

**REFERENCE MANUAL**  
**TAPE DECK 5850**  
**ROCKETSONDE OBSERVATIONS**

**U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
ENVIRONMENTAL DATA SERVICE  
NATIONAL CLIMATIC CENTER  
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## INTRODUCTION

SOURCE HISTORY

Rocketry, as a means of gathering information from the atmosphere, has appealed to scientists since the earliest days of the study of the ocean of air in which we live. It was not until the late 1950's, however, that advancing technology permitted the establishment of a modest Rocket sounding program. Initially the Inter-Range Instrumentation Group (IRIG) coordinated the efforts of the various agencies involved. Currently, World Data Center A for Meteorology (WDC-A) acts as the collection agency and is charged with the responsibility of editing and publishing the soundings. Participating agencies include the U.S. Air Force, U.S. Army, U.S. Navy, U.S. Atomic Energy Commission, National Aeronautics and Space Administration, Foreign Countries, and Schellenger Research Labs. The taped data are retained and made available to researchers by the National Climatic Center, Environmental Data Service, National Oceanic and Atmospheric Administration of the Department of Commerce. The National Climatic Center is located in the Federal Building in Asheville, North Carolina. Users of this manual are referred to IRIG Document 111-64 for a detailed history of the Meteorological Rocket Network.

QUALITY CONTROL

Data for agency networks are forwarded to respective agency collection points where high speed computers are used to uniformly reduce and tape the observations. Each report contains the wind and temperature measurements along with computed values for pressure, density, and speed of sound. Although extensive machine and personnel quality controls were and are still applied, experience has shown that erroneous values still contaminate the file to some extent. As the state of the art has progressed, changes in observing and recording methods have necessitated many program modifications. Poor or improper documentation of measurement units is also a constant challenge to the programmer. IT IS RECOMMENDED THAT THE USER OF THESE TAPES INCLUDE A SUFFICIENT NUMBER OF PROGRAM STEPS TO ASSURE EXCLUSION OF GROSS DATA ERRORS.

TAPING PROCEDURES

Observations prior to 1969 were converted from tapes retained by the Data Processing Division of the Air Weather Service. Reduction and quality control of these data was the joint effort of a variety of civilian and governmental agencies. Beginning with the 1969 observations, responsibility for preparing observations was transferred to the National Climatic Center. At this time, changes were also made in the reduction techniques and reporting formats.

TAPE INFORMATION

The tapes are in card image format, blocked ten per tape record (800 characters). Each observation appears on tape by ascending card number. ie. for a given observation - card 00 followed by cards 01-19, followed by cards 20, followed by cards 30 etc. Within the card number groups, where applicable, levels are presented in order of descending height (highest level first). Observations are filed on 7 channel tape at a density of 556 bits per inch, in the BCD mode.

If an element was not reported, the entire field will be blank.

If an element was reported but excluded from the tape during the quality control processing, the entire field will contain 9's.

If one or more layers were missing, an interpolated altitude was inserted between two valid bounding layers with the word "missing" placed in tape positions 21-27.

THE MANUAL

This manual is designed to allow the general researcher to use the tapes without reference to other publications. It is, however, beyond the scope or intent of this manual to document in detail, the various instruments used or, attempt to describe the vagaries of observing and recording practices employed by the several agencies. Persons interested in these details are referred to the many published IRIG documents.

The manual is divided into sections to explain an observation in it's normal sequence on tape.

- Basic Information
- Questionable Data Layers
- Mobile Station Information
- ROCOB Sounding Levels
- Constant Pressure Levels
- Rawinsonde Levels

TAPE DECK		PAGE NO.
5850	ROCKETSONDE OBSERVATIONS	iii

STATION LIST

This list is intended to be used only as an indication of the stations from which Rocketsonde observations are or have been received. Current status of the taped data will be furnished upon request.

78861	Antigua, AAFB, BWI	17°09'N	061°47'W
08384	Arenosillo, Spain	37°06'N	006°44'W
61902	Ascension Island AFB	07°59'S	014°25'W
91162	Barking Sands, Kauai, Hawaii	22°02'N	159°47'W
23156	Beaumont, Calif.	33°56'N	116°56'W
74794	Cape Kennedy, Fla.	28°27'N	080°32'W
94300	Carnavon, W. Australia	24°53'S	113°40'E
72221	Eglin AFB, Fla.	30°23'N	086°42'W
78076	Eleuthera Island	25°16'N	076°19'W
91250	Eniwetok, M.I.	11°26'N	162°23'E
72913	Ft. Churchill, Canada	58°44'N	093°49'W
70266	Ft. Greely, Alaska	64°00'N	145°44'W
78783	Ft. Sherman, C.Z.	09°20'N	079°59'W
41350	Gan, Maldive Islands	00°41'S	073°09'E
78118	Grand Turk Island	21°26'N	071°09'W
72477	Green River, Utah	38°56'N	110°04'W
78954	Harp, Seawell, Barbados, WI	13°06'N	059°37'W
20046	Heiss Island, USSR	80°37'N	058°03'E
04794	Highwater Test Range, Canada	45°01'N	072°27'W
78016	Kindley AFB, Bermuda	32°21'N	064°39'W
91366	Kwajalein, M.I.	08°44'N	167°44'E
87689	Mar Chiquita, Argentina	37°45'S	057°25'W
89664	McMurdo Sound, Antarctica	77°53'S	166°44'E
82599	Natal, Brazil	05°55'N	035°10'W
74124	Primrose Lake, Canada	54°45'N	110°03'W
70027	Pt. Barrow, Alaska	71°21'N	156°59'W
72391	Pt Mugu, Calif.	34°07'N	119°07'W
72291	San Nicolas Island, Calif.	33°14'N	110°25'W
78089	San Salvador Island AAFB	24°07'N	074°27'W
00001	Ship Sierra		
87020	Tartagal, Argentina	22°46'S	063°49'W
04202	Thule, Greenland	76°33'N	068°49'W
43373	Thumba, India	08°30'N	076°52'W
72485	Tonopah Test Range, Nev.	38°00'N	116°30'W
47849	Uchinoura, Japan	31°15'N	131°05'E
72393	Vandenberg AFB, Calif.	34°40'N	120°36'W
72402	Wallops Island, Va.	37°50'N	075°29'W
03023	West Geirinish, Scotland	57°21'N	007°22'W
72269	White Sands Missile Range, N.M.	32°23'N	106°29'W
94659	Woomera, S. Australia	30°56'S	136°31'E
72280	Yuma Proving Ground, Ariz.	32°52'N	114°19'W
03156	Zurf, White Sands Missile Range, N.M.	33°46'N	106°36'W

BASIC OBSERVATIONAL DATA

STATION NUMBER	YR	MO	DY	TIME GMT	RAWIN TIME DIFF	WIND SEN	THER SEN	SPC		SPC		WND COR	TMP COR	QUESTIONABLE DATA LAYERS				
								A	O	B	O			WIND TOP	WIND BOTM	THER TOP	THER BOTM	
XXXXX	XX	XX	XX	XXXX	XXXX	XXX	XXX	XX	X	XX	X	XX	XX	XXXX	XXXX	XXXX	XXXX	
	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018

QUEST. DATA LYRS			RW		THERMO. BASE DATA			I
TP	SPEC TOP	SPEC BOTM	TP	RL	ALT	PRESS MB	TEMP	N D
XX	XXXX	XXXX	XX	XX	XXXX	XXX XX	XXX X	XX
019	020	021	022	023	024	025	026	027

<u>TAPE FIELD NUMBER</u>	<u>TAPE POSITIONS</u>	<u>ELEMENT</u>
001	01 - 05	STATION NUMBER
002	06 - 07	YEAR
003	08 - 09	MONTH
004	10 - 11	DAY
005	12 - 15	TIME OF OBSERVATION - GMT
006	16 - 19	RAWINSONDE TIME DIFFERENCE
007	20 - 22	WIND SENSOR CODE
008	23 - 25	THERMODYNAMIC SENSOR CODE
009	26 - 27	SPECIAL SENSOR "A" CODE
010	28	SPECIAL SENSOR "A" CORRECTION CODE
011	29 - 30	SPECIAL SENSOR "B" CODE
012	31	SPECIAL SENSOR "B" CORRECTION CODE
013	32 - 33	WIND CORRECTION METHOD
014	34 - 35	THERMODYNAMIC CORRECTION METHOD
015 - 016	36 - 43	QUESTIONABLE WIND LAYER
017 - 018	44 - 51	QUESTIONABLE THERMODYNAMIC LAYER
019 - 021	52 - 61	QUESTIONABLE SPECIAL SENSOR TYPE AND LAYER
022	62 - 63	RADIOSONDE TYPE
023	64 - 65	RAWINSONDE RELEASE POINT
024	66 - 69	THERMODYNAMIC BASE ALTITUDE
025	70 - 74	THERMODYNAMIC BASE PRESSURE
026	75 - 78	THERMODYNAMIC BASE TEMPERATURE
027	79 - 80	CARD INDICATOR

<u>TAPE FIELD NUMBER</u>	<u>ELEMENT</u>	<u>TAPE CONFIGURATION</u>	<u>CODE DEFINITION AND REMARKS</u>
001	STATION NUMBER	00001 - 99999	Identifying WMO or WBAN number
002	YEAR	57 - 99	Year of observation 1957 - 1999
003	MONTH	01 - 12	Month of the year  01 = January 02 = February etc.
004	DAY	01 - 31	Day of the month
005	TIME OF OBSERVATION - GMT	0000 - 2359	Observation time in hours and minutes GMT
006	RAWINSONDE TIME DIFFERENCE	+000 - +999 -000 - -999	Time difference between the Rocketsonde and Rawinsonde observation  +000 - +999 = Number of minutes the Rawinsonde is released after the Rocketsonde -000 - -999 = Number of minutes the Rawinsonde is released before the Rocketsonde
007	WIND SENSOR CODE	000 - 999 01- - 80-	Type of wind sensor used  000 = None 001 - 009 = Unassigned  <u>Chaff</u> 010 = Chaff 01- = Experimental 011 - 099 = Reserved  <u>Parachute</u> 100 = Unspecified 10- = Experimental 101 = 5 - 11 ft. diameter equiv. 102 = 12- 18 ft. diameter equiv. 103 = Equal to or greater than 19 ft. diameter equivalent 104 - 199 = Reserved  200 - 399 = Unassigned  <u>Sphere, Passive</u> 400 = Inflatable 40- = Inflatable, Experimental 401 - 449 = Reserved  <u>Sphere, Instrumented</u> 450 = Inflatable 45- = Inflatable, Experimental 451 - 499 = Reserved  <u>Sphere, Instrumented</u> 500 = Solid 50- = Solid, Experimental 501 - 549 = Reserved

TAPE DECK	ROCKETSONDE OBSERVATIONS	PAGE NO.
5850		BASIC - 3

TAPE FIELD NUMBER	ELEMENT	TAPE CONFIGURATION	CODE DEFINITION AND REMARKS
007	WIND SENSOR CODE (CONT'D)	000 - 999 01- - 80-	<p>Type of wind sensor used</p> <p><u>Grenade</u> 550 = Unspecified 55- = Experimental 551 - 599 = Reserved</p> <p><u>Starute</u> 600 = Unspecified 60- = Experimental 601 - 699 = Reserved</p> <p><u>Chemical Trail</u> 700 = Unspecified 70- = Experimental 701 - 799 = Reserved</p> <p><u>Remote Sensing</u> 800 = Unspecified 80- = Experimental 801 - 899 = Reserved</p> <p>900 = Unassigned</p> <p><u>Previous Instruments</u> 901 = Chaff 902 = Parachute 903 = Chaff and Chute 904 = Sphere (Inflatable) 905 = Sphere (Accelerometer) 906 = Grenade 907 = Balloon Parachute 908 = Chemical Trail 909 = Ram Air Decelerator</p> <p>910 - 999 = Unassigned</p>
008	THERMODYNAMIC SENSOR CODE	000 - 999 01- - 80-	<p>Type of thermodynamic sensor used</p> <p><u>Sondes</u> 000 = None 001 - 009 = Unassigned 01- = Arcasonde experimental 010 = Arcasonde 1A, thin film mount, 10 mil. (BT) 011 = Arcasonde 1A, long wire mount, 10 mil. (BT) 012 = Arcasonde 1/4 (BT) 013 - 019 = Reserved</p> <p>02- = WOX1A and WOX1/4 experimental 020 = WOX1A 10 mil. (BT) 021 = WOX1/4 10 mil. (BT) 022 - 029 = Reserved</p> <p>03- = STS experimental (BT) 030 = Unassigned 031 = STS 10 mil. (BT) 032 - 039 = Reserved</p> <p>04- = MK-1 and MK-2 experimental (RW) 040 = MK-1 (RW) 041 = MK-2 (RW) 042 - 044 = Unassigned 045 = IT spiral wound tungsten (RW) 046 - 049 = Reserved</p>

TAPE DECK 5850	ROCKETSONDE OBSERVATIONS		PAGE NO. BASIC - 4
<u>TAPE FIELD NUMBER</u>	<u>ELEMENT</u>	<u>TAPE CONFIGURATION</u>	<u>CODE DEFINITION AND REMARKS</u>
008	THERMODYNAMIC SENSOR CODE (CONT'D)	000 - 999 01 - - 80-	Type of thermodynamic sensor used
			05- = AN/DMQ-9 experimental (BT) 050 = AN/DMQ-9 thin film mount 10 mil. (BT) 051 = AN/DMQ-9 long wire mount 10 mil. (BT) 052 - 059 = Reserved 06- = Datasonde experimental 060 = Datasonde loop thin film mount 10 mil. (BT) 061 = Datasonde long lead wire 10 mil. (BT) 062 - 069 = Reserved 07- = Echosonde ES 64-B experimental (RW) 070 = Echosonde ES 64-B (RW) 071 - 079 = Reserved 080 - 398 = Unassigned 399 = Experimental sondes other than those listed above
			<u>Sphere, Passive</u> 400 = Inflatable 40- = Inflatable experimental 401 - 449 = Reserved
			<u>Sphere, Instrumented</u> 450 = Inflatable 45- = Inflatable experimental 451 - 499 = Reserved
			<u>Sphere, Instrumented</u> 500 = Solid 50- = Solid experimental 501 - 549 = Reserved
			550 = Grenade 55- = Grenade experimental 551 - 599 = Reserved
			600 = Density gauge 60- = Density gauge experimental 601 - 649 = Reserved
			650 = Pressure gauge 65- = Pressure gauge experimental 651 - 699 = Reserved
			700 = Spinning wire densitometer 70- = Spinning wire densitometer experimental 701 - 799 = Reserved
			800 = Remote sensing 80- = Remote sensing experimental 801 - 899 = Reserved
			900 - 999 = Unassigned
			<u>Previous Instruments</u> 900 = Delta 901 = DMQ-6 902 = Gamma 903 = Borg Warner 904 = Gamma II



TAPE DECK		ROCKETSONDE OBSERVATIONS		PAGE NO.
5850				BASIC - 5
TAPE FIELD NUMBER	ELEMENT	TAPE CONFIGURATION	CODE DEFINITION AND REMARKS	
008	THERMODYNAMIC SENSOR CODE (CONT'D)	000 - 999 01- - 80-	Type of thermodynamic sensor used	
			905 = Hasp (Instrumented)	
			906 = PMR II	
			907 = Sphere (Inflatable)	
			908 = Sphere (Accelerometer)	
			909 = Grenade	
			910 = Resistance Wire	
			911 = Metrosonde	
			912 = Servo-Mech Sonde (SM-1)	
			913 = Arcasonde II-A	
			914 = Arcasonde II	
			915 = Delta (TF)	
			916 = Mini Loki (STS M.L.)	
			917 = Solid State Arcasonde	
			918 = Experimental	
			919 - 999 = Unassigned	
009	SPECIAL SENSOR "A" CODE	00 - 99	Type of sensor used	<u>UNITS</u>
011	SPECIAL SENSOR "B" CODE		00 = Not applicable	
019	QUESTIONABLE SPECIAL SENSOR TYPE		01 = Ozone	Micro-mb
			02 = O/O <sub>2</sub> Ratio	Non dimensional
			03 = Water vapor	
			04 = CO <sub>2</sub>	
			05 = NLC	Lbs/cm <sup>3</sup>
			06 = Electron density	E/cm <sup>3</sup>
			07 = Electron temperature	°K
			08 = Ion density	I/cm <sup>3</sup>
			09 = Positive ion temp.	°K
			10-99 = Unassigned	
010	SPECIAL SENSOR "A" CORRECTION CODE	0 - 9	Type of correction used	
012	SPECIAL SENSOR "B" CORRECTION CODE		0 = Not used	
			1 = Original as proposed by developer	
			2 = Second, on list for specific instrument	
			3 = Third, on list for specific instrument	
			etc.	
013	WIND CORRECTION METHOD	00 - 99	Type of wind correction method used	
			00 = Not applicable	
			01 = Eddy	
			02 = Malet	
			03 - 99 = Unassigned	
014	THERMODYNAMIC CORRECTION METHOD	00 - 99	Type of thermodynamic correction used	
			00 = Not applicable	
			01 = Wagner	
			02 = Henry, IRIG MWG, 1968 (Arcasonde 1A)	
			03 = Rubio and Ballard, STS	
			04 = Rubio and Ballard, (Arcasonde 1A)	
			05 = Drews (Arcasonde 1A)	
			06 = NOL White Oak	
			07 - 99 = Unassigned	
015	QUESTIONABLE WIND LAYER (TOP)	0000 - 9999	The bounding altitudes of a layer of	
016	QUESTIONABLE WIND LAYER (BOTTOM)		questionable wind in hundreds of geometric meters	

<u>TAPE FIELD NUMBER</u>	<u>ELEMENT</u>	<u>TAPE CONFIGURATION</u>	<u>CODE DEFINITION AND REMARKS</u>
017 018	QUESTIONABLE THERMODYNAMIC LAYER (TOP) QUESTIONABLE THERMODYNAMIC LAYER (BOT)	0000 - 9999	The bounding altitudes of a layer of questionable thermodynamics in hundreds of geometric meters
020 021	QUESTIONABLE SPECIAL SENSOR LAYER(TOP) QUESTIONABLE SPECIAL SENSOR LAYER(BOT)	0000 - 9999	The bounding altitudes of a layer of questionable special sensor data in hundreds of geometric meters
022	RADIOSONDE TYPE	01 - 22	<p>Type of Radiosonde instrument used</p> <p>01 = USA NOAA external thermistor            02 = USA NOAA double-duct            03 = Bendix-Friez duct type            04 = USA Military AN/AMT-4            05 = USA Military AN/AMT-12 (incl. A &amp; B)            06 = USA AN/AMQ-9            07 = Unassigned            08 = Canadian model IV            09 = German Democratic Rep. Freiberg            10 = German Federal Rep. Graw            11 = Indian chronometric            12 = Indian fan            13 = Japanese code sending            14 = British Kew            15 = French Metox            16 = Czechoslovakian Metra            17 = Pakistani            18 = Swiss modified            19 = USSR a-22-III (IV)            20 = Finnish Vaisala RS-12            21 = Finnish Vaisala RS-13            22 = Finnish Vaisala RS-14</p> <p>Note: Many of these instruments are used in other than the country of origin</p>
023	RAWINSONDE OBSERVATION RELEASE POINT	00 - 99	<p>Direction and distance of the Rawinsonde release point from the Rocket launch point.</p> <p>High order position = direction            Low order position = distance</p> <p>00 = Rawinsonde release point equal to or less than one kilometer</p> <p><u>Direction in Degrees and Tenths</u>            1 = 022.6 - 067.5            2 = 067.6 - 112.5            3 = 112.6 - 157.5            4 = 157.6 - 202.5            5 = 202.6 - 247.5            6 = 247.6 - 292.5            7 = 292.6 - 337.5            8 = 337.6 - 022.5</p> <p><u>Distance in Kilometers and Tenths</u>            1 = 01.1 - 05.0            2 = 05.1 - 10.0            3 = 10.1 - 20.0            4 = 20.1 - 30.0            5 = 30.1 - 40.0            6 = 40.1 - 50.0            7 = 50.1 - 75.0            8 = 75.1 - 100.0            9 = More than 100</p>

TAPE DECK 5850	ROCKETSONDE OBSERVATIONS	PAGE NO. BASIC - 7
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<u>TAPE FIELD NUMBER</u>	<u>ELEMENT</u>	<u>TAPE CONFIGURATION</u>	<u>CODE DEFINITION AND REMARKS</u>
024	THERMODYNAMIC BASE DATA ALTITUDE	0000 - 9999	Altitude of the base data used in computations of equation of state or hydrostatic equation for Rocketsonde observations - in geopotential decameters
025	THERMODYNAMIC BASE DATA PRESSURE	00000 - 99999	Pressure of the base data used in computations of equation of state or hydrostatic equation for Rocketsonde observations - in millibars and hundredths
026	THERMODYNAMIC BASE DATA TEMPERATURE	+000 - +999 -000 - -999	Temperature of the base data used in computations of equation of state or hydrostatic equation for Rocketsonde observations - in degrees Celsius and tenths  The high order position contains either a + or - sign
027	CARD INDICATOR	00	Basic data identification. This field is always 00 for the header card

QUESTIONABLE OBSERVATIONAL DATA

STATION NUMBER	YR	MO	DY	TIME GMT	BLANK	QUESTIONABLE DATA LAYERS				
						WIND TOP	WIND BOTM	THER TOP	THER BOTM	
XXXXX	XX	XX	XX	XXXX	XXXXXXXXXXXXXXXXXXXX	XXX	XXX	XXX	XXX	
001	002	003	004	005		006	007	008	009	010

QUEST. DATA LYRS			BLANK	I N D
TP	SPEC TOP	SPEC BOTM		
XX	XXX	XXX	XXXXXXXXXXXXXXXXXX	XX
011	012	013		014 015

<u>TAPE FIELD NUMBER</u>	<u>TAPE POSITION</u>	<u>ELEMENT</u>
001	01 - 05	STATION NUMBER
002	06 - 07	YEAR
003	08 - 09	MONTH
004	10 - 11	DAY
005	12 - 15	TIME OF OBSERVATION - GMT
006	16 - 35	BLANK
007 - 008	36 - 43	QUESTIONABLE WIND LAYER
009 - 010	44 - 51	QUESTIONABLE THERMODYNAMIC LAYER
011 - 013	52 - 61	QUESTIONABLE SPECIAL SENSOR TYPE AND LAYER
014	62 - 78	BLANK
015	79 - 80	CARD INDICATOR

TAPE DECK	ROCKETSONDE OBSERVATIONS	PAGE NO.
5850		QUEST - 2

<u>TAPE FIELD NUMBER</u>	<u>ELEMENT</u>	<u>TAPE CONFIGURATION</u>	<u>CODE DEFINITION AND REMARKS</u>
001 - 005	IDENTIFICATION		Refer to BASIC OBSERVATIONAL DATA section
007 - 013	QUESTIONABLE DATA LAYERS		Refer to BASIC OBSERVATIONAL DATA section
015	CARD INDICATOR	01 - 19	Questionable layer card identification. Up to 19 cards may be included in this section

MOBILE RAWINSONDE STATION OBSERVATIONAL DATA

STATION NUMBER	YR	MO	DY	TIME GMT	LAT	LONG	BLANK
XXXXX	XX	XX	XX	XXXX	XXXX	XXXXX	XX

001    002    003    004            005    006            007

BLANK	I N D
XXXXXXXX	XX

008    009

<u>TAPE</u> <u>FIELD NUMBER</u>	<u>TAPE</u> <u>POSITION</u>	<u>ELEMENT</u>
001	01 - 05	STATION NUMBER
002	06 - 07	YEAR
003	08 - 09	MONTH
004	10 - 11	DAY
005	12 - 15	TIME OF OBSERVATION - GMT
006	16 - 19	LATITUDE
007	20 - 24	LONGITUDE
008	25 - 78	BLANK
009	79 - 80	CARD INDICATOR

TAPE DECK	ROCKETSONDE OBSERVATIONS	PAGE NO.
5850		MOBILE - 2

<u>TAPE FIELD NUMBER</u>	<u>ELEMENT</u>	<u>TAPE CONFIGURATION</u>	<u>CODE DEFINITION AND REMARKS</u>
001 - 005	IDENTIFICATION		Refer to BASIC OBSERVATIONAL DATA section
006	LATITUDE	000N - 900N 000S - 900S	Latitude of Mobile Rawinsonde station in degrees and tenths with North or South indicated alphanumerically in the low order position
007	LONGITUDE	0000W - 1800W 0000E - 1800E	Longitude of Mobile Rawinsonde station in degrees and tenths with East or West indicated alphanumerically in the low order position
009	CARD INDICATOR	20	Mobile Rawinsonde station card identification. This field always 20 for Mobile station card

ROCKETSONDE OBSERVATIONAL DATA

STATION NUMBER	YR	MO	DY	TIME GMT	ALTTT	WIND				FALL VEL	TEMP	TMP COR	
						PLR DIR	PLR SPD	N - S COMP	E - W COMP				N - S CORR
XXXXX	XX	XX	XX	XXXX	XXXXX	XXX	XXX	XXXX	XXXX	XXXX	XXX	XXXX	XXX

001    002    003    004    005    006    007    008    009    010    011    012    013    014    015

PRESSURE	DENSITY	SPD SND	SPL SEN A	SPL SEN B	B L K	IND
X.XXX+X	X.XXX+X	XXX	XXX	XXXX	XX	XX

016                    017    018    019    020    021    022

<u>TAPE FIELD NUMBER</u>	<u>TAPE POSITION</u>	<u>ELEMENT</u>
001	01 - 05	STATION NUMBER
002	06 - 07	YEAR
003	08 - 09	MONTH
004	10 - 11	DAY
005	12 - 15	TIME OF OBSERVATION - GMT
006	16 - 20	ALTITUDE
007	21 - 23	POLAR WIND DIRECTION
008	24 - 26	POLAR WIND SPEED
009	27 - 30	NORTH - SOUTH WIND COMPONENT
010	31 - 34	EAST - WEST WIND COMPONENT
011	35 - 38	NORTH - SOUTH CORRECTED WIND COMPONENT
012	39 - 42	EAST - WEST CORRECTED WIND COMPONENT
013	43 - 45	FALL VELOCITY
014	46 - 49	TEMPERATURE
015	50 - 52	TEMPERATURE CORRECTION
016	53 - 59	PRESSURE
017	60 - 66	DENSITY
018	67 - 69	SPEED OF SOUND
019	70 - 72	SPECIAL SENSOR "A" DATA
020	73 - 76	SPECIAL SENSOR "B" DATA
021	77 - 78	BLANK
022	79 - 80	CARD INDICATOR



TAPE DECK	ROCKETSONDE OBSERVATIONS	PAGE NO.
5850		ROCOB - 2

<u>TAPE FIELD NUMBER</u>	<u>ELEMENT</u>	<u>TAPE CONFIGURATION</u>	<u>CODE DEFINITION AND REMARKS</u>
001 - 005	IDENTIFICATION		Refer to BASIC OBSERVATIONAL DATA section
006	ALTITUDE	00000 - 99999	Altitude of the level in geometric decameters corrected for the earth's curvature
007	POLAR WIND DIRECTION	000 - 360	Wind direction in whole degrees with respect to true North. Whenever tape fields 011 and 012 are entered, the polar wind is a corrected wind also
008	POLAR WIND SPEED	000 - 999	Wind speed in whole meters per second. Whenever tape fields 011 and 012 are entered, the polar wind is a corrected wind also
009	NORTH - SOUTH WIND COMPONENT	-000 - -999 b000 - b999	Magnitude of the North- South component wind in whole meters per second  North = - in high order position South = b in high order position (b = blank)
010	EAST - WEST WIND COMPONENT	-000 - -999 b000 - b999	Magnitude of the East - West component wind in whole meters per second  East = - in high order position West = b in high order position (b = blank)
011	NORTH - SOUTH CORRECTED WIND COMPONENT	-000 - -999 b000 - b999	Wind components corrected by the method specified in Field 013 of the BASIC OBSERVATIONAL DATA section. These fields used by sites with digital computer capability. Notations are the same as those for non-corrected wind components (Fields 009 - 010)
012	EAST - WEST CORRECTED WIND COMPONENT		
013	FALL VELOCITY	000 - 999	Velocity at which the parachute, instrument package, etc. is falling in whole meters per second
014	TEMPERATURE	b000 - b099 -001 - -999	Temperature of the level in whole degrees Celsius  b000 - b099 = +00°C to +99°C -001 - -999 = -01°C to -999°C
015	TEMPERATURE CORRECTION	b00 - b99 -01 - -99	Corrections that were applied to the measured temperatures in whole degrees Celsius  b00 - b99 = +00°C to +99°C -01 - -99 = -01°C to -99°C  When the values in Field 014 are corrected temperatures, Field 015 should contain the amount of correction applied

TAPE FIELD NUMBER	ELEMENT	TAPE CONFIGURATION	CODE DEFINITION AND REMARKS
016	PRESSURE	0.000+0 - 9.999+9 0.000-0 - 9.999-9	<p>Pressure in millibars with a signed exponent. The decimal point and exponent sign will always appear in the positions indicated</p> <p style="text-align: center;"><u>Examples</u></p> <p style="text-align: center;">4.564-1 = 0.4564 millibars 4.564+0 = 4.564 millibars 4.564+1 = 45.64 millibars</p> <p>This Field should always contain four significant figures of pressure plus the decimal point and exponent sign</p>
017	DENSITY	0.000+0 - 9.999+9 0.000-0 - 9.999-9	<p>Density in grams per cubic meter with a signed exponent. The decimal point and exponent sign will always appear in the positions indicated</p> <p style="text-align: center;"><u>Examples</u></p> <p style="text-align: center;">5.092-2 = 0.05092 gm/m<sup>3</sup> 5.092+0 = 5.092 gm/m<sup>3</sup> 5.092+1 = 50.92 gm/m<sup>3</sup></p>
018	SPEED OF SOUND	000 - 999	<p>Speed of sound in whole meters per second</p> <p>Either these values were entered from a table presenting speed of sound in dry air as a function of temperature, according to classical theory or were computed when table limits were exceeded</p>
019	SPECIAL SENSOR DATA "A"	bbb	Blank - reserved for future use
020	SPECIAL SENSOR DATA "B"	bbbb	Blank - reserved for future use
021	BLANK		
022	CARD INDICATOR	30	Rocketsonde sounding data indicator. Levels are on tape in descending order, the highest attained altitude being first.

CONSTANT PRESSURE OBSERVATIONAL DATA

STATION NUMBER	YR	MO	DY	TIME GMT	ALTTT	WIND						BLNK	TEMP	TMP COR
						PLR DIR	PLR SPD	N - S COMP	E - W COMP	N - S CORR	E - W CORR			
XXXXX	XX	XX	XX	XXXX	XXXXX	XXX	XXX	XXXX	XXXX	XXXX	XXXX	XXX	XXXX	XXX
001	002	003	004	005	006	007	008	009	010	011	012	013	014	015

PRESSURE	DENSITY	SPD SND	SPL SEN A	SPL SEN B	B L K	IND
X.XXX+X	X.XXX+X	XXX	XXX	XXXX	XX	XX
016	017	018	019	020	021	022

<u>TAPE FILED NUMBER</u>	<u>TAPE POSITION</u>	<u>ELEMENT</u>
001	01 - 05	STATION NUMBER
002	06 - 07	YEAR
003	08 - 09	MONTH
004	10 - 11	DAY
005	12 - 15	TIME OF OBSERVATION - GMT
006	16 - 20	ALTITUDE
007	21 - 23	POLAR WIND DIRECTION
008	24 - 26	POLAR WIND SPEED
009	27 - 30	NORTH - SOUTH WIND COMPONENT
010	31 - 34	EAST - WEST WIND COMPONENT
011	35 - 38	NORTH - SOUTH CORRECTED WIND COMPONENT
012	39 - 42	EAST - WEST CORRECTED WIND COMPONENT
013	43 - 45	BLANK
014	46 - 49	TEMPERATURE
015	50 - 52	TEMPERATURE CORRECTION
016	53 - 59	PRESSURE
017	60 - 66	DENSITY
018	67 - 69	SPEED OF SOUND
019	70 - 72	SPECIAL SENSOR "A" DATA
020	73 - 76	SPECIAL SENSOR "B" DATA
021	77 - 78	BLANK
022	79 - 80	CARD INDICATOR

<u>TAPE FIELD NUMBER</u>	<u>ELEMENT</u>	<u>TAPE CONFIGURATION</u>	<u>CODE DEFINITION AND REMARKS</u>
001 - 005	IDENTIFICATION		Refer to BASIC OBSERVATIONAL DATA section
006	ALTITUDE	00000 - 99999	Altitude of the constant pressure level in geopotential decameters
007	POLAR WIND DIRECTION	000 - 360	Wind direction in whole degrees with respect to true North. Whenever tape fields 011 and 012 are entered, the polar wind is a corrected wind also
008	POLAR WIND SPEED	000 - 999	Wind speed in whole meters per second. Whenever tape fields 011 and 012 are entered, the polar wind is a corrected wind also
009	NORTH - SOUTH WIND COMPONENT	-000 - -999 b000 - b999	Magnitude of the North - South component wind in whole meters per second  North = - in high order position South = b in high order position (b = blank)
010	EAST - WEST WIND COMPONENT	-000 - -999 b000 - b999	Magnitude of the East - West component wind in whole meters per second  East = - in high order position West = b in high order position (b = blank)
011	NORTH - SOUTH CORRECTED WIND COMPONENT	-000 - -999 b000 - b999	Wind components corrected by the method specified in Field 013 of the BASIC OBSERVATIONAL DATA section. These fields used by sites with digital computer capability. Notations are the same as those for non-corrected wind components (Fields 009 - 010)
012	EAST - WEST CORRECTED WIND COMPONENT		
013	BLANK	bbb	Blank. Not used in this section
014	TEMPERATURE	b000 - b099 -001 - -999	Temperature of the level in whole degrees Celsius  b000 - b099 = +00°C to +99°C -001 - -999 = -01°C to -999°C
015	TEMPERATURE CORRECTION	b00 - b99 -01 - -99	Corrections that were applied to the measured temperatures in whole degrees Celsius  b00 - b99 = +00°C to +99°C -01 - -99 = -01°C to -99°C  When the values in Field 014 are corrected temperatures, Field 015 should contain the amount of correction applied

<u>TAPE FIELD NUMBER</u>	<u>ELEMENT</u>	<u>TAPE CONFIGURATION</u>	<u>CODE DEFINITION AND REMARKS</u>
016	PRESSURE	0.000+0 - 9.999+9 0.000-0 - 9.999-9	<p>Pressure in millibars with a signed exponent. The decimal point and exponent sign will always appear in the positions indicated. When available, the following levels will be reported:</p> <p style="margin-left: 40px;"> 4.000-1 = .4 millibars  7.000-1 = .7 "  1.000+0 = 1.0 "  2.000+0 = 2.0 "  3.000+0 = 3.0 "  5.000+0 = 5.0 "  7.000+0 = 7.0 "  1.000+1 = 10.0 "  2.000+1 = 20.0 "  3.000+1 = 30.0 "  5.000+1 = 50.0 " </p>
017	DENSITY	0.000+0 - 9.999+9 0.000-0 - 9.999-9	<p>Density in grams per cubic meter with a signed exponent. The decimal point and exponent sign will always appear in the positions indicated</p> <p style="margin-left: 40px;"><u>Examples</u></p> <p style="margin-left: 40px;"> 5.092-2 = 0.05092 gm/m<sup>3</sup>  5.092+0 = 5.092 gm/m<sup>3</sup>  5.092+1 = 50.92 gm/m<sup>3</sup> </p>
018	SPEED OF SOUND	000 - 999	<p>Speed of sound in whole meters per second</p> <p style="margin-left: 40px;">Below 90 Km these values may have been entered from a table presenting speed of sound in dry air as a function of temperature according to classical theory</p>
019	SPECIAL SENSOR "A" DATA	bbb	Blank. Reserved for future use
020	SPECIAL SENSOR "B" DATA	bbbb	Blank. Reserved for future use
021	BLANK	bb	Blank. Reserved for future use
022	CARD INDICATOR	40	Indicates constant pressure data. Levels are on tape in descending order, the least pressure being first

RAWINSONDE OBSERVATIONAL DATA

STATION NUMBER	YR	MO	DY	TIME GMT	ALTIT	WIND				BLANKS	TEMP	B L K	
						PLR DIR	PLR SPD	N - S COMP	E - W COMP				
XXXXX	XX	XX	XX	XXXX	XXXXX	XXX	XXX	XXXX	XXXX	XXXXXXXXXXXX	XXXX	XXX	
	001	002	003	004	005	006	007	008	009	010	011	012	013

PRESSURE	BLANKS	IND
X.XXX <sup>7</sup> X	XXXXXXXXXXXXXXXXXXXX	XX
	014	015
		016

<u>TAPE FIELD NUMBER</u>	<u>TAPE POSITION</u>	<u>ELEMENT</u>
001	01 - 05	STATION NUMBER
002	06 - 07	YEAR
003	08 - 09	MONTH
004	10 - 11	DAY
005	12 - 15	TIME OF OBSERVATION - GMT
006	16 - 20	ALTITUDE
007	21 - 23	POLAR WIND DIRECTION
008	24 - 26	POLAR WIND SPEED
009	27 - 30	NORTH - SOUTH WIND COMPONENT
010	31 - 34	EAST - WEST WIND COMPONENT
011	35 - 45	BLANK
012	46 - 49	TEMPERATURE
013	50 - 52	BLANK
014	53 - 59	PRESSURE
015	60 - 78	BLANK
016	79 - 80	CARD INDICATOR

<u>TAPE FIELD NUMBER</u>	<u>ELEMENT</u>	<u>TAPE CONFIGURATION</u>	<u>CODE DEFINITION AND REMARKS</u>
001 - 005	IDENTIFICATION		Refer to BASIC OBSERVATIONAL DATA section
006	ALTITUDE	00000 - 99999	Altitude of the level in geopotential decameters
007	POLAR WIND DIRECTION	000 - 360	Wind direction in whole degrees with respect to true North
008	POLAR WIND SPEED	000 - 999	Wind speed in whole meters per second
009	NORTH - SOUTH WIND COMPONENT	-000 - -999 b000 - b999	Magnitude of the North - South component wind in whole meters per second  North = - in high order position South = b in high order position (b = blank)
010	EAST - WEST WIND COMPONENT	-000 - -999 b000 - b999	Magnitude of the East - West component wind in whole meters per second East = - in high order position West = b in high order position (b = blank)
011	BLANK		
012	TEMPERATURE	b000 - b999 -001 - -999	Temperature in degrees Celsius and tenths  b000 - b099 = +00.0°C to +99.9°C -001 - -999 = -00.1°C to -99.9°C
013	BLANK		
014	PRESSURE	0.000+0 - 9.999+9 0.000-0 - 9.999-9	Pressure in millibars with a signed exponent. The decimal point and exponent sign will always appear the the positions indicated. Pressures less than 1000 mb are reported to tenths of a millibar  <u>Examples</u> 1.000+3 = 1000 millibars 8.523+2 = 852.3 millibars
015	BLANK		
016	CARD INDICATOR	50	50 indicates that Rawinsonde data are present. Levels are on tape in descending order, the least pressure being first