APPENDIX C - Section 2

METEOROLOGICAL PROGRAM CODES

Table C2-1. Projection Indicator (PI) Set Codes

NOTES:

1. Projection reference latitudes are 60N for Northern Hemisphere polar stereographic and 22.5N and 22.5S for Mercator.

2. Projection (polar stereographic, Mercator), Longitude X (except Mercator), and ASCII Descriptor for the LAWC PI Set Codes will be determined by mutual agreement between the exchanging agencies controlling the weather information systems involved in the data exchange.

3. The following linear size ratios apply for polar stereographic;

Hemispheric = 6:1
Continental/Oceanic = 3:1
Regional Window = 2:1
Subwindow = 1:1

4. The following linear size ratios apply for Mercator:

Tropical Continental/Ocean = 3:1
Regional Window = 2:1
Subwindow = 1:1

5. Lower left corner points are in units of the USAF AFGWC whole mesh Satellite Global Data Base (SGDB) grid. The area coverage of the hemispheric projections are always 49 x 49 whole mesh SGDB grid points. The Continental/Ocean are always 25 x 25. The Regional are always 17 x 17. The Subwindows are 9 x 9. The SGDB grid point values can be converted to NMC and FNOC whole mesh grid point values.

PI SET CODE	DESCRIPTION	PROJECTION	LONG X	LOWER CORNER ROW	LEFT POINT COLUMN	ASCII DES-CRIPTOR
00	No Background					
1	N. Hemisphere US	Polar Stereographic	80W	9	57	XW
2	N. Hemisphere Europe	Polar Stereographic	10E	57	57	XN

3	N. Hemisphere Pacific	Polar Stereographic	170W	9	9	XP
4	N. Hemisphere Asia	Polar Stereographic	100E	57	9	XE
5	S. Hemisphere	Polar Stereographic	100E	9	57	XS
6 - 9 (Not Assigned)						
10	Cont/Ocean N. America	Polar Stereographic	80W	17	57	NA
11	Cont/Ocean Atlantic (US)	Polar Stereographic	80W	29	53	NT
12	Cont/Ocean Atlantic (Europe)	Polar Stereographic	10E	53	53	EW
13	Cont/Ocean Eurasia	Polar Stereographic	10E	57	36	AS
14	Cont/Ocean N.W. Pacific	Polar Stereographic	170W	9	9	PQ
15	Cont/Ocean N.E. Pacific	Polar Stereographic	170W	9	25	PN
16	Cont/Ocean Far East	Polar Stereographic	100E	33	9	FE
17 - 30 (Not Assigned)						
31	Regional Window Caribbean	Mercator		69	19	CA
32	Regional Window Tropical Hawaiian Islands	Mercator		47	19	TR
33	Regional Window Marianas	Mercator		31	19	MY
34	Regional Window S.E. Asia	Mercator		25	19	ID
35 - 39 (Not Assigned)						
40	Regional Window CONUS	Polar Stereographic	80W	21	55	US

41	Regional Window East US	Polar Stereographic	80W	25	57	UE
42	Regional Window West US	Polar Stereographic	80W	17	57	UW
43	Regional Window North US	Polar Stereographic	80W	17	49	UN
44	Regional Window Canada	Polar Stereographic	80W	25	49	CN
45	Regional Window Europe	Polar Stereog[illegible]	10E	52	39	EU
46	Regional Window East Asia	Polar Stereographic	100E	33	12	JN
47	Regional Window Alaska	Polar Stereographic	170W	18	27	AQ
48	Regional Window Hawaii	Polar Stereographic	170W	7	31	PA
49	Regional Window Azores	Polar Stereographic	10E	49	50	AZ
50 - 59 (Not Assigned)						
60	Tropical Cont/Ocean Indian Ocean	Mercator		9	27	IO
61	Tropical Cont/Ocean W. Pacific	Mercator		31	27	PW
62	Tropical Cont/Ocean E. Pacific	Mercator		53	27	PZ
63	Tropical Cont/Ocean W. Hemisphere	Mercator		63	27	SA
64	Tropical Cont/Ocean Atlantic	Mercator		73	27	ST
65	Tropical Cont/Ocean Africa	Mercator		90	27	AF
66 - 69 (Not Assigned)						
70	Subwindow US (N.W.)	Polar Stereographic	80W	21	47	UM

71	Subwindow US (West)	Polar Stereographic	80W	19	50	UA
72	Subwindow US (Mountain)	Polar Stereographic	80W	22	50	UC
73	Subwindow US (S.W.)	Polar Stereographic	80W	22	53	UX
74	Subwindow US (N. Central)	Polar Stereographic	80W	25	50	UD
75	Subwindow US (S. Central)	Polar Stereographic	80W	25	53	UL
76	Subwindow US (East)	Polar Stereographic	80W	28	52	UO
77	Subwindow US (N.E.)	Polar Stereographic	80W	31	51	UP
78	Subwindow US (S.E.)	Polar Stereographic	80W	28	55	UF
79	Subwindow US (N.E. Pacific)	Polar Stereographic	80W	18	45	UB
80	Subwindow W. Europe	Polar Stereographic	10E	48	38	UK
81	Subwindow Iceland	Polar Stereographic	10E	44	40	IL
82	Subwindow Spain	Polar Stereographic	10E	51	40	SP
83	Subwindow Italy	Polar Stereographic	10E	51	36	IY
84	Subwindow Turkey	Polar Stereographic	10E	51	31	TU
85	Subwindow USSR	Polar Stereographic	10E	45	32	RS
86 - 89 (Not Assigned)						
90	Subwindow Alaska	Polar Stereographic	170W	22	31	AK
91	Subwindow Alaska (Arctic)	Polar Stereographic	170W	26	27	AC

92	Subwindow Alaska (NW Canada)	Polar Stereographic	170W	26	35	AY
93	Subwindow Alaska (Gulf)	Polar Stereographic	170W	18	35	GA
94	Subwindow Alaska (Bering Sea)	Polar Stereographic	170W	18	27	LU
95 - 99 (Not Assigned)						
100	Subwindow Hawaii	Polar Stereographic	170W	7	34	HW
101	Subwindow Hawaii (NW)	Polar Stereographic	170W	16	31	HF
102	Subwindow Hawaii (NE)	Polar Stereographic	170W	16	39	HG
103	Subwindow Hawaii (E)	Polar Stereographic	170W	7	39	HH
104	Subwindow Hawaii (W)	Polar Stereographic	170W	7	31	HI
105 - 109 (Not Assigned)						
110	Subwindow Korea	Polar Stereographic	100E	30	15	KO
111	Subwindow Japan	Polar Stereographic	100E	27	17	JP
112	Subwindow Okinawa	Polar Stereographic	100E	28	12	EC
113	Subwindow Asia (E USSR)	Polar Stereographic	100E	33	20	MK
114	Subwindow Asia (NW Pacific)	Polar Stereographic	100E	25	20	JH
115	Subwindow Asia (W Cen Pacific)	Polar Stereographic	100E	25	12	JK
116	Subwindow Asia (China)	Polar Stereographic	100E	33	12	CI
117 - 119 (Not Assigned)						

120	*Subwindow Lajes*	*Polar Stereographic*	*10E*	*49*	*46*	*LJ*
121	*Subwindow Lajes (NW Atlantic)*	*Polar Stereographic*	*10E*	*41*	*50*	*NF*
122	*Subwindow Lajes (Iceland)*	*Polar Stereogrphic*	*10E*	*41*	*42*	*GL*
123	*Subwindow Lajes (NE Atlantic)*	*Polar Stereographic*	*10E*	*49*	*42*	*PO*
124	*Subwindow Lajes (NC Atlantic)*	*Polar Stereographic*	*10E*	*49*	*50*	*AX*

125 - 129 (Not Assigned)

130	*Subwindow Panama*	*Mercator*		*72*	*14*	*PM*
131	*Subwindow Gulf of Mexico*	*Mercator*		*70*	*12*	*GX*
132	*Subwindow Tropical Hawaii*	*Mercator*		*51*	*13*	*HT*
133	*Subwindow Guam*	*Mercator*		*35*	*14*	*GM*
134	*Subwindow S. China Sea*	*Mercator*		*27*	*14*	*SS*
135	*Subwindow Philippine Sea*	*Mercator*		*32*	*11*	*PH*

136 - 149 (Not Assigned)

150 LAWC #1

151 LAWC #2

152 LAWC #3

153 - 254 (Not Assigned)

255 Background will be defined by a Mode 01/Submode 10 Block

Table C2-2. Plot Process Codes

Code Value Octal	*Meaning*
0	*The character data within the block represent alphanumeric characters to be displayed as a label or character string. The label or string is to be placed with the lower left corner of the first character at the location specified by the M,N Coordinate. There shall be only one M,N Coordinate pair and one set of alphanumeric characters in the plot data block.*
1	*The character data within the block are to be interpreted as mnemonics for weather symbols to be displayed on the product. Each symbol is to be placed with the lower left corner of the symbol at the location specified by the M,N coordinate. Each mnemonic will be four ASCII characters in length, left justified and blank filled, and the data plot block may contain any number of coordinates and mnemonics (511 is the maximum due to the 4096-byte block length restriction). The weather symbol mnemonics and their definition are shown in Table A2-1.*
2	*Multiple sets of coordinates and character data will appear in the plot data block (see Appendix F, Example 6.) In the first set, M COORDINATE (1) is set to the displayable rotation angle of the character data which appears in the other data sets of character data. Rotation of the data for display is done in a clockwise manner. N COORDINATE (1) in the first set gives the character justification of the displayable symbols. Justification values are assigned as follows:* *0 Default device justification* *1 Top/left* *2 Center/left* *3 Bottom/left* *4 Top/center* *5 Center/center* *6 Bottom/center* *7 Top/right* *8 Center/right* *9 Bottom/right* *The four ASCII Characters in the first character string designate the character set which will be used to display the characters given in the other character strings. These set designations are listed in Table C2-6. Each character string starting with the second is terminated with Null (if the Null Termination option is used) or ETX. See Section 2.2.3.2.B.*

Example 6 in Appendix F illustrates the use of the Plot Data Block using Plot Process Code 2.

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Table C2-3. Grid Indicator (GI) Set Codes

NOTES:

1. Grids are defined for every regional window background map (see Table C2-2). The last two digits of the GI Set Code are identical to the PI Set Code (31-49) for the corresponding regional window background map. The hundred digit in the GI Set Code gives the grid mesh (e.g., Whole Mesh = 0, 1/2 Mesh = 1, 1/8 Mesh = 2).

2. The array size for each GI Set Code is given in USAF AFGWC Satellite Global Data Base mesh units (whole, half, eighth). These units can be converted to NMC and FNMOC corresponding mesh units.

3. Projection reference latitudes are 60N for Northern Hemisphere polar stereographic and 22.5N and 22.5S for Mercator. The Mesh Lengths are true at these latitudes.

4. See AFGWC/TN - 79/003, Map Projections and Grid Systems for Meteorological Applications, March 1981, for a complete discussion of grid systems and their relation to various map projections.

5. Knowing the mesh size, the location of the pole on that grid mesh, and the grid point of the lower left corner of the product, one can determine IPOLE/ JPOLE as used in Mode 7/Submode 20.

GI SET CODE	GRID MESH	DESCRIPTION	ARRAY SIZE	MESH LENGTH
031	Whole	Caribbean	17 x 17	3.71 degrees
032	Whole	Tropical Hawaiian Islands	17 x 17	3.71 degrees longitude
033	Whole	Marianas	17 x 17	3.71 degrees longitude
034	Whole	S. E. Asia	17 x 17	3.71 degrees longitude
035 - 039 (Not Assigned)				
040	Whole	Continental US	17 x 17	381 km
041	Whole	East US	17 x 17	381 km
042	Whole	West US	17 x 17	381 km
043	Whole	North US	17 x 17	381 km
044	Whole	Canada	17 x 17	381 km
045	Whole	Europe	17 x 17	381 km
046	Whole	Asia	17 x 17	381 km
047	Whole	Alaska	17 x 17	381 km
048	Whole	Hawaii	17 x 17	381 km

049	Whole	Azores	17 x 17	381 km
050 - 130 (Not Assigned)				
131	1/2	Caribbean	33 x 33	1.86 degrees longitude
132	1/2	Tropical Hawaiian Islands	33 x 33	1.86 degrees longitude
133	1/2	Marianas	33 x 33	1.86 degrees longitude
134	1/2	S.E. Asia	33 x 33	1.86 degrees longitude
135 - 139 (Not Assigned)				
140	1/2	Continental US	33 x 33	190.5 km
141	1/2	East US	33 x 33	190.5 km
142	1/2	West US	33 x 33	190.5 km
143	1/2	North US	33 x 33	190.5 km
144	1/2	Canada	33 x 33	190.5 km
145	1/2	Europe	33 x 33	190.5 km
146	1/2	Asia	33 x 33	190.5 km
147	1/2	Alaska	33 x 33	190.5 km
148	1/2	Hawaii	33 x 33	190.5 km
149	1/2	Azores	33 x 33	190.5 km
150 - 230 (Not Assigned)				
231	1/8	Caribbean	129 x 129	.464 degrees longitude
232	1/8	Tropical Hawaiian Islands	129 x 129	.464 degrees longitude
233	1/8	Marianas	129 x 129	.464 degrees longitude
234	1/8	Philippines	129 x 129	.464 degrees longitude
235 - 239 (Not Assigned)				
240	1/8	Continental US	129 x 129	47.62 km
241	1/8	East US	129 x 129	47.62 km
242	1/8	West US	129 x 129	47.62 km
243	1/8	North US	129 x 129	47.62 km
244	1/8	Canada	129 x 129	47.62 km
245	1/8	Europe	129 x 129	47.62 km
246	1/8	Asia	129 x 129	47.62 km

247	*1/8*	*Alaska*	*129 x 129*	*47.62 km*
248	*1/8*	*Hawaii*	*129 x 129*	*47.62 km*
249	*1/8*	*Azores*	*129 x 129*	*47.62 km*

250 - 256 (Not Assigned)

Table C2-4. UNITS CODE (OCTAL)

NOTES:

1. * = *Multiplied by*

2. ** = *Raised to the power of*

3. / = *Divided by or per*

4. *Unit symbols shown in the symbol column are the preferred International Standard symbols which correspond to the Federal and American National Standards. Non ISO symbols correspond to practice that does not conflict with ISO, ANSI, and Federal practice.*

5. *Code units 15, 43, 46, and 74 have not been changed to conform with the ISO, ANSI, Federal and DOD standards and practice. These will probably by changed in future editions of this document to conform with metric practice.*

CODE	UNITS	SYMBOL	
0	Degrees Fahrenheit	°F	
1	Degrees Kelvin	°K	
2	Degrees Celsius	°C	
3	Meters	m	
4	Meters per Second	m/s	
5	Knots	Kts	
6	Miles per Hour	mph	
7	Hectopascals (Millibars)	hPa	(mbar)
10	Centimeters	cm	
11	Meters per Second Squared	m/s^2	(m/s**2)
12	Feet	ft	
13	Geopotential Meter	m_{gp}	
14	Seconds	s	
15	Gram-calories per square centimeter per day	$g.cal/cm^2/d$	(g*cal/cm**2/d)
16	Nautical Miles per Day	NM/d	
17	Centimeters per Second	cm/s	
20	Probability Code		
21	Hectopascals per Second	hPa/s	(mbar/s)
22	Per Second	1/s	
23	Dimensionless		
24	Percent	%	
25	Meters Squared per Second	m^2/s	(m**2/s)
26	Kilograms per Square Meter	kg/m^2	(kg/m**2)
27	Kilograms per Square Meter per Second	$kg/m^2/s$	(kg/m**2/s)

CODE	UNITS	SYMBOL	
30 =	Hectopascals per Meter	hPa/m	(mbar/m)
31 =	Percent per Meter	%/m	
32 =	Degrees Kelvin per Meter	°K/m2	
33 =	Watts per Square Meter	W/m^2	(W/m**2)
34 =	Degrees Kelvin per Second	°K/s	
35 =	Degrees per 10 (Compass)	°/10	
36 =	Degrees Celsius per 10^4 Square Kilometers	$^oC/10^4\ km^2$	(oC/10**4 km**2)
37 =	Degrees (Compass Direction)	°	
40 =	Centimeters Squared per Second	cm^2/s	(cm**2/s)
41 =	Degrees Celsius per 100 feet (Gradient)	°C/100ft	
42 =	Degrees Celsius per 100 Km (horizontal gradient)	°C/100 km	
43 =	Gram-Calories per Square Centimeter per hour	$g.cal/cm^2/h$	(g*cal/cm**2/h)
44 =	Refractive N Units		
45 =	Meters Squared per 3 times 10^{15}	$m^2/3.10^{15}$	(m**2/3*10**15)
46 =	Microbars Per Second	ubar/s	
47 =	Millimeters	mm	
50 =	Kilometers	km	
51 =	Inches	in	
52 =	Yards	yd	
53 =	Statute Miles	mi	
54 =	Nautical Miles	NM	
55 =	Degrees of Latitude or Longitude	Lat, Lon	
56 =	Eights		
57 =	Square Kilometers	km^2	(km**2)
60 =	Square Statute Miles	mi^2	(mi**2)
61 =	Mean Solar Minutes	min	
62 =	Mean Solar Hours	h	
63 =	Mean Solar Days	d	
64 =	Months	mo	
65 =	Years	yr	
66 =	Per Second times 10 to the minus fifth power	$1/s.10^{-5}$	(1/s)*10**-5
67 =	Kilometers per Hour	km/h	
70 =	Degrees of Latitude or Longitude per Day	Lat/d, Lon/d	
71 =	Grams	g	
72 =	Kilograms	kg	
73 =	Grams per Cubic Centimeter	g/cm^3	(g/cm**3)
74 =	Langleys	ly	
75 =	Grams per Kilogram	g/kg	
76 =	Millimeters per Hour	mm/h	
77 =	Dobson units	m atm-cm	

CODE	*UNITS*	*SYMBOL*
100	*= Degrees of Latitude * 100*	*Lat.100*
101	*= Degrees of Longitude * 100*	*Lon.100*
102	*= Number of micro-seconds*	$s/(10^6)$
103	*= Velocity Variance*	$(cm/s)^2$
104	*= Velocity*	*cm/s*
105	*= Per degree Kelvin*	$1/^oK$

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Table C2-5. Data Representation Codes

CODE (Octal)	*DEFINITION*
0	*Two's complement integer (Scaled by a multiplier characteristic power of 10)*
1	*IEEE Floating point*
2	*ASCII (7 bit ANSI X3.4-1977)*
3	*Two's complement integer (Scaled by a multiplier characteristic power of 2)*

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Table C2-6. Character Sets

Each table entry defines both a typeface and a matrix of numeric values and corresponding symbols.

Character Set	*Description*
AFOS	*AFOS Standard Character Set, Programmer's Reference Guide, Graphic Display Module, Publication No. WDL-TR7676A, Environmental Systems, Ford Aerospace and Communications Corp.*
0000	*Proportional-spaced character set*
0001	*Proportional-spaced character set without serif*
0040	*Fixed-space character set*
0042	*"Hollow" or Outlined character set*
0054	*Inclined or italic character set*