COMMUNICATIONS EQUIPMENT MODIFICATION NOTE 38, Revision A (for Electronics Technicians)
Maintenance Branch
W/OPS12: GSS

SUBJECT : Console Replacement System (CRS) Output Channel Expansion

PURPOSE : To expand the capabilities of the CRS system from a Large 7 channel to a Maximum 9 channel configuration.

SITES AFFECTED :

Site Name	SID	Org. Code
WFO Chicago, IL	LOT	WR9969

EQUIPMENT AFFECTED : CRS (B440)

PARTS REQUIRED : The parts required will be issued to each site by W/OPS12 from the National Logistics Support Center under the applicable approved site-specific Request for Change CRH724.

(1) Front-End Processor (FEP) hold-down strap (ASN: B440-STRAP)
(1) FEP Computer (ASN: B440-2A2)
(1) FEP hard disk drive (ASN: B440-2A2A8-FEP)
(1) Local area network (LAN) board (ASN: B440-1A8A10)
(1) LAN cable segment (ASN: B440-2W1)
(1) BNC tee connector (ASN: B440-4J1)
(1) FEP switch VGA video cable (ASN: B440-2W3)
(1) FEP switch PS/2 keyboard cable (ASN: B440-2W4)
(1) DECtalk card (ASN: B440-2A2A11XX)
(2) Audio Switch Module (ASM) cards (ASN: B440-2A6A3)
(2) DECtalk-ASM audio cable (ASN: B440-4W12)
(1) NOAA Weather Radio Specific Area Message Encoder (NWRSAME) Encoder-ACP interface cable (ASN: B440-1A5W4)
(1) DOS formatted diskette with CRS test database ASCII files (provided by W/OPS12)

PARTS SUPPLIED BY THE SITE : The following parts are to be provided by the site:

(2) Transmitter audio output cables
(1) NWRSAME Encoder (if available)
Cable marking tags and tie-wraps, as needed

TOOLS AND TEST EQUIPMENT REQUIRED	:	#1 and #2 Phillips screwdrivers CRS test database ASCII files diskette provided by W/OPS12 (see Parts Required) Small flat-blade jeweler's screwdriver Root mean square (RMS) voltmeter/dB meter 600-ohm dummy load with a RJ-11 plug attached Anti-static workstation kit
TIME REQUIRED	:	3 Hours
EFFECT ON OTHER: INSTRUCTIONS		None.
AUTHORIZATION	:	The authority for his modification is Request For Change CRH724.
VERIFICATION STATEMENT	:	This procedure has been verified at Weather Service Headquarters (WSH) Silver Spring, MD (SLVM2).
GENERAL	:	This procedure contains instructions to add output channel(s) to the CRS system and is contained in the attachments.
PROCEDURE	:	Attachment **A** provides procedures for implementing this modification. Attachment **B** (CRS Hardware Drawings) provides reference information. Attachment **C** provides verification of the new physical configuration (used before applying power). Attachment **D** provides a completed sample of WS Form A-26, Maintenance Record.

REPORTING INSTRUCTIONS	:	Report the completed modification on WS Form A-26, Maintenance Record, according to the instructions in Engineering Handbook No. 4 (EHB-4), Engineering Management Reporting System (EMRS), part 2, and EHB-4 appendix I. Include the following information on the A-26:

a. An equipment code of '**CRSSA**' in block 7.
b. A serial number of '**001**' in block 8.
c. The **ASN** and **NSN** of the FEP in block 13.
d. A Mod No. of '**38A**' in block 17a.
e. **Serial number** for the FEP in block 18.

A sample WS Form A-26 is provided as attachment **D**.

John McNulty
Chief, Maintenance, Logistics, and Acquisition Division

Attachment **A** - Procedure
Attachment **B** - CRS Hardware Drawings
Attachment **C** - New Configuration Physical Verification
Attachment **D** - WS Form A-26 Sample

Attachment A

Modification Procedure

Attachment A
Modification Procedure

Overview

This modification note provides instructions for expanding a Console Replacement System (CRS) from a LARGE 7 channel configuration to a MAXIMUM 9 channel configuration. The modification procedure contains seven parts:

1. CRS Power-Down Procedures
2. Equipment Upgrade Procedures
3. CRS Power-Up Procedures
4. CRS Login, Application Software Error Verification, and Test Database ASCII File Loading Procedures
5. Post Hardware Expansion Channel Operability Verification Procedures
6. Adding New Transmitter Channels and Editing Site Database ASCII File Procedures
7. ASM Alignment Procedures

NOTE:

1. Read the entire procedure and verify receipt of all required parts before proceeding with the actual modification.

2. Coordinate with the operations staff before performing this procedure.

CAUTION

CRS must be down to perform the expansion modification. This modification contains test messages that should not be broadcast on any transmitter.

In addition, the site database ASCII file will be recompiled and all dictionary files will be lost! Switch to backup NWR system and ensure the dictionary files are backed up (see the *CRS System Administration Manual*) before performing this modification.

NOTE:

3. The new 3FEP setup procedures in part 2, sections 2.1 and 2.2 can be performed prior to shutting down the system. This saves downtime for the current CRS operational system.

PART 1 - CRS POWER-DOWN PROCEDURES

1.1 CRS Application Shutdown Procedure

1. Click the **System** menu and click **Stop System**.
2. Wait until all icons on the *CRS System Status* menu turn **red**.

1.2 UNIX Shutdown Procedure

NOTE: 1. The shutdown of the CRS application is just one task before the graceful power-down. After stopping the CRS application software, implement a "controlled/orderly UNIX shutdown with NO automatic reboot" on the main processor (MP), and implement a "controlled/orderly UNIX shutdown" on all FEPs. Upon completion of the controlled/orderly UNIX shutdown, power-down the processors in the following order: MPs first followed by the FEPs.

1. Click the **Maintenance** menu in the main CRS menu to access the *Maintenance* pull-down menu.
2. Click **UNIX Shell** in the *Maintenance* pull-down menu. A UNIX xterm window pops up for the entry of UNIX commands.
3. Type the following UNIX command in the xterm window:

   su root
4. Press the **Enter** key. The shell responds with a prompt to enter root passwords.
5. Type the password for the root.
6. Press the **Enter** key. The shell prompt changes to a pound sign indicating that all subsequent UNIX command entries have root authority.
7. Type the following UNIX command in the xterm window:

   rsh 5MP /sbin/shutdown -i0 -g0 -y
8. Press the **Enter** key. The shell command prompt returns after displaying a confirmation of shutdown initiation on 5MP. UNIX on processor 5MP shuts down.
9. Type the following UNIX command in the xterm window:

   rsh 1FEP /sbin/shutdown -i0 -g0 -y
10. Press the **Enter** key. The shell command prompt returns after displaying a confirmation of shutdown initiation on 1FEP. UNIX on processor 1FEP shuts down.
11. Type the following UNIX command in the xterm window:

    rsh 2FEP /sbin/shutdown -i0 -g0 -y

12. Press the **Enter** key. The shell command prompt returns after displaying a confirmation of shutdown initiation on 2FEP. UNIX on processor 2FEP shuts down.
13. Type the following UNIX command in the xterm window:

    rsh 4BKUP /sbin/shutdown -i0 -g0 -y
14. Press the **Enter** key. The shell command prompt returns after displaying a confirmation of shutdown initiation on 4BKUP. The UNIX on processor 4BKUP shuts down.
15. Type the following UNIX commands in the xterm window:
    a. **cd /**
    b. Press the **Enter** key.
    c. Type **/sbin/shutdown -i0 -g0 -y**.
    d. Press the **Enter** key. Each CRS processor for the system may be safely powered-down when UNIX indicates shutdown is complete with the following message:

       Press any key to reboot…

NOTE: 2. Do not reboot any machine, go to 1.3.

1.3 CRS Hardware Power-Down Procedure

Power-down all CRS equipment at the operator's station and in the equipment room by turning off the following:

Operators Station	Equipment Room
0MP and Monitor	4BKUP
5MP and Monitor	1FEP
NWRSAME (all)	2FEP
	LAN Bridge
	LAN Server
	Monitor
	Printer
	ASA power supplies
	Modem

PART 2 - EQUIPMENT UPGRADE PROCEDURE

2.1 New 3FEP LAN Board and Hard Drive Installation Procedures

NOTE:	Removing and replacing circuit cards must be accomplished in an anti-static work area using approved anti-static procedures.

1. Remove the right side cover of the new 3FEP using the following procedure:
   a. Remove the right three screws located on the back of the system unit (see attachment **B,** figure A-1). These screws secure the right side access panel of the system to the chassis.
   b. Pull the panel backward while lifting it upward.
2. Remove the screws holding expansion slot covers 1 through 4 (see attachment **B**, figure A-13). Retain the screws for use in 1FEP and 4BKUP (see 2.3, step 6).
3. Remove and retain the expansion slot covers for use in 1FEP and 4BKUP (see 2.3, step 6).
4. Install the new LAN card (ASN: B440-1A8A10) in expansion slot number 1 and reinstall a retaining screw.

2.2 Installation of the Hard Disk Drive (HDD) and Cage Combination Procedure

1. Align the three slides on the HDD cage with the three slots on the upper left corner of the chassis.
2. Insert the slides into the slots holding the HDD cage at an angle away from the chassis.
3. Slide the HDD cage towards the bottom of the chassis and swing the HDD cage into the chassis body.
4. Align the two screw slots at the top with the threaded holes in the chassis and secure the HDD cage with two screws.
5. Secure the HDD cage with a single screw at the tab located at the lower right corner of the HDD cage (see attachment **B**, figure A-13).
6. Hookup the hard disk drive cable to the HDD. Cable connectors are keyed and only fit one way. Connect the other end of the HDD cable to the SCSI port on 3FEP motherboard.
7. Connect a power connector from the power supply to the hard disk drive.

NOTE: Perform Part 1, CRS Power-down Procedure before proceeding.

2.3 1FEP and 4BKUP DECtalk Card Removal Procedure

NOTE: 1. Removing and replacing circuit cards must be accomplished in an anti-static work area using approved anti-static procedures.

1. Remove all cabling from 1FEP, 2FEP, and 4BKUP and remove 1FEP and 4BKUP from the equipment rack to the anti-static work area (see attachment **B**, figure A-5).
2. Remove the DECtalk cards from slot 5 of both the 1FEP and 4BKUP units using the following procedure:
   a. Access the DECtalk cards by removing the right three screws located on the back of the system unit. These screws secure the right side access panel of the system to the chassis (see attachment **B**, figure A-1).
   b. Pull the panel backward and lift upward.
3. Remove the screw that holds the DECtalk card in place.
4. Carefully remove the DECtalk card from the expansion slot by placing your hands on the right and left edges of the card and pulling the card up out of the chassis.

NOTE: 2. These two DECtalk cards will be placed in the new 3FEP.

5. Place one of the expansion slot covers removed from the new 3FEP in 1FEP and 4BKUP at expansion slot 5, using one of the removed screws.
6. Replace 1FEP and 4BKUP right side covers using the reverse procedure in step 2.
7. Replace 1FEP and 4BKUP in the CRS Main Unit Cabinet.
8. Reconnect all cabling to 1FEP, 2FEP, and 4BKUP with the exception of the DECtalk to ASM audio cables.

2.4 DECtalk Card Configuration for the Appropriate I/O Address Procedure

NOTE: 1. Depending on the CRS site configuration, there may be as many as five DECtalk cards per FEP. DECtalk cards are identified as module numbers 0, 1, 2, 3, and 4 located in slots 2 through 6.

1. Configure each DECtalk card removed above and the new DECtalk card (ASN: B440-2A2A11) for the appropriate I/O address, through Switch 2 (SW2) as defined in table 1 and pictured in attachment **B**, figure A-11.

Table 1. DECtalk Card Switch 2 (SW2) Settings

Module #	SW2-1	SW2-2	SW2-3	SW2-4	SW2-5	SW2-6	I/O Address	PC Slot
0	off	off	off	on	off	off	240	2
1	off	on	off	on	off	off	250	3
2	on	off	on	off	off	on	328	4
3	off	off	on	on	off	on	360	5
4	off	off	off	off	on	on	380	6

NOTE: 2. Regardless of FEP, DECtalk card configuration remains constant, meaning that modules 0, 1, 2, 3, and 4 are configured the same for each FEP.

2. Using table 1, set up a DECtalk card with the I/O address: 240
   Install the DECtalk card into slot 2 of the new 3FEP.
3. Using table 1, set up a DECtalk card with the I/O address: 250
   Install the DECtalk card into slot 3 of the new 3FEP.
4. Using table 1, set up a DECtalk card with the I/O address: 328
   Install the DECtalk card into slot 4 of 3FEP.
5. Replace the 3FEP cover removed using the reverse procedure in section 2.1, step 1.

2.5 3FEP Computer Installation Procedure

1. Install 3FEP in the CRS Main Unit Cabinet.
2. Install the new FEP Switch VGA Video Cable (ASN: B440-2W3) between 3FEP video out and switch position B).
3. Install the new FEP Switch PS/2 Keyboard Cable (ASN: B440-2W4) between 3FEP keyboard connection and switch position B.
4. Install the new LAN cable segment (ASN: B440-2W1) and BNC tee connector (ASN: B440-4J1) to connect the 3FEP PC into the existing CRS LAN (3FEP shall be connected between 2FEP and 5MP). (See figure A-15).

2.6 ASM Card Installation Procedure

1. Remove audio switching assembly (ASA) slot 8 and 9 covers by removing the two screws.

NOTE: There are five jumpers to be set on each ASM card.

2. Take one of the new ASM cards (ASN: B440-2A6A3) and set the jumpers for slot 8 of the ASA in accordance with table 2.

Table 2. ASM Card Jumper Settings

	ASA Slot #	Silence Alarm Jumper "JP1"	ACP Channel Sel. Jumper "JP2" & "JP3"	BKUP Live/ Playback Cntrl Jumper "JP4"	FEP Select Jumper "JP5"
ASM 1 (channel 1)	1	EN (Enable)	1	BUL2	FEP1
ASM 2 (channel 2)	2	EN (Enable)	2	BUL2	FEP1
ASM 3 (channel 3)	3	EN (Enable)	3	BUL2	FEP1
ASM 4 (channel 4)	4	EN (Enable)	4	BUL2	FEP2
ASM 5 (channel 5)	5	EN (Enable)	5	BUL2	FEP2
ASM 6 (channel 6)	6	EN (Enable)	6	BUL2	FEP2
ASM 7 (channel 7)	7	EN (Enable)	7	BUL2	FEP3
ASM 8 (channel 8)	8	EN (Enable)	8	BUL2	FEP3
ASM 9 (channel 9)	9	EN (Enable)	9	BUL2	FEP3
ASM PB1 (mon/playback chan 1)	PB1	DIS (Disable)	PB1	PB	FEP1
ASM PB2 (mon/playback chan 2)	PB2	DIS (Disable)	PB2	PB	FEP2

3. Install the new ASM card into Slot 8 of the ASA chassis and tighten the two screws.

4. Repeat steps 2 and 3 for each of the remaining ASM cards.

2.7 Operational and Spare ASC Jumper Setting and Cable Installation Procedure

1. Disconnect five DECtalk-ASC audio cables (labeled as 4-1, 4-2, 4-3, 4-4, and 4-5).
2. Disconnect the two ACP-ASC audio cables.
3. Disconnect the ASC-4BKUP parallel port interface cables.
4. Disconnect the two ACP-ASC control cables.
5. Loosen the four front panel screws and extract the ASC card.
6. On both the operational and spare ASC, set the backup channel configuration using the seven jumpers on JP1. Using all seven jumpers, move the jumpers to the side of the block that lists the number of output channels for your site configuration, the center row of pins being common. Example: Using **Figure 1** as a reference if your site configuration had 5, 6, 9, or 10 channels, each jumper would connect from the center row of pins to the top row of pins. If your site configuration had 1, 2, 3, 4, 7, 8, 11, 12, or 13 channels, each jumper would connect from the center row of pins to the bottom row of pins.

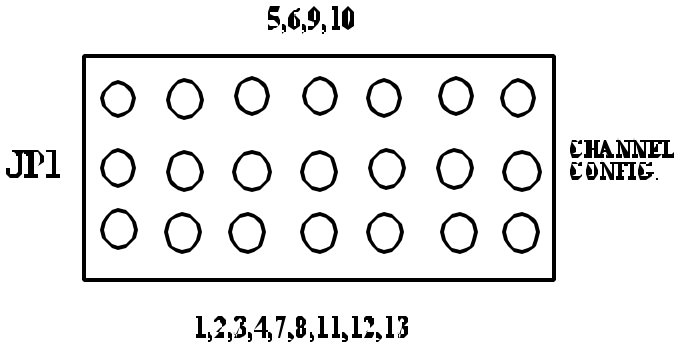

Figure 1. ASM Card Jumper Block

7. Insert the ASC back into the ASA and tighten the four front panel screws.
8. Reconnect the two ACP-ASC control cables.
9. Reconnect the ASC-4BKUP parallel port interface cable.
10. Reconnect the two ACP-ASC audio cables.
11. Reconnect existing DECtalk-ASC audio cables on 4BKUP in accordance with table 3 with the exception of the unused cable labeled 4-4. Tie the unused cable back with tie-wraps.

Table 3. DECtalk to ASC Audio Cables

From	To	Cable Label
4BKUP DECtalk 1 “J2” Port	ASC “BKUP Audio 1” Port	4-1
4BKUP DECtalk 2 “J2” Port	ASC “BKUP Audio 2” Port	4-2
4BKUP DECtalk 3 “J2” Port	ASC “BKUP Audio 3” Port	4-3
4BKUP DECtalk 5 “J2” Port	ASC “BKUP Audio 5” Port	4-5

CAUTION

Ensure the unused DECtalk-ASM/ASC cable 4-4 is not connected to any ASM/ASC ports.

2.8 DECtalk-ASM Audio Cable Installation Procedure

1. Using write-on cable labels, mark and connect the new DECtalk-ASM audio cables on FEP3 in accordance with table 4.
2. Reconnect and relabel the existing DECtalk-ASM audio cables on 1FEP and 2FEP in accordance with table 4 with the exception of the unused slot 5 DECtalk-ASM cable labeled 1-4. Tie the unused cable back with tie-wraps.

Table 4. DECtalk to ASM Audio Cables

From	To	Cable Label
1FEP DECtalk 1 “J2” Port	ASM 1 “IN Port”	1-1
1FEP DECtalk 2 “J2” Port	ASM 2 “IN Port”	1-2
1FEP DECtalk 3 “J2” Port	ASM 3 “IN Port”	1-3
2FEP DECtalk 1 “J2” Port	ASM 4 “IN Port”	2-1
2FEP DECtalk 2 “J2” Port	ASM 5 “IN Port”	2-2
2FEP DECtalk 3 “J2” Port	ASM 6 “IN Port”	2-3

From	To	Cable Label
3FEP DECtalk 1 “J2” Port	ASM 7 “IN Port”	3-1
3FEP DECtalk 2 “J2” Port	ASM 8 “IN Port”	3-2
3FEP DECtalk 3 “J2” Port	ASM 9 “IN Port”	3-3
1FEP DECtalk 5 “J2” Port	ASM PB1 “IN Port”	1-5
2FEP DECtalk 5 “J2” Port	ASM PB2 “IN Port”	2-5

CAUTION

Ensure the unused DECtalk-ASM/ASC cable 1-4 is not connected to any ASM/ASC ports.

2.9 New Transmitter Audio Output Cable Installation Procedure

1. Install the new audio output cable to connect the OUT 1 port of new ASM card at slots 8 and 9 of the ASA chassis to the Demarc Panel position for the new transmitters.
2. Install the new NWRSAME encoders (if available) to the top panel of the 5MP workstation (if available).
3. Install the Encoder-ACP interface cable from the NWRSAME encoder rear connector to the SAME Input 1 port of ACP2 rear panel (this connects to pins 2, 6, 7, 9, and 10 of the NWRSAME encoder), if available.

NOTE: This completes the hardware modification.

PART 3 - CRS POWER-UP PROCEDURES

*****WARNING*****

Prior to powering-up the FEPs, perform the *New Configuration Physical Verification* procedure contained in attachment C to verify proper system configuration. Failure to

perform the procedure, can result in transmitter broadcasts assigned to incorrect output channels.

3.1 Power-Up FEP Procedure

1. To power-up the FEPs, press the **ON/OFF** switches located on the front of the enclosures (center right). A green power LED on each FEP lights indicating power is on. The FEPs can be powered-up in any sequence. The FEPs go through a memory check, display the system configuration (as recognized by the BIOS), then boot the embedded operating system. At the completion of the boot process, the console screen displays the prompt, **Console Login:**. The embedded operating system automatically initializes to a pre-set level and then waits for final start-up commands from the master MP.

NOTE: The FEPs share a common console through the Shared Monitor Switch. The console displays messages while completing the boot process of the FEP currently switched in.

2. Use the Shared Monitor Switch to select the next FEP. The console monitor displays:

   Press <F1> to resume, <F2> to Setup
3. Press **F1** to complete the boot process. The prompt, **Console Login:** displays.
4. Repeat for each remaining FEP.

3.2 Power-up Main Processors Procedure.

NOTE: 1. Power-up 0MP as the master main processor and 5MP as the shadowing processor.

To power-up the MPs, press the **ON/OFF** switches located on the front of the enclosures (center right). A green power LED on each MP lights indicating that power is on. The MPs can be powered-up in any sequence. The MPs go through a memory check, file system check, system configuration verification (as recognized by the BIOS), and then boot the embedded UNIX operating system. At the completion of the boot process, the workstation screen displays the CRS Login screen. The MPs are now ready for the initialization of the CRS application software.

NOTE:

2. For Build 6.4 and higher: Following power-up, CRS displays the *Security Screen*. To continue the login process, click the **Acknowledge** button.
3. Whenever the MPs are powered-up, they automatically step through the boot process to the multiuser mode without operator intervention.

3.3 CRS Application Software Installation on the New FEP Procedure

1. From an MP workstation at the CRS Login Screen, type **root** (to Logon as root) in the Login ID field and press **Enter**. The cursor moves to the *Password* field.
2. Type in your assigned password and press **Enter** to complete the CRS login process. The system displays the *UNIXWare Desktop*.
3. Double-click the **Admin_Tools** icon from the *UNIXWare Desktop*. The *Admin Tools* window displays.
4. Double-click the **App_Installer** icon from the *Admin Tools* window. The *Application Installer* window displays. This window is divided into two windows. All procedures that follow are accomplished in the upper window.

NOTE:

1. You will need the CD that has your current version of software loaded on the CRS system.

5. Place the CD with the CRS software into the CD-drive.
6. Select **CD-ROM_1**, from the upper window, as your media to install. Three icons display: *crsopsais* (auto installer), *crsopsfpm* (FEP multi-pack), *crsopsmpm* (MP multi-pack).
7. Select **crsopsais**, and click the **Install** button on the right side of the upper window. The *auto_install* window displays and the installation script starts. The installation script stops for you to make a selection of the installation type. The following statements display:

   Build installation options.
   a) all processors (0MP, 5MP, 1FEP, 2FEP, 3FEP, 4BKUP)
   f) front-end processors (1FEP, 2FEP, 3FEP, 4BKUP)
   m) master processors (0MP, 5MP)
   s) specific processor
   Select Installation Option (default: a)

8. Type **a** and press **Enter**. Numerous installation status messages on the *auto_install* window display. Follow the on-screen instructions and answer any questions asked. When the installation process completes, the CRS displays:

   Continue 0MP shutdown? (default: y)

9. Press **Enter** to reboot 0MP.

NOTE:	2. For Build 6.4 and higher: Following power-up, CRS displays the *Security Screen*. To continue the login process, click the **Acknowledge** button.

10. Use the *Shared Monitor Switch* on the equipment rack to select the next FEP for rebooting. The console monitor displays:

    Press <F1> to resume, <F2> to Setup.

11. Press **F1** to complete the boot process. The prompt, **Console Login:** displays.

PART 4 - CRS LOGIN, APPLICATION SOFTWARE ERROR VERIFICATION, AND TEST DATABASE ASCII FILE LOADING PROCEDURES

4.1 CRS Login Procedure

NOTE:	1. For Build 6.4 and higher: Following power-up, CRS displays the *Security Screen*. The operator must acknowledge the Security Screen by clicking on the **Acknowledge** button to continue the login process. 2. The CRS Login Screen allows you to log onto CRS. This screen contains two fields, i.e., *Login ID* and *Password*. The fields are provided to allow you to type in your assigned login ID and password.

1. Type **admin** (for system administrator) in the *Login ID* field and press **Enter**. The cursor moves to the *Password* field.
2. Type in your assigned password and press **Enter** to complete the CRS login process. The system displays the *CRS main* display. In addition, the system displays the following error message:

   System is not operational. Perform 'Start CRS' to start system.

3. Click **OK** to clear the message.

NOTE:	3. The error message is only a status message indicating that CRS is not running.

4.2 CRS Applications Software Installation Error Verification Procedure

1. Open a UNIX Shell
   a. Click **Maintenance**.
   b. Click **UNIX Shell**.
2. Type **grep ERROR /crs/install.log** and press **Enter**.
3. Ensure there are no error messages. Any error messages must be reported to CRS Site Support Staff at 301-713-0191 x 145 or 144.
4. Type **grep WARNING /crs/install.log** and press **Enter**.
5. Ensure there are no error messages. Any error messages must be reported to CRS Site Support Staff at 301-713-0191 x145 or x144.

NOTE: Ignore any IP address error messages.

4.3 CRS Test Database ASCII File Loading Procedure

NOTE: 1. The following instructions for loading the CRS test database ASCII file assume that everything is being done with 0MP set as the MP.

1. Place the diskette with CRS test database ASCII files in the 0MP diskette drive to copy the desired file from the diskette to CRS.
   a. Type **mdir a:** and press the **Enter** key to display a directory listing of the files on the test database diskette. There are 13 files on the diskette with the following filename convention:

      TYP*W*_CFG.ASC where *W* = 1 - 4
      LRG*X*_CFG.ASC where *X* = 5 - 8
      MAX*Y*_CFG.ASC where *Y* = 9
      MAX*Z*_CF.ASC where *Z* = 10 - 13
      (*W*, *X*, *Y*, and *Z* represent the number of channels supported by your CRS)

   b. Locate the applicable test database ASCII file.
   c. Type **mcopy -t a:filename /crs/data/SS/filename**.

NOTE: 2. Where *filename* is the name of the CRS test database ASCII file to be used.

   d. Press the **Enter** key.

2. Click and hold the left mouse button on any white space, move the cursor to select **XCRS_SITE Utility,** and release the button to bring up the *XCRS_SITE Utility* window.

3. Click the **Select ASCII Site Setup** button to bring up the list of ASCII files.

4. Select the desired database ASCII filename that you copied from the diskette in 4.3 step 1.c and double click.

NOTE: 3. The directory selection block has a default directory name of /crs/data/SS, and the file filter block has a default file name of /crs/data/SS/*.ASC. If the desired filename does not appear, it may have copied to the wrong directory in section 4.3 step 1.c. If that is the case, change the default directory name to the directory specified in section 4.3 step 1.c. The other reason the filename does not appear is because it is being filtered out. Remember, UNIX is case sensitive and if copied with an asc extension that was in lower case, it does not display. Change the filter file name to **/crs/data/SS/*.asc**, and the filename displays.

5. Select *Initialize System Configuration and Database* to ensure the entire system database and configuration is erased and replaced.

6. Click the **Start Site Configuration** button. The system displays:

   Will now perform FULL site reconfiguration. Continue?

7. Click **OK**. The “wristwatch” and the “working” message display. Several messages scroll by. The last message reads:

   Finished with site configure

   The “wristwatch” and “working” message disappear. Ensure there are no error messages at the completion of the site configuration process.

8. Restart CRS by clicking on **Start CRS System**. The system displays:

   The CRS system will be STARTED. Continue?

9. Click **OK**. The “wristwatch” and the “working” message display. Several messages scroll by. The last message refers to starting 4BKUP. The “wristwatch” and “working” message disappear.

10. Click **Exit** to close the *XCRS_SITE Utility* window.

11. Click the **UNIX Shell** window to select it. At the prompt type **Exit** and press **Enter** to close the *UNIX Shell*.

12. Open the *System Status* window.

    a. Click **System**.

    b. Click **System Status**.

13. Monitor the *System Status* window and ensure the system is operational.

PART 5 - POST HARDWARE EXPANSION CHANNEL OPERABILITY VERIFICATION PROCEDURES

5.1 Channel Operability Verification Procedure

NOTE:	The CRS test database ASCII files contain test messages configured for continuous broadcast for channel operability verification.

1. Connect a monitor speaker or headphones to the ACP.
2. Using the Channel Select control, select each channel, one at a time, and monitor the output for the correct message (i.e., with channel one selected, the message output is: *This is transmitter one, audio switch module one.*).

5.2 FEP Backup Mode Channel Operability Verification Procedure.

1. Click **Maintenance**.
2. Click **Front-End Processor Switch**.
3. Select **1** in the *Front-End Processor Switch* window under FEP.
4. Select **Out** under *Switch*.
5. Select **Yes** under *Backup*
6. Click the **Save the current record** icon to execute the FEP switch process. The *Question* window displays:

   Switch out the FEP FULLY offline ???
7. Click **OK** to continue. The system displays the “wristwatch” and the “Requesting FEP Switchout” message.
8. Monitor the *FEP1* and *BKUP System Status* icons and verify FEP1 is in backup mode and the *BKUP* icon displays the online status.
9. Upon completion of the FEP switch process, repeat section 5.1 steps 1 and 2.
10. Upon completion of the FEP backup mode channel operability verification, perform the following to display the *Front-End Processor Switch* window:
    a. Click **Maintenance**.
    b. Click **Front-End Processor Switch**.
11. In the *Front-End Processor Switch* window under FEP: select **1**.
12. Under *Switch*: select **IN** to switch FEP1 back in.

13. Click the **Save the current record** icon to execute the FEP switch process. The system displays the “wristwatch” and the **Requesting FEP switch-in...** message.

14. Monitor the *FEP1* and *BKUP System Status* icons and verify FEP1 is online and the *BKUP* icon displays the backup mode status.

15. When the system returns to normal operation, perform the following steps to close the *Front-End Processor Switch* window and stop CRS:

    a. On the *Front-End Processor Switch* window:

        1) Click **File**.

        2) Click **Exit**.

    b. On the *Main CRS* menu:

        1) Click **System**.

        2) Click **Stop System**.

        3) Click **OK**.

        4) Click **Close**.

16. Monitor the *System Status* window and verify the CRS application has stopped.

PART 6 - ADDING NEW TRANSMITTER CHANNELS AND EDITING SITE DATABASE ASCII FILE PROCEDURES

6.1 Adding New Transmitter Channels Procedure

1. Click and hold the left mouse button on any white space, move the cursor to select **XCRS_SITE Utility,** and release the button to bring up the *XCRS_SITE Utility* window.

2. Click **Select ASCII Site Setup** button to bring up the list of ASCII files.

3. Select the current site database ASCII file and double click.

4. Click **Add Transmitter(s)** button to start the **addxmt** program. It displays how many channels currently are available, the next available channel to be added, and its appropriate processor and slot.

5. Use the following sequence of steps for each channel to be added:

    a. **Mnemonic**

        1) Type option number **1** and press **Enter** to select *Mnemonic*.

        2) Type **a** and press **Enter** at the program prompt to add *Mnemonic*.

3) Type **mmmmm** and press **Enter** (where mmmmm is the desired *Mnemonic*), up to a length of 5 characters. The program returns the *Mnemonic*.

4) Type **0** or press **Tab** and press **Enter** to complete *Mnemonic* selection.

b. **Call Sign**

1) Type option number **2** and press **Enter** to select *Call Sign*.

2) Type **a** and press **Enter** at the program prompt to add the *Call Sign*.

3) Enter the *Call Sign* in the same manner as the *Mnemonic*, up to a length of 5 characters. The program returns the *Call Sign*.

4) Type **0** or press **Tab** and press **Enter** to complete the *Call Sign* selection.

c. **Frequency**

1) Type option number **3** and press **Enter** to select *Frequency*. The *Frequency* option only allows a selection of one of the seven choices listed.

2) Type **n** and press **Enter** (where n is the desired *Frequency* choice). The program returns the *Frequency* choice by displaying an asterisk next to the *Frequency* selection.

3) Type **0** or press **Tab** and press **Enter** to complete the *Frequency* selection.

d. **Location**

1) Type option number **4** and press **Enter** to select *Location*.

2) Type **a** and press **Enter** at the program prompt to add the *Location*.

3) Enter the **Location** (in the same manner as the *Mnemonic* and the *Call Sign*) up to a length of 40 ASCII characters. The program returns the *Location*.

4) Type **0** or press **Tab** and press **Enter** to complete the *Location* selection.

e. **Add Transmitter**

1) Type option number **5** and press **Enter** to use all the parameters defined in the first four steps to configure a new channel in the database ASCII file. The program verifies that a new channel is really needed.

2) Type **y** and press **Enter**. The program returns the assignment of each channel to its proper processor and slot. The program tells you the appropriate database ASCII file has been updated and the original has been saved with the .SAV extension.

6. The program then asks if another channel is needed. If so, repeat steps 5 **a** through **e** for the next new channel. If not, type **n** and press **Enter** to exit the program.

6.2 Editing the Site Database ASCII File Procedure

1. When exit **addxmt** is done, the *Question* box displays:

   Ready to recompile selected ASCII file. Continue?

2. Click **Cancel** to close the *Question* box.
3. Select *Initialize System Configuration and Database* to ensure the entire system database and configuration is erased and replaced.
4. Click **Start Site Configure**. The *Question* box displays:

   Will now perform FULL site reconfiguration. Continue?

5. Click **OK** to recompile the database ASCII file. Upon completion of the database ASCII file recompile process, the system displays:

   Finished with site configure.

6. Restart CRS by clicking on **Start CRS System**. The system displays:

   The CRS system will be STARTED. Continue?

7. Click **OK**. The "wristwatch" and the "working" message display. Several messages scroll by. The last message refers to starting 4BKUP and the "wristwatch" and "working" message disappear.
8. Click **Exit** to close the *XCRS_SITE Utility* window.
9. Open the *Alert Monitor* window:
   a. Click **System**.
   b. Click **Alert Monitor**.

NOTE:	No attempt is made by **addxmt** to establish station identifiers, broadcast programs, broadcast suites, message types, voice parameters, keep alive messages, interrupt messages, etc. for the new channels. These must be configured through the CRS graphical user interface (see the *CRS Site Operator's Manual*) and updated in the site database ASCII file.

PART 7 - ASM ALIGNMENT PROCEDURES

NOTE: The output of each added ASM card must be aligned before placing in service. The alignments must be performed in the following sequence:

1. Verify ACP **Ref.** Mark Alignment.
2. ASM Card Alignment.

7.1 Verify ACP Ref. Mark Alignment Procedure

NOTE:
1. The ACP Ref. mark alignment can be performed independently and does not require the use of any tool or equipment.
2. Transmitter x in this procedure refers to the channel under test.

1. Set up the CRS for BUL (backup live). No system database is required.
2. Set the index mark on the **tone volume control** knob to the **Ref.** position.
3. Push the **Transmitter x** and **Enable** buttons in sequence to start BUL on channel x. The buttons are located in the **BACKUP LIVE** block area on the ACP front panel.

NOTE: 3. Do not send audio to a transmitter while performing this procedure.

4. Push the **Alert Tone 1** button to generate the 1050 Hz warning alert tone (WAT).
5. Ensure the VU meter on the ACP front panel indicates **0 dBm**.

NOTE: 4. The duration of 1050 Hz WAT is 10 seconds.

6. Adjust the tone volume control for a reading of **0 dBm**.
7. Repeat steps 4, 5 and 6 as necessary to obtain a reading of **0 dBm**.

NOTE: 5. When the tone volume control is set to the true Ref. position, the ACP provides the selected WAT output level of **0 dBm**.

8. To stop BUL, first push the **Enable** button, then push the **Transmitter x** button.

7.2 ASM Card Alignment Procedure

NOTE:

1. This alignment requires two people: one in the operations room and one in the equipment room.

2. When performing any of the following alignments, the system's output(s) must be disconnected from the telecommunications link and terminated into a 600-ohm load. All audio signal level measurements are taken across the 600-ohm load.

3. Transmitter **x**, in this procedure, refers to the channel under test.

1. Assemble the following required Equipment:
   - dB Meter to read the audio signal level
   - Small jeweler's screwdriver
   - 600-ohm dummy load with RJ-11 plug attached
2. Set up the CRS for BUL. No system database is required.
3. Set the index mark on the tone volume control knob to the **Ref.** position as described in section 7.1, Verify ACP Ref. Mark Alignment Procedure.
4. Push the **Transmitter x** and **Enable** buttons in sequence to start BUL on channel x. The buttons are located in the *BACKUP LIVE* block area on the ACP front panel.
5. Plug the RJ-11 connector (with the 600-ohm load attached) into the RJ-11 jack of OUT 1 on the ASM of transmitter x (output channel x).
6. Connect the dB meter across the 600-ohm load.
7. Push the **Alert Tone 1** button to send a WAT to the OUT 1 jack of ASM card 1.
8. Measure and record the signal level in dB across the 600-ohm load.
9. Using a small jeweler's screwdriver, adjust the transmitter gain control potentiometer through the ASM front panel until a reading of **0 dBm** is obtained across the 600-ohm load.

NOTE:

4. Table 5 provides equivalent V rms and V p-p values related to dBm (all referenced to 600-ohms) as an aid in referencing readings taken with measurement equipment that may not read directly in dBm.

Table 5. Voltages vs dBm (into 600-ohm load)

dBm	RMS	P-P	dBm	RMS	P-P	dBm	RMS	P-P
10	2.440	6.93	-4	0.480	1.35	-17	0.110	0.301
9	2.183	6.17	-5	0.430	1.20	-18	0.097	0.270

8	1.946	5.50	-6	0.390	1.03	-19	0.087	0.240
7	1.734	4.90	-7	0.345	0.96	-20	0.0775	0.215
6	1.546	4.37	-8	0.306	0.85	-21	0.690	0.194
5	1.377	3.89	-9	0.275	0.76	-22	0.061	0.170
4	1.228	3.47	-10	0.245	0.68	-23	0.054	0.152
3	1.094	3.01	-11	0.213	0.61	-24	0.048	0.135
2	0.975	2.75	-12	0.192	0.54	-25	0.043	0.120
1	0.869	2.46	-13	0.173	0.48	-26	0.039	0.108
0	0.775	2.15	-14	0.154	0.43	-27	0.034	0.096
-1	0.690	1.94	-15	0.138	0.38	-28	0.031	0.085
-2	0.610	1.70	-16	0.125	0.34	-29	0.028	0.076
-3	0.540	1.52				-30	0.024	0.068

NOTE:

5. The WAT output from the ACP nominally lasts 10 seconds. It is recommended that a second person push the **Alert Tone1** button for a near continuous tone output. This will smooth out the calibration effort and minimize the time required.

6. Primary (Out1) and secondary (Out2) outputs are two independent outputs. However, the output level of Out1 is affected by approximately 1.5 dB if Out2 is loaded.

7. During BUL, the VU meter monitors the ACP tone output, not the output of the ASM card. The ACP tone output is sent to the ASM card via the ASC for final output.

10. Repeat steps 7, 8 and 9 as necessary to obtain a reading of **0 dBm** for the channel under test.

11. To stop BUL, first push the **Enable** button and then push the **Transmitter x** button.

12. Repeat steps 1 through 10 to align each of the new ASM cards in the system.

13. Remember to activate each ASM card output by pushing the respective **Transmitter x** button and then the **Enable** button.