

**UPGRADE RPG HARDWARE AND SOFTWARE FOR  
FRAME RELAY COMMUNICATIONS**

**DOPPLER METEOROLOGICAL RADAR  
WSR-88D**



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**FAA APPROVAL**

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**NWS APPROVAL:**



**Mark S. Paese**

Signature valid

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**DoD APPROVAL:**

**BY ORDER OF THE SECRETARY OF THE AIR FORCE**

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Chief of Staff**

**Date** \_\_\_\_\_

**Edward L. Berkowitz, Chief  
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Radar Operations Center  
TOMA**

**1. SUBJECT**

Upgrade Radar Product Generator (RPG) Hardware and Software for Frame Relay Communications.

**2. PURPOSE**

This modification installs the necessary RPG hardware and software to use frame relay telecommunications for FAA and CONUS DoD radars and their associated NWS WFOs currently supporting Distant Master System Control Function (MSCFs). Frame relay telecommunications will improve Distant MSCF response time, make one-time requests available from FAA and CONUS DoD radars via the AWIPS WAN, and support the maximum Routine Product Set from FAA and CONUS DoD radars to the associated NWS WFO. The authority for this modification is Radar Operations Center (ROC) Engineering Change Proposal (ECP) 0177, Upgrade RPG for Digital or Frame Relay Communications.

RPG Software Build 5 (NWS Software Note 24, DoD AF TO 31P1-4-108-618, and FAA Order 6345.1 CHG 49, Chap 45) will need to be loaded by the site before an ROC installation team arrives to perform this retrofit. The ROC installation team will install a new frame relay hub router and a new module into the existing NWS RPG router at the NWS WFO. The team will load the Distant MSCF software specific to frame relay.

The ROC installation team will also install RPG router hardware and software specific to frame relay at CONUS DoD and FAA RPGs.

There will be 30 to 45 minutes during frame relay installation when no data is flowing from the NWS radar and the FAA or CONUS DoD radar to AWIPS. This is because the WSR-88D RPG routers will be powered down while new hardware and software is being installed.

AWIPS Open Build 3 has to be installed to take full advantage of this change. If AWIPS Open Build 3 is not installed yet, AWIPS will continue to obtain data from the DoD radar or FAA via the existing dedicated and dial circuits. Once AWIPS Open Build 3 is available, the AWIPS system administrator will be provided instructions on configuring the AWIPS to obtain a full Routine Product Set from the associated DoD or FAA radar.

This modification will be coordinated to minimize data loss at each site. Limited RPG downtime is anticipated while this modification is being performed. At CONUS DoD and FAA radars, the RPGs routers will be taken offline approximately 45 minutes. At NWS WFOs, the NWS RPGs will be taken offline approximately 30 minutes. At NWS WFOs, Distant MSCFs will be offline approximately 45 minutes. If there is a problem with the frame relay telecommunications service, contact the ROC Hotline for assistance in converting back to analog telecommunications.

**NWS: EHB-6, Modification Note 77**  
**DoD: AFTO 31P1-4-108-621**  
**FAA: EEM Modification Handbook 6345.1, CHG 50, Chap 46**

For additional information concerning this document, contact the Radar Operations Center (ROC) Hotline, Norman, OK; phone number: (800) 643-3363 or (405) 573-8900 or by e-mail at [NEXRAD.Hotline@noaa.gov](mailto:NEXRAD.Hotline@noaa.gov). An electronic copy of this document can be found at the following Internet address:  
[www.roc.noaa.gov/ssb/sysdoc/techman/tmlinks.asp](http://www.roc.noaa.gov/ssb/sysdoc/techman/tmlinks.asp)

**3. SITES AFFECTED**

See ATTACHMENT 1.

**4. ESTIMATED COMPLETION DATE**

This modification must be reported completed no later than 60 days after the completion of the installation by the ROC.

**5. EQUIPMENT AFFECTED**

Radar Product Generator Group.

**6. SPARES AFFECTED**

Not applicable.

**7. MODIFICATION ACCOMPLISHED BY**

A team from the ROC will perform all hardware and software installations.

**8. MATERIAL REQUIRED**

The materials required for this modification will be brought by the ROC team performing the modification.

**9. SOURCE OF MATERIALS**

Kits are requisitioned by the ROC Retrofit Management Team and shipped at no cost to the site.

**10. SPECIAL TOOLS AND TEST EQUIPMENT REQUIRED**

Not applicable.

**11. TIME AND PERSONNEL REQUIRED**

<b>Work Phases</b>	<b>Work-hours</b>
Unpacking	0.5
Disassembly	0.25
Installation	0.25
Assembly	0.0
Operational Check	0.5
<b>Total Work-hours</b>	<b>1.5</b>

**12. DOCUMENTS AFFECTED**

- a. Technical Manual, System Description, Revision 4, dated 31 March 2003.**  
NWS: EHB 6-500, Change 1  
DoD: AF TO 31P1-4-108-1, Change 1  
FAA: TI 6345.1 V1, Change 1  
Navy: EM 400-AA-MMM-010/WSR88D, Change 1
- b. Technical Manual, Illustrated Parts Breakdown (IPB), Revision 7, dated 31 October 2003.**  
NWS: EHB 6-501, Change 1  
DoD: AF TO 31P1-4-108-4, Change 1  
FAA: TI 6345.1 V2, Change 1  
Navy: EM 400-AB-IPB-010, Change 1
- c. Technical Manual, Work Unit Code, Revision 1, dated 1 November 2001.**  
NWS: EHB 6-502, Change 3  
DoD: AF TO 31P1-4-108-06, Change 3  
FAA: TI 6345.1 V3, Change 3  
Navy: EM 400-AC-WUC-010, Change 3
- d. Technical Manual, Inspection, Lubrication, and Maintenance Requirements, Revision 2, dated 1 June 2002.**  
NWS: EHB 6-503, Change 3  
DoD: AF TO 31P1-4-108-6, Change 3  
FAA: TI 6345.1 V4, Change 3  
Navy: EM 400-AM-MOO-010, Change 3
- e. Technical Manual, Preventive Maintenance Inspection Work Cards, Revision 3, dated 15 May 2002.**  
NWS: EHB 6-503-2, Change 2  
DoD: AF TO 31P1-4-108-6WC-8, Change 2  
FAA: TI 6345.1 V4, Change 2

**f. Maintenance Instructions, Radar Product Generator (RPG), Revision 1, dated 30 April 2003.**

NWS: EHB 6-525, Change 2  
DoD: AF TO 31P1-4-108-452-1, Change 2  
FAA: TI 6345.1 V49, Change 2

**g. Operations Instructions, Radar Product Generation (RPG), Revision 2, dated 29 March 2004.**

NWS: EHB 6-526  
DoD: AF TO 31P1-4-108-451-1  
FAA: TI 6345.1 V50

**13. VERIFICATION STATEMENT**

This modification was successfully installed at the Radar Operations Center.

**14. DISPOSITION OF REMOVED AND REPLACED PARTS/MATERIALS**

Parts removed (W320) at the site should be maintained by the site to reinstall, in the event of a problem with frame relay service. For a short period of time, analog service will remain activated and in the event of an emergency, the site could revert to using dedicated modem to modem connections. This would need to be coordinated with the ROC.

The original equipment manufacturer (OEM) containers should be maintained by the site to re-ship the Cisco 2621XM 10/100 Dual Ethernet Modular Router-AC in the event of a router failure. The router assembly, versus modular components, are considered one Line Replaceable Unit (LRU).

**15. PROCEDURES**

Not applicable.

**16. FAA DISTRIBUTION**

This directive is distributed to selected offices and services within Washington headquarters, the William J. Hughes Technical Center, the Mike Monroney Aeronautical Center, regional Airway Facilities divisions, and Airway Facilities field offices having the following facilities/equipment: NXRAD.

**17. CHANGES TO TABLE OF CONTENTS (FAA)**

This chapter will be included in the next revision to the table of contents for FAA Order 6345.1, Electronic Equipment Modification Handbook - Next Generation Weather Radar (NEXRAD).

**18. RECOMMENDATIONS FOR CHANGES (FAA)**

Forward any recommendations for changes to this directive through normal channels to the National Airway Systems Engineering Division, AOS-200, Operational Support.

**19. REPORTING INSTRUCTIONS**

**a. NWS**

Report completed modification on WS Form A-26, Engineering Management Reporting System Maintenance Record, according to the instructions in NWS Instruction (NWSI) 30-2104, Engineering Management Reporting System (EMRS), part 2 and Appendix G. Include the following information on the WS Form A-26:

- An Equipment Code of RPG in Block 7.
- The appropriate serial number in Block 8.
- A Mod No. of 77 in Block 17a.

A sample EMRS report is provided as ATTACHMENT 3.

**b. DoD**

Update the AFTO Form 95 to show TCTO compliance. Report TCTO compliance in accordance with TO 00-20-2, Table 3-10, Rule 9.

**c. FAA**

Enter this directive number, date, and chapter number on the appropriate FAA Form 6032-1, Airway Facilities Modification Record.

Use the Maintenance Management System (MMS) application Log Equipment Modification (LEM) function to report the completion of this modification. Verify N is in the REP COD field to ensure the log entry will be upward reportable to the national data base for access by AOS. This directive should be entered into the LEM fields as follows:

(1) FAC/SERV: NXRAD

(2) LOC/IDENT: 55 BA

(3) Short Name: SYS

(4) Order No.: 6345.1

(5) Chapter: 46

(6) Change: 50

**NWS: EHB-6, Modification Note 77**  
**DoD: AFTO 31P1-4-108-621**  
**FAA: EEM Modification Handbook 6345.1, CHG 50, Chap 46**

**d. DoD**

Complete [ATTACHMENT 2](#), and return the information to the ROC by one of the four methods below:

- (1) Mail Address:           Program Branch, Retrofit Management Team  
                                  WSR-88D Radar Operations Center  
                                  3200 Marshall Ave., Suite 101  
                                  Norman, Oklahoma 73072-8028
  
- (2) Fax Number:           (405) 573-3480  
                                  ATTN: Retrofit Management Team
  
- (3) E-mail Address:       [NEXRAD.Logistics@noaa.gov](mailto:NEXRAD.Logistics@noaa.gov)
  
- (4) Web Version:          <http://www.roc.noaa.gov/ssb/logistics/completion.asp>

NWS: EHB-6, Modification Note 77  
 DoD: TO 31P1-4-108-621  
 FAA: EEM Modification Handbook 6345.1 CHG 50, Chap 46

ATTACHMENT 1

EFFECTIVITY

**NWS**

NEXRAD Site Name	City, ST	EQP	SID	ORG Code
<b>Eastern Region</b>				
BURLINGTON	SOUTH BURLINGTON, VT	RPG	BTV	WN9617
NORFOLK	WAKEFIELD, VA	RPG	AKQ	WN9952
<b>Southern Region</b>				
ALBUQUERQUE	ALBUQUERQUE, NM	RPG	ABQ	WP9365
ATLANTA	PEACHTREE CITY, GA	RPG	FFC	WP9219
AUSTIN/SAN ANTONIO	NEW BRAUNFELS, TX	RPG	EWX	WP9253
BIRMINGHAM	ALABASTER, AL	RPG	BMX	WP9957
DALLAS/FT WORTH	FORT WORTH, TX	RPG	FWD	WP9259
EL PASO	SANTA TERESA, NM	RPG	EPZ	WP9270
JACKSON/BRANDON, MS	JACKSON, MS	RPG	JAN	WP9235
JACKSONVILLE	JACKSONVILLE, FL	RPG	JAX	WP9206
LAKE CHARLES	LAKE CHARLES, LA	RPG	LCH	WP9240
MOBILE	MOBILE, AL	RPG	MOB	WP9223
NORMAN	NORMAN, OK	RPG	OUN	WP9921
SAN ANGELO	SAN ANGELO, TX	RPG	SJT	WP9263

ATTACHMENT 1 (Continued)

EFFECTIVITY

NEXRAD Site Name	City, ST	EQP	SID	ORG Code
TALLAHASSEE	TALLAHASSEE, FL	RPG	TLH	WP9214
<b>Central Region</b>				
BISMARCK	BISMARCK, ND	RPG	BIS	WR9764
PADUCAH	PADUCAH, KY	RPG	PAH	WR9957
<b>Western Region</b>				
LAS VEGAS	LAS VEGAS, NV	RPG	VEF	WT9386
LOS ANGELES	OXNARD, CA	RPG	LOX	WT9295
SACRAMENTO	SACRAMENTO, CA	RPG	STO	WT9914
<b>DoD</b>				
ALTUS AFB	FREDERICK, OK	RPG	FDR	FE4419
BEALE AFB	OROVILLE, CA	RPG	BBX	FE4686
CANNON AFB	FIELD, NM	RPG	FDX	FE4855
COLUMBUS AFB	GREENWOOD SPRINGS, MS	RPG	GWX	FE3022
DOVER AFB	ELLENDALE STATE FOREST, DE	RPG	DOX	FE4497
DYESS AFB	MORAN, TX	RPG	DYX	FE4661
EDWARDS AFB	BORON, CA	RPG	EYX	FE2805

ATTACHMENT 1 (Continued)

EFFECTIVITY

NEXRAD Site Name	City, ST	EQP	SID	ORG Code
EGLIN AFB	RED BAY, FL	RPG	EVX	FE2823
FT CAMPBELL	TRENTON, KY	RPG	HPX	FY4812
FT DRUM	MONTAGUE, NY	RPG	TYX	FY4846
FT HOOD	GRANGER, TX	RPG	GRK	FY4824
FT POLK	FT POLK, LA	RPG	POE	FY4825
FT RUCKER	ECHO, AL	RPG	EOX	FY4805
HOLLOMAN AFB	RUIDOSO, NM	RPG	HDX	FE4801
LAUGHLIN AFB	BRACKETVILLE, TX	RPG	DFX	FE3099
MAXWELL AFB	CARRVILLE, AL	RPG	MXX	FE3300
MINOT AFB	DEERING, ND	RPG	MBX	FE4528
MOODY AFB	SOUTH STOCKTON, GA	RPG	VAX	FE4830
ROBINS AFB	JEFFERSONVILLE, GA	RPG	JGX	FE2067
VANCE AFB	CHEROKEE, OK	RPG	VNX	FE3029
VANDENBERG AFB	ORCUTT, CA	RPG	VBX	FE4610
<b>FAA</b>				
ANCHORAGE FAA (RPG 2)	KENAI, AK	RPG	AHG	6901AJ
ANCHORAGE FAA (RPG 1)	KENAI, AK	RPG	AHG	6901AJ
BETHEL FAA (RPG 2)	BETHEL, AK	RPG	ABC	690112

ATTACHMENT 1 (Continued)

EFFECTIVITY

NEXRAD Site Name	City, ST	EQP	SID	ORG Code
BETHEL FAA (RPG 1)	BETHEL, AK	RPG	ABC	690112
FAIRBANKS FAA (RPG 2)	FAIRBANKS, AK	RPG	APD	690178
FAIRBANKS FAA (RPG 1)	FAIRBANKS, AK	RPG	APD	690178
KAMUELA/KOHALA APT(RPG 2)	KAMUELA, HI	RPG	HKM	699235
KAMUELA/KOHALA APT(RPG 1)	KAMUELA, HI	RPG	HKM	699235
KING SALMON FAA (RPG 2)	KING SALMON, AK	RPG	AKC	690137
KING SALMON FAA (RPG 1)	KING SALMON, AK	RPG	AKC	690137
MIDDLETON ISLAND (RPG 2)	MIDDLETON ISLAND, AK	RPG	AIH	690140
MIDDLETON ISLAND (RPG 1)	MIDDLETON ISLAND, AK	RPG	AIH	690140
MOLOKAI FAA (RPG 2)	MOLOKAI, HI	RPG	HMO	699213
MOLOKAI FAA (RPG 1)	MOLOKAI, HI	RPG	HMO	699213
NOME FAA (RPG 2)	NOME, AK	RPG	AEC	690147
NOME FAA (RPG 1)	NOME, AK	RPG	AEC	690147
SAN JUAN FAA (RPG 2)	SAN JUAN, PR	RPG	JUA	69F362
SAN JUAN FAA (RPG 1)	SAN JUAN, PR	RPG	JUA	69F362
SITKA FAA (RPG 2)	BIORKA ISLAND, AK	RPG	ACG	690141
SITKA FAA (RPG 1)	BIORKA ISLAND, AK	RPG	ACG	690141
SOUTH KAUAI FAA (RPG 2)	SOUTH KAUAI, HI	RPG	HKI	699211
SOUTH KAUAI FAA (RPG 1)	SOUTH KAUAI, HI	RPG	HKI	699211

NWS: EHB-6, Modification Note 77  
 DoD: TO 31P1-4-108-621  
 FAA: EEM Modification Handbook 6345.1 CHG 50, Chap 46

ATTACHMENT 1 (Continued)

EFFECTIVITY

NEXRAD Site Name	City, ST	EQP	SID	ORG Code
SOUTH SHORE FAA (RPG 2)	NAALEHU, HI	RPG	HWA	699201
SOUTH SHORE FAA (RPG 1)	NAALEHU, HI	RPG	HWA	699201

ATTACHMENT 2

FRAME RELAY HARDWARE AND SOFTWARE MODIFICATION COMPLETION FORM

**\*\*\*\*\* DoD Only will complete and return this form \*\*\*\*\***  
**NWS report completion through EMRS**  
**FAA report completion through LEMS**

Site Name: \_\_\_\_\_

Site Identifier: \_\_\_\_\_

Total Time to Complete this Modification Document: \_\_\_\_\_

Technician's Name(s): \_\_\_\_\_

Technician's Phone Number: \_\_\_\_\_

Date Completed: \_\_\_\_\_

Circuit Number: \_\_\_\_\_

Problem(s) Encountered:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Upon completion of this form, return the information to the ROC using one of the four methods below:

1. Mailing Address: Program Branch, Retrofit Management Team  
WSR-88D Radar Operations Center  
3200 Marshall Ave., Suite 101  
Norman, OK 73072-8028
2. FAX Number: (405) 573-3480  
ATTN: Retrofit Management Team
3. E-mail Address: [NEXRAD.Logistics@noaa.gov](mailto:NEXRAD.Logistics@noaa.gov)
4. Web Version: <http://www.roc.noaa.gov/ssb/logistics/complete/>