The information contained in Table 2 is sufficient for a user to describe the indigeneous characteristics of the machine-readable *MCG* to a computer. Information easily varied from installation to installation, such as block size (physical record length), blocking factor (number of logical records per physical record), total number of blocks, tape density, number of tracks, and internal coding (EBCDIC, ASCII, etc.) is not included. That information should always be transmitted if secondary copies are supplied to other users or installations.

Table 2. Tape Characteristics. *Morphological Catalogue of Galaxies.*

NUMBER OF FILES	1
LOGICAL RECORD LENGTH (BYTES)	64
RECORD FORMAT	FB*
TOTAL NUMBER OF LOGICAL RECORDS	29003

*Fixed block length (last block may be short)

SECTION 4 - REMARKS, MODIFICATIONS, ACKNOWLEDGMENTS, AND REFERENCES

The magnetic tape version of the MCG was received from Dr. Robert S. Dixon of the Ohio State University Radio Observatory on 7 December 1981. As received, the catalogue consisted of 28904 records of length 90 bytes. Each logical record contained a number giving the approximate sequential position of the object in the original published catalogue volumes, but the machine version was ordered by right ascension. Upon listing the data and scanning some records manually, enough errors were found such that it was deemed necessary to check the records more closely.

The catalogue was sorted by MCG number from north to south to obtain the published order. Further checking revealed many hundreds of records in the MCG-01 zone with MCG+01 in bytes 1-6. At this time it was decided to review the published version in order to compare certain data items in detail, e.g. the "a, b, ..." suffixes on MCG and NGC/IC numbers, the MCG and NGC/IC numbers themselves, and the number of galaxies in each region. A complete count of the number of objects in each region was performed manually by scanning the published volumes and adding suffixed records to the highest number in each region. (This procedure was complicated by the fact that while one region might have the sequence ..., 15, 16a, 16b, 17, ..., another has ..., 15, 16, 16a, 16b, 17, ...) Following some initial corrections and the addition of an uncertainty symbol (:) to NGC/IC identifications (in place of ? in the published catalogue) [since it is important to know about such uncertainties when using the catalogue for source identification] a computer program was written to make a count of the objects in each region, to count the total number of regions with at least one object, and to list all suffixed objects along the way (these had also been recorded during the manual count). The initial run on the partially corrected version gave 28950 objects in 824 occupied regions, while the manual count gave 29003 objects. A region-by-region count comparison revealed 26 regions with discrepant counts. The discrepancies were checked and individually resolved. Most corrections involved duplicate records and erroneous MCG numbers (two occupied regions were added due to the omission of MCG+10-01-001 and the correction of the MCG+05-40 records to MCG+05-41). The individual corrections found during the catalogue analysis are listed in Table 3. In addition to correcting the tabulated items, the following changes were made to the machine-readable version in order to make it more uniform, self-consistent, and storage efficient:

1. Many NGC and IC numbers were not right justified or were misaligned in the data field; these were corrected in 125 cases. The two bytes following the NGC/IC field were not uniform in content (asterisks were usually in the byte following the NGC/IC number, but sometimes not if an A or B were present; or sometimes the A, B, ... followed the NGC/IC number and the asterisk was in the next byte. Question marks (?) were present following two NGC numbers. The question marks were changed to colons and colons were added to 111 NGC/IC numbers as a result of the catalogue review. All components identifications (A, B, ...) were changed to lower case to agree with the published catalogue.

2. The presence of preceding zeroes on *NGC* and *IC* numbers was not consistent, so all preceding zeroes were deleted. Although not important for reading the data, the records would not sort properly if a sort were performed on *NGC* and *IC* numbers.

3. Approximately five hundred MCG-01 records having erroneous plus (+) signs were corrected.

4. The format was modified by deleting all unused bytes (except the one between degrees and minutes of declination) and removing the sequential numbers (which were not correct in many cases where *MCG* numbers were corrected, thereby moving the record location, and which are no longer needed because the catalogue is now in published order).

5. Following all corrections, the modified catalogue was resorted in *MCG* published order. If needed for possible source identifications by right ascension searches, the records can easily be sorted by RA.

Table 3. Individual Corrections to the *MCG*.

MCG	Datum	For	Read	Remarks
+12-11-023	NGC	3654		Delete number
+12-19-002				Delete duplicate record
+12-19-004				Delete duplicate record
+12-20-002				Delete duplicate record
+11-01-001				Delete duplicate record
+11-04-002				Delete duplicate record
+10-01-001				Add from Addenda, Part III
+10-03-001	MCG	+10-01-001	+10-03-001	
	α	00	01	
	δ	+5902	+5749	
	mag	13.68	18	
	d	15 x 10	2 x 1.5	
	D	50 x 40	5	
	I_d, I_D, i		161	
+10-23-065	NGC	6127	6127-/	
+09-13-029	NGC	2429	2429a	
+09-13-040	NGC	2429	2429b	
+09-14-006	NGC	2518	2518/	
+09-25-040	NGC	506	5906/	
+08-16-036	NGC	2686	2686a	
+08-16-037	NGC	2686	2686b	
+08-16-039	NGC	2687	2687b	
+08-23-022	D	4 x 1#5	4 x 1.5	
+08-27-003	NGC	2683	5683	
+08-27-032	NGC	2794	5794	
+08-27-034	MCG	+08-28-033	+08-28-034	Two records had 033
+08-32-001	MCG	+08-31-001	+08-32-001	
+08-34-009	MCG	+09-34-009	+08-34-009	
+07-05-024	NGC	846	846/	

Table 3. (continued)

MCG	Datum	For	Read	Remarks
+07-26-056				Add 4 missing records
to -059				
+07-28-018				Add 49 missing records
to -062				
+07-27-017	NGC	4067	4067/	
+07-34-060				Delete duplicate record
+06-05-090				Add missing record
+06-05-091	α	0206.95	0207.1	
+06-06-074				Delete duplicate record
+06-20-021	MCG	-06-20-021	+06-20-021	
+06-25-009				Delete duplicate record
+06-25-016	NGC	3545	3545a	
+06-25-017	NGC	3545	3545b	
+06-28-033	NGC	4711	3804 *	Change NGC to IC
+06-29-014	NGC	4912	4912/	
+06-32-002	NGC	5579	5579/	
+06-32-005	MCG	+06-32-055	+06-32-005	
+06-34-007	IC	4542a	4542b	
+06-49-039	NGC	7318	7318a	
+06-49-040	NGC	7318	7318a	Both records are "a"
+05-05-036	NGC	760	760/	
+05-07-016	NGC	978	978a	
+05-07-017	NGC	978	978b	
+05-21-014	NGC	2679	2679/	
+05-29-074	NGC	4310	4310/	
+05-30-066	NGC	4656	4656/	
+05-30-105a	MCG	+05-30-105	+05-30-105a	
+05-37-014	MCG			Delete duplicate record
+05-37-015	MCG			Delete duplicate record
+05-41-001	MCG	+05-40-001	+05-41-001	
+05-41-002	MCG	+05-40-002	+05-41-002	
+05-41-003	MCG	+05-40-003	+05-41-003	
+05-41-004	MCG	+05-40-004	+05-41-004	
+05-41-005	MCG	+05-40-005	+05-41-005	
+05-41-006	MCG	+05-40-006	+05-41-006	
+05-41-007	MCG	+05-40-007	+05-41-007	
+05-41-008	MCG	+05-40-008	+05-41-008	
+05-41-009	MCG	+05-40-009	+05-41-009	
+05-41-010	MCG	+05-40-010	+05-41-010	
+05-41-011	MCG	+05-40-011	+05-41-011	
+05-41-012	MCG	+05-40-012	+05-41-012	
+05-41-013	MCG	+05-40-013	+05-41-013	
+05-41-014	MCG	+05-40-014	+05-41-014	
+05-41-015	MCG	+05-40-015	+05-41-015	
+05-42-003	MCG	+05-40-003	+05-42-003	
+05-53-004	NGC	7303	7303/	

Table 3. (continued)

MCG	Datum	For	Read	Remarks
+04-01-030	NGC	8 9	8/	
+04-02-005	NGC	8283	82/	
+04-02-008	NGC	85a	85b	
+04-02-035	NGC	169A	169b	
+04-06-003 to -062				Add 60 missing records
+04-10-012				Delete duplicate record
+04-24-026	NGC	3189	3189/	
+04-28-057	MCG	+04-08-057	+04-28-057	
+04-38-005	NGC	6027	6027b	
+04-38-006	NGC	6027	6027a	
+04-38-007	NGC	6027	6027c	
+04-38-008	NGC	6027	6027A	
+04-38-009	NGC	6027	6027d	
+04-38-010	NGC	6027	6027e	
+04-44-003	NGC	6660	6660/	
+04-54-005	NGC	7436	7436a	
+04-54-006	NGC	7436	7436b	
+03-25-008	NGC	2933	2933/	
+03-32-016	NGC	4322	4322/	
+03-45-035	NGC	6467	6467/	
+03-46-012	NGC	6548	6548/	
+03-59-024	IC	7578	7578a	
+03-59-025	IC	7578	7578b	
+02-24-010	NGC	2874	2874/	
+02-33-014	IC	815	815a	
+02-33-015	IC	815	815b	
+02-34-018	NGC	5174	5174/	
+02-59-013	NGC	7559	7559a	
+02-59-014	NGC	7559	7559b	
+02-59-022	NGC	7594=	7594	
+01-28-010	NGC	3386	3386/	
+01-31-046	IC	3131	3131/	
+01-32-038	NGC	4342	4342/	
+01-32-043	IC	3265	3265/	
+01-33-024	NGC	4795	4795/	
+01-36-033	NGC	5535	5535/	
+01-39-014a	α	0515.1	1515.1	
+01-58-007				Delete duplicate record
+01-59-051a	MCG	+01-59-51A	+01-59-051a	
+00-03-001	MCG	+01-03-001	+00-03-001	
+00-03-003	MCG	-00-03-003	+03-03-003	
+00-04-142	NGC	547	547a	
+00-04-143	NGC	547	547b	
+00-25-032	NGC	3047	3047b	
+00-25-033	NGC	3047	3047a	

Table 3. (concluded)

MCG	Datum	For	Read	Remarks
+00-32-019	NGC	R80		Delete Reinmuth number
+00-60-058	NGC	7783	7783a	
+00-60-059	NGC	7783	7783b	
+00-60-060	NGC	7783	7783c	
-01-01-047	MCG	- 1-01-047	-01-01-047	
-01-01-062	NGC	61	61a	
-01-01-063	NGC	61	61b	
-01-03-002	IC	1575*	1575a*	
-01-03-003	IC	1575*	1575b*	
-01-05-041	MCG	+01-05-041	-01-05-041	
-01-07-002	NGC	8945	894/	
-01-50-002	I_d		1	Record from Addenda, Part II
	I_D		3	Remaining data previously present
	i		1	
-01-58-014	IC	5278	5278:*	Number in IC
-01-60-004	NGC	7694	7694/	
-02-03-063	NGC	341	341a	
-02-03-064	NGC	341	341b	
-02-007-004	[illegible]	-1200	-12 00	Alignment
-02-12-011	IC	369*	370*	
-02-12-031	IC	376	376/	
-02-28-013	NGC	3421	3421/	
-02-32-003	NGC	4279	4279/	
-03-05-003	MCG	-03-04-003	-03-05-003	
-03-05-009	MCG	-03-04-009	-03-05-009	
-03-08-048	NGC	1150	1150/	
-03-10-030				Add missing record
-03-26-028	NGC	3140	3140/	
-04-01-041	NGC	235	235a	
-04-01-042	NGC	235	235b	
-04-33-044				Delete duplicate record
-04-48-006	NGC	6907	6907/	

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REFERENCES

Bigay, J. 1951, *Ann. Astrophys.* 14, 319.

Dreyer, J. L. E. 1888, *New General Catalogue of Nebulae and Clusters of Stars, Mem. Roy. Astron. Soc.* 49, Part I (London: Royal Astronomical Society 1962, reprinted).

Dreyer, J. L. E. 1895, *Index Catalogue of Nebulae found in the Years 1888-1894, with Notes and Corrections to the New General Catalogue, Mem. Roy. Astron. Soc.* 51, 185 (London: Royal Astronomical Society 1962, reprinted).

Dreyer, J. L. E. 1908, *Second Index Catalogue of Nebulae and Clusters of Stars, containing Objects found in the years 1895-1907, with Notes and Corrections to the New General Catalogue and to the Index Catalogue for 1888-94, Mem. Roy. Astron. Soc.* 59, Part 2, 105 (London: Royal Astronomical Society 1962, reprinted).

Holmberg, E. 1937, *Ann. Obs. Lund.* No. 6.

Holmberg, E. 1958, *Lund. Medd.* 2, No. 136.

Humason, M. L., Mayall, N. U. and Sandage, A. R. 1956, *Astron. J.* 61, 97.

Pettit, E. 1954, *Astrophys. J.* 120, 413.

Reiz, A. 1941, *Ann Obs. Lund.* No. 9.

Vorontsov-Velyaminov, B. A. and Krasnogorskaya, A. A. 1962, *Morphological Catalogue of Galaxies, Part I, Catalogue of 7200 Galaxies from +90° to +45° Declination* (Moscow: Sternberg Institute 32).

Vorontsov-Velyaminov, B. A. and Arhipova, A. A. 1963, *Morphological Catalogue of Galaxies, Part III, Catalogue of 6740 Galaxies from +15° to -9° Declination* (Moscow: Sternberg Institute 33).

Vorontsov-Velyaminov, B. A. and Arhipova, A. A. 1964, *Morphological Catalogue of Galaxies, Part II, Catalogue of 9650 Galaxies from +45° to +15° Declination* (Moscow: Sternberg Institute 34).

Vorontsov-Velyaminov, B. A. and Arhipova, A. A. 1968, *Morphological Catalogue of Galaxies Part IV, Catalogue of 5410 Galaxies from -9° to -33° Declination* (Moscow: Sternberg Institute 38).

SECTION 5 - SAMPLE LISTING

The sample listing given on the following pages contains logical data records exactly as they are recorded on the tape. Groups of records from the beginning and end of the catalogue are illustrated. The beginning of each record and bytes within the record are indicated by the column heading index across the top of each page (digits read vertically).

LISTING OF RECORDS FROM TAPE FILE

TAPE FILE NAME: Morphol Cat Galaxies
RECORDS 1 TO 30
TAPE FILE 53
RECORD LENGTH 64 BYTES
INPUT VOLSER ADC007

COLUMN HEADING INDEX											
RECORD	1	MCG+15-01-001		0003.	+88 04 16.	2.	0.5	16.	13.	.352	
RECORD	2	MCG+15-01-002		0455.	+88 19 15.	1.5	1.	10.	4.	.252	
RECORD	3	MCG+15-01-003		0544.	+87 42. 16.	1.5	1.	6.5	3.	.164	
RECORD	4	MCG+15-01-004		0619.	+87 35 16.	1.		8.	1.	5454	
RECORD	5	MCG+15-01-005a*		0635.	+87 22 17.	0.3		5.	3.	.551	
RECORD	6	MCG+15-01-005b*		0635.	+87 22 18.			1.		43	
RECORD	7	MCG+15-01-006		0658.5	+87 52 17.	2.	1.	13.	4.	.562	
RECORD	8	MCG+15-01-007		0734.	+88 16 17.	0.5		6.	2.	5162	
RECORD	9	MCG+15-01-008		0917.	+89 15 16.	4.	1.5	8.	3.	.263	
RECORD	10	MCG+15-01-009		0933.5	+88 23 15.	0.5	0.3	20.	17.	.361	
RECORD	11	MCG+15-01-010		1130.	+89 22 16.	2.5	2.	11.	10.	.461	
RECORD	12	MCG+15-01-011	3172	1140.	+89 22 15.	3.		10.	6.	5251	
RECORD	13	MCG+15-01-012		1157.	+88 25 15.	4.5	2.5	6.	3.	.153	
RECORD	14	MCG+15-01-013		1250.	+88 04 16.	0.5		7.	7.	.153	
RECORD	15	MCG+15-01-014		1255.5	+87 35 17.	3.	1.5			365	
RECORD	16	MCG+15-01-015		1432.5	+87 23 17.	0.5		4.	2.	5162	
RECORD	17	MCG+15-01-016		1544.	+87 23. 17.	0.5	0.3	4.	2.	.143	
RECORD	18	MCG+15-01-017		1624.	+87 57 17.	1.6	1.3			1	
RECORD	19	MCG+15-01-018		1806.	+88 19. 16.	2.5	2.	4.5	2.	.363	
RECORD	20	MCG+15-01-019		1810.	+87 40 16.	2.5	2.	5.	3.	.162	
RECORD	21	MCG+15-01-020		1819.5	+87 44 17.	2.	1.5			1	
RECORD	22	MCG+15-01-021		1832.5	+87 48 16.			13.	1.	5465	
RECORD	23	MCG+15-01-022		1929.	+88 30 17.	1.5	1.	5.	2.	5562	
RECORD	24	MCG+15-01-023		1933.	+88 37 16.	1.		6.		461	
RECORD	25	MCG+15-01-024		1952.5	+87 09. 16.	1.3	0.5	6.		151	
RECORD	26	MCG+15-01-025		2010.	+88 27 16.	2.5	2.	4.		46	
RECORD	27	MCG+14-01-001		2251.	+82 39 14.	2.5	2.	24.	5.	.343	
RECORD	28	MCG+14-01-002		2306.	+86 30 17.	1.5		7.5	6.	5151	
RECORD	29	MCG+14-01-003		2307.	+86 29 16.	1.5		6.		151	
RECORD	30	MCG+14-01-004 *		2351.	+85 46 17.			9.	0.	5335	

L I S T I N G O F R E C O R D S F R O M T A P E F I L E

TAPE FILE NAME: Morphol Cat Galaxies
RECORDS 28974 TO 29003
TAPE FILE 53
RECORD LENGTH 64 BYTES
INPUT VOLSER ADC007

COLUMN HEADING INDEX														
RECORD	28974	MCG-05-56-004	*		2343.6	-28	24	15.			8.	2.	144
RECORD	28975	MCG-05-56-005	*5349	*2343.7		-28	17	15.			6.	2.	144
RECORD	28976	MCG-05-56-006			2344.1	-29	00	15.	1.5	1.5	6.	4.	152
RECORD	28977	MCG-05-56-007			2344.1	-29	22	15.	2.5	2.	4.	3.	15
RECORD	28978	MCG-05-56-008			2344.5	-29	27	15.			4.	1.	5133
RECORD	28979	MCG-05-56-009	5350	*2344.6		-28	15	15.			2.5	2.5	1
RECORD	28980	MCG-05-56-010	*5353	*2344.9		-28	24	14.	3.	?.			1
RECORD	28981	MCG-05-56-011	*5354	*2344.9		-28	25	15.	2.5	2.	6.	2.	14
RECORD	28982	MCG-05-56-012			2345.2	-27	46	15.	4.	2.	8.	3.	5153
RECORD	28983	MCG-05-56-013	*5358	*2345.3		-28	26	14.			12.	12.	14
RECORD	28984	MCG-05-56-014	*7755		2345.4	-30	49	11.	11.	11.	36.	30.	241
RECORD	28985	MCG-05-56-015			2345.4	-28	36	15.	2.5	2.	6.	5.	15
RECORD	28986	MCG-05-56-016	*		2345.9	-27	07	15.	3.	2.	4.	2.	143
RECORD	28987	MCG-05-56-017			2346.7	-30	33	15.	2.	2.	6.	4.	141
RECORD	28988	MCG-05-56-018			2346.7	-29	18	15.	4.	2.5	6.	4.	252
RECORD	28989	MCG-05-56-019			2347.4	-28	13	15.	3.	2.	12.	2.	135
RECORD	28990	MCG-05-56-020			2347.6	-29	25	15.	3.	1.5	11.	6.	162
RECORD	28991	MCG-05-56-021			2347.6	-29	17	15.	2.	2.	4.	4.	151
RECORD	28992	MCG-05-56-022			2348.2	-28	43	15.			4.	3.	131
RECORD	28993	MCG-05-56-023	5362	*2349.1		-28	39	14.	3.5	3.5			1
RECORD	28994	MCG-05-56-024			2349.4	-28	14	16.	4.	2.	6.	2.	143
RECORD	28995	MCG-05-56-025			2349.4	-28	12	15.	2.5	2.5	4.	4.	15
RECORD	28996	MCG-05-56-026			2349.6	-29	22	15.			3.	3.	11
RECORD	28997	MCG-05-56-027			2349.7	-29	44	15.	4.	2.	7.	2.	135
RECORD	28998	MCG-05-56-028			2349.8	-30	32	15.			4.	3.	121
RECORD	28999	MCG-05-56-029			2349.8	-29	18	15.	2.	2.	4.	4.	15
RECORD	29000	MCG-05-56-030			2349.9	-28	37	15.			7.	2.	135
RECORD	29001	MCG-05-56-031			2350.0	-30	28	15.	2.5	2.	9.	8.	151
RECORD	29002	MCG-05-56-032			2350.2	-28	51	15.	2.	2.			16
RECORD	29003	MCG-05-56-033			2350.8	-29	50	15.	2.5	2.	6.	4.	14