MAINTENANCE MANUAL

ORION™
REMOTE TEST UNIT & CONTROL CHANNEL MONITOR
(GPS SIMULCAST & VOTED NON-SIMULCAST APPLICATIONS)

TABLE OF CONTENTS

INTRODUCTION

SCOPE OF MANUAL

This manual covers programming, operation, and maintenance for the Orion radio version of the Remote Test Unit (RTU) and the Control Channel Monitor (CCM). The RTU and CCM are used where there is no direct connection to the Site Controller, and instructions from the Site Controller are conveyed over the Control Channel. An RTU and CCM combination is used at each transmitter site in an EDACS Simulcast system, while a CCM by itself is used at each Auxiliary (Satellite) Receiver Site.

RELATED MANUALS

For additional information, see one or more of the following related manuals:

TQ-3374 V14 (or later) - Radio Programming Guide

LBI-38984 - User's Guide, EDACS System Manager

LBI-38888 - Operator's Manual, Orion Control Unit

LBI-38992 - Maint. Manual, Orion Control Unit

LBI-38903 - Maint. Manual, Orion VHF Mobile

LBI-39172 - Maint. Manual, Orion VHF Mobile, Dual Bandwidth

LBI-38904 - Maint. Manual, Orion UHF Mobile

LBI-39162 - Maint. Manual, Orion UHF Mobile, Dual Bandwidth

LBI-38902 - Maint. Manual, Orion 800 MHz Mobile

LBI-38906 - Maint. Manual, Orion 900 MHz Mobile

TECHNICAL ASSISTANCE

For technical assistance, contact the Ericsson Technical Assistance Center (TAC) at the number shown on the last page of this manual.

ERICSSON

DESCRIPTION

HARDWARE

The Orion radio version of the RTU or CCM consists of an Orion radio specially prepared for one of these diagnostic functions (you cannot modify a regular Orion radio in the field to be an RTU or CCM). The RTU comes equipped with a control unit; the CCM comes without a control unit. Additional special preparation consists of the following:

- Lowest power model for frequency range
- Adjusted for reduced power
- Contains TU (diagnostic) flash software
- Enabled as a diagnostic radio (see note)

NOTE

Note that the radio must be enabled as a diagnostic radio in the factory. This is not the same as enabling the "MRK and ORION Diagnostics Test Mode" in the user-configurable Radio Diagnostics screen of the radio personality programming software.

The RTU (when used) and the CCM are mounted in a single 3-RU (5.25-inch high) Orion Radio Shelf, as shown in Figure 1. The shelf also contains a fan and Orion Radio Shelf harness for each Orion radio installed. Each harness includes a separate programming switch and external connectors for programming, DC power, and alarm system. In addition, the shelf contains a 30 dB attenuator (when the RTU is included), a Buffer Board, and internal coaxial and Buffer Board cables. See the Parts Lists and Interconnection Diagrams at the end of this manual for more details.

APPLICATIONS

The RTU checks the operation of the Control Channel at a transmitter site by monitoring the channel for correct sync and message integrity. The RTU is also used to check the operation of the Working Channels at a transmitter site in an EDACS Simulcast system by simulating a user placing a call request on the system. The RTU checks high and low speed data received from the assigned Working Channel at the site, and the assigned Working Channel GETC at the site checks high and low speed data received from the RTU. Although the RTU comes with a control head, a microphone should never be attached, and no attempt should ever be made to use it as a test or service radio.

CAUTION

DO NOT connect a microphone to an RTU and try to use it as a test or service radio. The system software was not designed to support this mode of operation. Attempting to use the radio in this mode may have undesirable effects on the operation of the system.

The CCM is used to obtain channel assignment and channel drop information from the Control Channel, and provide it (via the BSL) to the Working Channel GETCs at an EDACS Simulcast or Auxiliary Receiver site. This information allows each Working Channel GETC to determine when it has been assigned to a call and when the call is dropped. See the Operation section of this manual for more details.

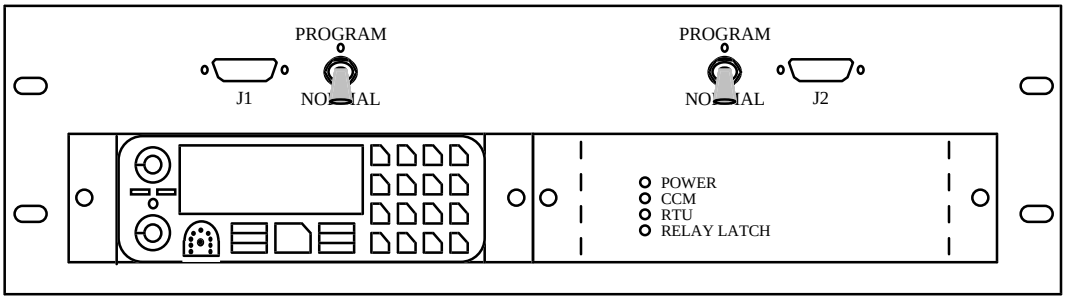


Figure 1 - Orion Radio Shelf with RTU and CCM Installed

PROGRAMMING

RTU / CCM PERSONALITY

The Orion radio is enabled as an RTU or CCM in the factory (you cannot substitute a regular Orion radio). However, the Personality used by the factory may not be exactly what is desired for the actual system (system name, channel frequencies, site ID, unit ID, and GID). To check the Personality (and make changes where necessary), use the following programming equipment and procedure.

Required Equipment

The following radio programming equipment is required to modify the Personality of an Orion RTU or CCM:

- PC (IBM PC/XT/AT or any true compatible with MS-DOS version 3.0 or later with an available serial port and 640K Internal RAM) - Used to run the EDACS 3 Radio Programming Software.
- EDACS 3 Radio Programming Software (part # TQ3374, version 14 or later) - Used to program an Orion radio.
- RS-232 Data Cable (part # 19B235027P1) - Connects the DB-25 male serial port of the PC to the Data Interface Module. If the PC uses a DB-9 male connector for the serial port, an adapter will be required.
- Data Interface Module (part # 19D438367G2) - Used to adjust logic levels between the Orion radio and the PC.
- 12 VDC Power Supply (part # 19B800850P2 for 120V, 60 Hz operation, or part # 19B800888P1 for 230V, 50 Hz operation) - Supplies power to the Data Interface Module.
- Programming Cable (part # 19B804722P1) - Connects the Data Interface Module to the Orion Radio Shelf, with built-in RS-232 interface circuit.

Procedure

The procedure given here consists of loading the Radio Programming Software into a PC, reading the Orion radio's existing Personality to the PC, modifying the Personality, saving the modified Personality for future use, and writing the modified Personality back into the Orion radio.

Load Programming Software

- Turn on the PC and wait for it to complete its initialization.
- When the **C:\>_** or **D:\>_** command prompt is shown on the PC monitor, insert the EDACS 3 Radios Program Disk #1 (Version 14 or later) into the PC's A (or B) drive, type "A:" (or "B:"), press the **Enter** key, type "INSTALL", and press the **Enter** key again.
- The **Radio Programming Software Installation Procedure** screen will appear. In the highlighted **Target Drive** field, type in the letter of the PC's hard disk (usually C or D) and press the **F1** (Begin) function key.
- The PC will read the Program Disk, create a GE directory in the root directory of the hard disk, and load the programming files into this GE directory. The PC will prompt you to insert Program Disk #2 and #3 when needed. Remove the previous Program Disk, insert the next Program Disk, and press the **F1** (Begin) function key to continue the installation. The PC will prompt you when the installation is complete. Press the **Enter** key and remove the last Program Disk. If your PC's hard disk is the C drive, type "C:" and press the **Enter** key. The **C:\GE\EDACS\BIN>_** command prompt should now be shown on the PC monitor. Type in "CD\" and press the **Enter** key to return to the **C:\>_** or **D:\>_** command prompt.

Run Programming Software

- With the DOS command prompt C:\ or D:\ displayed on the PC monitor, type "CD\GE" and press the **Enter** key (to go to the directory named GE where the programming files are located).
- Type "MRK" and press the **Enter** key (to run the programming file for MRK and Orion radios). You will know that the programming file is running when you see the introductory copyright screen briefly, followed by the **Current Personality** screen on the PC monitor.

Connect Programming Equipment

- For the RTU, connect the radio programming equipment to J1 on the front of the Orion Radio Shelf as shown in Figure 2. For the CCM, connect to J2.

- Move the switch closest to the used connector to the up or "PROGRAM" position.

Evoke Programming Mode

- Temporarily disconnect the DC power cable from J4 on the back of the Orion Radio Shelf to invoke the Programming Mode for the RTU (J6 for the CCM). (Ignore any DSP ERR message that may briefly be displayed when the radio is turned on.)

- For the RTU, make sure that the message **PC PROG** is displayed on the front panel. If not, check to make sure that the programming equipment is connected as shown in Figure 2, and that the switch on the front of the Orion Radio Shelf is in the up or "PROGRAM" position. Then, try again to evoke the programming mode.

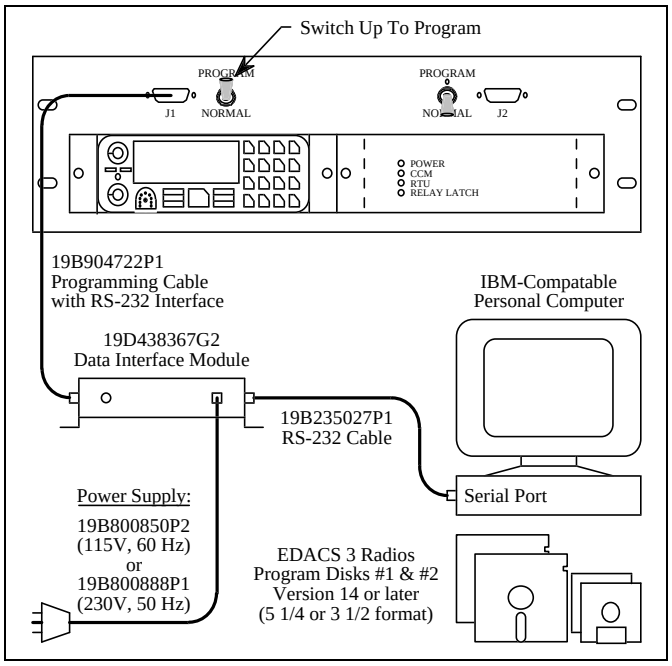


Figure 2 - Programming Setup

Read Personality from Radio

- Using the **Current Personality** screen as the starting point, press the **F6** (Read) function key to bring up the **Read Radio** window in front of the **Current Personality** screen (see Figure 3).

- In the **Selected Filename** field, type a filename to be used to identify the personality to be read from the radio. (Example: RTU_1 could be used to identify the RTU personality for system 1.)

- Press the **F1** (Yes) function key to read the RTU or CCM personality into the PC.

- When complete, press the **Enter** key and check that the new filename is shown in the **Current Personality** screen.

Check Diagnostic Application

- In the **Current Personality** screen, use the arrow keys to select (highlight) the file name given to the personality read from the radio.

- Press the **F2** (Change) function key to bring up the **Change/Edit File** window in front of the **Current Personality** screen.

- Check to be sure that the file name given to the personality read from the RTU or CCM is shown in the **File to be edited:** field.

- Press the **F1** (Yes) function key to go to the **Radio Personality** screen (see Figure 4).

- Press the **F7** (Option) function key to go to the **Radio Options** screen.

- Press the **F8** (More) function key until DGNTST appears under F2 in the function key toolbar at the bottom of the screen.

- Press the **F2** (DGNTST) function key to go to the **Radio Diagnostics Options** screen (see Figure 5).

- Select **Enable** in the **MRK and Orion Diagnostics Test Mode:** field using the **Tab** key.

- Press the down arrow key to move the cursor to the **Diagnostic Function:** field.

- Use the **Tab** key to select **Stand Alone Test Unit** if the Orion radio is being used as an RTU, or to select **Voter Monitor** if the Orion radio is being used as a CCM.

- Press the **F10** (Back) function key to go back to the **Radio Options** screen.

- Press the **F10** (Back) function key to go back to the **Radio Personality** screen.

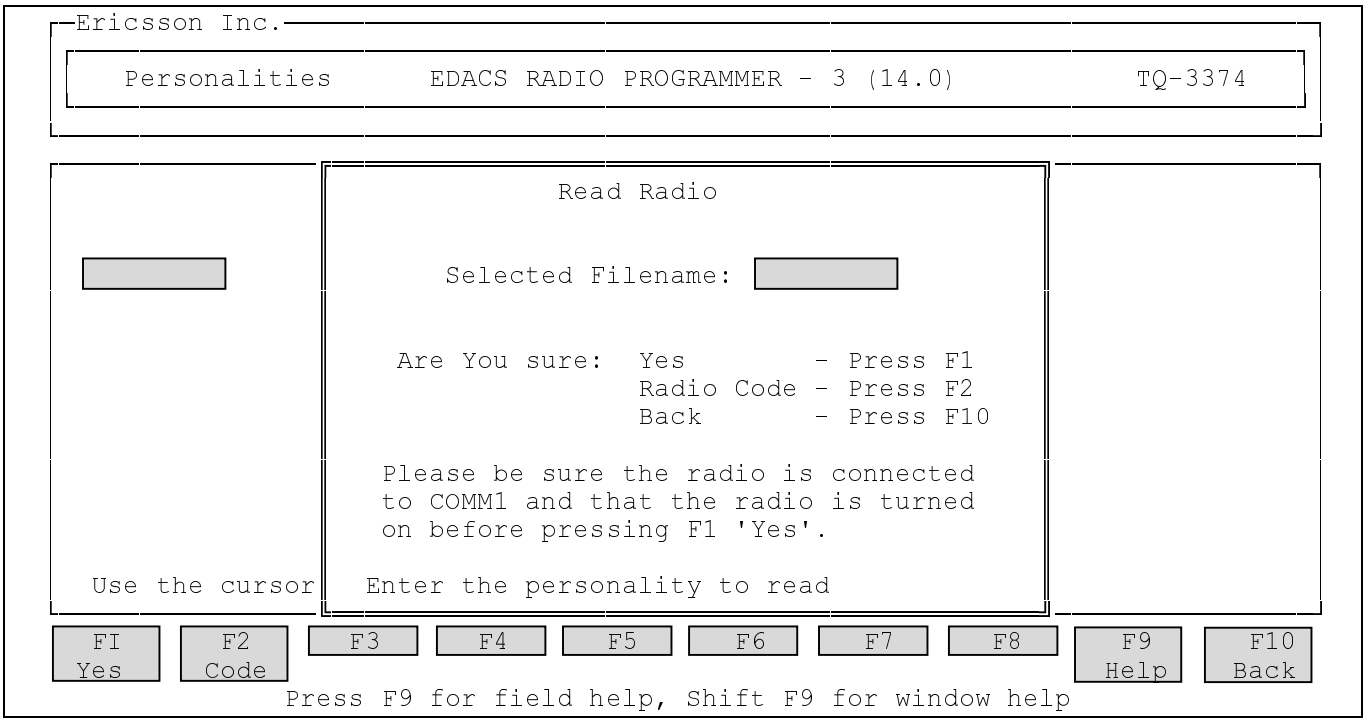


Figure 3 - Read Radio Window

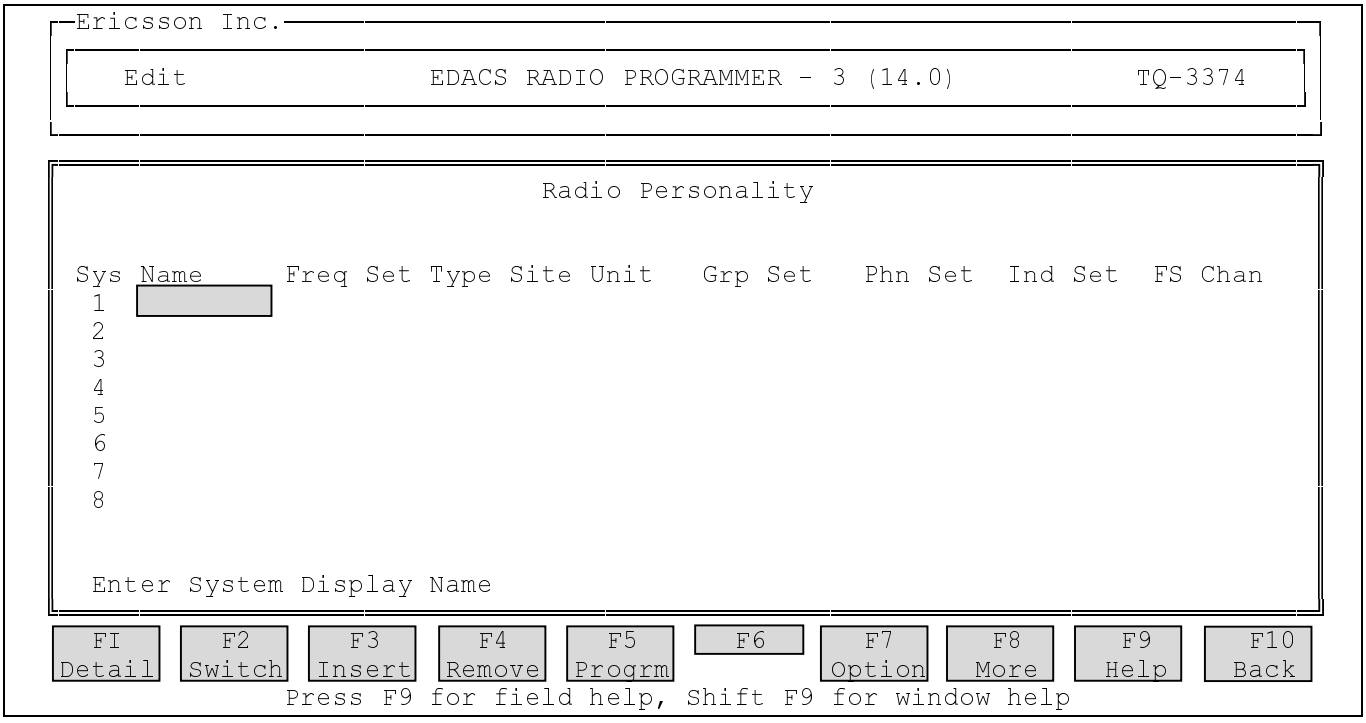


Figure 4 - Radio Personality Screen

Check Frequency Set

- In the **Radio Personality** screen, use the arrow keys to select (highlight) the top space in the Freq Set column.
- Press the **F1** (Detail) function key to go to the **Trunked Frequency Set** screen.
- Press the **F7** (Option) function key to bring up the **Trunked Set Options** window in front of the **Trunked Frequency Set** screen (see Figure 6).
- Check the channel spacing shown in the **Bandwidth Options:** field.
- To change the channel spacing selection, use the arrow keys to select (highlight) the **Bandwidth Options:** field. Then use the Tab key to select the desired channel spacing.
- When the channel spacing shown in the **Bandwidth Options:** field is correct for the system, press the **F10** (Back) function key to go back to the **Trunked Frequency Set** screen (see Figure 7).
- Check the transmit frequency shown in the **Tx Freq** column beside each channel (remember that the transmit frequencies for mobiles are the receive frequencies marked on the Station GETC shelf for each channel).
- To change or add a transmit frequency, use the arrow keys to select (highlight) the frequency to be changed or the space where a frequency is to be added, and type over the existing numbers or spaces. Receive frequencies will be changed automatically, based on the transmit frequencies.
- When the transmit frequencies shown in the **Trunked Frequency Set** screen are correct for all channels, press the **F5** (Store) function key to bring up the **Store File** window in front of the **Trunked Frequency Set** screen.
- In the **File to be saved:** field, type a file name to be used to identify the frequency set for this personality. Write the file name down - you will need it to define the personality later in the procedure.
- Press the **F1** (Yes) function key to store (save) the frequency set and remove the **Store File** window.
- Press the **F10** (Back) function key to go back to the **Radio Personality** screen.

Check Group Set

- In the **Radio Personality** screen, use the arrow keys to select (highlight) the top space in the **Grp Set** column.
- Press the **F1** (Detail) function key to go to the **Group Set Summary** screen.
- Check the GIDs shown in the **Grp ID** column. The GIDs will not be used by the RTU or CCM, but at least one must be listed here to satisfy the requirements to define the group set, and at least one group set must be defined to satisfy the requirements to define the personality for the RTU or CCM. Typically, a single GID (001) is used by the factory for the RTU and CCM.
- To change or add a GID, use the arrow keys to select (highlight) the GID to be changed or the space where a GID is to be added, and type over the existing numbers or spaces.
- If at least one GID is shown in the **Group Set Summary** screen (no name is necessary in the **Name** column), press the **F5** (Store) function key to bring up the **Store File** window in front of the **Group Set Summary** screen (see Figure 8).
- In the **File to be saved:** field, type a file name to be used to identify the group set for this personality. Write the file name down - you will need it to define the personality later in the procedure.
- Press the **F1** (Yes) function key to store (save) the group set and remove the **Store File** window.
- Press the **F10** (Back) function key to go back to the **Radio Personality** screen.

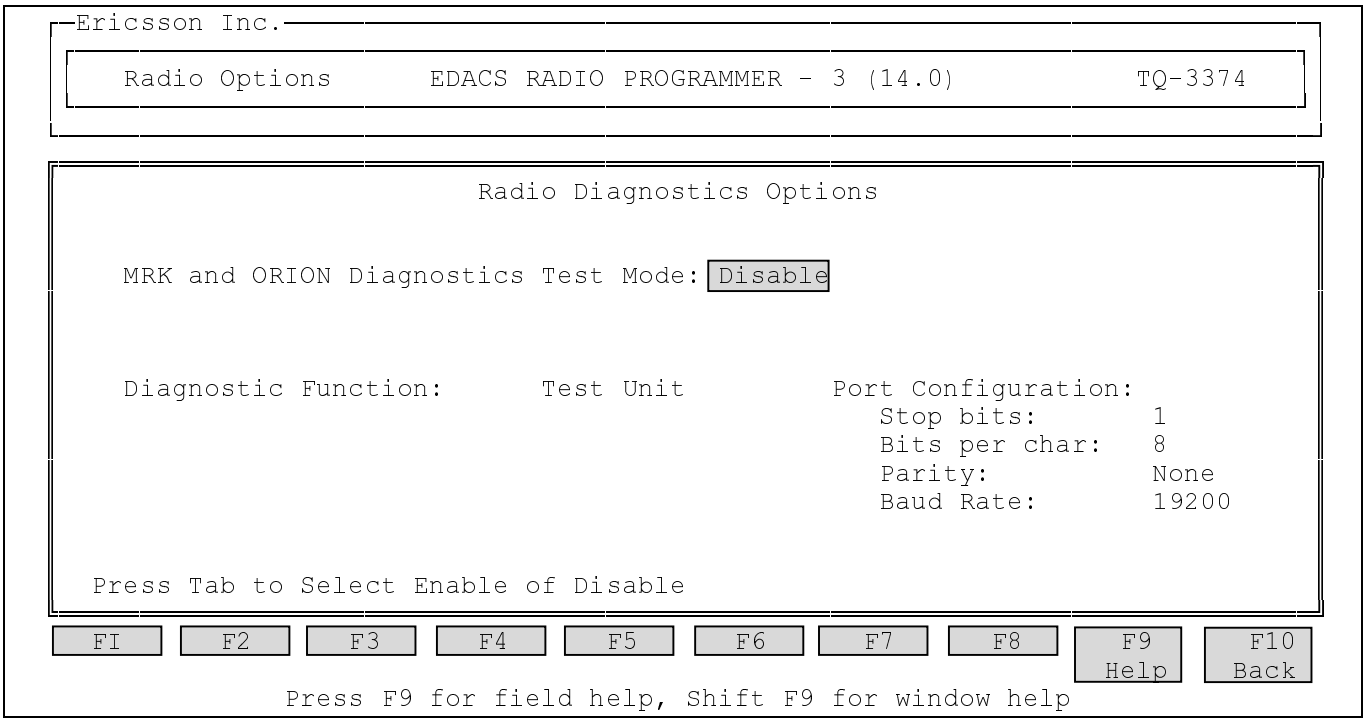


Figure 5 - Radio Diagnostics Options Screen

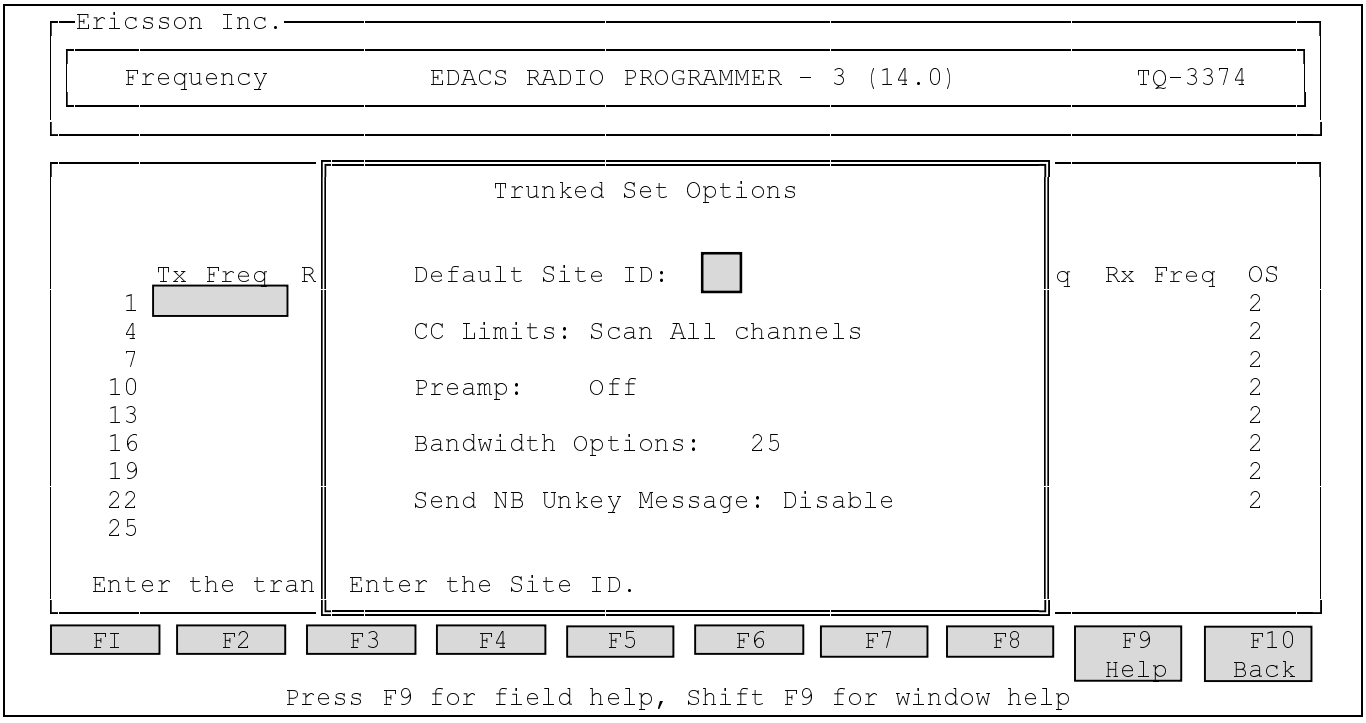


Figure 6 - Trunked Set Options Window

Define Personality

- In the **Radio Personality** screen, use the arrow keys to select (highlight) the top space in the **Name** column. Then type the name of the system where the RTU or CCM is installed.
- Use the arrow keys to select (highlight) the top space in the **Freq Set** column. Then type the file name you used to identify the frequency set for this personality.
- Use the arrow keys to select (highlight) the top space in the **Site** column. Then type the site ID where the RTU or CCM is installed.
- Use the arrow keys to select (highlight) the top space in the **Unit** column. Then type any LID that is not currently in use in the system. The LID will not be used by the RTU or CCM, but must be listed here to satisfy the requirements to define the personality.
- Use the arrow keys to select (highlight) the top space in the **Grp Set** column. Then type the file name you used to identify the group set for this personality.

Save Personality

- Press the **F10** (Back) function key to bring up the **Save File** window in front of the **Radio Personality** screen.
- Check to be sure that the file name given to the personality read from the RTU or CCM is shown in the **File to be saved:** field.
- Press the **F1** (Yes) function key to bring up the message telling you that the file exists.
- Type "Y" to overwrite the original file and go to the **Current Personality** screen.

Write Personality to Radio

- Press the **F5** (Program) function key to program the Orion radio with the modified personality.
- When programming is complete, press the **F10** (Back) function key to go back to the DOS command prompt. Make sure you see the DOS command prompt displayed on the PC monitor before proceeding.

Disconnect Programming Equipment

- Move the switch on the front of the Orion Radio Shelf to the down or "NORMAL" position.
- Disconnect the programming equipment from the Orion Radio Shelf.

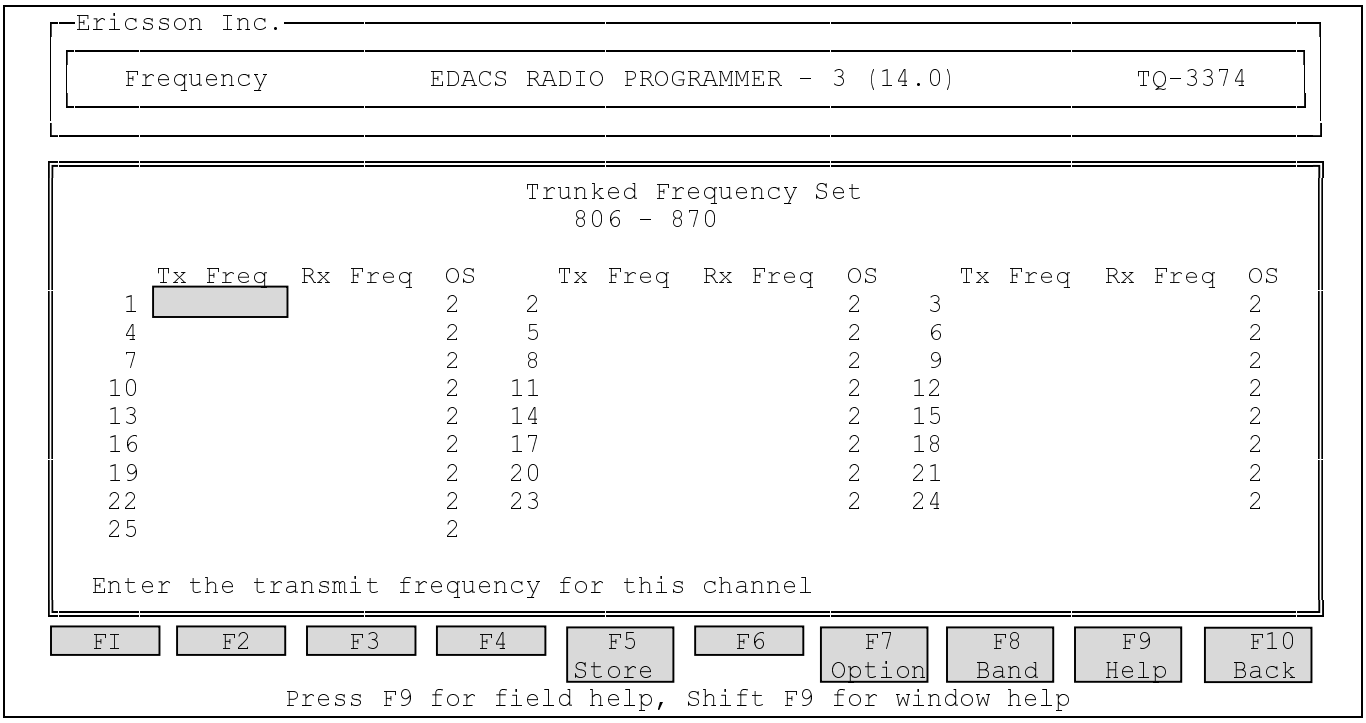


Figure 7 - Trunked Frequency Set Screen

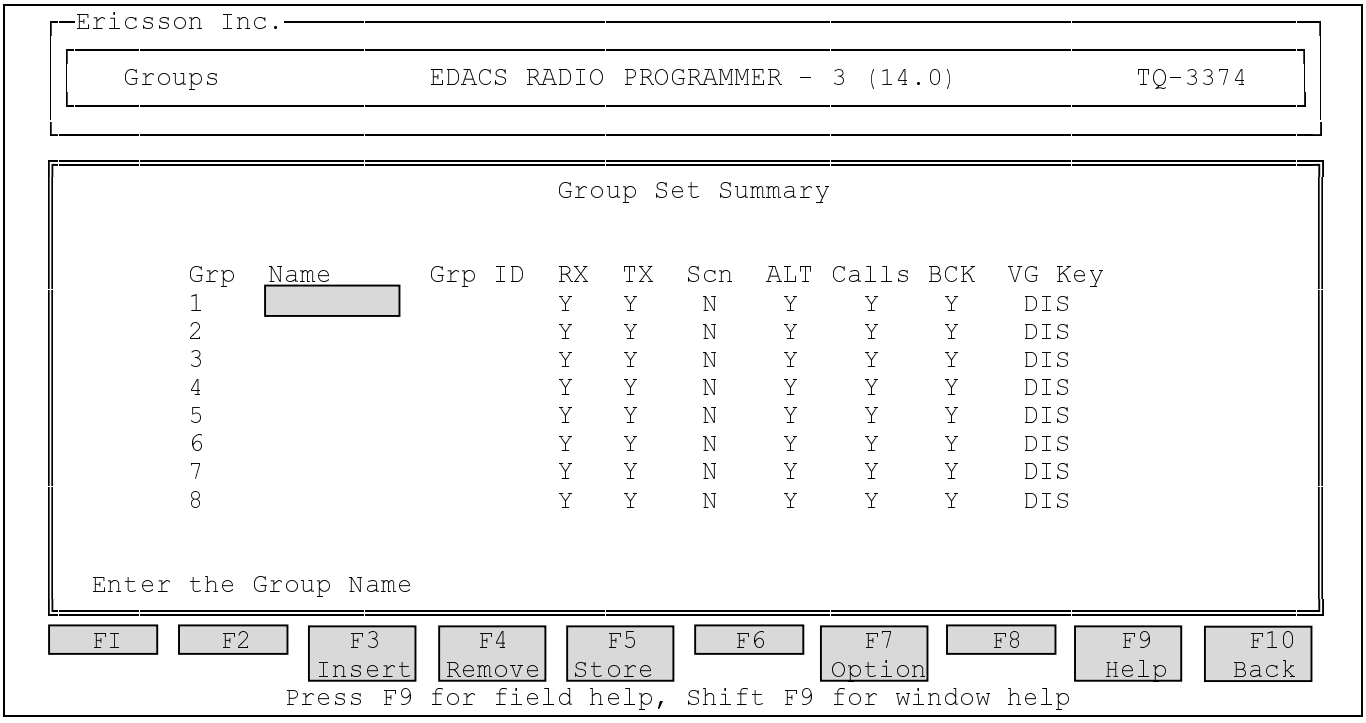


Figure 8 - Group Set Summary Screen

SYSTEM MANAGER

Three RTU parameters used by the Site Controller are configurable through the System Manager. Use the following procedure to check and/or change these parameters in the site database and send any changes gracefully to the Site Controller.

Site Test Parameters Panel

- From the **User Menu** screen, enter **10** in the **Menu Item** field to see the **External Device Definition** screen.
- In the **Selected Device** panel, enter the site number (or site name) in the **Device Number** field (or the **Device Name** field) where the TU is installed.
- Press the **Next** key three times to see the **Site Test Parameters** panel (3:4).

TU Parameters

- The **Test Unit Enabled** parameter is used to tell the Site Controller if test calls are to be placed on the system. In the **Site Test Parameters** panel, enter **Y** in the **Test Unit Enabled** field.
- The **Local Test Unit** parameter is used to tell the Site Controller if the Test Unit is local to the Site Controller (subject to Site Controller polling), or remote to the Site Controller (not subject to Site Controller polling). In the **Site Test Parameters** panel, use the arrow keys to select (highlight) **Remote** in the **Local Test Unit** field.
- The **Background Test Call Interval** parameter is used to set the time interval (in minutes) between Background Test Calls. The field may contain any number from 0 to 1440 (default = 5). Entering a 0 in this field disables Background Test Calls, but the Test Unit will continue to monitor the Control Channel and make Recovery Test Calls on failed Working Channels. In the **Site Test Parameters** panel, enter the desired number, or (if already OK) go on.

Save to Database

- After you have completed all the changes you wish to make to the three TU parameters, press the **Do** key to save your changes in the database.

Send Database to Site Controller

- When you press the **Do** key to save changes to the site database in the System Manager, these changes are not automatically sent to the site. Whenever a Site Controller computer is reset or powered on, it will request that the System Manager download the latest database for that site, including the latest TU parameter changes. However, this is not the way to get TU parameter changes to the site. The remaining steps allow a system administrator to send the TU parameter changes without disrupting the site.
- From the **User Menu** screen, enter **22** in the **Menu Item** field to see the **Site Reconfiguration** screen.
- In the **Selected Site** panel, enter the **Site Number** or **Site Name** for the site to be sent the TU data.
- Press the **Next** key three times to see the **Site Test Parameters** panel (3:5).
- In the **Site Test Parameters** panel (3:5), change the character in the rows between the Database box and the Site box from **N** to **Y** for each TU parameter you wish to send to the site and press the **Do** key.

Exit

- Press the **F6** function key to return to the **User Menu** screen.
- Press the **F7** function key to exit from the System Manager.

OPERATION

CAUTION

DO NOT connect a microphone to an RTU and try to use it as a test or service radio. The system software was not designed to support this mode of operation. Attempting to use the radio in this mode may have undesirable effects on the operation of the system.

REMOTE TEST UNIT

When the Remote Test Unit (RTU) is powered-up, it initializes itself to a predetermined state and performs self-diagnostic checks. The RTU then searches the outgoing channels looking for the periodic control messages of the Control Channel. When the RTU is synchronized with the control messages on the Control Channel, it is ready to monitor the Control Channel.

Monitor Control Channel

RTU monitoring of the Control Channel consists of the following activities:

- Maintaining synchronization with the control message data frames on the Control Channel.
- Correctly decoding the control messages.
- Verifying the site ID.

For as long as the RTU is able to successfully complete all of these monitoring activities, it periodically sends a message to the alarm system indicating that the Control Channel is OK. However, if at any time the RTU is unable to successfully complete any of these monitoring activities, it sends a message to the alarm system indicating the activity that failed and then will not send any other message to the alarm system until all of these monitoring activities are once again successfully completed.

The failure indication is passed through the Simulcast alarm system to the Control Point GETC for the existing Control Channel. The Site Controller receives the failure indication from the Control Point GETC, logs the failure indication as an Aux Alarm in an Activity Record, fails the existing Control Channel, selects another channel to be the Control Channel, sends a Control Channel assignment message to the Control Point GETC for the selected channel, and reports an Auxiliary Alarm for that channel to the System Manager.

The Control Point GETC for the newly-assigned Control Channel then sends the Control Channel assignment message to the Station GETC for that channel at each transmit site in the Simulcast system. Meanwhile, as soon as the RTU is unable to maintain synchronization with the control message data frames on the Control Channel, the RTU will begin searching for a newly-assigned Control Channel. When the RTU is synchronized with the control messages on the newly-assigned Control Channel, the RTU is ready to monitor the Control Channel once again.

Test Call

The Site Controller determines when and on what channel a test call is to be placed. When the Site Controller needs to have a test call placed on a specific channel, the Site Controller sends a test call request message to the Control Point GETC for the Control Channel. The test call request message is sent from the Control Point GETC for the Control Channel to the Control Channel GETC at each Simulcast site. The Control Channel at each site then transmits the test call request message. When the RTU decodes the test call request message on the Control Channel, the RTU simulates a user placing a call on the system and is assigned the Working Channel to be tested. The RTU checks high and low speed data received from the assigned Working Channel at the site, and the assigned Working Channel at the site checks high and low speed data received from the RTU. At the end of the test call, the RTU sends a call results message to the alarm system giving the results of the test call.

A failure at any step in the test call causes the RTU to send an unsuccessful call results message. A normal (successful) Test Call contains the following steps:

1. The RTU decodes a test call request message on the Control Channel.
2. The RTU transmits (RF) a request (on the Control Channel) for an individual call and waits to receive a Working Channel assignment. (The RTU uses a LID of 0 for both the caller and callee.)
3. The RTU receives (RF) a Working Channel assignment and adjusts to the frequencies of the assigned Working Channel.
4. The RTU receives (RF) a high-speed-data channel confirmation signal from the Working Channel.

5. The RTU sends (RF) a high-speed-data key message followed by low-speed data to the Working Channel.

6. The Working Channel GETC at the site detects the high-speed-data key message and low-speed data from the RTU. Each GETC supplies a receiver fault indicator line to the Simulcast Alarm System. This line is set low whenever the GETC decodes a Test Call Request on the BSL and its channel number matches that of the Control or Working Channel to be used in the call. This receiver fault line is set back to high in the GETC, indicating "**RX Pass**" L4 off, under the following conditions:

   - In Control Channel mode, when the channel request is seen on the RF.

   - In the Working Channel mode, when dotting and low-speed data are detected.

7. The RTU stops sending low-speed data to the Working Channel.

8. When the Working Channel GETC at the site stops receiving the low-speed data from the RTU, it transmits low-speed data for the remaining 2-second hang-time interval.

9. The RTU checks for low-speed data, sends a call results message to the alarm system, and returns to the frequencies of the Control Channel.

10. When the RTU is synchronized with the control messages on the Control Channel, the RTU is ready to monitor the Control Channel once again.

The Simulcast Alarm System uses the Call Results message (from the RTU) along with the receiver fault lines (from the GETCs) to determine if a channel has passed or failed the test call.

CONTROL CHANNEL MONITOR

When the Control Channel Monitor (CCM) is powered-up, it initializes itself to a predetermined state and performs self-diagnostic checks. The CCM then searches the outgoing channels looking for the periodic control messages of the Control Channel. When the CCM is synchronized with the control messages on the Control Channel, it is ready to monitor the Control Channel.

CCM monitoring of the Control Channel consists of the following activities:

- Maintaining synchronization with the control message data frames on the Control Channel.

- Correctly decoding all channel assignment and channel drop information from control messages.

- Placing this channel assignment and channel drop information on the Backup Serial Line (BSL).

BUFFER BOARD

The Buffer Board monitors the Control Channel data from the CCM and messages from the RTU, and provides TTL Status Lines to the Simulcast Alarm System (logic high = no alarm). Loss of Control Channel data or Orion radio messages causes the Buffer Board to change the state of the TTL Status Lines (logic high = alarm).

MAINTENANCE

Maintenance information for the Orion radio hardware is described in the Orion maintenance manuals listed in the Introduction section of this manual.

REMOTE TEST UNIT (RTU)

The unique features of the RTU can be checked using the following in-system tests. Each of these tests simulates an abnormal condition that the RTU is designed to detect. Each test requires one person at the location of the RTU, a second person to monitor the System Manager, and for both to be in voice contact with each other. Check to see that the RTU operates as described for each test - not only after the simulated failure is introduced, but also after the simulated failure is removed.

To speed up these tests, temporarily set the Background Test Call Interval to 1 minute using the Site Reconfiguration screen (menu selection 22) of the System Manager. Note the present value so you can set the Background Test Call Interval back to this value when you finish the tests.

Simulated Control Channel Failure

High-Speed Data: The following test simulates a high-speed data failure on the Control Channel by forcing the Control Channel GETC not to send high-speed data:

- Identify the Control Channel GETC by finding the GETC that has L6 and L7 (last two LEDs on right) illuminated continuously.
- Pull the Control Channel GETC shelf out and remove jumper J60.
- Have the second person observe that the Site Controller fails this channel, the channel is taken out of service, and a new Control Channel is selected (look at the Site Monitor screen of the System Manager - menu selection 32).
- Replace jumper J60 and push the Control Channel GETC shelf in.
- Have the second person observe that a Recovery Test Call is placed on the original Control Channel, and it is returned to service as a Working Channel (look at the Site Monitor screen of the System Manager - menu selection 32).

Simulated Working Channel Failures

High-Speed Data: The following test simulates a high-speed data failure on the Working Channel by forcing a Working Channel GETC not to send high-speed data:

- Identify a Working Channel GETC by finding one that does not have L6 (LED 2nd from right) illuminated continuously.
- Pull the Working Channel GETC shelf out and remove jumper J60.
- Wait for a Background Test Call to be placed on this channel. Have the second person observe that the test call fails, and the channel is taken out of service (look at the Site Monitor screen of the System Manager).
- Replace jumper J60 and push the Working Channel GETC shelf in.
- Have the second person observe that a Recovery Test Call is placed on this channel and it is returned to service (look at the Site Monitor screen of the System Manager).

Low-Speed Data: The following test simulates a low-speed data failure on a Working Channel by forcing the Working Channel GETC not to send low-speed data:

- Identify a Working Channel GETC by finding one that does not have L6 (LED 2nd from right) illuminated continuously.
- Pull the Working Channel GETC shelf out and move jumper J17 from pins 1 & 2 to pins 2 &3.
- Wait for a Background Test Call to be placed on this channel. Have the second person observe that the RTU fails this channel and takes it out of service (look at the Site Monitor screen of the System Manager).
- Move jumper J17 back to pins 1 &2 and push the Working Channel GETC shelf in.
- Have the second person observe that a test call is placed on this channel and it is returned to service (look at the Site Monitor screen of the System Manager).

Channel Frequency: The following test simulates a Working Channel set to the wrong channel frequency:

- Identify a Working Channel GETC by finding one that does not have L6 (LED 2nd from right) illuminated continuously.

- Pull the Working Channel GETC shelf out and record the positions of DIP switches S1-1 through S1-7 and S2-1 through S2-4. Then change the DIP switch settings to a combination for a frequency not used by the system (see the configuration manual for Station GETC) and reset the GETC.

- Wait for a Background Test Call to be placed on this channel. Have the second person observe that the Site Controller fails this channel and takes it out of service (look at the Site Monitor screen of the System Manager).

- Return the DIP switches to their original positions, reset the GETC, and push the Working Channel GETC shelf in.

- Have the second person observe that a test call is placed on this channel and it is returned to service (look at the Site Monitor screen of the System Manager).

- Return the Background Test Call Interval to its former value.

RTU to GPS Simulcast Alarm System Communications

The following test simulates a communications failure between the RTU and the GPS Simulcast Alarm System:

- Put the Program/Normal toggle switch for the RTU into the Program position.

- Verify that the GPS Simulcast Alarm System's RTU Alarm activates within 50 seconds.

CONTROL CHANNEL MONITOR (CCM)

The unique features of the CCM can be checked using the following in-system tests. These tests check the correct decoding and transmission to the BSL of the channel assignment and channel drop information from the control messages monitored by the CCM on the Control Channel. Each test requires one person at the location of the CCM, a second person to monitor the System Manager, and for both to be in voice contact with each other. Check to see that the CCM operates as described for each test.

To speed up these tests, temporarily set the Background Test Call Interval to 1 minute using the Site Reconfiguration screen (menu selection 22) of the System Manager. Note the present value so you can set the Background Test Call Interval back to this value when you finish the tests.

Channel Assignment

The following test checks channel assignments for Working Channels:

- Identify a Working Channel GETC by finding one that does not have L6 (LED 2nd from right) illuminated continuously.

- Wait for a call to be assigned to this channel (actual user call request or Background Test Call). Then have the second person verify that the same channel number is indicated for the call on the Site Monitor screen of the System Manager.

- Repeat for several different Working Channels.

Channel Drop

The following test checks channel drops for Working Channels:

- Have the second person notify you as soon as a channel is dropped, as shown on the Site Monitor screen of the System Manager. Then verify that L6 on the assigned Working Channel GETC is no longer illuminated continuously.

- Repeat for several different Working Channels.

- Return the Background Test Call Interval to its former value.

CCM to GPS Simulcast Alarm System Communications

The following test simulates a communications failure between the CCM and the GPS Simulcast Alarm System:

- Put the Program/Normal toggle switch for the CCM into the Program position.

- Verify that the GPS Simulcast Alarm System's CCM Alarm activates within 10 seconds.

GLOSSARY

Backup Serial Line	The Backup Serial Line (BSL) is the serial data line linking all GETCs together at one site, and is used for communication between GETCs when they are not connected directly to a Site Controller.
BSL	See Backup Serial Line.
CCM	See Control Channel Monitor.
Control Channel	A Control Channel is any allowed radio channel (only one at a time) at an EDACS Trunked Site that is used for call requests and Working Channel assignments for trunked calls.
Control Channel Monitor	A Control Channel Monitor (CCM) is used to obtain channel assignment and channel drop information from the Control Channel, and provide it (via the BSL) to the receivers at an EDACS Simulcast or Auxiliary Receiver site.
EDACS	EDACS, short for Enhanced Digital Access Communications System, is a registered trademark of Ericsson Inc. It is used by Ericsson to describe specific communications systems and their specific equipment which meet or exceed the needs of the Public Service, Industrial, Commercial, and Utility markets world-wide.
GPS	Global Positioning System
Orion	Orion, a trade mark of Ericsson Inc., is the name of a line of mobile radios.
Remote Test Unit	A Remote Test Unit (RTU) is used to check the operation of the radio channels at a transmitter site in an EDACS Simulcast system.
RTU	See Remote Test Unit.
Stand Alone TU	This term, used by the EDACS 3 programming software, refers to the Remote Test Unit.
Test Unit	A Test Unit (TU) is an EDACS Site Controller option that provides a means of testing the radio channels for an EDACS Trunked Site by placing test calls on the Working Channels (under the direction of the Site Controller computer), and monitoring the outgoing messages on the Control Channel.
TU	See Test Unit.
Voter Monitor	This term, used by the EDACS 3 programming software, refers to the Control Channel Monitor.
Working Channel	A Working Channel is any radio channel at an EDACS Trunked Site that is available or in use to carry trunked calls.

PARTS LISTS

Parts for the Orion radio are listed in the manual for the radio. Parts for the Orion Radio Shelf (other than the radio), and associated cables and antennas are listed here.

Orion Radio Shelf Equipped As
Control Channel Monitor (CCM)

ITEM	QTY	PART NO.	DESCRIPTION
1	1	SXA 120 4222	Orion Radio Shelf
3	1	Freq. Dependent	Orion CCM Radio w/o Control Unit
4	2	RPM 113 2490/1 RPM 113 2489/1	Orion Radio Shelf Harness w separate power conn on radio w/o separate power conn on radio
8	1	RPM 113 2491/1	RF Cable (CCM Radio to Back of Shelf)
---	1	NTM 201 1086 ***	Fan Mounting Kit ***
---	1	NTM 201 1087 ***	Radio Mounting Kit ***
---	1	NTM 201 1090 ***	Shelf Mounting Kit ***
9	1	ROA 117 2280 ***	Orion Buffer Board Assembly ***
10	1	RPM 113 2504/2	Cable, Buffer Board Relay
11	3	RPM 113 2807/2	Cable, Buffer Board Data
---	1	19B804722P1	Cable, Programming
29	1	SXA 120 4226/1	Blank for Front Panel

*** Further breakdown of this part is shown in another parts table.

Orion Radio Shelf Equipped As
Remote Test Unit (RTU) & Control Channel Monitor (CCM)

ITEM	QTY	PART NO.	DESCRIPTION
1	1	SXA 120 4222	Orion Radio Shelf
2	1	Freq. Dependent	Orion RTU Radio w Control Unit
3	1	Freq. Dependent	Orion CCM Radio w/o Control Unit
4	2	RPM 113 2490/1 RPM 113 2489/1	Orion Radio Shelf Harness w separate power conn on radio w/o separate power conn on radio
5	1	RPM 113 2491/2	RF Cable (RTU Radio to Attenuator)
6	1	19A149360P1	RF Attenuator, 50 Ohms, 20 W, 30 dB
7	1	RPM 113 2491/3	RF Cable (Attenuator to Back of Shelf)
8	1	RPM 113 2491/1	RF Cable (CCM Radio to Back of Shelf)
---	2	NTM 201 1086 ***	Fan Mounting Kit ***
---	2	NTM 201 1087 ***	Radio Mounting Kit ***
---	1	NTM 201 1090 ***	Shelf Mounting Kit ***
9	1	ROA 117 2280 ***	Orion Buffer Board Asm ***
10	1	RPM 113 2504/2	Cable, Buffer Board Relay
11	3	RPM 113 2807/2	Cable, Buffer Board Data
---	1	19B804722P1	Cable, Programming

*** Further breakdown of this part is shown in another parts table.

Fan Mounting Kit
NTM 201 1086

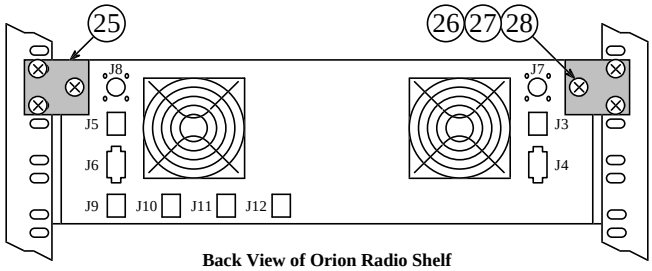
ITEM	QTY	PART NO.	DESCRIPTION
12	1	BKV 301 216/02	Fan
13	2	105 8567/1	Fan Guard
14	1	SRG 120 06	Rubber Grommet (5490477P2)
15	2	SND 109 29/02	Connector Terminal
16	1	RNT 403 405/002	Connector Housing (Amp 172165-1)
17	10	NSV 350 05	Cable Clamp (701863P15)
18	4	SBA 120 040/0450	Screw, M4x45, Torx
19	6	SBA 120 040/0080	Screw, M4x8, Torx, Black
20	8	SCA 101 040/80	Flat Washer, M4, Black
21	16	SBM 101 112/03	Lock Nut, M4, Hex

Radio Mounting Kit
NTM 201 1087

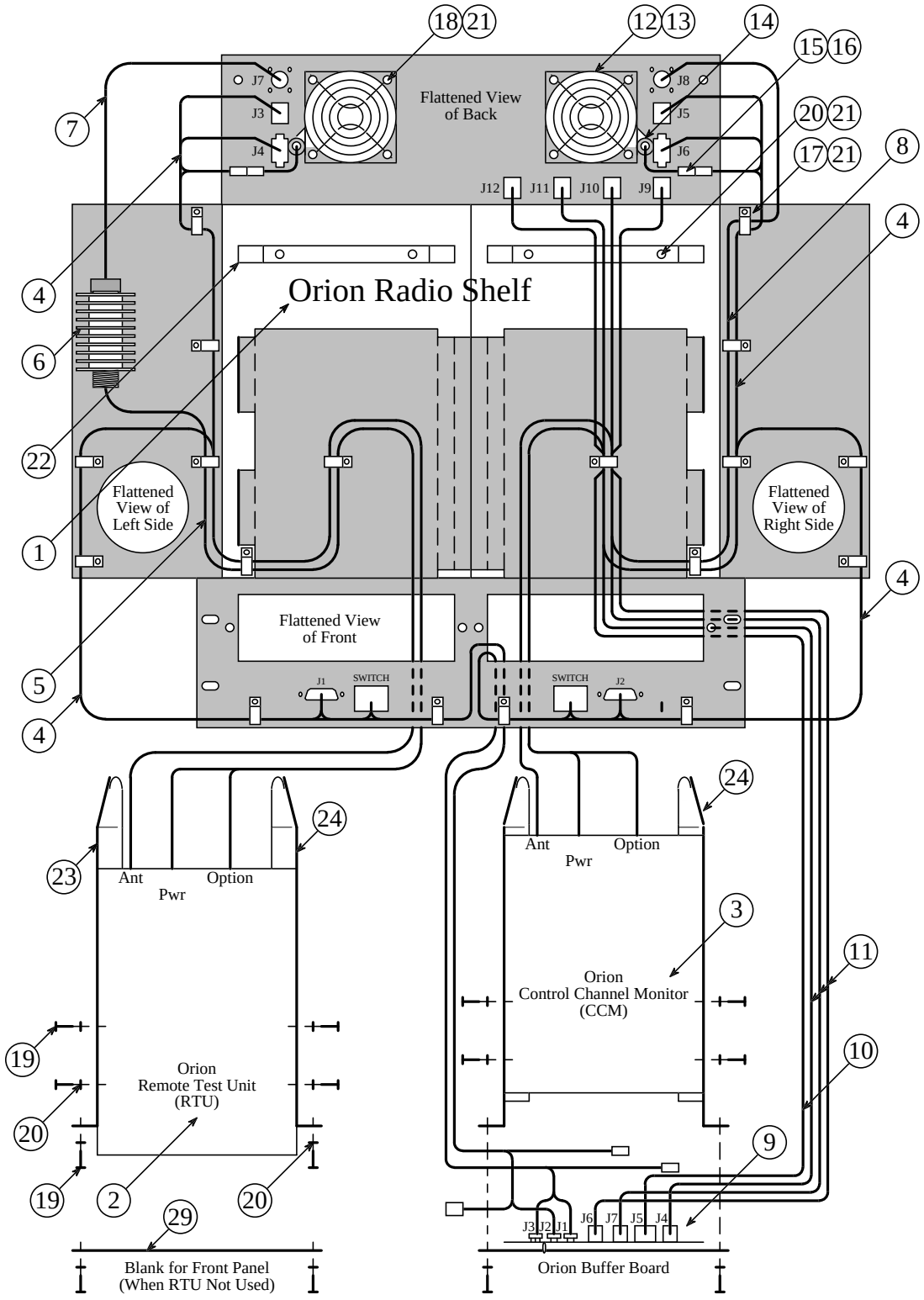
ITEM	QTY	PART NO.	DESCRIPTION
22	1	SXA 120 4228	Retaining Bracket, Radio Slides
23	1	SXA 120 4229/1	Radio Slide, Left Side
24	1	SXA 120 4229/2	Radio Slide, Right Side

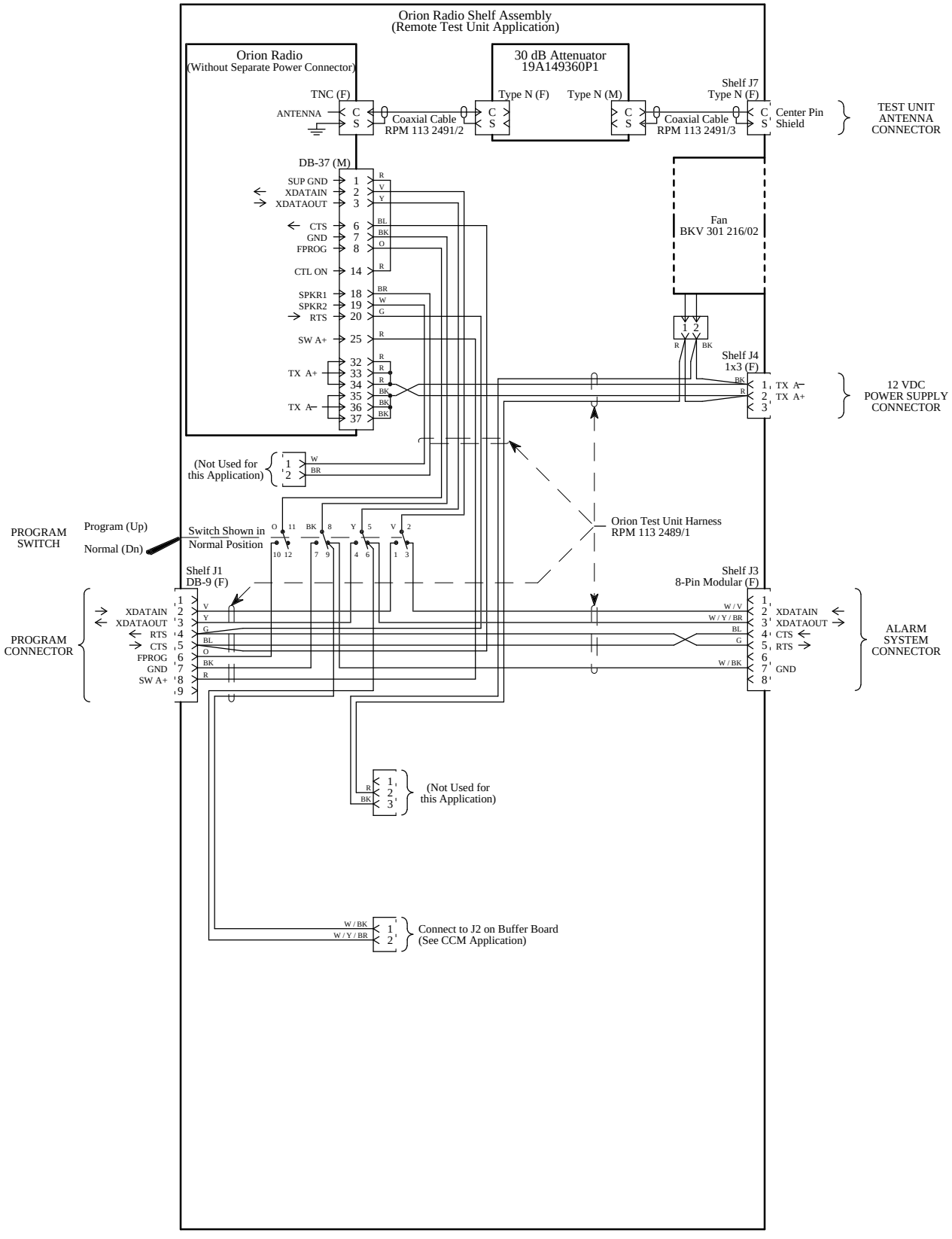
Shelf Mounting Kit
NTM 201 1090

ITEM	QTY	PART NO.	DESCRIPTION
25	2	SXA 120 4230	Support, Shelf Back
26	2	03/SBA 120 040/0120	Screw, M4x12, Torx
27	2	SCL 112 136	Lock Washer, M4
28	2	SCA 101 040/03	Flat Washer, M4

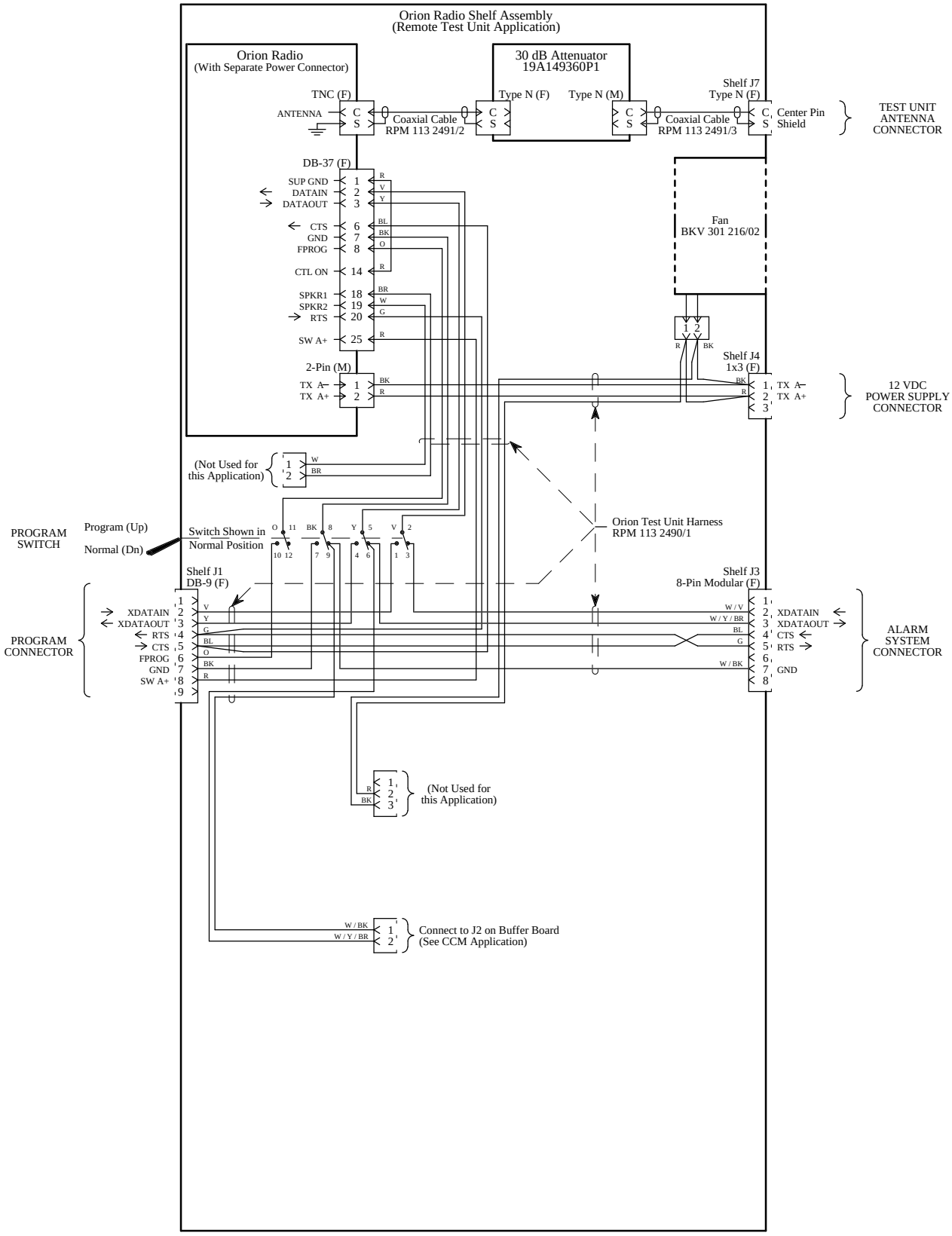


Back View of Orion Radio Shelf

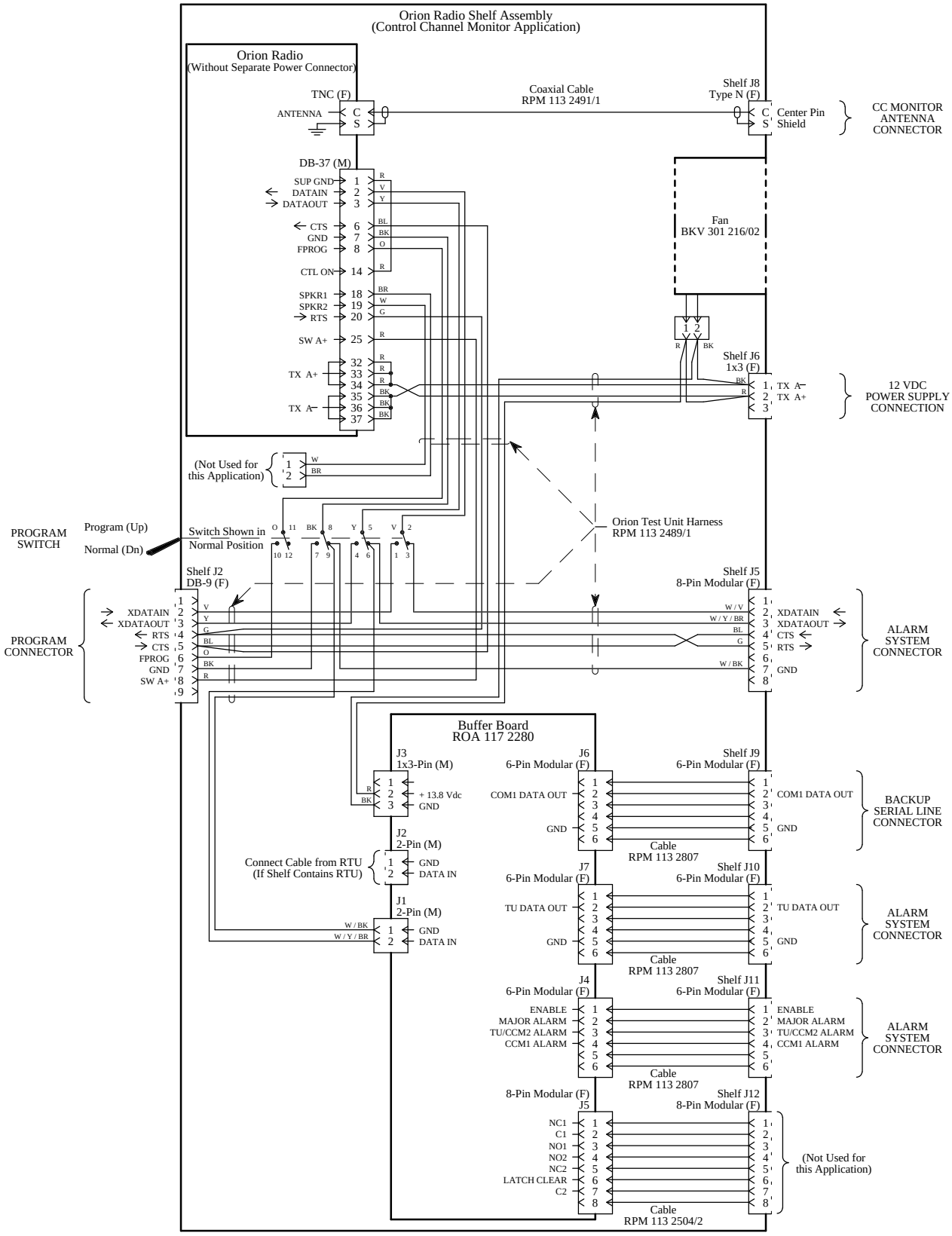

Flattened View of Back
J7
J3
J4
J8
J5
J6
J12
J11
J10
J9
Orion Radio Shelf
Flattened View of Left Side
Flattened View of Right Side
Flattened View of Front
J1
SWITCH
SWITCH
J2
Ant
Option
Pwr
Orion Remote Test Unit (RTU)
Blank for Front Panel (When RTU Not Used)
Orion Control Channel Monitor (CCM)
Orion Buffer Board
J3
J2
J1
J6
J7
J5
J4



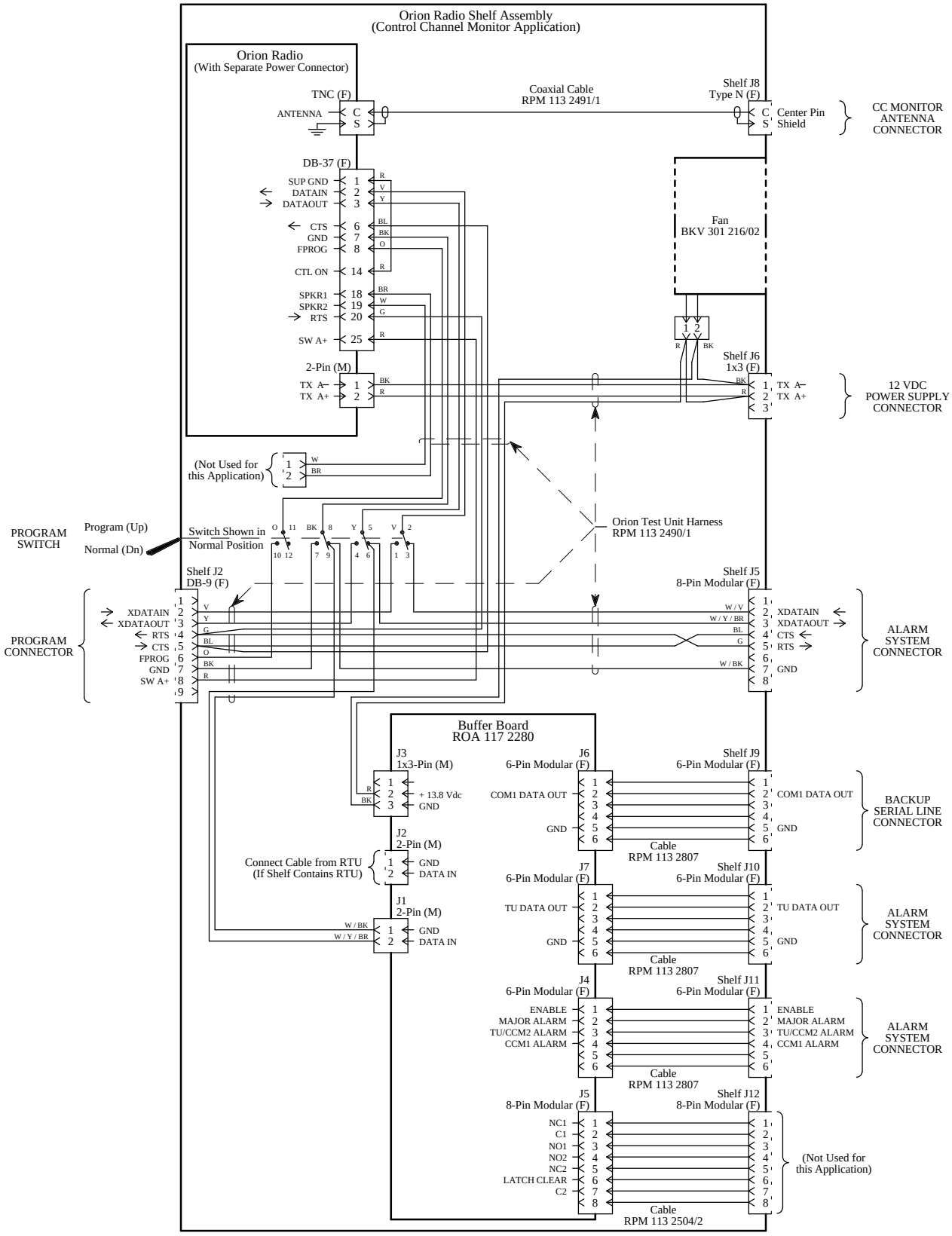
Interconnection Diagram
Remote Test Unit (Without Separate Power Connector)



Interconnection Diagram
Remote Test Unit (With Separate Power Connector)



Interconnection Diagram
Control Channel Monitor (Without Separate Power Connector)



Interconnection Diagram
Control Channel Monitor (With Separate Power Connector)

Ericsson Inc.
Private Radio Systems
Mountain View Road
Lynchburg, Virginia 24502
1-800-528-7711 (Outside USA, 804-528-7711)

AE/LZB 119 1885 R1A
Printed in U.S.A.