Quality

Reliable

Proven

CSI-DRACELA-PR-AW
CS12-560-419

Important Safety Information

Antennas used for the purpose of radiating signals indoors are limited to a *maximum* gain of 3 dBi. The outdoor antenna used for the purpose of communicating to the wireless infrastructure is limited to -2 dBi, or any combination of gain and loss that equates to -2 dBi at output. Each antenna must be positioned to observe minimum separation requirements from all users and bystanders. The following guidelines should be used when considering separation distances.

INDOOR antennas must be placed such that, under normal conditions, personnel cannot come within 20 cm (~8.0 in.) from any inside antenna. Adhering to this minimum separation will ensure that the employee or bystander cannot exceed RF exposures beyond the maximum permissible limit as defined by section 1.1310 i.e. limits for General Population/Uncontrolled Exposure.

OUTDOOR antenna must be positioned such that, under normal conditions, personnel cannot approach closer than 120 cm. (~4 ft.). A non- directional antenna having a maximum gain of -2 dBi is used, precautions should be taken to prevent personnel from routinely passing closer than specified.
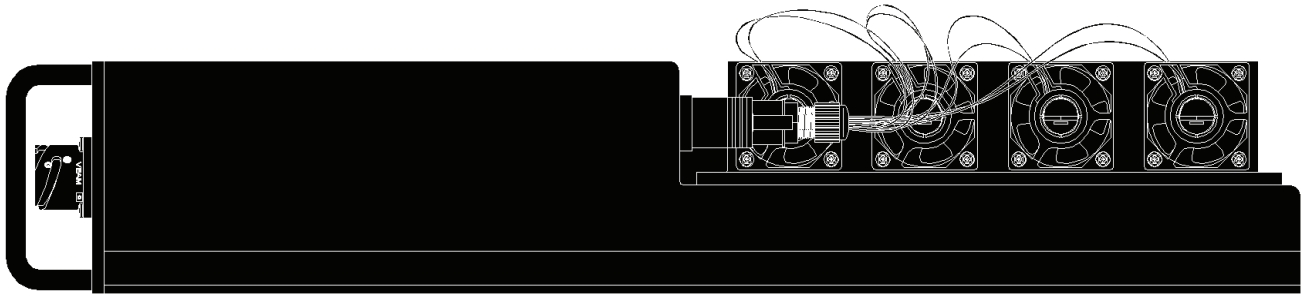
Radio and Television Interference

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes and Modifications not expressly approved by Cellular Specialties, Inc. can void your authority to operate this equipment under Federal Communications Commission's rules.

Table of Contents

Module Side View

Warning: The protective cover for the serial port must be securely fastened when the port is not in use to prevent compromise of enclosure integrity.

Serial Port

Module Top View

Status LED   Modem   PCS Server   Server Ant   PCS Donor   Donor Ant   DC Out

FCC Label   COM   Cell Server   U7C Server   Cell Donor   U7C Donor   Power LED   DC In
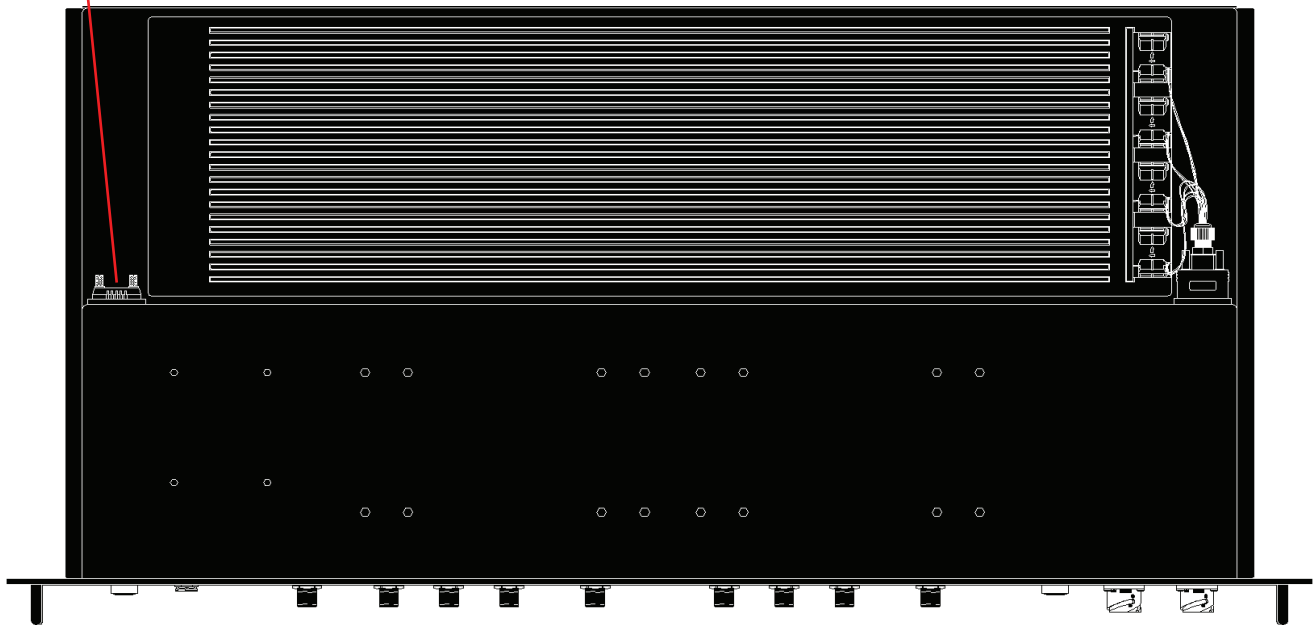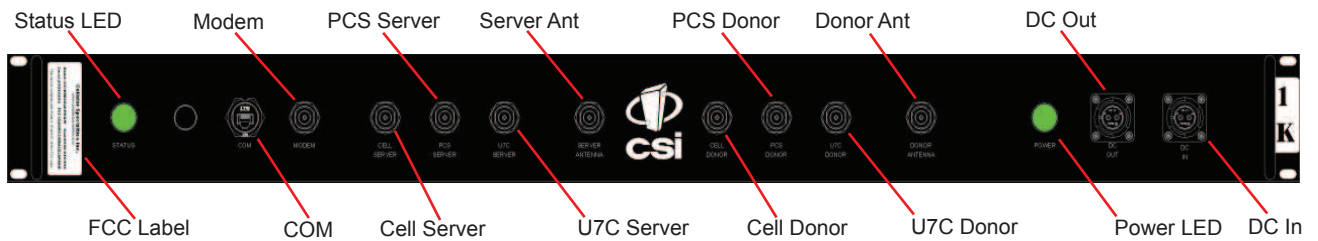
Module Face Plate View

Installation

1. Unpack the box containing the CSI 1K repeater system module.

2. After unpacking the components, verify all parts and cables are present. If any parts are discovered to be missing contact Cellular Specialties, Inc. at 1-877-844-4274 to arrange for replacements to be sent.

3. Install the repeater in the new rack attached at bottom of the existing system frame and secure in place with 4 - #10-32 screws .

1A, 1B & 1C "RINGO" UNIT (INSTALLED)

1D,1E & 1F "PAUL" UNIT (INSTALLED)

#10-32 SCREW (4 PLACES)

1K "JOHN UNIT"

1G, 1H & 1J "GEORGE" UNIT (INSTALLED)
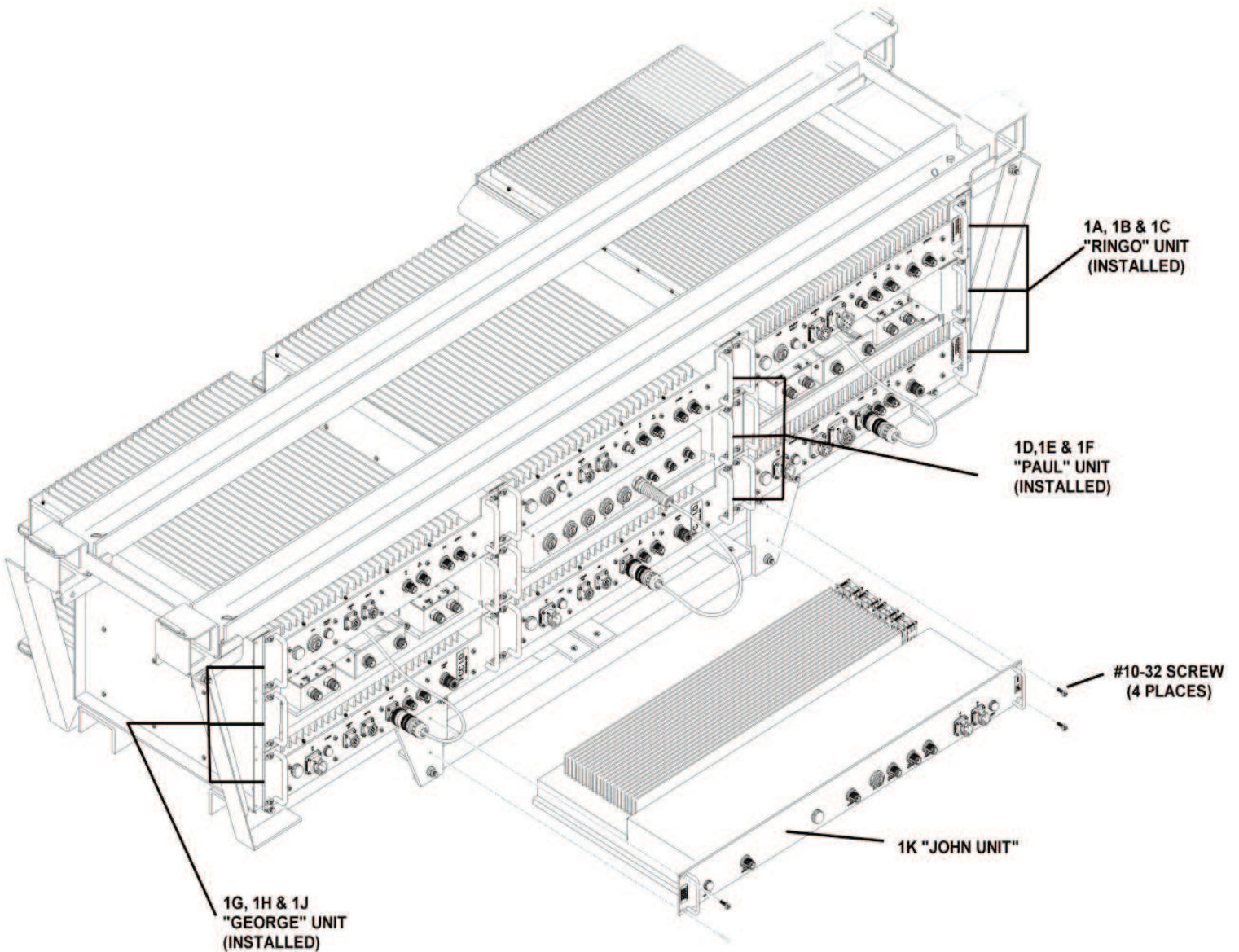
Physical Installation Into The Train

Installation

1. Remove the male input connector of the CBL/A **72VDC** PIGTAIL, 820-2164-001, from the train's **72VDC** power supply cable and connect it to the female **DC OUT** connector on the **1K** module. The other connectors on this cable assembly will remain installed in their current locations. Install the connector of the **72VDC** power supply cable from the train into the port labeled **DC IN** on the **1K** unit.

2. Remove the train's donor antenna feed cable from the **COMMON** port on the **1B** module and connect it to the port labeled **DONOR ANTENNA** on the **1K** module.

3. Remove the train's radiax cable feed from the second **COMMON** port on the **1B** module and connect it to the port labeled **SERVER ANTENNA** port on the **1K** module.

4. Remove the **820-2064-001** cable that connects the right hand coupler port labeled **LOW** on the **1H** module to the **DONOR ANT** port on the **1J** module.

5. Install the supplied Rubber Duck antenna in the **1K** module, **MODEM** port.

6. Remove the **820-2064-001** cable that connects the right hand coupler port labeled **HIGH** on the **1B** module to the **DONOR ANT** port on the **1C** module.
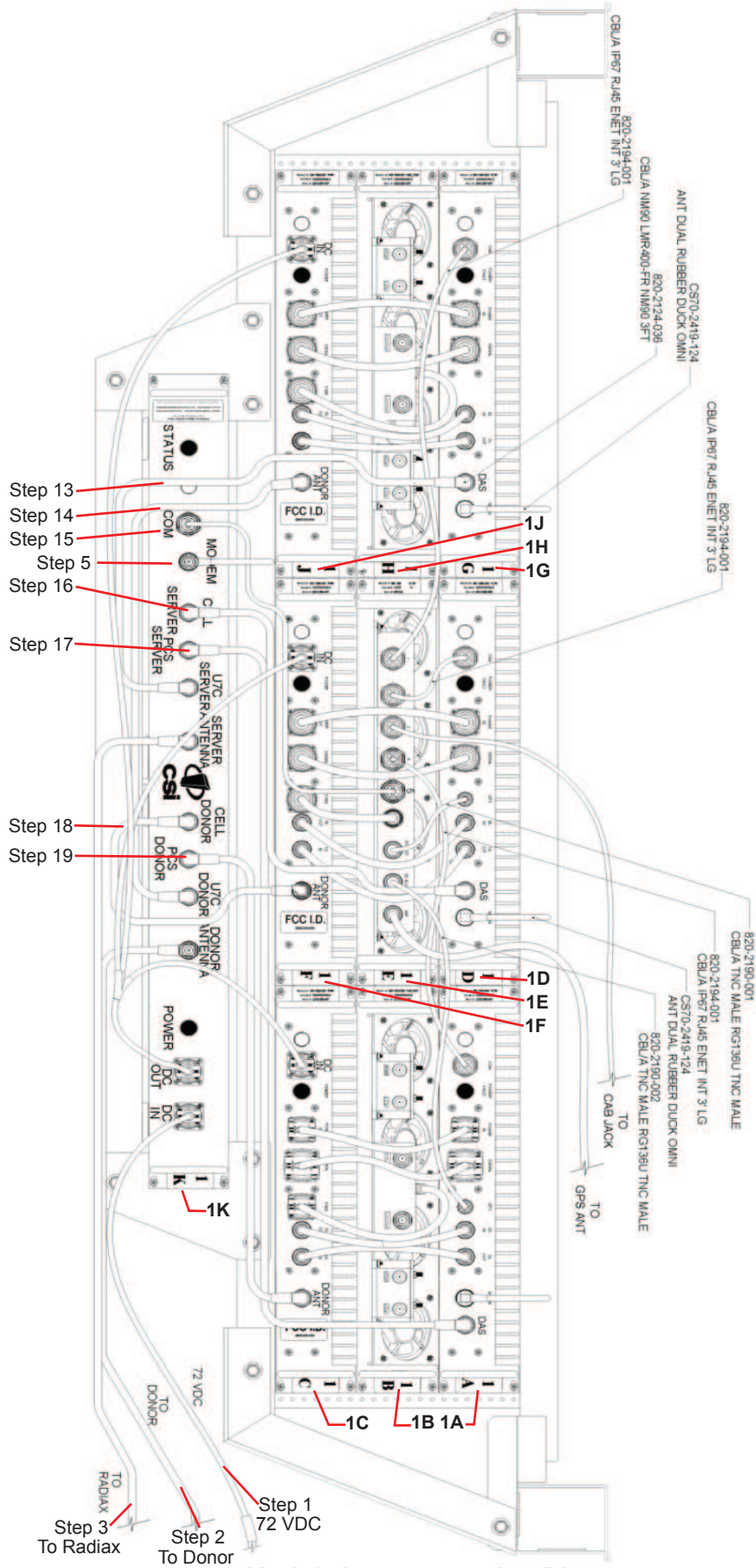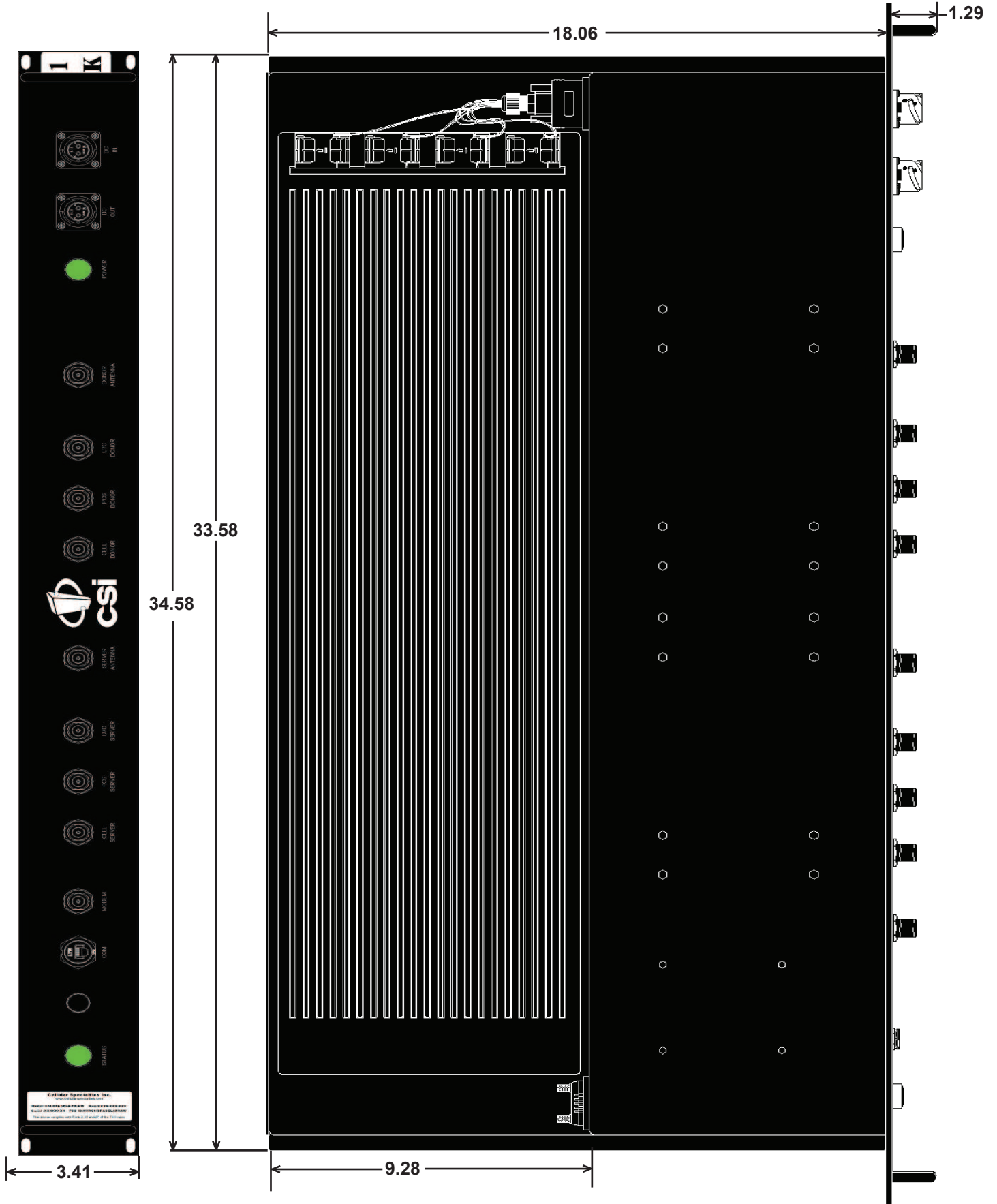
7. Remove the **CS54-3059-12** cable that connects the right hand coupler port labeled **HIGH** on the **1H** module to the **DONOR ANT** port on the **1F** module.

8. Remove the **820-2124-001** cable that connects the left hand coupler port labeled **LOW** on the **1H** module to the **DAS** port on the **1G** module.

9. Remove the **820-2124-001** cable that connects the left hand coupler port labeled **HIGH** on the **1B** module to the **DAS** port on the **1A** module.

10. Remove the **CS54-3059-12** cable that connects the left hand coupler port labeled **HIGH** on the **1H** module to the **DAS** port on the **1D** module.

11. Remove the **CS54-3154-12** cable that connects the left hand coupler port labeled **COMMON** on the **1H** module to the left hand coupler port labeled **LOW** on the **1B** module.

12. Remove the **CS54-3154-12** cable that connects the right hand coupler port labeled **COMMON** on the **1H** module to the right hand coupler port labeled **LOW** on the **1B** module.

13. Connect one supplied 820-2124-036 cable from the **DAS** port on the **1G** module to the **U7C SERVER** port on the **1K** module.

14. Connect one supplied 820-2124-036 cable from the **DONOR ANT** port on the **1J** module to the **U7C DONOR** port on the **1K** module.

15. Connect one supplied 820-2194-001 cable from the port **5** on the **1E** module to the **COM** port on the **1K** module.

16. Connect one supplied 820-2124-036 cable from the **DAS** port on the **1D** module to the **CELL SERVER** port on the **1K** module.

17. Connect one supplied 820-2124-036 cable from the **DAS** port on the **1A** module to the **PCS SERVER** port on the **1K** module.

18. Connect one supplied 820-2124-036 cable from the **DONOR ANT** port on the **1F** module to the **CELL DONOR** port on the **1K** module.

19. Connect one supplied 820-2124-036 cable from the **DONOR ANT** port on the **1C** module to the **PCS DONOR** port on the **1K** module.

RF and Power Cabling

Step 13

Step 14

Step 15

Step 5

Step 16

Step 17

1J
1H
1G

Step 18

Step 19

1D
1E
1F

1K

1C   1B 1A

Step 1
72 VDC

Step 3
To Radiax

Step 2
To Donor

Module Interconnection Diagram

1.29

18.06

33.58

34.58

3.41

9.28

Face Plate Dimensions

Top View Dimensions

Installation

Power Up

To power up the CSI repeater simply connect the 72 VDC power cable from the train to the DC IN port on the Power Module.   When powered up, the repeater will begin in the Operational Mode, using the "Band Switching Algorithm". The repeater will not key until boot up is complete, a GPS location fix is obtained and the unit is within an " Area Definition".

Normal Operation

After boot up and a GPS position fix is obtain the repeater will begin operation based on the Area Definitions, "Channel Power Measurement and Keying Decision" and "Low Isolation Detection and Protection" algorithms. The operational software will continuously monitor the repeater's environment and make the necessary adjustments to keep the product operating within specifications and FCC Type Certification.

System Status

The Software provides real time status data reporting the state of the repeater. This status contains:

System Info:
- Location
- Model
- Board Type
- Carrier
- SW Version
- Serial Number
- Item Number
- Date Built
- Watchdog Timer
- CPLD Version

Software Build Information:
- Builder
- URL
- Revision
- Compile Date

Local Area network:
- Hostname
- Boot Protocol
- IP Address
- MAC Address

Wide Area network:
- Remote Enabled
- Modem Type
- IP Address

SNMP Configuration:
- Enabled
- Read-only User
- Read-write User
- Read-only User
- Read-only Community
- Read-write Community
- Traps/Informs
- Heartbeat

Modem Status:
- Connected

GPS Location Data:
- Run State
- Latitude
- Longitude
- PCS Filter ID
- Location
- BTA
- Satellite Count
- No Box Count
- Searching Count

RF Alarms:
- Over Range
- Oscillation
- VSWR
- Out if Band Overdrive
- Low Signal
- No Signal

Scan Receiver:
- Run State
- Dekey Limit
- Filter ID
- Channels
  - Channel-1
  - Channel-2
  - Channel-3
  - Channel-4
  - Channel-5

System Alarms:
- Synthesizer
- Voltage
- Temperature
- Software
- Hardware

Alarms

The Operating Software will monitor the repeater for conditions that are out of normal operation, triggering an alarm event. The Operating software in conjunction with the Communications Subsystem when so configured will send alarm messages via E-mail or SMS texting to a User Provisioned account.

Each Alarm has these User Provisioned Capabilities.:

- · Disable the System: The Operating software can disable the System (prohibit Keying) until the alarm condition is cleared if provisioned
- · Alarm Filter Conditions: A Filter Condition (such as X number of occurrences per hour) to the alarm to prevent false or unuseful notifications if provisioned.
- · Send an Alarm Message: The Operating Software can send a notification via message E-mail or SMS through the Communications Subsystem if provisioned.
- · Alarm Clear Message: The Operating Software can send an alarm clear message when an alarm condition clears if provisioned.

Alarm Notification Message

The alarm messages consists of the Systems Identification Tag, a summary of the current alarms, and a short English message describing the alarm condition(s). Below is a list of the alarms that will trigger an alarm message to be sent.:

Downlink Over Range	Downlink High Temperature	Scan Receiver Low	Uncalibration
Uplink Over Range	Downlink Low Temperature	Scan Receiver High	AGC Disabled
Synthesizer Error	Uplink High VSWR	No GPS Data	Property File Error
DAC Error	Uplink Low VSWR	No GPS Lock	DAS Failure
DC Current High	Uplink Filter Load	No GPS Fix	Watchdog Timer
DC Current Low	Uplink Over Current	GPS Antenna Current	Modem Not Responding
Downlink High VSWR	Uplink Under Current	GPS Fix Filter Not Present	User Login
Downlink Low VSWR	Oscillation	Chassis Overheat	Password Changed
Downlink Filter Load	Uplink High Temperature	Chassis Under Temp	CPU Boot
Downlink Over Current	Uplink Low Temperature	Software Abort	Placed in Disabled Condition
Downlink Under Current	Fan Failure	Software Error	In Maintenance Mode

Powerup and System Check Out Procedures

Section 3

Hardware Operations

Test Point Locations and Values

The CSI repeater, CS12-560-419, by design, has no external test points. The module is sealed with no user serviceable parts inside. Testing and configuration is done exclusively by interfacing the repeater with a laptop or desktop computer and using Text Menu Interface (TMI). This user interface will provide a complete status of the repeater. In most cases if all other components of the system prove to be working properly and the repeater is not, the user will need to return the unit to CSI for inspection and repair. See the Warranty and Repair Procedures in Section 3 of this manual.

If the cover for module is removed by the user the warranty will be void and the cost of any needed repair will be the responsibility of the user.

Indicator Lights

This repeater was designed with only two external indicator lights. Both are approximately 3/4" diameter LEDs. Located on the Module face plate. The first LED labeled STATUS glows red as the repeater is powered up. When the unit completes all of it's bootup procedures the LED will change color and glow green to indicate the system is operating normally. If the LED remains red it's an indication of a problem and the user will need to check the system status using the TMI.

The second LED is also located on the faceplate of the Module, and is labeled POWER. This light is designed only to show that the unit has DC current and will glow green when the unit is powered.

Troubleshooting

All cables should be checked for shorts and opens.

The rooftop antenna (Donor Antenna), should be checked for damage.

The DAS antennas should be checked for damage.

If cables and antennas are acceptable and the problem persists, check repeater status using the Web based GUI or the TMI. See Alarm/Action Matrix on the next page.

Should the repeater fail, or if service is lost and the cause can not be determined from the steps above, the user should contact CSI Technical Support @ 1.877.844.4274. CSI will remotely access the repeater and advise the respondent of next step(s).

Subsystem	Alarm Name	Alarm Type	Send E-mail	Shutdown Op Mode?	Disable Unit?
Downlink Power	Over Range	Critical	Yes	Yes	No
	Low Signal	Routine	No	No	No
	No Signal	Routine	No	No	No
	Out of Band Signal	Routine	No	No	No
Uplink Power	Over Range	Critical	Yes	Yes	No
	Out of Band Signal	Routine	No	No	No
Common Hardware Alarms	Synthesizer Error	Critical	Yes	Yes	Yes
	Dac Error	Critical	Yes	Yes	Yes
	DC Current High	Severe	Yes	Yes	No
	DC Current Low	Severe	Yes	Yes	No
Downlink PA	Oscillation	Routine	No	No	No
	Input Power High	Routine	No	No	No
	High VSWR	Severe	Yes	No	No
	Low VSWR	Severe	Yes	No	No
	FilterLoad	Critical	Yes	Yes	No
	Overcurrent	Severe	Yes	No	No
	Undercurrent	Severe	Yes	No	No
	Low Isolation	Routine	No	No	No
	High Temperature	Severe	Yes	Yes	No
	Low Temperature	Severe	Yes	No	No
Uplink PA	HighVSWR	Severe	Yes	No	No
	Low VSWR	Severe	Yes	No	No
	FilterLoad	Critical	Yes	Yes	No
	Overcurrent	Severe	Yes	No	No
	Undercurrent	Severe	Yes	No	No
	Oscillation	Routine	No	No	No
	Low Isolation	Routine	No	No	No
	High Temperature	Severe	Yes	Yes	No
	Low Temperature	Severe	Yes	No	No
	Fan Activation	Routine	No	No	No
	Fan Failure	Severe	Yes	No	No
Scanning Receiver Alarms	ScanRcvrLow	Severe	Yes	Yes	No
	ScanRcvrHigh	Severe	Yes	Yes	No
GPS Receiver Alarms	No GPS Data	Critical	Yes	Yes	Yes
	No GPS Lock	Severe	Yes	No	No
	No GSP Fix	Critical	Yes	Yes	No
	Gps Antenna Current	Severe	Yes	No	No
	Gps Fix Filter Not Present	Severe	Yes	Yes	Yes
Software Alarm Types	Overheat	Severe	Yes	No	No
	Undertemp	Severe	Yes	No	No
	Software Abort	Critical	Yes	Yes	??
	Software Error	Severe	Yes	Yes	No
	Uncalibration	Critical	Yes	Yes	Yes
	AGC Disabled	Critical	Yes	Yes	Yes
	Property File Error	Critical	Yes	Yes	No
	DAS Failure	Critical	Yes	Yes	No
	Watchdog Timer	Critical	Yes	Yes	No
	Heartbeat	Informational	No	Yes	No
Communications	Modem Not Responding	Severe	Yes	No	No
	Modem Not Connected	Routine	No	No	No

1 Scope

The warranty period for this product shall be 18 months (548 calendar days) from the date of the Purchaser's Acceptance, plus any extended maintenance periods as specified in the order. During said period(s), CSI warrants that each repeater will be free of defects in material and workmanship.

CSI's sole obligation and the Purchaser's exclusive remedy for any breach of warranty is limited to adjustments, repairs, or at the Purchaser's option, replacement of a System or parts of a System thereof at no cost to the CSI. All exchanged Systems or System parts will become the property of the CSI. Servicing hereunder will be furnished by the CSI's nearest service location. CSI shall perform this service at a time agreed to by the Purchaser. This warranty will not apply to a particular item if:

(a) Adjustment, repair or replacement is required because of accident, neglect, misuse, failure of electric power, environmental controls, transportation or causes other than ordinary use, except that such adjustment, repair, or replacement is required due to actions caused by or the responsibility of CSI's employees or CSI's authorized agents;

(b) The Purchaser fails to operate a System or follow operator-level maintenance procedures in accordance with the CSI's recommendations;

(c) Any person other than the CSI's engineer or an authorized agent of the CSI modifies, adjusts, or repairs the product or performs any maintenance service other than routine operator-level maintenance without the CSI's prior written consent.

The warranty hereunder does not include:
(a) Any furnished consumable supplies,
(b) Painting or refinishing the product,
(c) Electrical work external to the product,
(d) Installation, maintenance or removal of alterations or attachments to the product except as provided by the original system design.

CSI's liability for breach of the above warranty will in no event exceed the purchase price of the Product(s) that has been paid

by the Purchaser.

2 Product Hardware Warranty (Non-Software)

(a) CSI represents and warrants to the Purchaser that upon delivery of a repeater to the Purchaser, all right, title and interest in the unit will pass to the Purchaser free of all liens, imperfections in title, claims, charges, restrictions, or other encumbrances. The CSI represents and warrants a repeater's Hardware (specifically excluding the Product Software) as furnished shall be new, merchantable, free from defects in material and workmanship, fit for the ordinary purpose for which the product is used, shall not infringe on any U.S. Patent, and for the period specified in this document from the date a repeater is delivered and shall conform to this documents specifications. Should a unit not conform to the foregoing warranties, CSI shall repair or replace defective or nonconforming product.

(b) During the warranty period, a defective repeater shall be either repaired on-site by CSI or returned to the CSI for repair or replacement at no charge or cost to the Purchaser. The Purchaser shall bear the risk of loss or damage until a unit is placed in the possession of the carrier. Unless otherwise agreed to by the CSI and the Purchaser, for a product that is returned to CSI for repair, CSI shall complete repairs and return repaired the product, or ship a replacement product, within three (3) days of receipt of defective repeater at CSI's designated repair location. CSI shall bear the cost of transportation charges for shipment to CSI (FOB origin freight collect) of the product to be repaired or replaced. For return shipments from CSI to the Purchaser, CSI shall bear the risk of loss or damage during transit and shall prepay and bear the cost of transportation charges for shipment of the product that has been repaired or replaced. If a repeater returned is not defective, CSI shall promptly advise the Purchaser in writing of the determination and in such cases, CSI shall return product to the Purchaser at the Purchaser's expense and risk in its "as received" condition. If a repeater is returned and is not in warranty, CSI shall promptly advise the Purchaser in writing of this determination and the charge to repair the product. In such cases, CSI shall repair the product if so instructed by the Purchaser in writing and charge the Purchaser for labor, parts, and shipping.

(c) During the warranty period, if the Purchaser's technical personnel attempt to determine whether or not a CSI repeater is the cause of service interruption and cannot identify and resolve the problem causing the interruption after communicating with CSI's technical personnel via telephone or other suitable means, and the service interruption still exists, then the Purchaser may request that CSI begin on-site repairs as soon as possible, but in no event later than one (1) business day plus reasonable travel time after receiving the Purchaser's request. If the problem is with CSI's product, (software or hardware), such on-site repairs by CSI shall be at no charge to the Purchaser.

Hardware Operations

(d) During the Warranty period, if the service interruption still exists after compliance with (c) above, and the service interruption is caused by either CSI's defective repeater(s) and/or CSI's product that does not confirm to specification and CSI has been given a reasonable time frame, as determined by the Purchaser, to correct the service interruption, the Purchaser may return the product to CSI and receive a credit for the total purchase price of the Product or a completely new repeater, at the Purchaser's option,.

(e) Any replacement, repair, modification, installation or other service performed by CSI shall be warranted, commencing with the date upon which repaired product is returned to the Purchaser, for the remainder of the unexpired period of the warranty.

(f) The warranties do not extend to a repeater to the extent that such repeater has been subjected to misuse, neglect, abuse, accident caused by the Purchaser or by a third party subsequent to the delivery of the unit, and such action is the cause of the damage or malfunction.

3 Product Software Warranty

(a) CSI warrants that the Purchaser shall have quiet enjoyment of the Product Software and that the Product Software and the Purchaser's use shall be free from claims of infringement, misuse or misappropriation of any intellectual property right during the term of the Purchaser license to Use the Software. As to Product Software which CSI does not have title, CSI warrants that has rights in the Software sufficient to permit the license of the Software to and that CSI has full right, power and authority to license the Software and other rights granted hereunder to Verizon Wireless.

(b) CSI also warrants that the media containing the Software will be free from defects in material and workmanship and that all related services provided by CSI shall be rendered by qualified personnel who will perform the tasks assigned consistent with good professional practice and the state of the art involved.

(c) CSI also warrants that there does not exists a copy protection or similar mechanisms within the Product Software, which will, either now or in the future, interfere with the operation of the Product. Furthermore, CSI warrants unless requested in writing by the Purchaser and the Purchaser approves response, or CSI advises the Purchaser in writing that it is necessary to perform valid duties under this attachment and authorized in writing by the Purchaser, any Product Software provided to the Purchaser by CSI for Use by the CSI or the Purchaser shall:

· contain no hidden files;
· not replicate, transmit or activate itself without control of an of an authorized person operating computer equipment on which it resides;
· not alter, damage or erase any data or computer programs without control of an authorized person operating computer equipment on which it resides;
· contain no encrypted imbedded key, node lock, time-out or other function, whether implemented by electronic, mechanical or other means, which restricts or may restrict Use or access to any programs or data developed under this Agreement, based on residency on a specific hardware configuration, frequency of duration of Use, or other limiting criteria ("Illicit Code").

(d) Where the Product Software is intended to be used in transaction processing or in the public switched network, CSI represents that nothing in the Product Software precludes the Purchaser form integrating a network management solution (including transaction processing and network monitoring) with the Product Software.

(e) For the period specified beginning with the effective date of license of the Software, CSI represents and warrants that the Product Software will perform in accordance with specifications. If within one year (365 days) subsequent to the expiration of the warranty period CSI has not repaired the Product Software to perform in accordance with specification for any exception communicated in writing by the Purchaser to CSI during the warranty period, the Purchaser may order and CSI shall refund to the Purchaser the amount paid to it for the nonconforming Product Software.

(f) CSI represents and warrants that if any portion of the Product Software is or becomes unusable, totally or in any respect, the Supplier will correct errors, defects and nonconformity and restore the Product Software to conforming condition without additional charge to the Purchaser.

Hardware Operations

4 Continuing Availability of Service and Parts

(a) CSI shall, if requested by the Purchaser, provide the Purchaser with maintenance service, repair service and parts for the Product and Software, for a period of seven (7) years after extended Product and Service agreements have been discontinued by the Purchaser. If CSI is unable to supply such services and/or parts or CSI is unable to obtain an alternative source to provide such services and/or parts for the Purchaser, then the CSI shall, without obligation or charge to the Purchaser, provide the Purchaser with drawings or other documents required to either manufacture or buy such parts and the technical information or any other rights necessary for the Purchaser to manufacture or purchase such parts for the purpose of supporting the Purchaser's customer base.

(b) The technical information shall include, by example and not by way of limitation:
· Manufacturing drawings and specifications of materials and parts comprising the replacement and repair parts and components;
· Manufacturing drawings and specifications covering special tooling and operation;
· A detailed list of all commercially available *Continuing Availability of Service and Parts*ble parts and components purchased by CSI on the open market, disclosing the part number, name and location of the Company and price lists for the purchase; and
· One complete copy of the source code used in the preparation of any software licensed or otherwise acquired by the Purchaser from CSI, provided however, that such source code shall remain the property of CSI and shall be separately licensed to the Purchaser for use by the Purchaser to support the Product.

(c) In the event that CSI either (i) does not own the source code or (ii) does not have the rights to disclose such source code, then CSI shall disclose its licensor or owner of said source code and shall get the rights on behalf of the Purchaser.

(d) Certain parts of the Product Software is subject to a licensing agreement and is sublicensed to the Purchaser. In the event of the inability to provide updates or continuing support of the application software at a reasonable cost, CSI shall assist the Purchaser in locating an alternative source.

5 Product Returns

Please call 1.877.844.4274 to obtain a Return Material Authorization (RMA) number for product assessment and repair.

Section 4

Software Operations

Local Communication Interface Ports

To allow monitoring and control, the repeater is equipped with two ports that provide external communication access (1 Ethernet CAT-5, and 1 DB-9 serial). The Ethernet, CAT-5 port is provided as a primary communications port to the PC. One serial interface, COM, can provide communications to local PC. The DB-9 pin assignments of COM 1 conform to the standard Electronic Industries Association (EIA232) specification. A diagram of the pin descriptions is provided below for reference.

Connecting a null modem cable to the COM 1 port and using a terminal emulation program with a PC will allow communication to the control processor's Text Menu Interface (TMI) for trouble shooting and advanced diagnostics. Call CSI technical support for assistance if you need to access these advanced features or for further information.

EIA232 Pin Specifications

DB9 FEMALE PINOUT REFERENCE
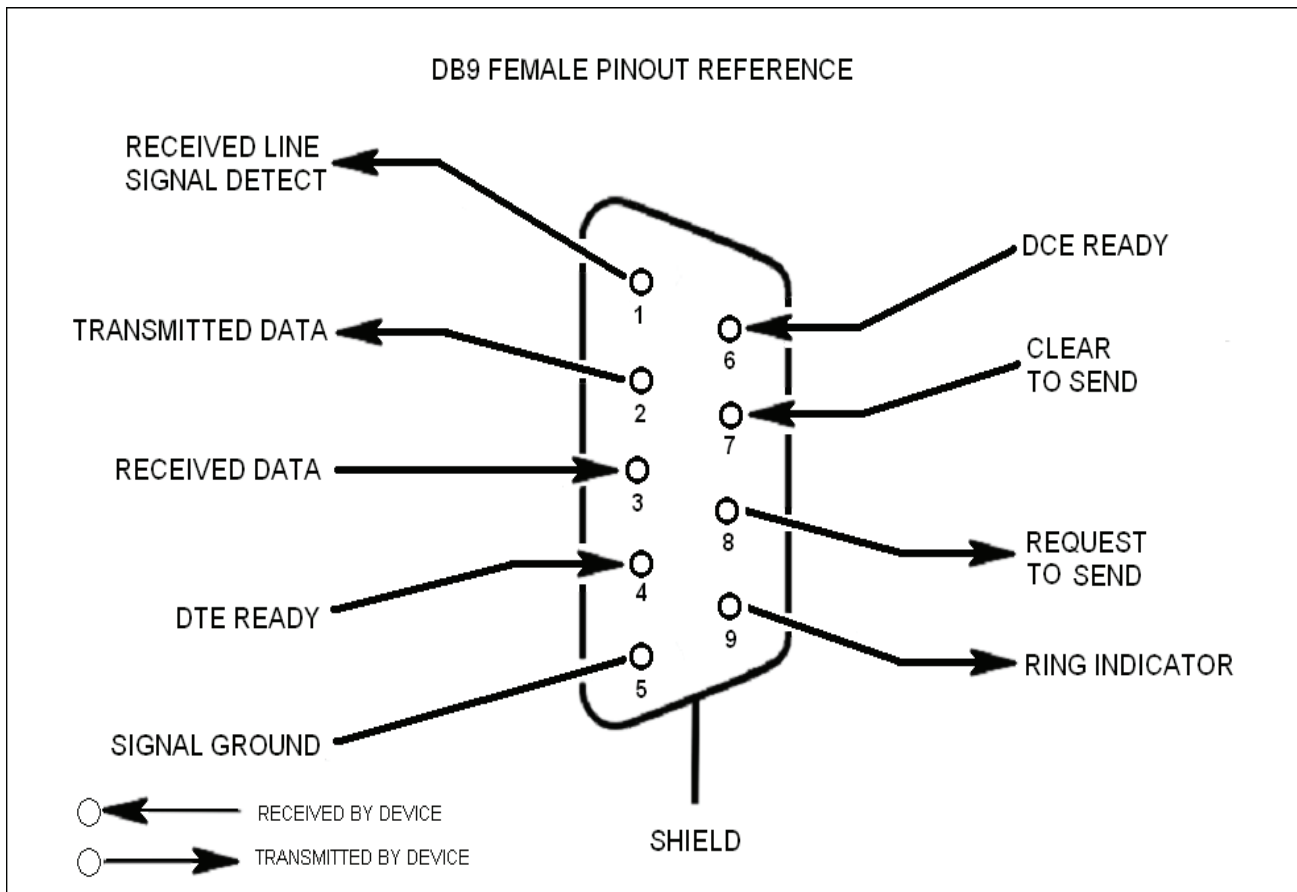
The diagram above is for reference only, it's intended to provide a quick source for pinout information in the event it should be necessary to adapt your serial cable because of an unusual connector configuration. In the vast majority of cases this information will not be needed.

General Operation Overview

Section 4

Software Operations

Ethernet

The Ethernet AUI conforms to IEEE 802.3 and is capable of supporting 10/100 Mbps communications speeds. This port is used to provide access to the UI.

Monitoring & Alarms

There are no physical connections provided to exclusively and specifically communicate system or alarm status. Information with regard to system or alarm status is provided by the TMI accessible via the communication ports described earlier.

Text Menu Interface

Local Access

Local access to the repeaters TMI, also known as the console interface, is made by connecting a serial cable (optional), as shown in figure 1, from the serial connector of the laptop to the serial port located on the top of the enclosure on the vertical surface facing the rear and near the heatsink. This connector is not labeled and is sealed with a special cover to maintain the integrity of the enclosure. This cover must be reinstalled after the serial port is used. In some cases, if the connector gender is not the same as shown in figure 1, an adapter (optional) as shown in figure 2 may also be required.


Figure 1

Figure 2

General Operation Overview

Section 4

Software Operations

Many terminal emulation programs will work if properly configured. In the following description, "TeraTerm" is used to establish the TMI session. This program is readily available via the Internet and is free from Ayera Technologies at: http://www.ayera.com/teraterm/

TeraTerm Pro Web works on Windows 95/98, 2000, XP. Here is the latest TeraTerm Pro Web release: Version 3.1.3, October 8, 2002. ttpro313.zip When the program is started, the screen to the right is displayed.
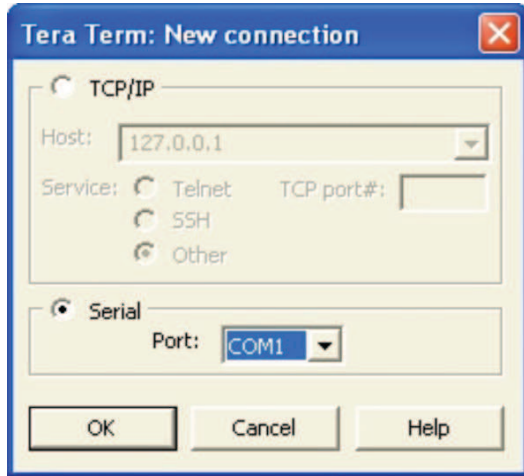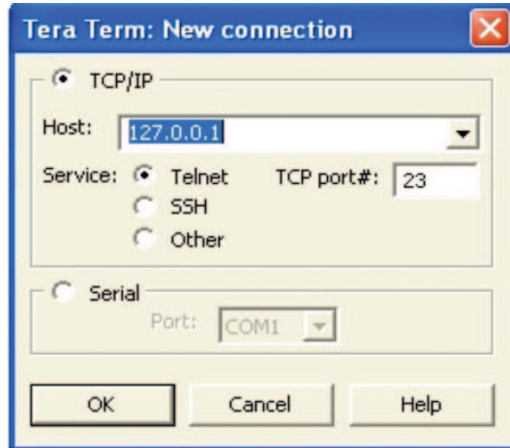
Select the Serial radio button and press OK.

Note: It may be necessary, in the System Properties section of the control panel; using Device Manager to determine what COM port your computer uses for the communications port. In this case it is COM 1.

Pressing "OK" will open up a blank dialog screen. Go to the setup dropdown menu and select Serial port to make changes to the serial port setup.
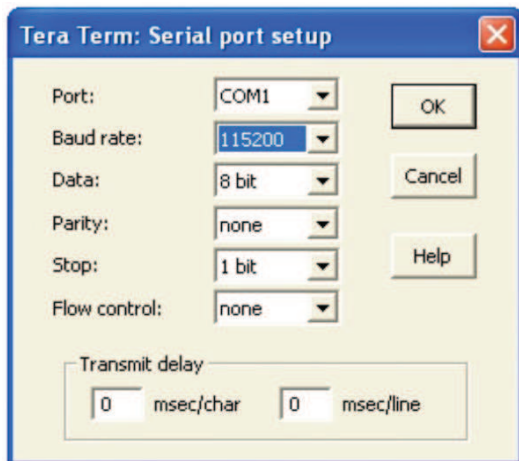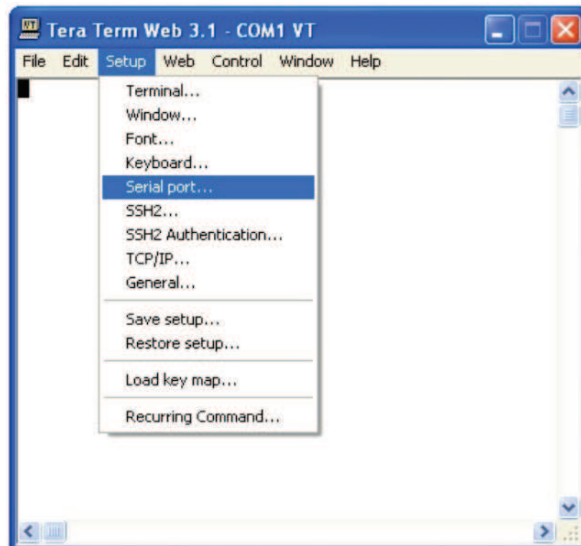
Configure the terminal program for the correct COM port, in this case COM 1 and 115200 baud rate as shown below.
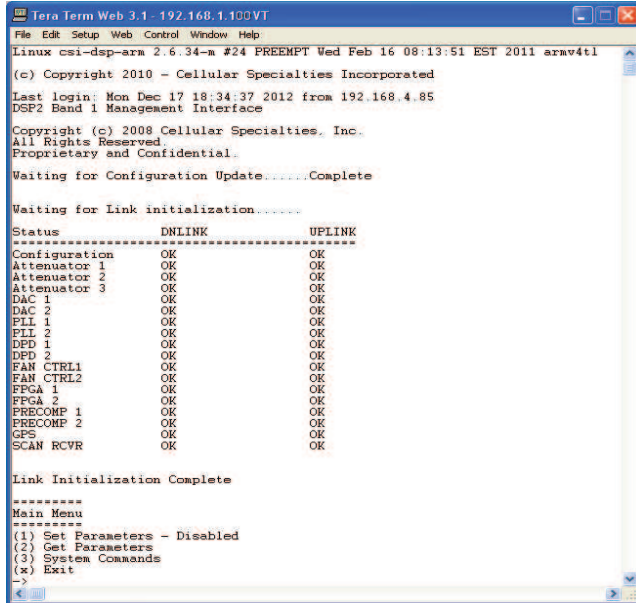
General Operation Overview

Software Operations

Text Menu Interface

Login

Once the unit has completed its boot up and link initialization phases it will display the login prompt. The default username is "bandone" The default password is "csi1234".

Main Menu

When "Set Parameters" is first selected the unit will ask for the maintenance mode login. (The default username for the maintenance mode is "csi" and the password is "csi1234".)

Set Parameters Menu
Once the maintenance mode login is performed successfully the main menu will be displayed again but without the "(Disabled)" qualifier on the "Set Parameters" choice.

Selecting (1) will display the Set Parameters Menu.

General Operation Overview

Telnet Session TCP/IP

The diagram below shows the normal use of Crossed and Straight cables.

Repeater

Network Hub
or Switch

Straight Cable

Straight Cable

PC

Crossed Cable

Repeater

PC

Straight Cable

Pin #	Signal	AT&T 258A
1	Transmit+	White/Orange
2	Transmit-	Orange/White or Orange
3	Receive+	White/Green
4	N/A	Blue/White or Blue
5	N/A	White/Blue
6	Receive-	Green/White or Green
7	N/A	White/Brown
8	N/A	Brown/White or Brown

Crossed Cable

Pin #	Signal	AT&T 258A
1	Receive+	White/Orange
2	Receive-	Orange/White or Orange
3	Transmit+	White/Green
4	N/A	Blue/White or Blue
5	N/A	White/Blue
6	Transmit-	Green/White or Green
7	N/A	White/Brown
8	N/A	Brown/White or Brown

General Operation Overview

Software Operations

Remote access to the repeater may be gained through a LAN connection and a terminal emulation program for TCP/IP. As with the serial connection, many terminal emulation programs will work, if properly configured. In the following description, "TeraTerm" is used to establish the TCP/IP session. Also, it will be required that the network configuration of the computer and the repeater being controlled be set up with the same Sub Net and Sub Net Mask in order to establish a link. In other words, the IP addresses of both the computer used and the repeater must use the same group of IP address number sets. For example, the repeater ships with the default IP address of 192.168.1.100 and a Sub Net Mask of 255.255.255.0. In order to connect, the computer to be used for the link would normally need an IP address of something like 192.168.1.12 with a Sub Net Mask of 255.255.255.0, the same Sub Net Mask as the repeater. In this example note: the last digit of the IP address may be any number except 1,100 and 255. Configuring your PC is normally fairly straight forward but it does vary somewhat with the operating system involved. If you require assistance, contact your IT department and they will be able to set up your PC for you.

When the TeraTerm program is started, the following screen is displayed. Change the default host IP address to the IP address of the repeater to be controlled. In the case of a new install, the default address is 192.168.1.100 and has been assigned at the factory. Select the service SSH. The TCP Port must be 22.
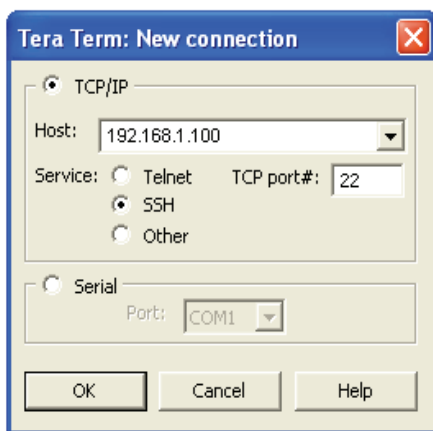
Pressing the "OK" button may display the security alert shown below.

Click the yes button and the first SSH2 Authentication Challenge screen is displayed. The user then types the username in the space provided. To make changes default user name is **"bandone"** .
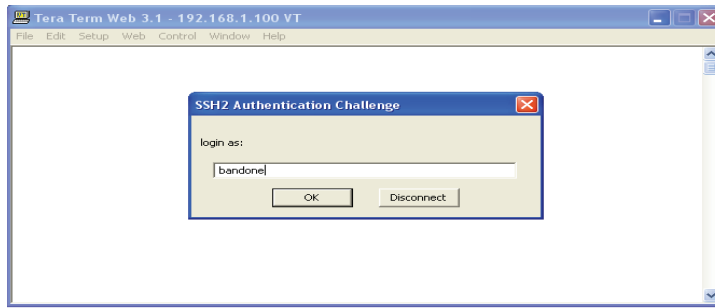
Press OK after entering the user name and the second SSH2 Authentication Challenge will be displayed.
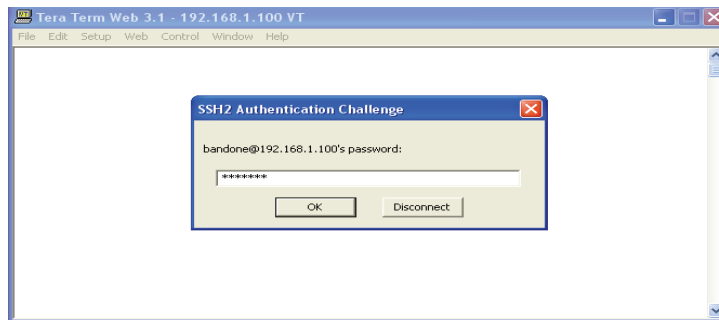
In the field provided, type the user name for the repeater to be changed. The default password is **"csi1234"** for all repeaters. After typing the password press OK and the main menu will be displayed as shown next.
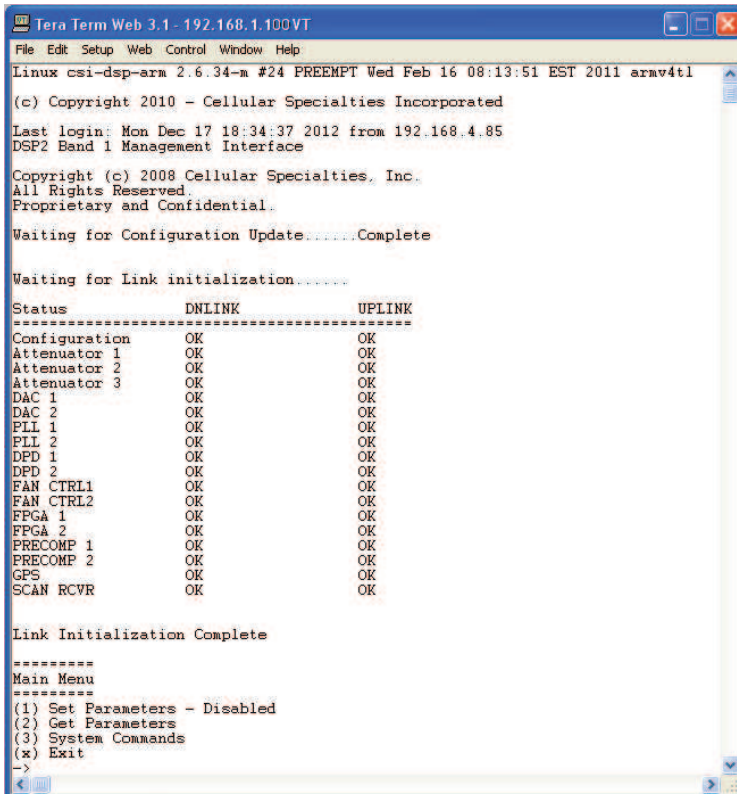
When "Set Parameters" is first selected the unit will ask for the maintenance mode login. (The default username for the maintenance mode is "csi" and the password is "csi1234".)
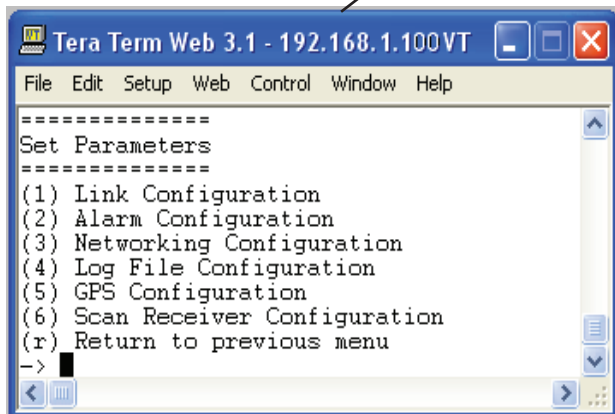
General Operation Overview

Section 4

Set Parameters Menu

Once the maintenance mode login is performed successfully the main menu will be displayed again but without the "(Disabled)" qualifier on the "Set Parameters" choice.

```
========================
Set Parameters - Disabled
========================
(1) Maintenance Mode Login
(r) Return to previous menu
->
------------
Enter Username: csi
Enter Password:
Maintenance Mode Enabled
=========
Main Menu
=========
(1) Set Parameters
(2) Get Parameters
(3) System Commands
(x) Exit
->
```

Selecting (1) will display the Set Parameters Menu.

```
==============
Set Parameters
==============
(1) Link Configuration
(2) Alarm Configuration
(3) Networking Configuration
(4) Log File Configuration
(5) GPS Configuration
(6) Scan Receiver Configuration
(r) Return to previous menu
->
```

General Operation Overview
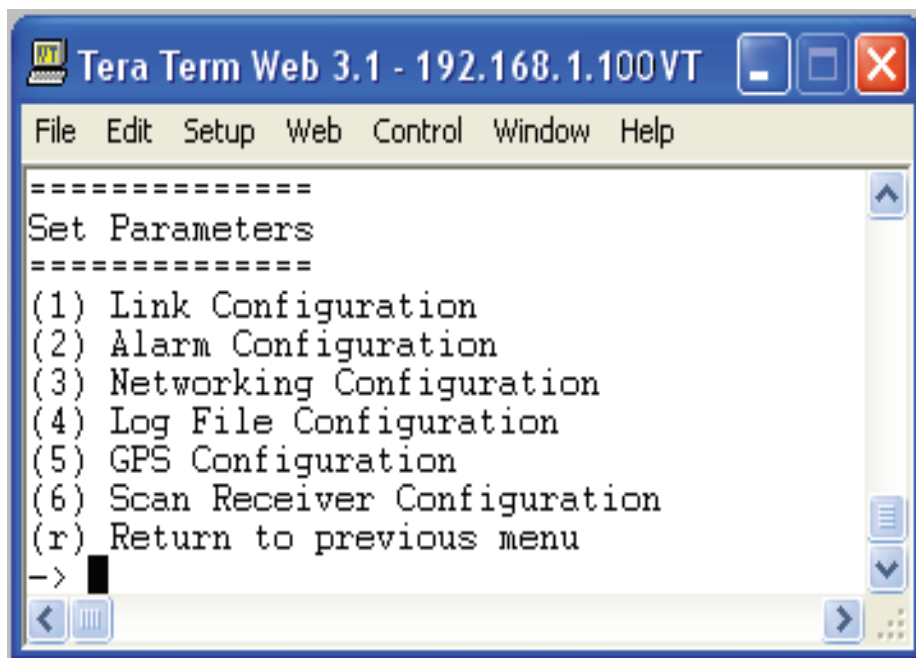
==============
Set Parameters
==============
(1)   Link Configuration

The "Link Configuration" menu is a collection of menu options that control the RF operating characteristics of a live system.

==================
Link Configuration
==================

(1)   Adjust Gain

The "Adjust Gain" option allows the user to control the total gain of the system. Valid gain settings range from 55 dB to 90 db. If the user selects to configure the downlink gain, the uplink gain will automatically be set to the same value. In order to override this condition, the user will have to select the uplink option and adjust the gain to the desired value.

Links:
(1) downlink
(2) uplink
(r) Return to previous menu
Link?

User Gain:
Setting 85.00 dB
User Gain? 85.0
Auto Setting Uplink Gain to 85.00 dB
To override, set Uplink gain separately

(2)   Select Active Filter

The "Select Active filter" option allows the user to select the filter coefficients that have been loaded in the FPGA for test purposes. Please note that in order for this to work properly, the GPS task needs to be disabled otherwise the filter selection will be overridden by the current location of the system.

FILTER settings:
(1) select filter coefficient
(2) show filter coefficient
(r) Return to previous menu
FILTER settings?
Filter Coefficient Table

filter index[1] = alB0F0-0
filter index[2] = alB0C0D0-0
filter index[3] =
filter index[4] =
filter index[5] =
filter index[6] =
filter index[7] =
filter index[8] =

General Operation Overview

filter index[9] =
filter index[10] =
filter index[11] =
filter index[12] =
filter index[13] =
filter index[14] =
filter index[15] =
filter index[16] =

FILTER settings:
(1) select filter coefficient
(2) show filter coefficient
(r) Return to previous menu
FILTER settings?
select filter [1-16]

(3)   Filter Programming

The "Filter Programming" option allows the user to select and load one of the loaded filter coefficients on the system. The user will be prompted to select which index the filter will be loaded into, one through sixteen or all for test purposes. Please note that in order for this to work properly, the GPS task needs to be disabled otherwise the filter selection will be overridden by the current location of the system.

Scan USB for files? (y,n):
File names:
(1) alA0B0-0
(2) alA0B0C0D0E0F0-WD
(3) alB0-0
(4) alB0C0-0
(5) alB0C0D0-0
(6) alB0D0-0
(7) alB0F0-0
(8) alF0-0
(r) Return to previous menu

Enter file number?

Select filter ID [1-16] [99 = all] =>

==================
Link Configuration
==================
(1) Adjust Gain
(2) Select Active Filter
(3) Filter Programming
(4) PA Output Control
(5) PA Oscillation Shutdown Control
(6) PA Oscillation Timer Control
(r) Return to previous menu
->

(4)   Power Amplifier Output Control

General Operation Overview

The "Power Amplifier Output Control" option allows the user to control the state of the power amplifier, ON or OFF. The setting overrides all other PA control tasks and is persistent across reboots. Care must be taken to insure the user is aware of the state of this setting so as to eliminate false keyed/de-keyed states.

```
            -----------------
PA Output Enable:
(1) off
(2) on
(r) Return to previous menu
PA Output Enable?

(r) Return to previous menu
->
```

(2) Alarm Configuration

The "Alarm Configuration" menu is a collection of menu options that control the alarming operating characteristics of a live system.

```
===================
Alarm Configuration
===================

(1)      Alarm Masking
```

The "Alarm Masking" option provide the user an ability to mask or unmask individual alarms based on the known operating characteristics of the environment that the unit is place in. Certain alarms will occur that do not directly affect the proper operation of the system and can therefore be masked. All alarms are still registered with the system regardless of the alarm state, user notification only takes placed on unmasked alarms.

```
=============
Alarm Masking
=============
 (1) Show Alarm Configuration
Displays the current mask state of all the alarms.
(2)Set Duplicate Alarm interval
(3) All Alarms
Sets all alarms to a given mask state (ON/OFF).
 (4) Link Alarms
Sets specific alarms of a particular link to a given mask state (ON/OFF).
 (5) HW/SW Alarm Configuration
Sets specific alarms of a specific sub-system to a given mask state (ON/OFF).
 (6) Miscellaneous Alarms
Sets specific miscellaneous alarms to a given mask state (ON/OFF).
 (r) Return to previous menu
->
```

(2)   Alarm Notification

The "Alarm Notification" option provides the user the ability to configure the system to externally notify service personnel of alarm event s.

```
==================
```
General Operation Overview

Section 4

Software Operations

Alarm Notification
==================

(1) Alarm Origin Tag

The "Alarm Origin Tag" option provides user access to two settable parameters that are used to distinguish which system is reporting the alarm. The user should develop a relative scheme of naming individual units so that they can be easily identified by service personnel. The two parameters are included as part of the alarm information that is sent.

================
Alarm Origin Tag
================
(1) Host Name
(2) Location
(r) Return to previous menu

(2) E-mail Alarm Configuration

==========================
E-mail Alarm Configuration
==========================

The "E-mail Alarm Configuration" option configures the e-mail alarm notification sub-system.

(1) Show E-mail Config

Displays the current configuration of the e-mail subsystem.

(2) Enable/Disable msmtp

Controls the state of the e-mail sub-system, the user must first enable msmtp in order for any e-mail alarms to be sent.

(3) Set Recipient Address

This option allows the user to configure up to five destination e-mail addresses that will receive system alarm events. It is best to leverage the management and configuration options of a destination mail server in order to setup a mail group of service personnel that will receive the alarms.

(4) Heart Beat Email Configuration

The system is capable of being configured to send out a heartbeat e-mail on a periodic basis. This function can be used to monitor the operational state of the system.

(5) Send Test Email

Provided that the e-mail sub-system is enabled and that there are configured destination addresses, this option will generate a test e-mail for diagnostic purposes.

(6) E-mail Client Configuration

This menu item provide access to user configurable options that setup the e-mail client (DSP system) for use with an authenticated e-mail server and account.

General Operation Overview

(r) Return to previous menu
->

(3) SMS Message Configuration

The "SMS Message Configuration" option configures the SMS (Short Messaging Service) l alarm notification sub-system. This option can be used to send alarm notifications to a user's cell phone as text messages.

(r) Return to previous menu
->

(3)   Watchdog Timer Configuration

The "Watchdog Timer Configuration" option configures a hardware based watchdog timer. Once enable, the DSP software will periodically write to the watchdog timer thus preventing an unscheduled reboot. Certain alarms can be configured to inhibit this periodic write which in turn will reboot the system when they occur.

```
============================
Watchdog Timer Configuration
============================
(1) ON
(2) OFF
(3) Reset Reboot Counter
(r) Return to previous menu
->
```

(r) Return to previous menu
->

(3) Networking Configuration

The "Networking Configuration" menu contains three configuration menus. The "Local Network Configuration" provides access to the network connection that is made to the system via the Ethernet port located on the front panel of the unit. The "Remote Network Configuration" is used to configure the wireless modem(s) that are attached to the USB port of the SBC (single board computer) that controls the unit. The "SNMP Configuration" option is not used or supported in this version of product.

```
========================
Networking Configuration
========================
(1)      Local Network Configuration
```

The "Local Networking Configuration" menu allows the user to configure the Ethernet port to operate in one of three modes once enabled. If the unit is configured to have a static IP address, then the user must know what the characteristics of the network are that the unit will be connected to. In DHCP client mode, the unit will broadcast a request for an IP address from a properly configured DHCP server on the network. In DHCP server mode (default) the unit will assign itself an IP address of 192.168.1.100 and it will also listen for DHCP IP address requests. If the user connects a device (laptop) directly to the Ethernet port (cabling requirements may differ) the unit will issue an IP address of 192.168.1.90. The unit is currently capable of issuing one client address. This is done to limit cataclysmic events should the unit be connected to a network that already has a DHCP server.

CAUTION: Network reconfirmation may cause local and remote access interruptions.

General Operation Overview

Section 4

Software Operations

```
===========================
Local Network Configuration
===========================
(1) enable
(2) disable
(3) set default static IP (192.168.1.100)
(4) set labview calibration IP (192.168.1.69)
(r) Return to previous menu
->
```
(2) Remote Network Configuration

The "Remote Networking Configuration" menu allows the user to configure the modem connected to the internal USB port of the SBC. This version of software is preconfigured to enable the default modem type installed in the unit and no user selection is necessary.

```
============================
Remote Network Configuration
============================
(1) enable modem
(2) disable modem
(3) Set Modem HeartBeat IpAddress
(r) Return to previous menu
->
```
(3) SNMP Configuration

The "SNMP Configuration" menu is not supported for this revision of the product.

```
==================
SNMP Configuration
==================
(1)      enable SNMP
============================
SNMP Configuration Parameter
============================
(1) Show SNMP Config
(2) List NMS IP Addresses
(3) Clear NMS IP Addresses
(4) Create NMS IP Address List
(5) Heartbeat Control
(6) Heartbeat Frequency
(7) Trap Control
(8) Restart SNMP Daemon
(9) Send Test Trap/Inform
(r) Return to previous menu
->
(2) disable SNMP
(r) Return to previous menu

 (r) Return to previous menu
```

(4) Log File Configuration

The system is capable of storing it's log files persistently on a periodic basis so that post mortem analysis can take

General Operation Overview

Software Operations

place. The log files will be placed in the "/log" directory on the compact flash. The service personnel can then use off the shelf applications to extract the information to their laptop for review.

```
======================
Log File Configuration
======================
```
(1) Display Log Rotate Settings
Displays the current settings of the log file rotation parameters.
(2) Change Log Rotation Period
This option allows the user to control the frequency of the log rotation task which will persistently store the log files based on size.
(3) Change Minimum Log Size
If an running log file exceeds this size (in bytes) the log file will be copied to the persistent storage location.
(4) Change Number of Logs Rotated
This parameter determines the number of log files of each type to maintain in persistent storage. Once the maximum number is reached, older files are discarded keeping only the most recent files.
(5) Configure Log to File
This option allows the user to write the current system status information to the appropriate log file on a periodic basis.
(r) Return to previous menu
->

(5) GPS Configuration

The GPS sub-system is an integral part of the control of the DSP based system. During normal operating mode, the GPS receiver controls the selection of filters and the key state of the unit. The unit must first receive a valid GPS string from the satellites before the unit will perform properly. The following menu allows the user to examine and configure the GPS operating parameters of the unit.

```
=================
GPS Configuration
=================
```
(1) Set GPS Mode

The GPS mode menu controls the operational state of the GPS receiver. The system is designed to run with a GPS emulator connected to COM3 (internal) for use s a test/debug mode. Additional menu items can be used to assist in the diagnosis of GPS related issues.

```
============
Set GPS Mode
============
```
(1) Enable GPS Receiver (default enabled)
(2) Enable GPS Emulator (default disabled)
(3) Disable GPS Receiver (default enabled)
(4) Set GPS Source Device (default Network Host Client)
(5) Set GPS ECP IP Address (default 192.168.1.101, 192.168.100)
(6) Enable/Disable Amplifier (default enabled)
(7) Set No Box Shutdown Mode (default enabled)
(8) Set No Satellites Shutdown Mode (default enabled)
(r) Return to previous menu
->

New to the GPS mode menu controls is the ability to select the source of the GPS signal/mode used by system.

General Operation Overview

Section 4

Software Operations

The system is now capable of receiving a GPS signal via an Ethernet connection to a host system which itself is connected to a GPS source. This mode of operation is the default for the Acela AWS unit and it is configured to primarily access the Acela CELL unit and secondarily the Acela PCS unit.

```
============
Set GPS Mode
============
(1) Enable GPS Receiver
(2) Enable GPS Emulator
(3) Disable GPS Receiver
(4) Set GPS Source Device
(5) Set GPS ECP IP Address
(6) Enable/Disable Amplifier
(7) Set No Box Shutdown Mode
(8) Set No Satellites Shutdown Mode
(r) Return to previous menu
->
(1) TTY Device
(2) Network Host Client
(3) Network Host Server
Enter GPS Source and *reboot* system ->
```

Also new to the GPS mode menu controls is the ability to select the IP address of the source of the GPS signal/ mode used by system. This is typically used in a laboratory environment when systems are not installed in the actual trains.

```
============
Set GPS Mode
============
(1) Enable GPS Receiver
(2) Enable GPS Emulator
(3) Disable GPS Receiver
(4) Set GPS Source Device
(5) Set GPS ECP IP Address
(6) Enable/Disable Amplifier
(7) Set No Box Shutdown Mode
(8) Set No Satellites Shutdown Mode
(r) Return to previous menu
->
------------------------------------
ECP Management Server IP Address:
* Enter up to 5 IP Addresses
* Hit 's' to save new list
* Hit 'r' to return to menu
Setting (192.168.1.101)
ECP Management Server IP Address 1? nnn.nnn.nnn.nnn
GPS ECP addresses:
```

(2) Set Time Interval

```
=================
Set Time Interval
=================
```

General Operation Overview

(1)   Set Test Delay

A user selected period used to delay (inhibit) the running of the GPS task.

 (2) Set GPS Receive Update Interval

This parameter determines interval at which the GPS task acquires the GPS Receiver data. It can be in seconds and microseconds. The default is 1 sec.

 (3) Set Program Filter Interval

The interval the GPS task programs the Filter. This is one of the parameters for programming the filter. The default value is 18 sec. Other parameters for filter programming are distance travelled after one filter is programmed. Except during the initial programming period when both filter are programmed.

 (4) Set No Data Timeout Interval

The interval the GPS task can be without receiving any data from GPS Receiver. After which an alarm is sent and the PA is turned OFF. The default value is 25sec.

 (5) Set Polling Interval

The interval for which the GPS task remains disabled after the PA is turned OFF. The default is 50 sec.

 (6) Set Emulator Update Interval

The interval the GPS task reads the GPS Emulator data from the test port. The default is 15 sec.

 (r) Return to previous menu

->

(3) Set Programming Distance

========================

Set Programming Distance

========================

(1) Set Distance To Program Filter

The distance the train may travel after programming one filter at which the next filter is programmed. The Default is quarter mile (0.25 miles).

 (2) Set Maximum Distance To Program Filter

The maximum distance the train can travel before programming the next filter. Default is 5 miles.

 (r) Return to previous menu

->

(4) Set Maximum Count

=================

Set Maximum Count

=================

(1) Set Maximum No Box Count

The maximum count for No Box (no fix data) before an alarm is sent and the PA is turned OFF. Default is 1500 ~ 25mins

 (2) Set Maximum No Satellite Count

The maximum count for not enough satellites (minimum is 3) before an alarm is sent and the PA is turned OFF. Default is 1800 ~ 30mins

 (r) Return to previous menu

->

(4)   Set Test Location

Used to select the location of the test filter set used for troubleshooting purposes.

=================

Set Test Location

=================

(1) Set Default Test Location

(2) Set Box For Test Location

(r) Return to previous menu

General Operation Overview

->

(6) Read GPS Parameters
Displays the current GPS configuration settings.

```
========================================================
GPS Parameters
========================================================
Run State                    Enabled
Debug Msg Level              0
PA Control Mode              Enabled
LookUp Table Size            10
Test Delay                   0
GpsRx Update Interval        1 secs:0 usecs
Program Filter Interval      18 secs
NoData Timeout Interval      25 secs
Polling Interval             50 secs
Emulator Update Interval     15 secs
Max NoBox Count              1500
Max No Satellites Count      1800
NoBox Shutdown Mode          Enabled
No Satellites Shutdown Mo    Enabled
========================================================
```

(7) Set Debug Message Level
        User selectable debug level, messages are sent to the "/var/log/dr610_2.log" file.

(0) Display No Msg
(1) Display Info Msg
(2) Display Debug Msg
(3) Display More Debug Msg
Enter GPS Debug Msg Level (0)->

(r) Return to previous menu
->

(6) Scan Receiver Configuration
The scan receiver hardware is used to monitor the power levels of a set of frequencies for a given filter set. If the scanned power level is above the maximum threshold value, the task will de-key the unit until such a condition no longer exists.

```
============================
Scan Receiver Configuration
============================
```
(1) Scan Receiver Operation
This option is used to control the state of the scan receiver task (ON/OFF).
(2) Read Scan Receiver Parameters
Displays the current configuration settings of the scan receiver task.
(3) Channel Sample Count
The number of samples per channel to acquire in order to compute an average power value.
(4) Key/De-key Threshold
The maximum power level in dBm which will cause the scan receiver task to de-key the PA.
(5) PA Recovery Time
The period of time in seconds that the unit will remain in a de-keyed state following an oscillation induced de-key.
(6) De-key Sample Count

General Operation Overview

The number of power readings to sample in order to compute the rolling average of the current scanned channels.
(7) Short/Fast Key Sample Count
The number of power readings to sample in order to compute the short/fast average of the current scanned channels. (See product specification document)
 (8) Long/Slow Key Sample Count
The number of power readings to sample in order to compute the long/slow average of the current scanned channels. (See product specification document)
 (9) Fast/Slow Key Delta Value
The value in dBm that determines if a fast or slow key decision is made.
(r) Return to previous menu

(r) Return to previous menu
->

==============
Get Parameters
==============
The "Get Parameters" menu is available to all users in order to view system status information and diagnose alarm information.

(1) Link Status
The "Link Status" option displays the current state of the system parameters. Information on this page is used to diagnose the health of the system.


```
===============================================================================
Timestamp: 2012:12:21 - 15:20:16  UTC UTC
===============================================================================
Uptime   : 2 days 20 hours 46 minutes
===============================================================================
Power (dBm)             DNLINK          UPLINK
===============================================================================
IN-BAND INPUT            -83.42          -65.58
COMPOSITE INPUT          -50.70          -56.66
MEASURED OUTPUT           3.58           21.42

CALIBRATED OUTPUT        27.40           33.00
MAXIMUM OUTPUT           27.40           33.00
VSWR                      ----           ++++
===============================================================================
AGC Control (dB)
===============================================================================
MODE            ON
---/---         0.00            0.00
===============================================================================
Status
===============================================================================
VOLTAGE         OK              OK
TEMPERATURE      OK              OK
SOFTWARE        OK              OK
HARDWARE        OK              OK
OSCILLATION     OK              OK
OVERRANGE       OK              OK
CALIBRATION     OK              OK
===============================================================================
```

General Operation Overview

```
DC Current
==============================================================================
AMPERAGE            3.54
==============================================================================
Temperature (Celsius)
==============================================================================
CPU                 40.06  new item, displays the temperature of the Single Board Computer
FPGA                53.75
==============================================================================
Power Amplifier
==============================================================================
STATUS              ON
AMPERAGE            0.89            6.31
TEMPERATURE         ----            66.84
==============================================================================
Fan Configuration
==============================================================================
STATE               OFF             OFF
STATUS              OK              OK
==============================================================================
System Configuration
==============================================================================
GAIN (dB)           87.00           87.00
FILTER              alB0F0-0
==============================================================================
```

(2) System Events
The "System Events" option displays the current list of system alarms. Alarm statistics are maintained in the "Show Counts" option.

```
============
System Events
============
(1) List
(2) Show Counts
(3) Clear
(r) Return to previous menu
```

(3) System Information

The "System Information" option displays the current state of the non-RF parameters.

```
=======================================================
System Info: 2008:11:18 - 20:54:46 UTC
=======================================================
Location            Software_lab
System Type         CSI-DSP85-A
Board Type          PCS - Rev. B
Carrier             Verizon EVDO
SW Version          02.03.00 RC5
Serial Number       CDJ80150-000148
Item Number         CS10-369-xxx
Date Built          10/08/2008
Watchdog Timer      Enabled
```

General Operation Overview

```
========================================================
Local Area Network:
========================================================
Hostname        csi-acela-beta5
Boot Protocol   dhcp
IP Address      192.168.1.90
MAC Address
========================================================
Wide Area Network:
========================================================
PPP Enabled         YES
Modem Type          CDMA
PPP0 Address        166.143.7.196
PPP0 MAC Address    166.143.7.196
PPP1 Address        0.0.0.0
PPP1 MAC Address
========================================================
SNMP Configuration:
========================================================
Enabled         YES
Traps/Informs   NO
Heartbeat       NO
========================================================
MODEM Status Information
========================================================

MODEM #1

RSSI (dBm)        -69 (OK)
Registration Sts  Modem has registered
Phone Number      9084425314
Current Band      Cellular Sleep
System ID         28
Network ID        5
Temperature (C)   36
========================================================
GPS Location Data
========================================================
Run State       Enabled
Latitude        42.997005
Longitude       -71.468246
Filter ID       1
Filter Name     pcR0A0D0B0E0F0C0-Wid
Location        Manchester
BTA             500
Satellite Count 3
NoBox Count     0
Searching Count 0
========================================================
Scan Receiver   MHz          avg dBm
========================================================
Run State       Enabled
Dekey Limit     -65.00
Filter ID       1
Channels        11
```

General Operation Overview

Channel-1   1971.25   -110.58
Channel-2   1972.50   -110.38
Channel-3   1973.75   -110.72
Channel-4   1975.00   -110.82
Channel-5   1976.25   -110.00
Channel-6   1977.50   -111.49
Channel-7   1978.75   -111.35
Channel-8   1980.00   -111.06
Channel-9   1981.25   -110.67
Channel-10   1982.50   -110.96
Channel-11   1983.75   -111.01
===

(4) Link Status Loop

The "Link Status Loop" option displays the current state of the system on a periodic basis in the form of a parse able string. Mode '0' displays a list of system parameters on a periodic basis. Mode '1' displays a list of system parameters every time the filter selection changes. Mode '2' displays a list of scan receiver parameters on a periodic basis. Mode '3' displays a list of power detector values on a periodic basis.

Enter loop delay -> 2
Display Mode (0 = normal, 1 = BTA changes, 2 = ScanRcvr RSSI, 3 = power) -> 0

2012:12:21, 16:50:26 UTC, 2:22:16, 48.00, 48.00, 43.18, 0.00, 0.49, Providence, 42.038258, -71.216042, 8, 2, 1, 2, alA0B0-0, alB0F0-0, 1, 0x10, 1, -120.86, -92.38, -50.94, -56.66, -33.86, -5.38, 87.00, 87.00, 0.0, 0.0, OK, OK, OK, OK, OK, OK, OK, OK, OK, OK, OK, OK, NM, 2, -65.00, 1, 8, 4, 12, -13.61, -13.62, -13.59, 12, 1, 2120.62, -13.82, 2, 2121.88, -13.67, 3, 2123.12, -13.87, 4, 2124.38, -14.23, 5, 2125.62, -14.50, 6, 2126.88, -14.64, 7, 2128.12, -14.52, 8, 2129.38, -14.56, 9, 2130.62, -14.62, 10, 2131.88, -14.60, 11, 2133.12, -14.64, 12, 2134.38, -14.64,

The repeater's operating software have two modes, an Operational mode and a Maintenance mode. These are described below.

Operational Mode:

Upon power up, the System will begin operation in the Operational Mode. Using a "Band Switching Algorithm" the repeater will not key until a GPS position fix is obtained and the unit is within an Area Definition.

Once GPS position fix is obtain the repeater will begin operation based on the Area Definitions "Channel Power Measurement and Keying Decision" and "Low Isolation Detection and Protection" algorithms. The operational software will continuously monitor the system's environment and make the necessary adjustments to keep the product operating with specifications and within the normal operating range of the Product and FCC Type Certification.

System Status

The Operating Software provides real time status data that reports the state of the repeater. This status contains:

Timestamp	Modem Band Type	Satellite Count
System Up Time	Active Filer	NoBox Count
Software Version	In-band input	Searching Count
System Serial Number	Measured Output	Scan RX Run State
Model Number	Composite Input	DeKey Limit
Item Number	AGC Mode	Scan RX Filter ID
Location	AGC Attenuation	# of Channels
Modem Signal Strength	GPS RunState	1 -10 Channel Freq's & SSI
Modem Registration Status	Latitude		

		RF Alarms:	**System Alarms:**
Modem Phone Number	Longitude		
Modem Current Band	Filter ID	Over Range	Synthesizer Lock
Modem System ID	Filter Name	Oscillation	Voltage
Modem Network ID	Location	VSWR	Temperature
Modem Temperature	BTA	Out of Band Overdrive	Software
		Low Signal	Hardware
		No Signal	

Currently System events are stored to a Log File. In future releases, with the exception of the System Serial Number and System Identifier, The Real Time Status of the Product will be saved to nonvolatile memory for retrieval. The nonvolatile memory will be able to store 48 hours of Status data, with up to 6 complete status records per minute. The interval that the status records are saved will be user defined.

The Operating Software will also record to nonvolatile memory and make available to a user in the Maintenance Mode:

- A count and time stamp each time the processor is booted.
- A count and time stamp of each time the operating software is placed into the Maintenance Mode, and the User ID of the operator that performed the action.
- A count and time stamp each time the Watchdog Timer is activated, and the associated debugging information available at the time of activation of the Watchdog Timer.
- The count and time stamp of any activation of the "Low Isolation Detection and Protection Algorithm" as defined in attachment C of this document.

 Alarms

The Operating Software has the ability to monitor a System for conditions that are out of normal operation, triggering an alarm event. The Operating software in conjunction with the Communications Subsystem is capable of sending alarm messages via E-mail using standard SMTP and POP3 protocols to a User Provisioned e-mail account.

Each Alarm defined has these User Provisioned Capabilities.:

- **Disable the System**: The Operating software can disable the System (prohibit Keying) until the alarm condition is cleared.
- **Alarm Filter Conditions**: A Filter Condition (such as X number of occurrences per hour) to the alarm to prevent false or un-useful notifications if provisioned.
- **Send an Alarm Message:** The Operating Software can send a notification via message E-mail through the Communications Subsystem if provisioned.
- **Alarm Clear Message:** The Operating Software can send an alarm clear message when an alarm condition clears if provisioned.

General Operation Overview

Maintenance Mode

The repeater has, in addition to it's normal "Operational Mode" a "Maintenance Mode". After system boot up this mode can be accessed in the TMI only by typing the user name and password of **service.**

This mode of operation provides all the same menus and features as shown in the software overview on previous pages except that upon entering the Maintenance Mode, the product will de-key and await instructions from a connected user. During the Maintenance Mode of operation the Operating Software supports:

- Manual operation of the Key/De-Key function.

- Manual operation of the Area Definition Switching function.

- Manual Setting of the gain setting in both the Uplink and Downlink Directions

- Retrieval of all current User Provisioned Settings from the Product

- Retrieval of the Current Version of software in the Product

- Setting of all User Provisioned Settings

- Retrieval of logged Status data

- Retrieval of boot counts, Maintenance Mode entry counts, Watch Dog timer events with debugging data, and Low Isolation Detection and Protection events.

- The Ability to Disable and Enable the System.

- A Method to automatically place the System back into operation upon the discontinuance of the Maintenance session.

- A Method to automatically place the stem back into operation after a User Provisioned time limit of inactivity in the Maintenance Mode.

- Ability to load Operating Software into the repeater's processor.

- Ability to perform a "soft" reset of the processor.

General Operation Overview

Terms used in this manual

AGC= Automatic Gain Control
CBC= Cross Band Coupler
CSI= Cellular Specialties, Inc.
DAS= Distributed Antenna System
DC = Direct Current
DHCP= Dynamic Host Configuration Protocol
DL = Down Link
FCC = Federal Communications Commission
FPGA= Field Programmable Gate Array
GPS = Global Positioning System
GUI = Graphical User Interface
IP = Internet Protocol
IT = Information Technologies
LAN = Local Area Network
LED= Light Emitting Diode
LNA = Low Noise Amplifier
PCS = Personal Communications Service
RF= Radio Frequency
SBC= Single board Computer
SNMP= Simple Network Management Protocol
TMI= Text Menu Interface
UL = Up Link
USB = Universal Serial Bus
VSWR = Voltage Standing Wave Ratio

Repeater Index

General Operation Overview

Notes

Notes