

**Precipitation Processing System (PPS) Product Format Description
User Selectable Storm Total Precipitation (USP)**

Change History Log		
Author	Date	Build
Kelley Miles	3/8/2005	8
Jihong Liu	3/17/2005	correction

Setting	Value	Comment
Product type	16-level	Two possible scales based on the maximum data value detected; one for OHP & THP, one for STP
Time generated	Once every volume scan	It generates the blank images before it reaches the user selected accumulation period
Product size	N/A	
Compression	none	
Resolution	1.1-Nmi x 1-deg	
Range	124	
AWIPS ID	WSRUSPxxx	xxx is site ID for originating WFO
<p>Description/Purpose This product shall provide a rainfall accumulation map displayed as an image, for user selected accumulation period. The product format and content shall be the same as the Surface Rainfall Accumulation and Storm Total Rainfall Accumulation products, except the accumulation period shall be of variable duration (in whole clock hours), ranging from a beginning to an ending time specified by the user. The product will usually be generated by request, but may also be generated routinely for limited, designated periods. One of these periods shall be the Default Period, which will span a 24 hour period from 1200z of the previous day to 1200z of the present day. The default version of the product may be generated any time following the completion of the first volume scan to start after 1200z each day, up to 6 hours later. The period of accumulation shall be defined by the operator via two parameters: the Ending Hour (ranging from 0 to 23z), and the Time Span (ranging form 1 to 24 whole clock hours prior to the Ending Hour.) No more than 30 hours of rainfall data prior to the most recent clock-hour will be required to generate this product. If a requested product cannot be generated due to an error condition, a message will be displayed explaining why, and the available hours of precipitation accumulation in the precipitation data base will be listed. "This product shall include annotations for product name, radar ID, maximum data value detected, radar position, times and dates of the beginning and end (clock hour) of the rainfall rate integration, radar position, radar elevation above MSL, radar operational mode, the bias in the radar estimate of the precipitation rate, and the error variance of the bias estimate.</p>		

Data Levels

The User Selectable Rainfall Accumulation is displayed in 16 data levels on one of two possible scales, based on the maximum data value detected: one scale corresponding to that presently in use for the Surface Rainfall Accumulation products (OHP & THP); the other scale corresponding to that presently in use for the Storm Total Rainfall Accumulation product (STP). The scale used for the User Selectable product will switch automatically between the two, with the OHP & THP

scale in effect unless the product maximum data value exceeds the lower limit of the maximum data level (e.g. 8 inches), in which case the STP scale will be invoked. Each data level code may vary with operational mode and with NEXRAD (or agency) system adaptation data.

Color Level Code Tables

See sections 28.2.2 and 29.2.2.

Range/Data Resolution

The resolution of this graphic product is 1.1 nmi (range) by 1 deg (azimuth) out to a range of 124 nmi.

Alphanumeric Display Graphic Screen

A tabular format (Appendix B, Format III, Configuration 6) will be displayable on the graphic display screens. The tabular format will include:

- (a) Gage Bias Flag
- (b) Number of Hours in product
- (c) End Times
- (d) Bias
- (e) Hours Included Flag

Standard Annotations

Beginning/ending Date and Time of Rainfall Rate Integration

Maximum Data Value

Radar Rate Bias Estimate

Error Variance of Bias Estimate

Gage Adjustment Bias Flag

Product Interaction

The following overlay products are displayable on this product:

- Hail Index
- Mesocyclone
- Severe Weather Probability
- Storm Tracking Information
- Tornado Vortex Signatures.

The following table provides a detailed specification of the DHR product.

Highlighted areas in the description below indicate changes since the previous Build

Note: a Halfword is 16 bits]

MESSAGE HEADER

References

2620001F (Class I User ICD):
Fig 3-3 “Message Header”

HALF WORD	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
01	Message Code	INT*2	N/A	31	N/A	
02	Date of Message	INT*2	Julian Date	1 to 32,767	1	
03-04	Time of Message	INT*4	Seconds	0 to 86,399	1	
05-06	Length of Message	INT*4	N/A	18 to 409856	1	
07	Source ID	INT*2	N/A	0 to 999	1	
08	Destination ID	INT*2	N/A	0 to 999	1	
09	Number of Blocks	INT*2	N/A	3	1	

PRODUCT DESCRIPTION BLOCK

References

2620001F (Class I Users ICD):
Fig 3-6 “Graphic Product Message” Sheet 2, Sheet 6, Sheet 7
Table III “Message Codes for Products”
Table V “Product Dependent Halfword Definition for Product Description Block”

2620003F (Product Spec ICD):
Section 28.2.2 “Color Level Code Table”

HALF WORD	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
10	Block Divider	INT*2	NA	-1	N/A	
11-12	Latitude of Radar	INT*4	Degrees	-90 to +90	0.001	
13-14	Longitude of Radar	INT*4	Degrees	-180 to +180	0.001	
15	Height of Radar	INT*2	Feet	-100 to	1	

HALF WORD	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
				+11000		
16	Product Code	INT*2	N/A	31		
17	Operational Mode	INT*2	N/A	0 to 2	N/A	
18	Volume Coverage Pattern	INT*2	N/A	1 to 767	N/A	
19	Sequence Number	INT*2	N/A	-13, 0 to 32767	1	
20	Volume Scan Number	INT*2	N/A	1 to 80	1	
21	Volume Scan Date	INT*2	Julian Date	1 to 32767	1	
22-23	Volume Scan Start Time	INT*4	Seconds GMT	0 to 86399	1	
24	Product Generation Date	INT*2	Julian Date	1 to 32767	1	
25-26	Product Generation Time	INT*4	Seconds	0 to 86399	1	
27	End Hour	INT*2	Hours	0 to 23	1	
28	Time Span	INT*2	Hours	1 to 24	1	
29	Elevation Number	INT*2	N/A	0 to 20	1	
30	Null Product Flag	INT*2	N/A	0 to 1	N/A	
31	Data Level 1 Threshold	INT*2	Inches	OHP/THP Code for ND (i.e. 0); STP Code for ND (i.e. 0)	1	
32	Data Level 2 Threshold	INT*2	Inches	OHP/THP Code for > 0.00; STP Code for > 0.0	1	
33	Data Level 3 Threshold	INT*2	Inches	OHP/THP Code for > 0.10; STP Code for > 0.3	1	
34	Data Level 4 Threshold	INT*2	Inches	OHP/THP Code for > 0.25; STP Code for > 0.6	1	
35	Data Level 5 Threshold	INT*2	Inches	OHP/THP Code for > 0.50; STP Code for 1.0	1	
36	Data Level 6	INT*2	Inches	OHP/THP	1	

HALF WORD	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
	Threshold			Code for > 0.75; STP Code for 1.5		
37	Data Level 7 Threshold	INT*2	Inches	OHP/THP Code for > 1.00; STP Code for 2.0	1	
38	Data Level 8 Threshold	INT*2	Inches	OHP/THP Code for > 1.25; STP Code for 2.5	1	
39	Data Level 9 Threshold	INT*2	Inches	OHP/THP Code for > 1.50; STP Code for 3.0	1	
40	Data Level 10 Threshold	INT*2	Inches	OHP/THP Code for > 1.75; STP Code for 4.0	1	
41	Data Level 11 Threshold	INT*2	Inches	OHP/THP Code for > 2.00; STP Code for 5.0	1	
42	Data Level 12 Threshold	INT*2	Inches	OHP/THP Code for > 2.50; STP Code for 6.0	1	
43	Data Level 13 Threshold	INT*2	Inches	OHP/THP Code for > 3.00; STP Code for 8.0	1	
44	Data Level 14 Threshold	INT*2	Inches	OHP/THP Code for > 4.00; STP Code for 10.0	1	
45	Data Level 15 Threshold	INT*2	Inches	OHP/THP Code for > 6.00; STP Code for 12.0	1	
46	Data Level 16 Threshold	INT*2	Inches	OHP/THP Code for > 8.00; STP Code for 15.0	1	

HALF WORD	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
47	Max rainfall	INT*2	Inches	0.0 to 327.6	0.1	
48	Begin Date Rainfall	INT*2	Julian Date	1 to 32767	1	
49	Begin Time Rainfall	INT*2	Minutes	1 to 1439	1	
50	End Date Rainfall	INT*2	Julian Date	1 to 32767	1	
51	End Time Rainfall	INT*2	Minutes	0 to 1439	1	
52	Average Mean-field Bias	INT*2	N/A	0.01 to 99.99	0.01	
53	Average Effective No. G-R Pairs (Sample Size)	INT*2	N/A	0.00 to 9999.99	0.01	
54	Version	INT*1	N/A	0	1	
54	Spot Blank	INT*1	N/A	0 to 1	1	
55-56	Offset to Symbology	INT*4	Halfwords	60	1	
57-58	Offset to Graphic	INT*4	Halfwords	0 to 400000	1	
59-60	Offset to Tabular	INT*4	Halfwords	0	1	Varies, depending on size of Symbology Block

PRODUCT SYMBOLOGY BLOCK

References

2620001F (Class I User ICD):

Section 3.2.1.2 “Product Symbology Block”
 Fig 3-6 “Graphic Product Message” Sheet 3 and Sheet 8
 Fig 3-10 “Radial Data Packet”

HALF WORD	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
61	Block Divider	INT*2	N/A	-1	N/A	
62	Block ID	INT*2	N/A	1	N/A	
63-64	Length of Block	INT*4	Bytes	1 to 400000	1	
65	Number of Layers	INT*2	N/A	1	1	
66	Layer Divider	INT*2	N/A	-1	N/A	
67-68	Length of Data Layer	INT*4	N/A	1 to 400000	1	
69	Packet Code	INT*2	N/A	AF1F (Hex)	N/A	

HALF WORD	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
70	Index of First Range Bin	INT*2	N/A	0	1	
71	Number of Range Bins	INT*2	N/A	115	1	
72	I Center of Sweep	INT*2	Km/4	256	1	
73	J Center of Sweep	INT*2	Km/4	280	1	
74	Scale Factor	Scaled Integer	Pixels	2.0	0.001	
75	Number of Radials	INT*2	N/A	360	1	
76	Number of RLE Halfwords in Radial	INT*2	Halfword	1 to 116	1	}Repeat
77	Radial Start Angle	Scaled Integer (INT*2)	Degrees	0.0 to 359.9	0.1	} Each } of }
78	Radial Angle Delta	Scaled Integer (INT*2)	Degrees	1.0 to 2.0	0.1	} Radial } }
79	Run (0)	4 Bit INT	N/A	0 to 15	1	} }
79	Color Code (0)	4 Bit INT	N/A	0 to 15	1	} }
79	Run (1)	4 Bit INT	N/A	0 to 15	1	} }
79	Color Code (1)	4 Bit INT	N/A	0 to 15	1	} }
...	} }
...	} }
...	} }
	Run (N)	4 Bit INT	N/A	0 to 15	1	} }
	Color Code (N)	4 Bit INT	N/A	0 to 15	1	
	End of Block	4 Bit INT	N/A	0000	N/A	End of } } block } marker }
	End of Block	4 Bit INT	N/A	0000	N/A	End of } } block } marker }

GRAPHIC ALPHANUMERIC BLOCK

References:

2620001F (Class I User ICD):

Figure 3-6 “Graphic Product Message” Sheet 4, Sheet 9 and Sheet 11

Section 3.2.1.3 “Graphic Alphanumeric Block”

Packet Code 8 (Text and Special Symbol Packets), shown in Figure 3-8b

Packet Code 10 (Unlinked Vector Packet), shown in Figure 3-8

Table VII. Product Dependent Definition for Graphic Alphanumeric Block: Fig 3-62

2620003F (Product Spec ICD):

Appendix B “Graphic Display Formats” Format III “Attribute Area”

HALF WORD	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
Offset+ 1	Block Divider	INT*2	N/A	-1	N/A	
2	Block ID	INT*2	N/A	2	N/A	
3-4	Length of Block	INT*4	Bytes	604	1	
5	Number of Pages	INT*2	N/A	2	1	Correction to original description (no format change)
6	Page Number	INT*2	N/A	1	1	
7	Length of Page	INT*2	Bytes	590	1	
8	Text Packet	INT*2	N/A	8	N/A	
9	Length of Data Block (Bytes)	INT*2	Bytes	86	1	
10	Value of Text String	INT*2	N/A	0	1	Color level of text
11	I Start	INT*2	Km/4 or Pixels	-2048 to +2047	1	
12	J Start	INT*2	Km/4 or Pixels	-2048 to +2047	1	
52	Message to follow	Char*80	8 bit ASCII	“GAGE BIAS – XXXX” Range: APPLIED, NOT APPLIED (space padded).	N/A	
53	Text Packet	INT*2	N/A	8	N/A	

HALF WORD	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
54	Length of Data Block (Bytes)	INT*2	Bytes	86	1	
55	Value of Text String	INT*2	N/A	0	1	Color level of text
56	I Start	INT*2	Km/4 or Pixels	-2048 to +2047	1	
57	J Start	INT*2	Km/4 or Pixels	-2048 to +2047	1	
97	Message to follow	Char*80	8 bit ASCII	“XX OF XX HOURS IN PRODUCT” Range from 1 to 24 (space padded)	1	Correction to original description (no format change)
98	Text Packet	INT*2	N/A	8	N/A	
99	Length of Data Block (Bytes)	INT*2	Bytes	86	1	
100	Value of Text String	INT*2	N/A	0	1	Color level of text
101	I Start	INT*2	Km/4 or Pixels	-2048 to +2047	1	
102	J Start	INT*2	Km/4 or Pixels	-2048 to +2047	1	
142	Message to Follow	Char*80	8 bit ASCII	“END TIMES xxZ xxZ xxZ” (end times range from 00 to 23)	1	The number of END TIMES depends on how many ending times the user selects. Correction to original description (no format change)
143	Text Packet	INT*2	N/A	8	N/A	
144	Length of Data Block (Bytes)	INT*2	Bytes	86	1	
145	Value of Text String	INT*2	N/A	0	1	Color level of text
146	I Start	INT*2	Km/4 or	-2048 to	1	

HALF WORD	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
			Pixels	+2047		
147	J Start	INT*2	Km/4 or Pixels	-2048 to +2047	1	
187	Message to Follow	Char*80	8 bit ASCII	“BIAS X.XX X.XX X.XX...” (each bias value ranges from 0.00 to 99.9 9)	0.01	The number of BIAS depends on the how many ending times the user selects
188	Text Packet	INT*2	N/A	8	N/A	
189	Length of Data Block (Bytes)	INT*2	Bytes	86	1	
190	Value of Text String	INT*2	N/A	0	1	Color level of text
191	I Start	INT*2	Km/4 or Pixels	-2048 to +2047	1	
192	J Start	INT*2	Km/4 or Pixels	-2048 to +2047	1	
232	Message to Follow	Char*80	8 bit ASCII	“HOURS INCLUDED? XXX XXX XXX...” Values: “YES”, “NO”)	N/A	
233	Text Packet	INT*2	N/A	10	N/A	
234	Length of Data Block (Bytes)	INT*2	Bytes	50	1	
235	Value (level) of vector	INT*2	N/A	5	1	
236	Begin I Vector 1	INT*2	Km/4 or Pixels	-2048 to +2047	1	
237	Begin J Vector 1	INT*2	Km/4 or Pixels	-2048 to +2047	1	
238	End I Vector 1	INT*2	Km/4 or Pixels	-2048 to +2047	1	
239	End J Vector 1	INT*2	Km/4 or Pixels	-2048 to +2047	1	
240	Begin I Vector 2	INT*2	Km/4 or Pixels	-2048 to +2047	1	
241	Begin J Vector 2	INT*2	Km/4 or Pixels	-2048 to +2047	1	

HALF WOR D	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
242	End I Vector 2	INT*2	Km/4 or Pixels	-2048 to +2047	1	
243	End J Vector 2	INT*2	Km/4 or Pixels	-2048 to +2047	1	
244	Begin I Vector 3	INT*2	Km/4 or Pixels	-2048 to +2047	1	
245	Begin J Vector 3	INT*2	Km/4 or Pixels	-2048 to +2047	1	
246	End I Vector 3	INT*2	Km/4 or Pixels	-2048 to +2047	1	
247	End J Vector 3	INT*2	Km/4 or Pixels	-2048 to +2047	1	
248	Begin I Vector 4	INT*2	Km/4 or Pixels	-2048 to +2047	1	
249	Begin J Vector 4	INT*2	Km/4 or Pixels	-2048 to +2047	1	
250	End I Vector 4	INT*2	Km/4 or Pixels	-2048 to +2047	1	
251	End J Vector 4	INT*2	Km/4 or Pixels	-2048 to +2047	1	
252	Begin I Vector 5	INT*2	Km/4 or Pixels	-2048 to +2047	1	
253	Begin J Vector 5	INT*2	Km/4 or Pixels	-2048 to +2047	1	
254	End I Vector 5	INT*2	Km/4 or Pixels	-2048 to +2047	1	
255	End J Vector 5	INT*2	Km/4 or Pixels	-2048 to +2047	1	
256	Begin I Vector 6	INT*2	Km/4 or Pixels	-2048 to +2047	1	
257	Begin J Vector 6	INT*2	Km/4 or Pixels	-2048 to +2047	1	
258	End I Vector 6	INT*2	Km/4 or Pixels	-2048 to +2047	1	
259	End J Vector 6	INT*2	Km/4 or Pixels	-2048 to +2047	1	
300	Text Packet	INT*2	N/A	10	N/A	
301	Length of Data Block (Bytes)	INT*2	Bytes	82	1	
302	Value (level) of vector	INT*2	N/A	5	1	
303	Begin I Vector 1	INT*2	Km/4 or Pixels	-2048 to +2047	1	

HALF WOR D	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
304	Begin J Vector 1	INT*2	Km/4 or Pixels	-2048 to +2047	1	
305	End I Vector 1	INT*2	Km/4 or Pixels	-2048 to +2047	1	
306	End J Vector 1	INT*2	Km/4 or Pixels	-2048 to +2047	1	
307	Begin I Vector 2	INT*2	Km/4 or Pixels	-2048 to +2047	1	
308	Begin J Vector 2	INT*2	Km/4 or Pixels	-2048 to +2047	1	
309	End I Vector 2	INT*2	Km/4 or Pixels	-2048 to +2047	1	
310	End J Vector 2	INT*2	Km/4 or Pixels	-2048 to +2047	1	
311	Begin I Vector 3	INT*2	Km/4 or Pixels	-2048 to +2047	1	
312	Begin J Vector 3	INT*2	Km/4 or Pixels	-2048 to +2047	1	
313	End I Vector 3	INT*2	Km/4 or Pixels	-2048 to +2047	1	
314	End J Vector 3	INT*2	Km/4 or Pixels	-2048 to +2047	1	
315	Begin I Vector 4	INT*2	Km/4 or Pixels	-2048 to +2047	1	
316	Begin J Vector 4	INT*2	Km/4 or Pixels	-2048 to +2047	1	
317	End I Vector 4	INT*2	Km/4 or Pixels	-2048 to +2047	1	
318	End J Vector 4	INT*2	Km/4 or Pixels	-2048 to +2047	1	
319	Begin I Vector 5	INT*2	Km/4 or Pixels	-2048 to +2047	1	
320	Begin J Vector 5	INT*2	Km/4 or Pixels	-2048 to +2047	1	
321	End I Vector 5	INT*2	Km/4 or Pixels	-2048 to +2047	1	
322	End J Vector 5	INT*2	Km/4 or Pixels	-2048 to +2047	1	
323	Begin I Vector 6	INT*2	Km/4 or Pixels	-2048 to +2047	1	
324	Begin J Vector 6	INT*2	Km/4 or Pixels	-2048 to +2047	1	
325	End I Vector 6	INT*2	Km/4 or	-2048 to	1	

HALF WOR D	FIELDNAME	TYPE	UNITS	VALUE	PRECISION/ ACCURACY	NOTES
			Pixels	+2047		
326	End J Vector 6	INT*2	Km/4 or Pixels	-2048 to +2047	1	
327	Begin I Vector 7	INT*2	Km/4 or Pixels	-2048 to +2047	1	
328	Begin J Vector 7	INT*2	Km/4 or Pixels	-2048 to +2047	1	
329	End I Vector 7	INT*2	Km/4 or Pixels	-2048 to +2047	1	
330	End J Vector 7	INT*2	Km/4 or Pixels	-2048 to +2047	1	
331	Begin I Vector 8	INT*2	Km/4 or Pixels	-2048 to +2047	1	
332	Begin J Vector 8	INT*2	Km/4 or Pixels	-2048 to +2047	1	
333	End I Vector 8	INT*2	Km/4 or Pixels	-2048 to +2047	1	
334	End J Vector 8	INT*2	Km/4 or Pixels	-2048 to +2047	1	
335	Begin I Vector 9	INT*2	Km/4 or Pixels	-2048 to +2047	1	
336	Begin J Vector 9	INT*2	Km/4 or Pixels	-2048 to +2047	1	
337	End I Vector 9	INT*2	Km/4 or Pixels	-2048 to +2047	1	
338	End J Vector 9	INT*2	Km/4 or Pixels	-2048 to +2047	1	
339	Begin I Vector 10	INT*2	Km/4 or Pixels	-2048 to +2047	1	
340	Begin J Vector 10	INT*2	Km/4 or Pixels	-2048 to +2047	1	
341	End I Vector 10	INT*2	Km/4 or Pixels	-2048 to +2047	1	
342	End J Vector 10	INT*2	Km/4 or Pixels	-2048 to +2047	1	

[TABULAR ALPHANUMERIC BLOCK NOT APPLICABLE FOR USP]

The following is USP Graphical Alphanumerical Block (GAB) abstracted from CVG

Page 1:

GAGE BIAS - NOT APPLIED								
12 OF 12 HOURS IN PRODUCT								
END TIMES	14Z	15Z	16Z	17Z	18Z	19Z	20Z	21Z
BIAS	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25
HOURS INCLUDED?	YES	YES	YES	YES	YES	YES	YES	YES

Page2:

GAGE BIAS - NOT APPLIED								
12 OF 12 HOURS IN PRODUCT								
END TIMES	22Z	23Z	00Z	01Z				
BIAS	1,25	1,25	1,25	1,25				
HOURS INCLUDED?	YES	YES	YES	YES				