EXHIBIT I

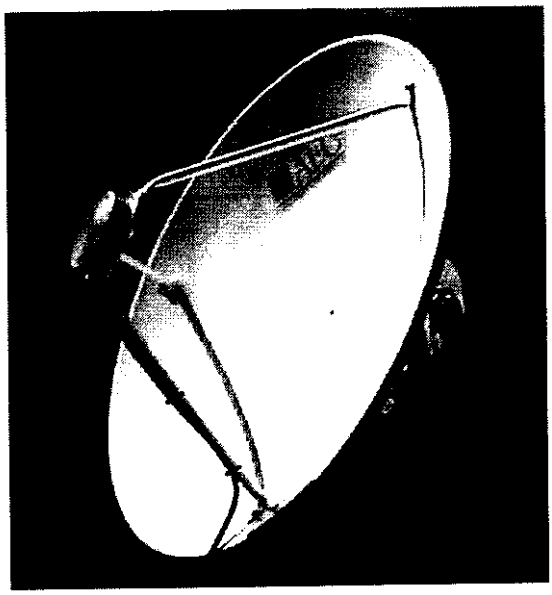
Operator's Manual for Advanced Fibre Communications Model UMC SSR-XCVR

Advanced Fibre Communications
FCC ID: NJV0310-0952

AFC®

ADVANCED FIBRE COMMUNICATIONS

Spread Spectrum Radio (SSR) Supplement



December, 1997

Document Part Number: 0600-0111

UMC 1000 User Documentation

Spread Spectrum Radio (SSR)

Contents

1. This SSR Supplement summarizes the equipment required to utilize the UMC 1000 system's SSR transport option. The contents of this supplement are the following:

   - A brief **overview** of the components that comprise the AFC Spread Spectrum Radio system. These components include the SSR-XCVR plug-in unit, parabolic reflector antenna, Antenna Interface Module (AIM), Cable Adapter Assembly (CAA), Spread Spectrum Interface Assembly (SSIA) and transverter (optional). This section begins on **page 4**.
   - The parts and procedures required to **install** the SSR transport option as well as basic installation guidelines and principles that must be followed. This section begins on **page 11**.
   - The UMC 1000 Craft Interface provisioning and maintenance commands required to **turn-up**, test and maintain effective SSR transport. This section begins on **page 14**.

Warning!

Static Sensitive Equipment

Use strict electrostatic discharge precautions when working on UMC 1000 or related equipment.

The SSR-XCVR, when operated at maximum output power with a high-gain directional antenna, can generate RF fields, which exceed the FCC limits for public exposure {CFR 47 1.1307(b)(1)} at distances up to 2.5 meters from the antenna. The antenna should be located such that uncontrolled public exposure is unlikely. The limits for controlled occupational exposure are also exceeded at distances up to 1 meter from the antenna. The antenna should be properly labeled warning maintenance people of the potential risks associated with working near the antenna with the transmitter operating.

Changes or modifications not expressly approved by AFC can void the user's authority to operate the equipment.

The UMC 1000 Spread Spectrum Radio (SSR) System

2. With the introduction of AFC's SSR transceiver (SSR-XCVR), spread spectrum radio technology has come into its own in the telephony world. Highly effective in deployment situations that are physically impossible or financially impractical for other transport media, spread spectrum radio transmission provides highly reliable voice and data transmission for a fraction of the investment required for traditional telephony deployment.

3. The UMC SSR-XCVR is a digital microwave radio transceiver that uses spread spectrum technology for license-free digital communications links. It operates along a line-of-sight propagation path at a license-free ISM (Industrial, Scientific and Medical) frequency band of 2.400 to 2.483 GHz, or at an optional ISM band of 5.725 to 5.850 GHz.

Spread Spectrum Radio

4. Spread spectrum radio transmission technology has been used for decades by the military for communication of important data because it is hard for an enemy to detect, intercept or jam the signal. These same features make SSR ideal for commercial telephony applications.

5. Commercial applications for SSR technology include wireless LANs, digital dispatch, digital cellular telephony, internet connections, radio modem devices and more.

6. Spread spectrum systems are classified into two general groups: frequency hopping and direct sequence. Some systems employ a combination of both techniques. The AFC SSR uses the Direct Sequence Spread Spectrum (DSSS) technique.

7. DSSS processing spreads the information signal over a large bandwidth, resulting in a lower power spectral density (PSD). The lower PSD of the transmitted carrier reduces the chance of interfering with other communication systems.

8. The sequence used to spread the carrier is often referred to as a Pseudo Noise (PN) sequence due to its pseudo-random nature. The DSSS receiver uses the same PN sequence to establish a correlation between the received signal and the expected PN pattern. Undesired signals that fall within the DSSS receiver bandwidth are not correlated with the receiver, and therefore, are rejected. This effect is useful in overcoming spurious interference. The extent to which a DSSS carrier can withstand interference is called the jamming margin. The jamming margin makes reliable radio communication possible in hostile environments.

9. At the transmitter, the modulating signal spreads the carrier via a unique PN code. The spread carrier is then de-spread at the receiver using the identical PN code. The key characteristic of spread spectrum communications is that occupied bandwidth for information transmission is much larger than the information bandwidth itself. The SSR-XCVR spreads the information 11 times over the transmission bandwidth. The nature of a spread carrier is such that the transmitted information is retrieved even if the received carrier is not intact. Various propagation and interference phenomena can disrupt the transmission, but the information is still extracted error free. The susceptibility to disruption is improved by higher spreading ratios; the trade-off is wider occupied bandwidth.

10. The reliability of a radio system is directly related to the system's fade margin. The fade margin is defined as the difference between the received signal strength and the minimum required signal strength to maintain specified performance criteria. Higher fade margins result in higher reliability. The other variables included in reliability calculations are propagation factors. Examples of such factors are climate and terrain. Humidity and precipitation result in lower reliability figures. Mountainous terrain, surprisingly, results in higher reliability as opposed to smooth terrain surfaces due to wave reflections.

The UMC SSR System

11. The UMC SSR system is easy to deploy, delivers great cost savings over other transport media, and requires little maintenance. It is ideal for transmission over rough terrain or water where other transport media are ineffective or cost-prohibitive. The sophisticated and straightforward craft interface simplifies provisioning, turn-up and test.

12. The SSR transceiver is a modular plug-in printed circuit board installed at both the LET and RST ends in any of the multi-purpose slots in the UMC channel bank.

13. The UMC SSR transceiver provides a 30 DS0 interface over a line-of-sight microwave link in the ISM frequency band of 2.400 – 2.483 GHz. An optional interface allows transmission over a 5.725 – 5.850 GHz frequency band. The link carries the data at 2.048 Mbps. Under certain conditions, the system can manage two 30 DS0 interfaces on the same microwave span.

14. The SSR system operates along a line-of-sight link only. Any type of obstruction in the radio propagation path will interfere with the operation of the system. The SSR span lengths vary depending on the specific application. Short spans of a few hundred yards are easily implemented with high fade margins. Long span lengths, however, are limited to the system reliability tolerance. Larger size antennas enable the SSR system to operate across spans of over 30 kilometers. Favorable propagation environments extend the span to over 40 kilometers with high reliability.

15. Since system performance is dependent upon numerous propagation factors unique to the physical application environment, each installation site must be engineered for optimum performance and reliability. For referrals to a qualified site engineer, call AFC Applications Engineering at (707) 794-7500.

System Components

16. Each node of the typical UMC SSR system comprises only a few components:

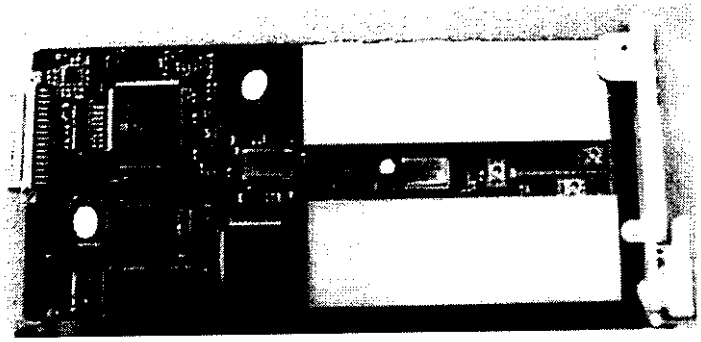
- UMC Channel Bank Assembly (CBA) with common control units
- SSR-XCVR modular transceiver
- Cable Adapter Assembly (CAA)
- Antenna Interface Module (AIM), containing the Low Noise Amplifier (LNA) and diplexor
- Optional Spread Spectrum Interface Assembly (SSIA) containing the transverter (necessary for the 5.7GHz band)
- Antenna receive and transmit cables
- Antenna dish and mounting unit

17. This section provides more detail on the system components.

- **Channel Bank Assembly:** The conventional 26-slot UMC CBA rack-mount card cage, or the 26-slot broadband card cage, or the 14-slot RSC/48 card cage, houses common control units such as the CPU, power supply unit (PSU), expansion link unit (ELU) and expansion bank control (EBC) if more than one CBA is present, and optional metallic test unit (MTU).

  The CBA also houses the SSR and other transceiver units, along with any other channel units needed according to the overall system configuration.

  Conventional copper or fiber can be deployed in conjunction with the SSR link, and several links can be established. Conventional UMC architecture supports both daisy-chained and star configurations.



- **SSR-XCVR:** The UMC SSR transceiver provides a 30 DS0 interface over a line-of-sight microwave link in the ISM (Industrial, Scientific and Medical) frequency band of 2.400 to 2.483 GHz.

  The SSR-XCVR is a modular UMC plug-in printed circuit board that contains both transmit and receive functions. Both the local and remote terminals must be equipped with the SSR-XCVR to establish a full duplex span over a microwave radio link.

  The SSR-XCVR is completely transparent in the operation of the UMC; the required allocation of channels is handled with local microprocessors that establish the required DS0s within the architecture of the UMC backplane.

- **Optional Spread Spectrum Interface Assembly (SSIA):** The SSIA contains the transverter module that is required when the 5.7 GHz band is used as the transceiver frequency spectrum.

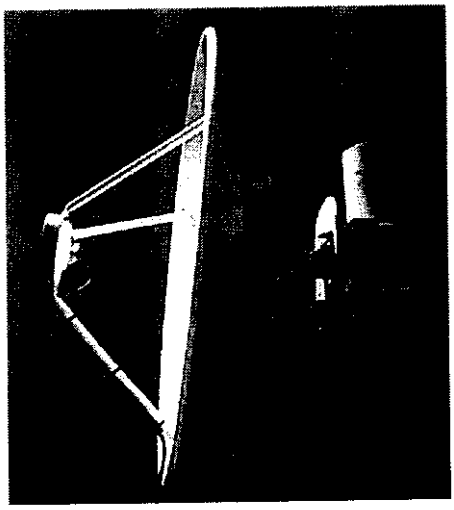
  The transverter is a frequency shifting module. Currently there is a 2.4 GHz to 5.7 GHz transverter module available. The transverter works in both directions for frequency translation. The transverter module is powered from -48Vdc furnished within the UMC enclosure.

- **Cable Adaptor Assembly (CAA):** The CAA is a rack-mounted support bracket for cabling pass-through termination. Up to four pairs of cables can be mounted and retained on the CAA. The CAA acts as a stress relief for the heavy and bulky antenna cables that may come from the AIM module. The CAA has SMA-to-N bulkhead-style connectors.

- **Antenna Interface Module (AIM)**: The AIM acts as the mounting for the LNA (Low Noise Amplifier), diplexor and surge suppressor. The LNA is used to amplify the received signal from the antenna to the SSR-XCVR. The diplexor is a specialized dual filter that allows the transmitted signal and the received signal to be combined into a single cable between the AIM and the antenna.

- **Antenna cables**: The cables that connect the antenna to the SSR-XCVR, AIM and optional SSIA can be of various lengths, depending on factors at the site such as the height of the tower, signal link budget, etc. All cables are heavy-duty, industrialized, weather-proofed and terminate in rugged "N" or "SMA" type connectors.

Transmit and receive cables connect the SSR-XCVR to the CAA; between the SSR-XCVR and the SSIA there is an additional timing cable.



- **Antenna:** The antenna size is determined by the span and power requirements of the site. Sometimes these are limited by radio regulatory commissions and hence only certain options are available.

  In general, increased span distance requires a larger antenna. However, other considerations are the gain of the antenna selected, the mounting of the antenna and the cabling to the antenna. Frequency considerations also play a role.

  The parabolic reflector focuses the signal onto the antenna feed module. This feed module is selective to the frequencies used in the system. It is important to use the correct feed module receiving the desired frequency band. For information on obtaining the feed module, contact AFC Applications Engineering at 707-793-8700 for a referral.

  The tower type and size is determined by the site and path and must be sufficiently high to allow an unobstructed line-of-sight path to the other antenna of the link. In some cases no tower is needed and the antenna may be mounted on the side of a tall building. In other cases an existing tower structure may be used.

  An antenna mount attaches the antenna to the mounting structure. The mount must allow for at least a 10° variation in the angular positioning of the X and Y directions of the antenna to permit proper alignment. This mount must also consider the attachment of the necessary cables, lightning protectors and aviation beacons.

  Power to the antenna is under UMC system control and is calculated and regulated on a site-by-site basis. Antenna size and gain will determine the radiated power. Regulatory commissions may restrict the regional radiated power limits.

System Specifications for the SSR-XCVR

• General

Coding	Direct sequence, 11-bit code
Modem	QPSK
Data Rate	2.048 Mbps
Frequency Range	2.410 to 2.473 GHz, 1 MHz steps
— with transverter	5.735 to 5.840 GHz, 1 MHz steps
Processing Gain	>10 dB
System Gain (radio only)	110 dB
— with transverter	105 dB
Acquisition Time	500 ms, max
Transmission Delay	50 µs max, radio only
Loopback	Local Digital, Local RF
RF Connectors	MCX (f)

• Transmitter

Output Power	0 to +18 dBm at Transmit Cable output, 1 dB steps
Channel Bandwidth	20 MHz
Output Impedance	50 Ω
Spurious Emissions	-65 dBc

• Receiver

Nominal Receive Level	-60 dBm at 10^{-9} BER
Maximum Receive Level	-30 dBm at 10^{-9}
Threshold Sensitivity	-90 dBm at 10^{-6}
— with transverter	-85 dBm at 10^{-6}
Image Rejection	80 dB
RSSI Range	-40 to -90 dBm

• Environmental

Operating Temperature	-40° to +65°C
Humidity	5% - 95%, non-condensing
Power Consumption	6 W, max
— with transverter	18 W, max

Installing the SSR Transport System

18. Installing AFC's SSR transport system can be broken down into four basic steps:

- Selecting the frequency band the SSR-XCVRs will utilize
- Choosing and preparing the installation site
- Selecting and installing the proper antenna (size and feed type)
- Installing the Antenna Interface Module (AIM), Cable Adaptor Assembly (CAA), Spread Spectrum Interface Assembly (SSIA) if required and the necessary cables

Note: Since system performance is dependent upon numerous propagation factors unique to the physical application environment, each installation site must be engineered for optimum performance and reliability.

19. The operator of the spread spectrum intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations.

Selecting the SSR-XCVR frequency band

20. Currently, there are two frequency bands available for SSR-XCVR transport:

- The ISM (Industrial, Scientific and Medical) band of 2.400 to 2.483 GHz
- An optional ISM frequency band of 5.725 to 5.850 GHz

21. In each of these two frequency bands, the user may select a primary and a protection frequency. There is no priority assigned to one of these frequencies over the other. Once the SSR-XCVR is enabled, the system will begin searching to create a link on either of those two frequencies. The system will begin operation on whichever of the two frequencies it syncs onto first.

22. The alternate frequency, either primary or protection, will not be used unless other interference occurs. In that case, the system again begins searching on the alternate frequency, shifting back and forth between the primary and protection, until a link is established again.

23. In some cases, the user may decide not to assign a protection frequency for an SSR system, using only the primary, because of the proximity of other SSR systems or other factors. The frequency planning process will determine such considerations.

24. Selecting the proper frequency band for a particular site will depend on several factors, including:

- Regulations restricting the use of either of the two bands mentioned above
- Span distance between nodes coupled with local output power restrictions
- Antenna size restrictions based on existing structure or building limitations

Note: Since system performance is dependent upon numerous propagation factors unique to the physical application environment, each installation site must be engineered for optimum performance and reliability.

Choosing and preparing the installation site

25. Due to SSR technology's line-of-sight requirements, the strategic placement of each SSR node is of utmost importance. Areas identified as potential installation sites should be clear of obstructions such as existing or planned buildings, trees and hills.

Note: The use of existing buildings or towers should be considered when choosing an installation site as this may reduce construction costs and installation time.

Note: Since system performance is dependent upon numerous propagation factors unique to the physical application environment, each installation site must be engineered for optimum performance and reliability.

Selecting and installing the proper antenna (including size and feed type)

26. Selecting the optimal antenna size is determined by calculating the span between nodes and accounting for power requirements. Radio regulatory commissions may limit the available antenna options. For referral to antenna vendors, contact AFC Applications Engineering at 707-794-7500.

27. Generally, increasing the span distance increases the size of the required antenna. However, other considerations such as antenna gain, mounting and cabling restrictions, and polarization must be specified.

28. Selecting the proper antenna feed type is also important. The antenna feed module (located on the antenna's focal point) is selective for frequencies used in the system.

Note: The correct feed module for the deployment spectrum must be used.

Note: Because antenna selection and installation is dependent upon so many factors unique to each installation site and use, each installation site must be engineered for optimum performance and reliability.

Installing the Antenna Interface Module (AIM), Cable Adapter Assembly (CAA), Spread Spectrum Interface Assembly (SSIA) if required and the necessary cables

29. The AIM is the mounting for the Low Noise Amplifier (LNA) and diplexor. Various factors such as the height of the antenna, system power limitations and local radio regulations may require the AIM to be installed anywhere between the antenna and the CAA.

30. Installation of the AIM should be performed on a site-by-site basis only. Figure A-1 shows a typical SSR installation including the location of the AIM.

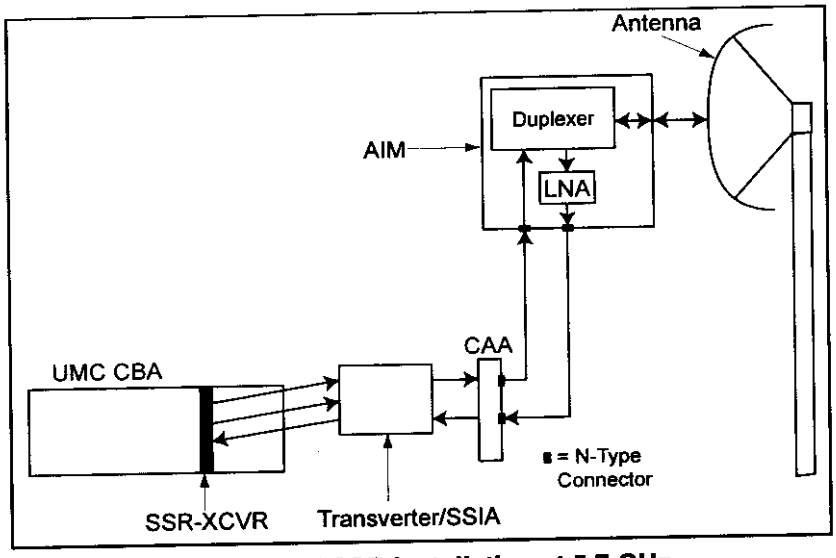


Figure A-1. Typical SSR Installation at 5.7 GHz

31. The CAA is a rack-mounted support bracket for cabling pass-through termination. The CAA provides stress relief for the heavy and bulky antenna cables coming from the AIM.

32. As with the AIM, installing the CAA should be performed on a site-by-site basis only. Figure A-1 shows a typical installation including the location of the AIM.

33. When the 5.7 GHz frequency spectrum is utilized, a special transverter is required. Currently, there is a 2.4 GHz to 5.7 GHz transverter module available. This transverter is a frequency translating module that translates the frequency in both directions (2.4 GHz to 5.7 GHz for transmission and 5.7 GHz to 2.4 GHz for reception).

34. The transverter is retained in the Spread Spectrum Interface Assembly (SSIA). The SSIA and transverter module are installed between the UMC 1000 CBA and the CAA. Figure A-1 shows a typical installation including the location of the SSIA.

35. The cables that connect to the antenna, AIM, and optional SSIA can be of various lengths that are a function of the site, the height of the antenna, signal link budget and other factors.

36. All exterior cables (including the antenna feed, antenna transmit and antenna receive) are heavy-duty industrial, weather-proof and terminate in rugged "N" type connectors.

Note: Because AIM, CAA, transverter and cable installation is dependent upon many factors unique to the physical application environment, each installation site must be engineered for optimum performance and reliability.

Provisioning the SSR Transport Option

37. In order to turn-up, test and maintain effective SSR transport, the following commands are available:

Transceiver Provisioning Menu (via the Provisioning Menu):

- List Transceiver Settings
- Modify Transceiver Settings
- List Alarm Thresholds
- Modify Alarm Thresholds

Maintenance Menu:

- List Performance Data

38. A basic overview of each of the commands listed above as they relate to the Spread Spectrum Radio system is provided in the following pages.

The Transceiver Provisioning Menu

39. The Transceiver Provisioning Menu can be used to list and modify transceiver settings and alarm thresholds for the transceiver cards in the system. The user may list or set BER-Red and BER-Maintenance alarms for fiber, copper and radio (including SSR) transceivers. Figure A-2 shows the Transceiver Provisioning Menu.

```
Thu Nov 26, 1992              UMC LET                    14:14:33
                    Transceiver Provisioning Menu

1. List Transceiver Settings
2. Modify Transceiver Settings
3. List Alarm Thresholds
4. Modify Alarm Thresholds
A. All Current Alarms
B. Provisioning Menu
*. Main Menu
?. Help

Transceiver Settings Menu
>> [1]:
```

Figure A-2. Transceiver Settings Menu

The List Transceiver Settings Command

40. The List Transceiver Settings command allows the user to list the various transceiver settings that may be modified for a particular transceiver type. To list these settings, type {1} at the Transceiver Provisioning Menu prompt and press {ENTER}. The system prompts for the plug-in type of the transceiver card whose settings are to be listed.

```
Enter Plug-In Type [All]:
```

41. For Spread Spectrum radio transport enter "SSR" or "SSR-XCVR."

42. After "SSR-XCVR" is entered, the system prompts for a starting location. This is the terminal-shelf-slot location from which to search for SSR transceiver cards.

```
Enter Starting Plug-In Location [LET-1-1]:
```

43. After the starting location is entered, the system prompts for an ending location. This is the terminal-shelf-slot location where the search for SSR transceiver cards is to stop.

```
Enter Ending Plug-In Location [RST1-8-22]:
```

44. When the ending location is entered, the system searches all specified slots for SSR transceiver cards. When matching transceiver cards are found, the settings for that card are listed on the screen. Figure A-3 shows a sample List Transceiver Settings screen.

```
List Transceiver Settings

Enter Plug-In Type [All]: SSR-XCVR
Enter Starting Plug-In Location [LET-1-1]: LET-1-1
Enter Ending Plug-In Location [RST1-8-22]: RST1-8-22

------------------------------------------------------------------
Location: LET-1-15 Plug-In: SSR-XCVR    Status: In-Service
                                      Service: Univ Span to RST1-1-15

      Transceiver: Enabled
      Transverter: None
      Primary Transmit Frequency: 2470 MHz
      Primary Receive Frequency: 2425 MHz
      Protection Transmit Frequency: 2460 MHz
      Protection Receive Frequency: 2415 MHz
      Transmit Power Level: 10 dBm

    Press Any Key
------------------------------------------------------------------
Location: RST1-1-15 Plug-In: SSR-XCVR   Status: In-Service
                                      Service: Univ Span to RST1-1-15

      Transceiver: Enabled
      Transverter: None
      Primary Transmit Frequency: 2425 MHz
      Primary Receive Frequency: 2470 MHz
      Protection Transmit Frequency: 2415 MHz
      Protection Receive Frequency: 2460 MHz
      Transmit Power Level: 10 dBm

    Press Any Key
```

Figure A-3. Sample List Transceiver Settings Screen

45. Table A-1 summarizes the settings available for the SSR-XCVR. When all card slots in the specified range have been searched and the SSR-XCVR settings are reported, the system returns to the Transceiver Settings Menu prompt.

The Modify Transceiver Settings Command

46. The Modify Transceiver Settings command allows the user to set options on the various transceiver cards available in the system. The Modify Transceiver Settings options for the SSR transceivers include the following:

Transceiver: When the user selects "Enabled", all current alarms will be reported, the appropriate alarm criticality is reflected on the CPU front panel LEDs, and traffic will operate according to alarm condition. When the user selects "Disabled", a status alarm will be indicated, all other current alarms reported by the card will be suppressed, and call traffic will be blocked. The data link will be maintained.

Transverter: This prompt enables the user to enter the frequency shift provided by an external transverter. The user has the option to select "None" or a frequency in the range of 3326 MHz to 3366 MHz. A step size of 2 MHz will be made when the bracket keys are used; at the boundaries of the range the prompt will roll to "None" and then to the opposite end of the range.

Primary Transmit Frequency: This prompt allows the user to select the frequency for the transmit. The user has the option of entering "None" or a frequency in the range of 2410 MHz to 2473 MHz (transverter set to "None"), or a frequency, shifted by the transverter, between 5735 MHz and 5840 MHz. A step size of 1 MHz will be made when the bracket keys are used; at the boundaries of the range, the prompt will roll to "None".

Primary Receive Frequency: This prompt allows the user to select the frequency for the receive. This prompt is only offered when the user has selected a transmit frequency A other than "None". The user can enter a frequency in the range of 2410 MHz to 2473 MHz (transverter set to "None"), or a frequency, shifted by the transverter, between 5735 MHz and 5840 MHz. A step size of 1 MHz will be made when the bracket keys are used; at the boundaries of the range the prompt will roll to the opposite end of the range.

Protection Transmit Frequency: This prompt allows the user to select another frequency for the transmit. This prompt is only offered when the user has selected a transmit frequency A other than "None". The user has the option of entering "None" or a frequency in the range of 2410 MHz to 2473 MHz (transverter set to "None"), or a frequency, shifted by the transverter, between 5735 MHz and 5840 MHz. A step size of 1 MHz will be made when the bracket keys are used; at the boundaries of the range the prompt will roll to "None".

Protection Receive Frequency: This prompt allows the user to select another frequency for the receive. This prompt is only offered when the user has selected a transmit frequency B other than "None". The user can enter a frequency in the range of 2410 MHz to 2473 MHz (transverter set to "None"), or a frequency, shifted by the transverter, between 5735 MHz and 5840 MHz. A step size of 1 MHz will be made when the bracket keys are used; at the boundaries of the range the prompt will roll to the opposite end of the range.

Transmit Power: This prompt allows the user to select the transmit power level in dBm. This prompt is only offered when the user has selected a transmit frequency A other than "None". The range is 0 to 18 dBm, or "Off." A step size of 1 dBm will be made when the bracket keys are used; at the boundaries of the range, the prompt will roll to the opposite end of the range.

47. Table A-1 summarizes the settings for the SSR-XCVR.

Table A-1: SSR Transceiver Settings

Transceiver Type	Setting	Acceptable Values
SSR-XCVR	Transceiver	Enabled*: Enable the transceiver Disabled: Disable the transceiver
	Transverter	None*; 3326 to 3366 MHz (2 MHz steps)
	Primary Transmit Frequency (see Notes 1 & 2)	None*; 2410 to 2473 MHz (1 MHz steps); 5735 to 5840 MHz (1 MHz steps)
	Primary Receive Frequency (see Note 3)	None*; 2410 to 2473 MHz (1 MHZ steps); 5735 to 5840 MHz (1 MHz steps)
	Protection Transmit Frequency (see Note 3)	None*; 2410 to 2473 MHz (1 MHz steps); 5735 to 5840 MHz (1 MHz steps)
	Protection Receive Frequency (see Note 4)	None*; 2410 to 2473 MHz (1 MHz steps); 5735 to 5840 MHz (1 MHz steps)
	Transmit Power	Off*; 0 to 18 dBm (1 dBm steps)

Note 1: The Primary Transmit Frequency range will be 2410 to 2473 MHz when the Transverter Frequency setting is "None".
Note 2: The Primary Transmit Frequency range will be 5735 to 5840 MHz when the Transverter Frequency setting is in the 3326 to 3366 MHz range.
Note 3: A Primary Transmit Frequency other than "None" must be entered to enter a value for this setting.
Note 4: A Primary Receive Frequency other than "None" must be entered to enter a value for this setting.
* indicates default value.

48. To modify SSR transceiver settings, select {2} at the Transceiver Settings Menu prompt and press {ENTER}. The system will display the following prompt.

```
Enter Plug-In Type [All]:
```

49. At the prompt, enter "SSR-XCVR". Press the {[} or {]} keys at the system prompt to scroll through the system options.

50. After the transceiver type, "SSR-XCVR", has been entered, the system prompts for a starting location. This location is the terminal-shelf-slot location where the user wishes to begin a search for SSR transceiver cards.

```
Enter Starting Plug-In Location [LET-1-1]:
```

51. After the starting location is entered, the system prompts for an ending location. This is the terminal-shelf-slot location where the search for SSR transceiver cards is to end.

```
Enter Ending Plug-In Location [RST1-8-22]:
```

52. When the ending location is entered, the system searches the specified range for SSR transceiver cards. When SSR transceiver cards are found, the system prints the location and plug-in type of the card, and the current settings for the card. Following the listing of the location plug-in type of the card and the current card settings. The system prompts the user asking if this card is to be edited.

```
Edit This Card? [No]:
```

53. If this card is not to be edited, press {ENTER}. The system will leave the settings at their current values and continue to search for the next SSR transceiver card. If this card is to be edited, type "Yes" and press {ENTER}. The system will then prompt the user for modifications to all settings necessary for the SSR transceiver being configured. Figure A-4 shows a sample screen using the Modify Transceiver Settings command.

```
Modify Transceiver Settings

Enter Plug-In Type [All]: SSR-XCVR
Enter Starting Plug-In Location [LET-1-1]: LET-1-1
Enter Ending Plug-In Location [RST1-8-22]: RST1-8-22

-----------------------------------------------------------------
Location: LET-1-15      Plug-In: SSR-XCVR
      Transceiver: Enabled
      Transverter: None
      Primary Transmit Frequency: 2420 MHz
      Primary Receive Frequency: 2460 MHz
      Protection Transmit Frequency: 2430 MHz
      Protection Receive Frequency: 2470 MHz
      Transmit Power Level: 10 dBm

Edit this card? [No]: Yes

Transceiver [Enabled]: Enabled
Enter Transverter Frequency in MHz [None]: None
Enter Primary Transmit Frequency in MHz [2425]: 2435
Enter Primary Receive Frequency in MHz [2460]: 2470
Enter Protection Transmit Frequency in MHz [2435]: 2445
Enter Protection Receive Frequency in MHz [2470]: 2475
Enter Transmit Power Level in dBm [10]: 10

Effect Changes? [Yes]: Yes
-----------------------------------------------------------------
Location: RST1-1-15     Plug-In: SSR-XCVR
      Transceiver: Enabled
      Transverter: None
      Primary Transmit Frequency: 2460 MHz
      Primary Receive Frequency: 2420 MHz
      Protection Transmit Frequency: 2470 MHz
      Protection Receive Frequency: 2430 MHz
      Transmit Power Level: 10 dBm

Edit This Card? [No]: Yes

Transceiver: [Enabled]
Enter Transverter Frequency in MHz [None]:
Enter Primary Transmit Frequency in MHz [2460]: 2420
Enter Primary Receive Frequency in MHz [2425]: 2460
Enter Protection Transmit Frequency in MHz [2470]: 2430
Enter Protection Receive Frequency in MHz [2435]: 2470
Enter Transmit Power Level in dBm [10]: 10

Effect Changes? [Yes]: Yes
```

Figure A-4. Sample Modify Transceiver Settings Screen

```
Transceiver [Enabled]: Enabled
```

54. This setting is used to specify whether a SSR span can be used in a network. If the SSR can be used, type "Enabled" and press {ENTER}. If the SSR is not to be used in the network, type "Disabled" and press {ENTER} to disable the SSR transceiver.

55. If the 5.7 GHz (5735 to 5840 MHz) frequency range is desired, a transverter frequency must be entered when prompted:

```
Transverter Frequency [None]:
```

56. This setting is used to specify the frequency shift provided by an external transverter. The transverter frequency setting is limited to the 3326 to 3366 MHz range (selectable in 2 MHz steps). If the transverter frequency value "None" is selected, no frequency shift will take place. The standard 2.4 GHz frequency range (2410 to 2473 MHz) is available.

57. When all settings for the SSR transceiver have been entered, the system prompts the user asking if the modified settings are to take effect.

```
Effect Changes? [Yes]:
```

58. To use the new settings, type "Yes" and press {ENTER}. If the settings are not correct, type "No" and press {ENTER}. A "No" response causes the system to leave the settings for this SSR transceiver at their previous values and go on to the next card. If corrections need to be made, repeat the Modify Transceiver Settings command.

59. When all cards in the specified range have been found and all SSR transceiver settings have been established, the system returns to the Transceiver Settings Menu prompt.

The List Alarm Thresholds Command

60. The List Alarm Thresholds command allows the user to list all BER thresholds that are currently set for all of the different transceiver cards in the system. The alarm information is generated by the transmission card as it constantly monitors both data bits and Cyclic Redundancy Check (CRC) violations. The collected data is used to calculate a Bit Error Rate. The BER is calculated for each end of the transmission span on the received data. The system operator may specify the Bit Error Rate where specific alarms are to be reported. Two BER alarms are currently supported, the BER Red alarm and the BER Maintenance alarm. The BER Red alarm indicates that the facility can no longer carry traffic. The default value for this alarm is 10^{-3}. When the system detects a BER at this threshold, the facility is removed from service. If a redundant facility is available, service is concentrated onto it. Otherwise, trunk conditioning is initiated. The BER Red alarm is a major alarm if no protection is available; it is a minor alarm if redundant facilities are available for concentration. The

BER Maintenance alarm indicates that the facility service is degraded. The BER Maintenance default threshold is 10^{-8} for fiber, 10^{-6} for T1, and 10^{-5} for RF (including SSR). The BER Maintenance alarm is a minor alarm.

61. To list the current BER threshold settings, type {3} at the prompt and press {ENTER}. The system will display a list of the current BER threshold settings on the screen. Figure A-5 shows a sample listing using the List BER Thresholds command. This report may also be printed on a printer.

```
List Alarm Thresholds

Fiber Thresholds
            BER-Red Alarm           :10-3
            BER-Maintenance Alarm   :10-8

T1 Thresholds
            BER-Red Alarm           :10-3
            BER-Maintenance Alarm   :10-6

RF Thresholds
            BER-Red Alarm           :10-3
            BER-Maintenance Alarm   :10-5

System Thresholds Listed
```

Figure A-5. Sample List BER Threshold Screen

The Modify Alarm Thresholds Command

62. The Modify Alarm Thresholds command allows the user to change the BER threshold settings for a specific transmission medium. To modify the BER thresholds, type {4} at the Transceiver Provisioning Menu prompt and press {ENTER}. The system then prompts the user for the type of facility to be modified.

```
Enter Facility Type [Fiber]:
```

63. Enter the "RF" facility type at the prompt and press {ENTER}. If the {ENTER} key is pressed without specifying the "RF" facility type, the system uses the default value, "Fiber". Press the {[} or {]} keys at the system prompt to scroll through the system options. Press {ENTER} when the desired facility is displayed at the prompt.

64. After entering the "RF" facility type, the system prompts the user for the new BER thresholds to be used for the specified facility. Table A-2 shows a list of the range of values to be used for the different transmission facilities available in the UMC 1000.

Table A-2: Threshold Ranges for RF Transmission

Facility Type	Alarm Type	Inputs Allowed	Default Value
RF	Red	10^{-3} to 10^{-7}	10^{-3}
	Maintenance	10^{-4} to 10^{-8}	10^{-5}

65. The first alarm threshold is the BER - Red Alarm. This threshold sets the Bit Error Rate at which a Major or Critical alarm is generated. This alarm indicates that the system transmission is too poor to carry traffic. For example, to trigger a BER Red Alarm when the BER reaches 1 x 10^{-3}, enter the "3" at the BER - Red Alarm prompt.

```
BER - Red Alarm [3]:
```

66. If the number entered is not valid, the system will display an error message identifying the error. Correct the error by entering a valid value at the prompt and pressing {ENTER}. When a valid value has been entered for the BER - Red Alarm, the system prompts for the alarm threshold value for the BER - Maintenance Alarm.

```
BER - Maintenance Alarm [8]:
```

67. At the prompt, enter the desired BER alarm threshold that will trigger a maintenance alarm and press {ENTER}. The {[} or {]} keys may be used to step through the available options. This value indicates that the system is experiencing sufficient errors in transmission that the system is in danger of failure. If an invalid value is entered, the system will display an error message identifying the problem. When a valid value is entered, the system will set the BER thresholds and display the message "System Thresholds Updated" and return to the Transceiver Setting Menu.

68. From any menu in the system, the "A" command is available. To list all alarms, type {A} at the Transceiver Setting Menu prompt and press {ENTER}.

69. To return to the Provisioning Menu, type {B} at the Transceiver Setting Menu prompt and press {ENTER}.

70. To return to the Main Menu, type {*} at the menu prompt and press {ENTER}.

71. For help with the commands in the Transceiver Setting Menu, type {?} at the menu prompt and press {ENTER}.

The Maintenance Menu

72. The Maintenance Menu provides commands for system hardware maintenance. Commands in this group provide listings of current alarms, alarm history, TR-8 group status, performance data, digital line card status and RF transceiver status. The Operate Alarm Cut Off command is also available on this menu.

73. For the purposes of this SSR Supplement, we will concentrate on the List Performance Data and Display Performance Data commands. Figure A-6 shows the Maintenance Menu.

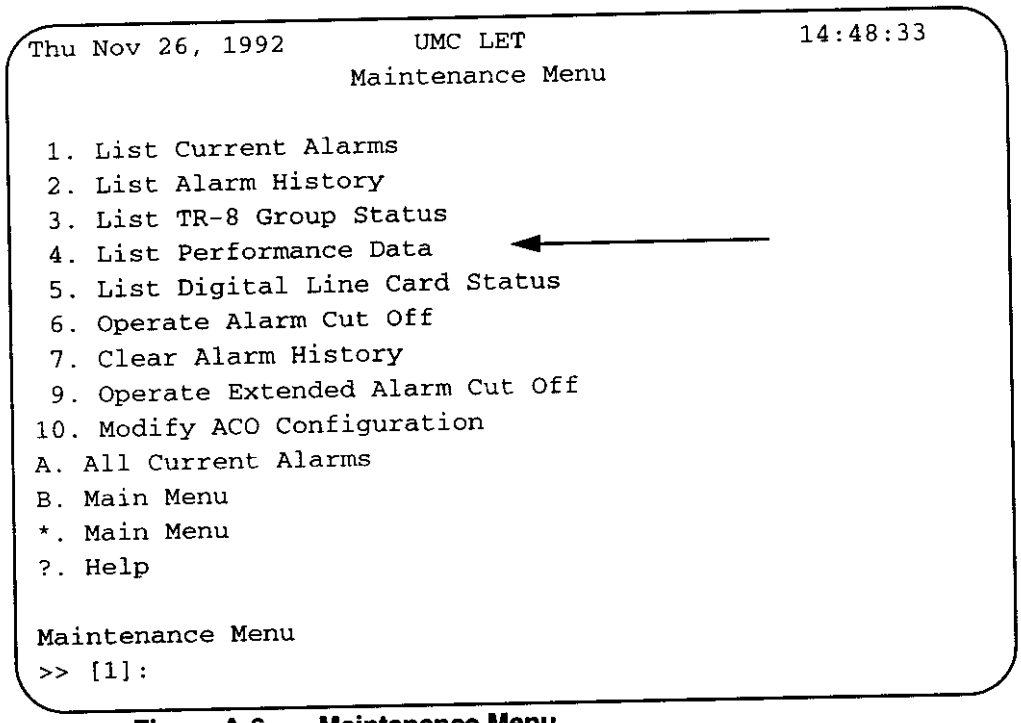


Figure A-6. Maintenance Menu

The List Performance Data Command

74. The List Performance Data command allows the user to view information about the current status of active transmission facilities in the system. Performance data listed includes the span being reported and the BER and status of individual spans. To obtain the performance data, select option {4} from the Maintenance Menu and press {ENTER}.

75. The system prompts for the facility type to be reported. If no facility type is specified, the system uses the first existing facility it encounters as the default.

```
Enter Facility Type [All]:
```

76. After entering a valid facility type, the system prompts for the starting plug-in location. Default is the first slot in the current terminal.

```
Enter Starting Plug-In Location [LET-1-1]:
```

77. At the prompt, enter a valid terminal-shelf-slot location where the report is to start. If no location is specified, the system defaults to the first slot in the current terminal for the starting location. Press {ENTER} at the Starting Location prompt to enter the default value. If the desired starting location is known, type that address at the prompt and press {ENTER}. If an incorrect value is entered, the system will display an error message identifying the error and requesting valid input. When a correct starting location has been entered, the system prompts for the ending location.

```
Enter Ending Plug-In Location [RST1-2-22]:
```

78. At the prompt, enter a valid terminal-shelf-slot location where the report is to end. If no ending location is specified, the system defaults to the highest RSTxx-8-26 address available for the system, where xx represents the highest remote terminal number stored in the system database. Press {ENTER} at the Ending Location prompt to enter the default value. If the desired ending location is known, type that address at the prompt and press {ENTER}. If an incorrect value is entered, the system will display an error message identifying the error and requesting valid input. When a correct ending location has been entered, the system displays the performance data information on the screen.

79. When the performance data has been displayed on the screen, the system returns to the Maintenance Menu. Figure A-7 shows a sample report from the List Performance Data command for RF transceivers.

```
Enter Facility Type [ALL]: RF

Enter Starting Plug-In Location [LET-1-1]: LET-1-1
Enter Ending Plug-In Location [RST1-1-PSUB]: RST1-1-PSUB

RF Span: LET-1-19 to RST1-1-19
                              LET <----------------------------->RST1
Status:                         Ok                              Ok
Bit Error Rate                  10-9                            10-9
Frequency                       Primary                         Primary
  Transmit                      5830                            5785
  Receive                       5785                            5830
RSSI                            -40 dBm                         -40 dBm

RF Span: LET-1-15 to RST1-1-15
                              LET <----------------------------->RST1
Status:                         Ok                              Ok
Bit Error Rate:                 10-9                            10-9
Frequency                       Primary                         Primary
  Transmit                      2410 MHz                        2470 MHz
  Receive                       2470 MHz                        2410 MHz
RSSI                            -67 dBm                         -40 dBm

Facility Performances Listed: 2
```

Figure A-7. Sample List Performance Data Screen (T1, Fiber, RF)

80. The dotted lines indicate the span between terminals. Table A-3 lists the categories and possible values reported by the List Performance Data command.

Table A-3: List Performance Data Values

Category	Definition	Acceptable Values
Terminal	Point of connection between transceiver spans. LET is Local Exchange Terminal; RST is Remote Subscriber Terminal.	LET, RST
Status	Status of a span. OK or a major or minor alarm.	Various.
Bit Error Rate	Bit error rate measured on the end of the span where the BER appears. For example, the BER on the LET measures bit error rates going in the direction of the LET.	10^{-3} to 10^{-9}
Frequency	Primary transmit and receive or Protection transmit and receive.	2410 –2473 MHz or 5735 – 5840 MHz
Receive SSI	Received Signal Strength Indicator.	-40 dBm to -90 dBm

This page is intentionally blank.

Elliott

Elliott Laboratories Inc.
www.elliottlabs.com

684 West Maude Avenue
Sunnyvale, CA 94086-3518

408-245-7800 Phone
408-245-3499 Fax

May 19, 1998

Chief, Equipment Authorization Branch,
Authorization and Evaluation Division,
Office of Engineering and Technology
FEDERAL COMMUNICATIONS COMMISSION
P.O. Box 358315
Pittsburgh, PA 15251-5315

Gentlemen:

The enclosed documents constitute a formal submittal and application for a Grant of Equipment Authorization pursuant to Subpart C of Part 15 of FCC Rules (CFR 47) regarding intentional radiators. Data within this report demonstrates that the equipment tested complies with the FCC limits for intentional radiators.

This submittal was prepared by Elliott Laboratories, as duly authorized agent. A copy of the letter of our appointment as agent is enclosed. Please also find enclosed a check in the amount of $1025.00 for the application fee.

If there are any questions or if further information is needed, please contact Elliott Laboratories for assistance.

Sincerely,

Mark Briggs

Mark Briggs
Manager, EMC Consulting Services

MB/bab
Enclosures:
- Application Fee
- FCC Form 731
- Non-Disclosure Request
- Agent Authorization Letter
- Anti-Drug Abuse Statement
- Emissions Test Report with Exhibits

File: R25090