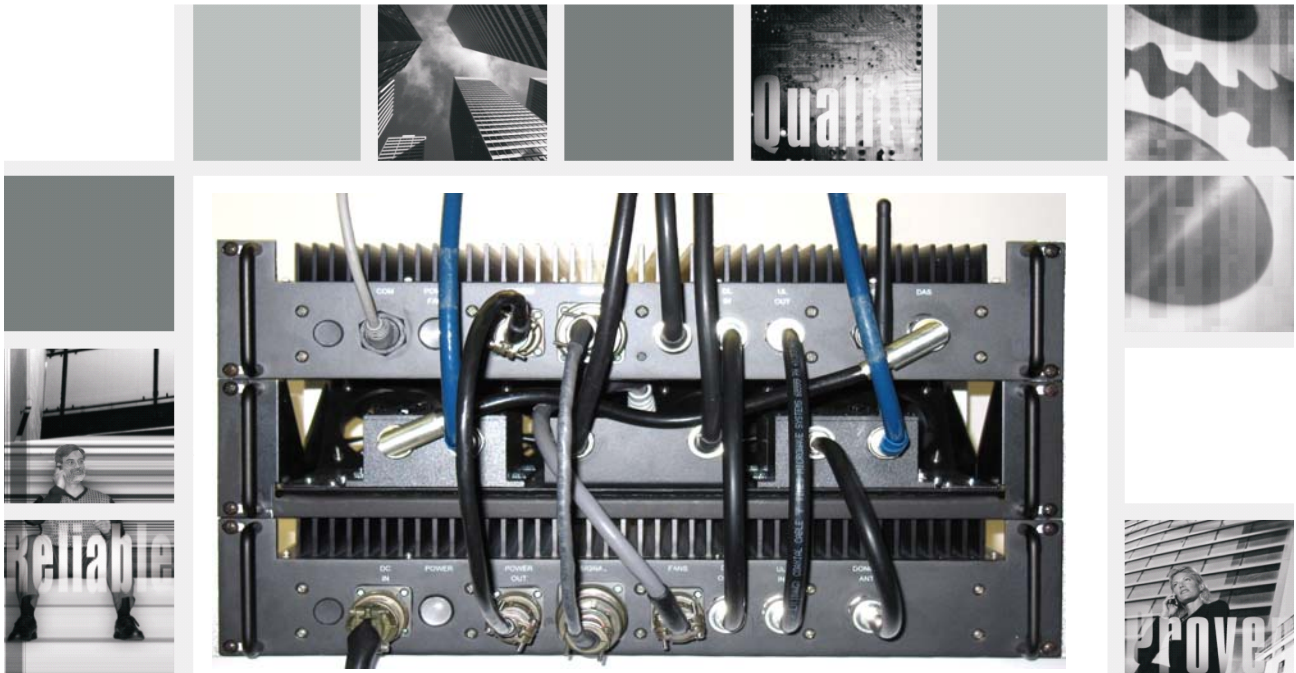


# csi

## Product Manual



*CS12-553-401  
User Manual*

## 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 3dBi gain, or any combination of gain and loss that equates to 3dB at input. 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 3 dBi is used, precautions should be taken to prevent personnel from routinely passing closer than specified.

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# Table Of Contents

## Section 1

### Hardware Configuration

System Level Block Diagram.....	4
Block Diagram of the Major Components.....	5
Module Face Plate Configuration .....	6
Module Label Locations .....	7

## Section 2

### Installation

Physical Installation into the Train.....	8
Required RF and Power Cabling .....	9-10
Power Up and Check Out Procedures .....	11

## Section 3

### Hardware Operations

Location and Offset Values for Test Points.....	11
Indicator Lights .....	12
Troubleshooting .....	13
Warranty and Repair Procedures .....	14-18

## Section 4

### Software Operations

Software Operation Overview .....	19-45
Software Behavior Under Normal Conditions .....	46-47

Terms Used in This Manual.....	48
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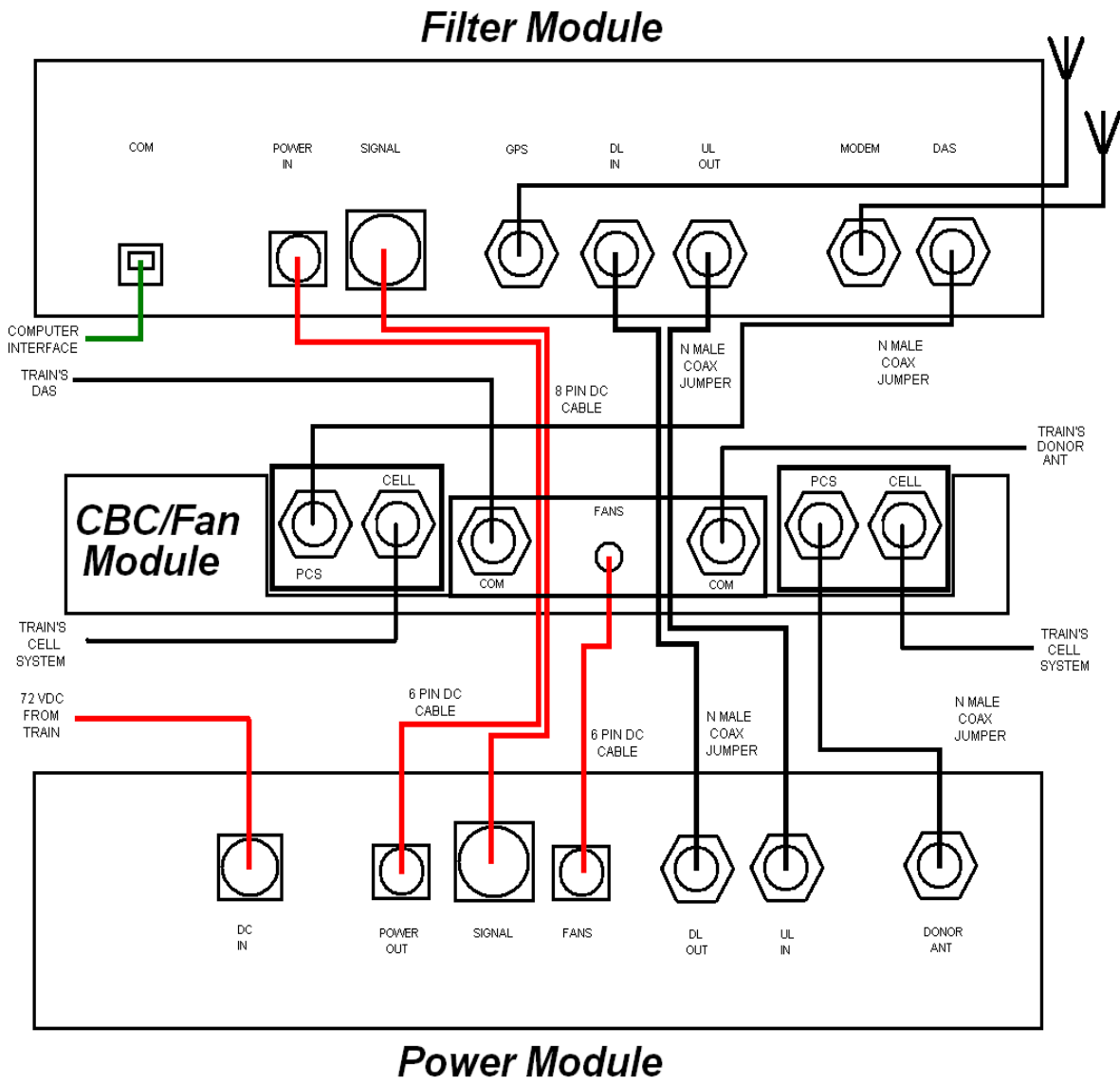
Index .....	49
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## Section 1

### Hardware Configuration

This CSI repeater system is comprised of three modules and the cable assemblies that interconnect them.

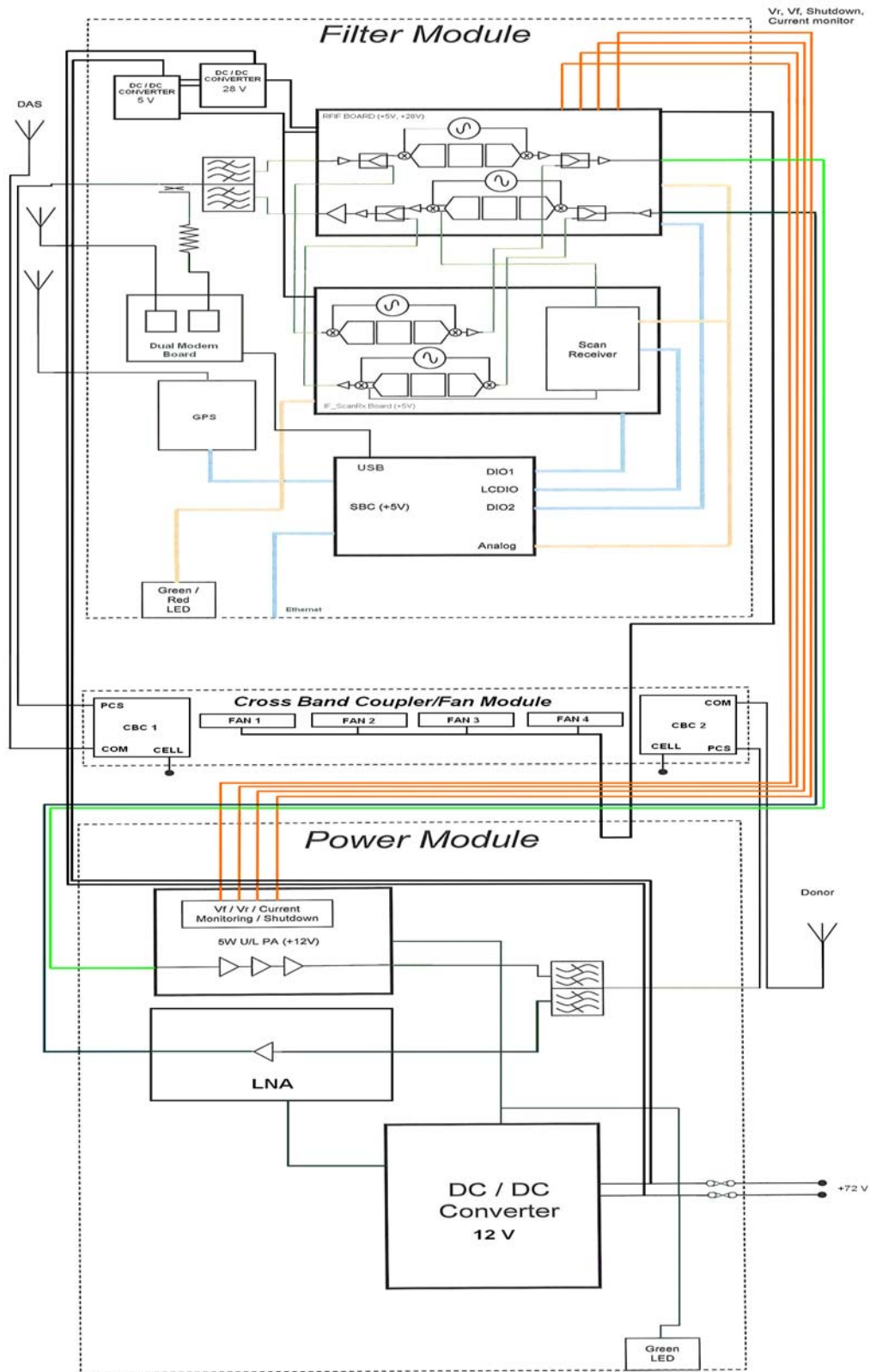
The **Filter Module** provides frequency selection and filtering. It also houses the system computer. The **Power Module** provides amplification and power distribution. The **CBC/Fan Module** (Cross Band Coupler/Fan Module) is the interface between the train's existing Cellular repeater system and this PCS repeater.



System Level Block Diagram

# Section 1

## Hardware Configuration

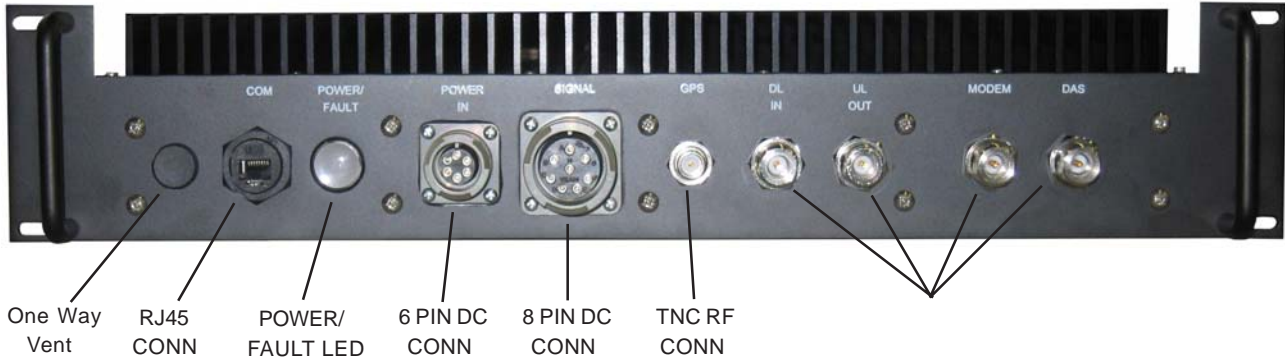


Block Diagram of the Major Components

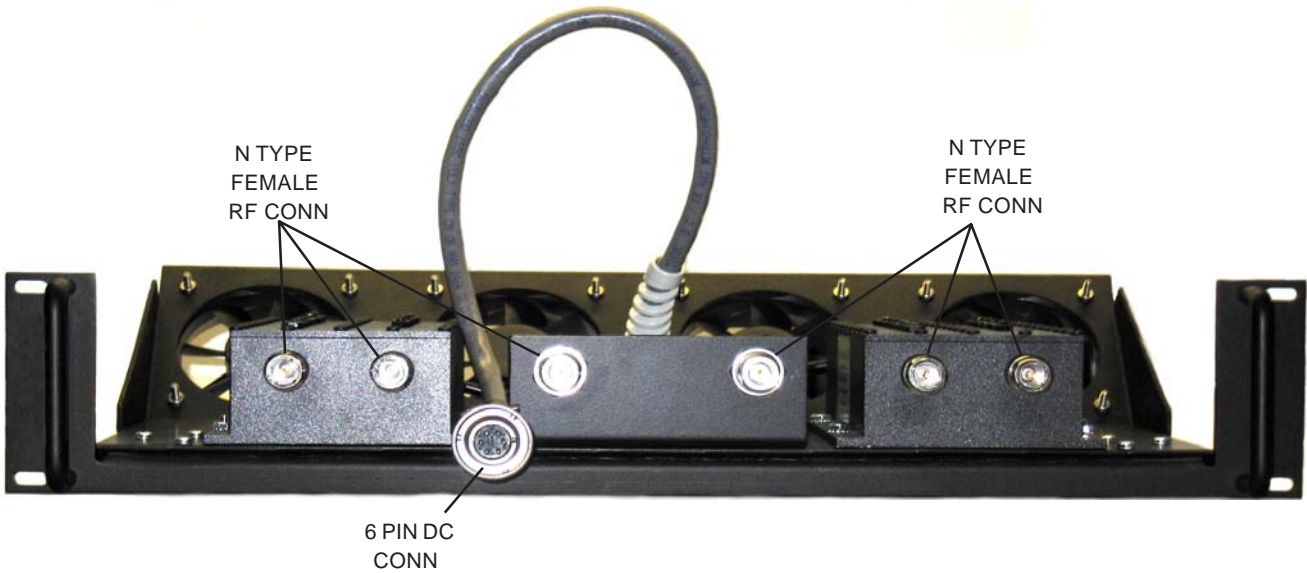
# Section 1

## Hardware Configuration

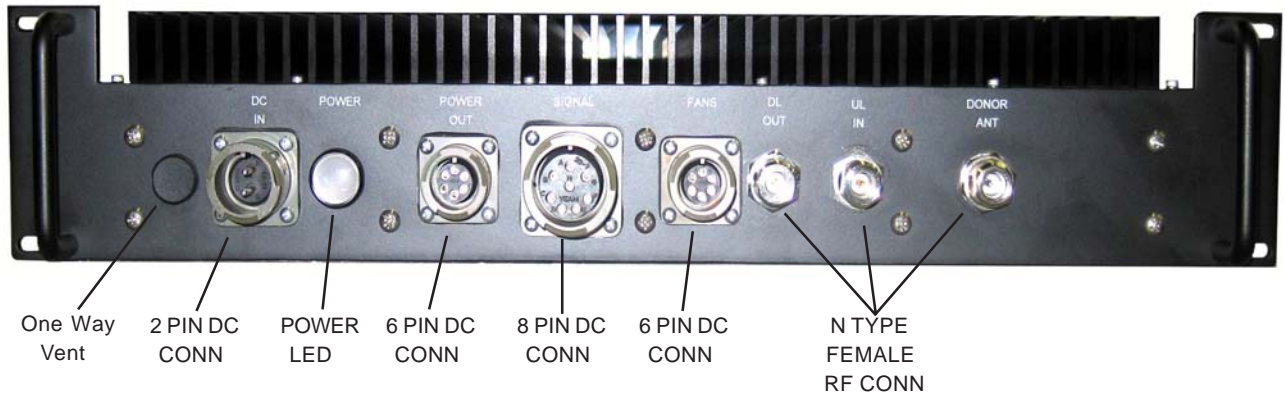
### Filter Module



### CBC/Fan Module



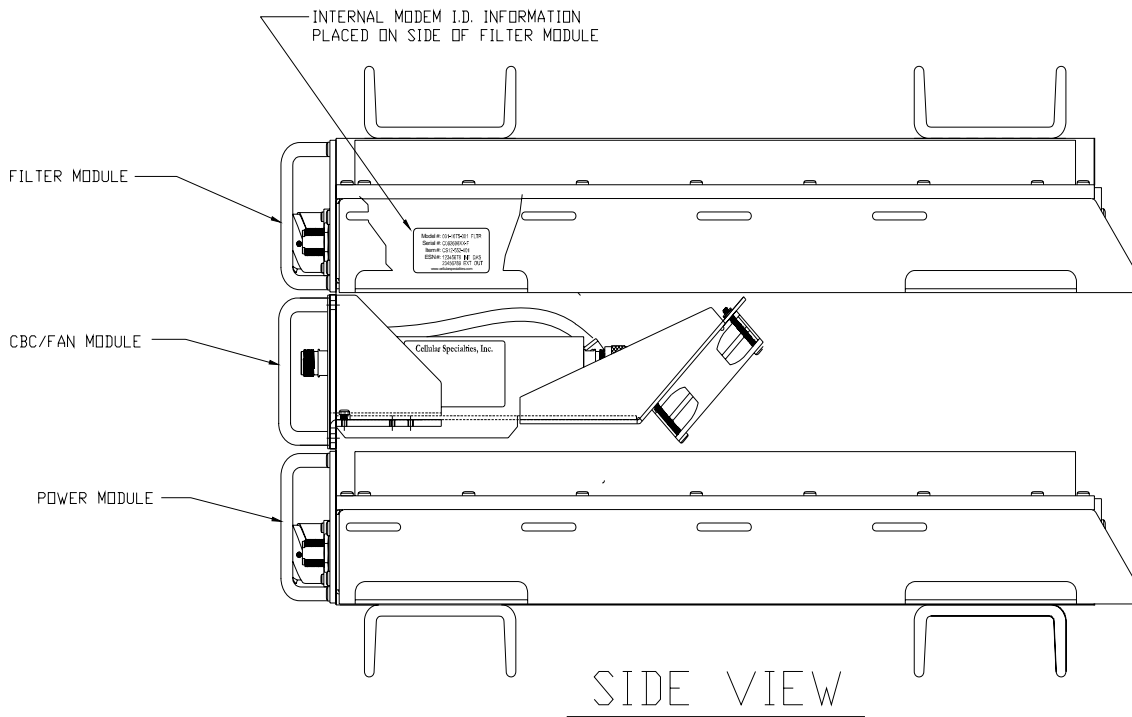
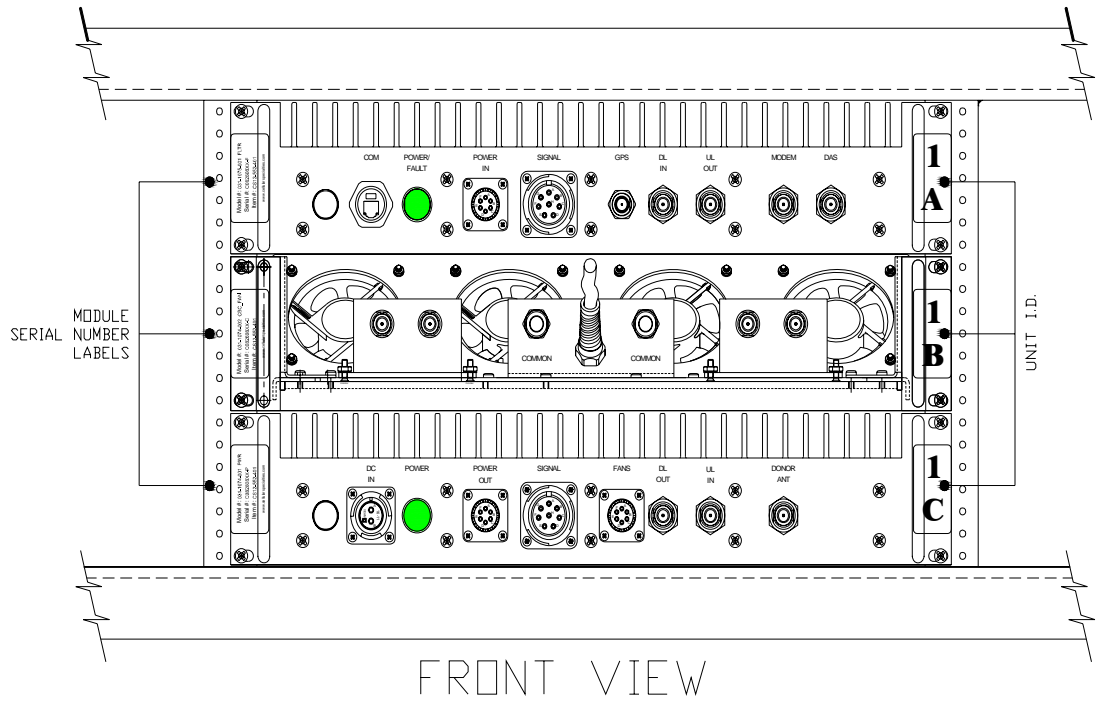
### Power Module



### Module Face Plate Configuration

# Section 1

## Hardware Configuration



### Module Label Locations

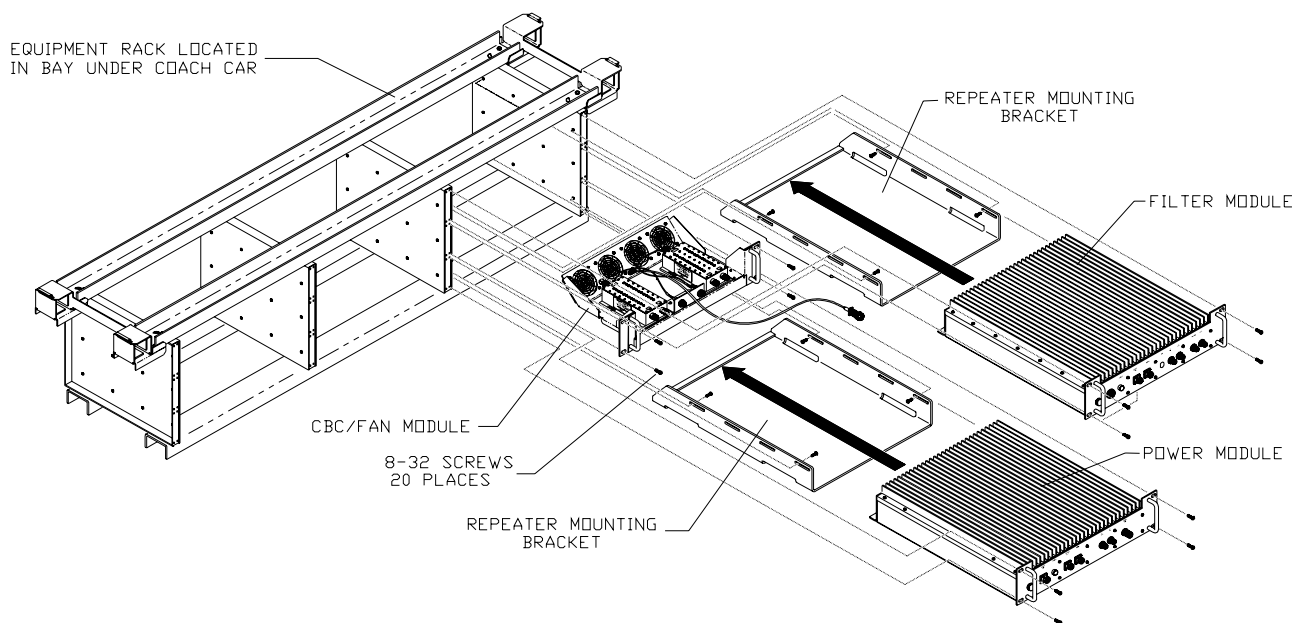


## Section 2

### Installation

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1. Unpack each of the three boxes that make up the CSI repeater system for the Acela train. The first box contains the **Filter Module** and associated components. The second box contains the **Power Module** and associated components. Lastly, the third box contains the **CBC/Fan Module** and associated components.
2. After unpacking, the major components should include one **Filter Module**, one **Power Module**, one **CBC/Fan Module** and two **Repeater Mounting Brackets**. The minor components are 20 #8-32 Phillips Head Machine Screws and cabling for interconnection of the modules, which will be detailed on the next page. 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 Mounting Brackets**, one in the rack's bottom slot and one in the rack's top slot using 4 #8-32 Phillips Head Machine Screws for each.
4. Install the **Power Module** in the rack's **bottom** slot as shown and secure with 4 #8-32 Phillips Head Machine Screws.
5. Install the **CBC/Fan Module** in the rack's **middle** slot as shown and secure with 4 #8-32 Phillips Head Machine Screws.
6. Install the **Filter Module** in the rack's **top** slot as shown and secure with 4 #8-32 Phillips Head Machine Screws.



### Physical Installation Into The Train



## Section 2

### Installation

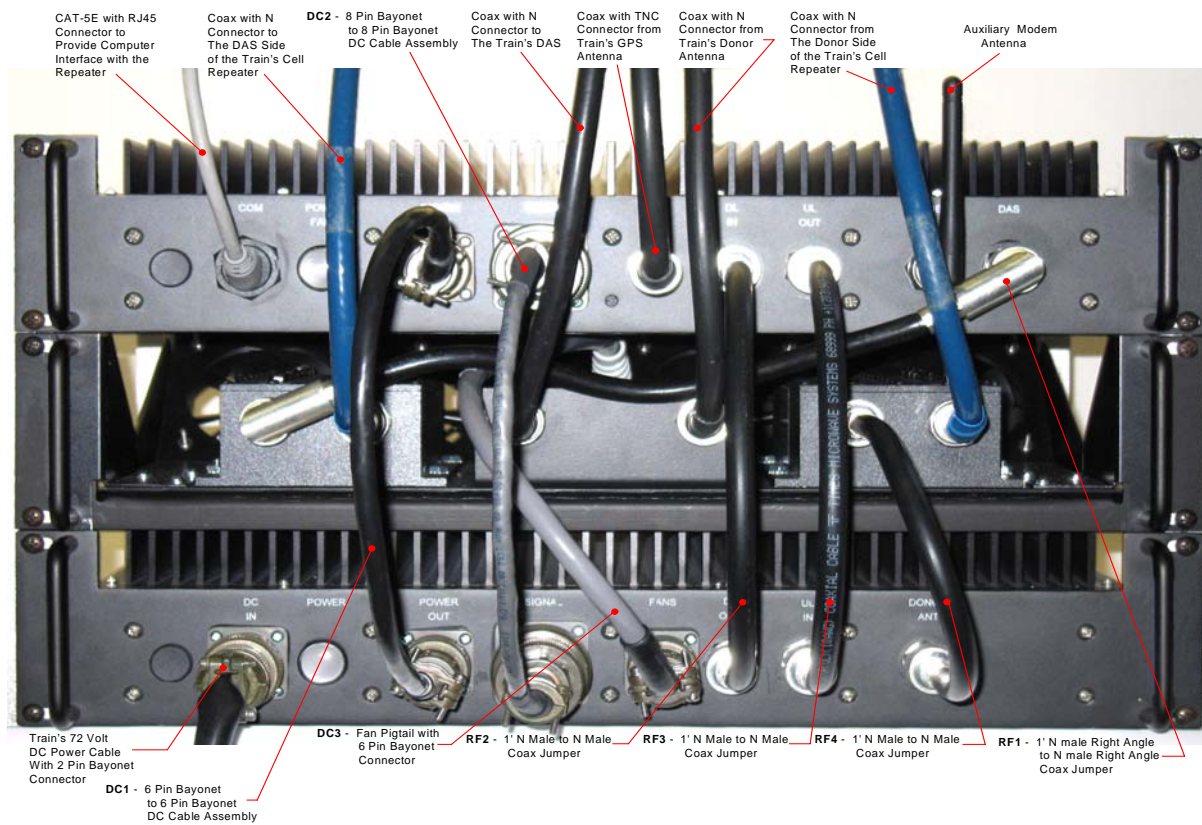
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1. With each of the three modules in place, DC and RF cables can be installed. Locate the DC cable with a 6 pin bayonet type connector at each end (**DC1**) and connect one end from the **POWER IN** port on the Filter Module to the **POWER OUT** port of the Power Module. Twist each connector clockwise until locked.
2. Locate the DC cable with an 8 pin bayonet type connector at each end (**DC2**) and connect one end from the **SIGNAL** port on the Filter Module to the **SIGNAL** port of the Power Module. Twist each connector clockwise until locked.
3. Connect the DC pigtail (**DC3**) from the CBC/Fan Module to the port labeled **FANS** on the Power Module. Twist the connector clockwise until locked.
4. Locate two 1' N male to N male coax jumpers (**RF2 & RF3**). One is installed from the **DL IN** port on the Filter Module to the **DL OUT** port on the Power Module. The other jumper connects between the **UL OUT** port on the Filter Module to the **UL IN** port on the POWER Module. **Note: hand tighten only. Do not use tools to tighten ANY N type connectors as damage to the jumper and/or equipment may occur.**
5. The next N male to N male coax jumper (**RF4**) is installed from the **DAS** port on the Filter Module to the **PCS** port on the right side cross band coupler in the CBC/Fan Module. The final coax jumper (**RF1**) is connected from the port labelled **DONOR ANT** on the Power Module to the **PCS** port on the left side cross band coupler in the CBC/Fan Module.
6. Connect the GPS antenna lead to the port on the Filter Module labelled **GPS**.
7. Connect the Modem antenna to the port on the Filter Module labelled **MODEM**.
8. Connect the Train's donor antenna lead to the **COM** port on the left side cross band coupler in the CBC/Fan Module.
9. Connect the lead from the train's cellular system donor port to the **CELL** port on the left side cross band coupler in the CBC/Fan Module.
10. Connect the lead to the train's cellular system's DAS port to the **CELL** port on the right side cross band coupler in the CBC/Fan Module.
11. Connect the Train's DAS antenna lead to the **COM** port on the right side cross band coupler in the CBC/Fan Module.
12. The final connection is to the train's 72VDC power supply. Locate the 2 pin power supply cable and plug it into the 2 pin bayonet type connector on the Power Module labelled **DC IN**. Twist the connector clockwise until locked.

## Section 2

### Installation

Note: located on the left side of the Filter Module is a standard RJ45 connector port designed to accept CAT-5E cable, the connector is labelled **COM**. This port is used to provide a computer interface. Refer to the diagram below for a graphical representation of the connections described on the previous page.



### RF and Power Cabling

## Section 2

### 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 obtained 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:

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		
Modem Phone Number	Longitude	<b>RF Alarms:</b>	<b>System Alarms:</b>
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	

#### 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 un-useful 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

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#### Test Point Locations and Values

The CSI repeater, CS12-553-401, by design, has no external test points. The Power and Filter modules are sealed with no user serviceable parts inside. The CBC/FAN Module had no user serviceable parts, if fans are observed to fail the module can be sent back to CSI for evaluation. Testing and configuration is done exclusively by interfacing the repeater with a laptop or desktop computer and using the Web based GUI or the TMI. Both user interfaces 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 covers for the Power and or Filter modules are 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 Filter Module face plate, between the COM and POWER IN ports, the first LED labeled POWER/FAULT glows red as the repeater is powered up. When the unit completes all of its 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 Web based GUI or the TMI.

The second LED is located on the faceplate of the Power Module, between the DC IN and POWER OUT connector ports. 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?	
<b>Downlink Power</b>	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	
<b>Uplink Power</b>	Over Range	Critical	Yes	Yes	No	
	Out of Band Signal	Routine	No	No	No	
<b>Common Hardware Alarms</b>	Synthesizer Error	Critical	Yes	Yes	Yes	
	Dac Error	Critical	Yes	Yes	Yes	
	DC Current High	Severe	Yes	Yes	No	
<b>Downlink PA</b>	DC Current Low	Severe	Yes	Yes	No	
	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	
	<b>Uplink PA</b>	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	
<b>Scanning Receiver Alarms</b>		ScanRcvrLow	Severe	Yes	Yes	No
		ScanRcvrHigh	Severe	Yes	Yes	No
<b>GPS Receiver Alarms</b>		No GPS Data	Critical	Yes	Yes	Yes
	No GPS Lock	Severe	Yes	No	No	
	No GSP Fix	Critical	Yes	Yes	No	
<b>Software Alarm Types</b>	Gps Antenna Current	Severe	Yes	No	No	
	Gps Fix Filter Not Present	Severe	Yes	Yes	Yes	
	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	
<b>Communications</b>	Heartbeat	Informational	No	Yes	No	
	Modem Not Responding	Severe	Yes	No	No	
	Modem Not Connected	Routine	No	No	No	

## Section 3

### Hardware Operations

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#### **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.

## Section 3

### Hardware Operations

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#### **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 the 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 the 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.



## Section 3

### Hardware Operations

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(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 the 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 the 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 exist 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:

## Section 3

### Hardware Operations

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- 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 from 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.

### Warranty and Repair Procedures

## Section 3

### Hardware Operations

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#### **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 Partsble 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

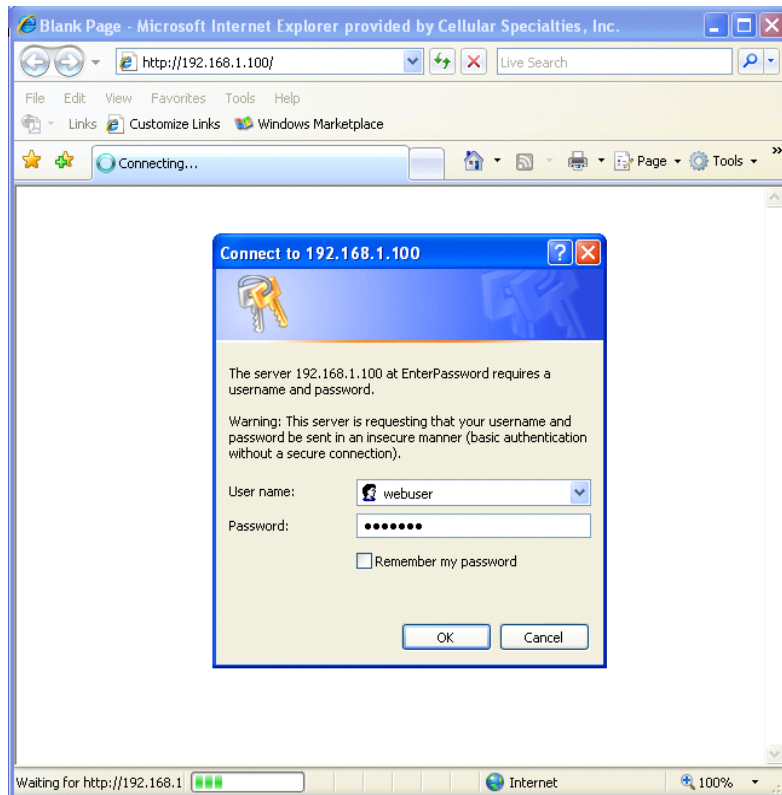
### Software Operations

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#### Web based GUI Session

Primary access to the repeater is gained using a LAN connection and a web browser program such as Firefox by Mozilla, or Internet Explorer from Microsoft. The repeater ships in DHCP server mode and by default the IP address will be 192.168.1.100. \*

If connecting directly to the repeater from a laptop or PC with a crossover CAT-5E cable or over a LAN the user types the IP address of the repeater into the browser address line to connect. When connection is made the user will be prompted for a user name and password. For the purpose of the GUI session, the default user name is **webuser** and the password is **csi1234**. This can also be changed as required. Internet access is not required to use the GUI. (Note: If you are connecting using a laptop, verify that your Ethernet port is powered. Some laptops will not allow Ethernet connection when on battery power. If this is the case with the laptop you are using you will need to plug it in or update the power settings.)



\*DHCP is a protocol that allows computers on a network to be automatically configured appropriately for that network. Networks provide DHCP service by maintaining one or more servers that listen for special broadcasts on the network, called DHCP requests. These requests are made by computers when they first join a particular network. The DHCP server replies with configuration information that the requester uses to join the network.

In the case of this repeater, the unit is configured to act as a DHCP server by default. This means that a computer configured to make a DHCP request on joining a network (most laptops are set up this way) will automatically receive a configuration from the repeater when it is connected to it via the local network port. This connection is made with either a crossover cable or an Ethernet switch or hub.

One word of caution: The repeater, if it joins a network already managed by another DHCP server, may cause disruptions in that network. To avoid any such problems, reconfigure the unit for static or DHCP client mode before connecting it to such a network. (The local networking config page in the web interface, and the menu interface, can be used to achieve this.)

#### General Operation Overview

## Section 4

### Software Operations

#### System Status:

When login is complete the user is brought to the system status page. The links on the page are activated by clicking on them.

The screenshot shows a web browser window titled "System Status - Microsoft Internet Explorer provided by Cellular Specialties, Inc." with the address bar showing "http://192.168.1.100/index.cgi". The page content is as follows:

### System Status

**Timestamp** 20080825 - 16:31:17  
**System Uptime** 3 days 2 hours 31 minutes  
**Software Version** 2.2.0 CS1  
**Serial Number** C08260803  
**Model Number** CSI-DR-XXXX-PROD  
**Item Number** CSI2-553-401  
**Location** Manchester

**Modem Status Information**  
**Modem#1**  
**Signal Strength** -72 (ok)  
**Registration Status** Modem has registered  
**Phone Number** 9084425314  
**Current Band** PCS  
**System ID** 28  
**Network ID** 5  
**Temperature** 38

**Band Type** PCS  
**Active Filter** pcA0D0B0E0F0C0-0

Power	Down Link	Up Link
In-band Input (dBm)	-74.1	≤ -81.0
Measured Output (dBm)	10.5	≤ 4.0
Composite Input (dBm)	≤ -53.0	≤ -53.0

**Gain Control**  
**AGC Mode** On  
**AGC Attenuation (dB)** 0.0 0.0  
**System Gain** 85.0 85.0

**GPS Information**  
**RunState** Enabled  
**Latitude** 43.0  
**Longitude** -71.5  
**Filter ID** 1  
**Filter Name** pcA0D0B0E0F0C0-0  
**Location** Manchester  
**BTA** 500  
**Satellite Count** 0  
**NoBox Count** 0  
**Searching Count** 334

Scan Receiver	MHz	avg dBm
Run State	Enabled	
DeKey Limit	-40.0	
Filter ID	1	
Channels	10	
Channel-1	1971.25	-93.9
Channel-2	1972.5	-94.6
Channel-3	1973.75	-95.1
Channel-4	1976.25	-97.0
Channel-5	1977.5	-97.4
Channel-6	1978.75	-97.0
Channel-7	1980.0	-96.7
Channel-8	1981.25	-96.4
Channel-9	1982.5	-95.8
Channel-10	1983.75	-96.0

**RF Alarms**

Over Range	<span style="background-color: green; width: 100px; height: 10px;"></span>
Oscillation	<span style="background-color: green; width: 100px; height: 10px;"></span>
VSWR	<span style="background-color: green; width: 100px; height: 10px;"></span>
Out of Band Overdrive	<span style="background-color: green; width: 100px; height: 10px;"></span>
Low Signal	<span style="background-color: green; width: 100px; height: 10px;"></span>
No Signal	<span style="background-color: green; width: 100px; height: 10px;"></span>

**System Alarms**

Synthesizer Lock	<span style="background-color: green; width: 100px; height: 10px;"></span>
Voltage	<span style="background-color: green; width: 100px; height: 10px;"></span>
Temperature	<span style="background-color: green; width: 100px; height: 10px;"></span>
Software	<span style="background-color: green; width: 100px; height: 10px;"></span>
Hardware	<span style="background-color: green; width: 100px; height: 10px;"></span>

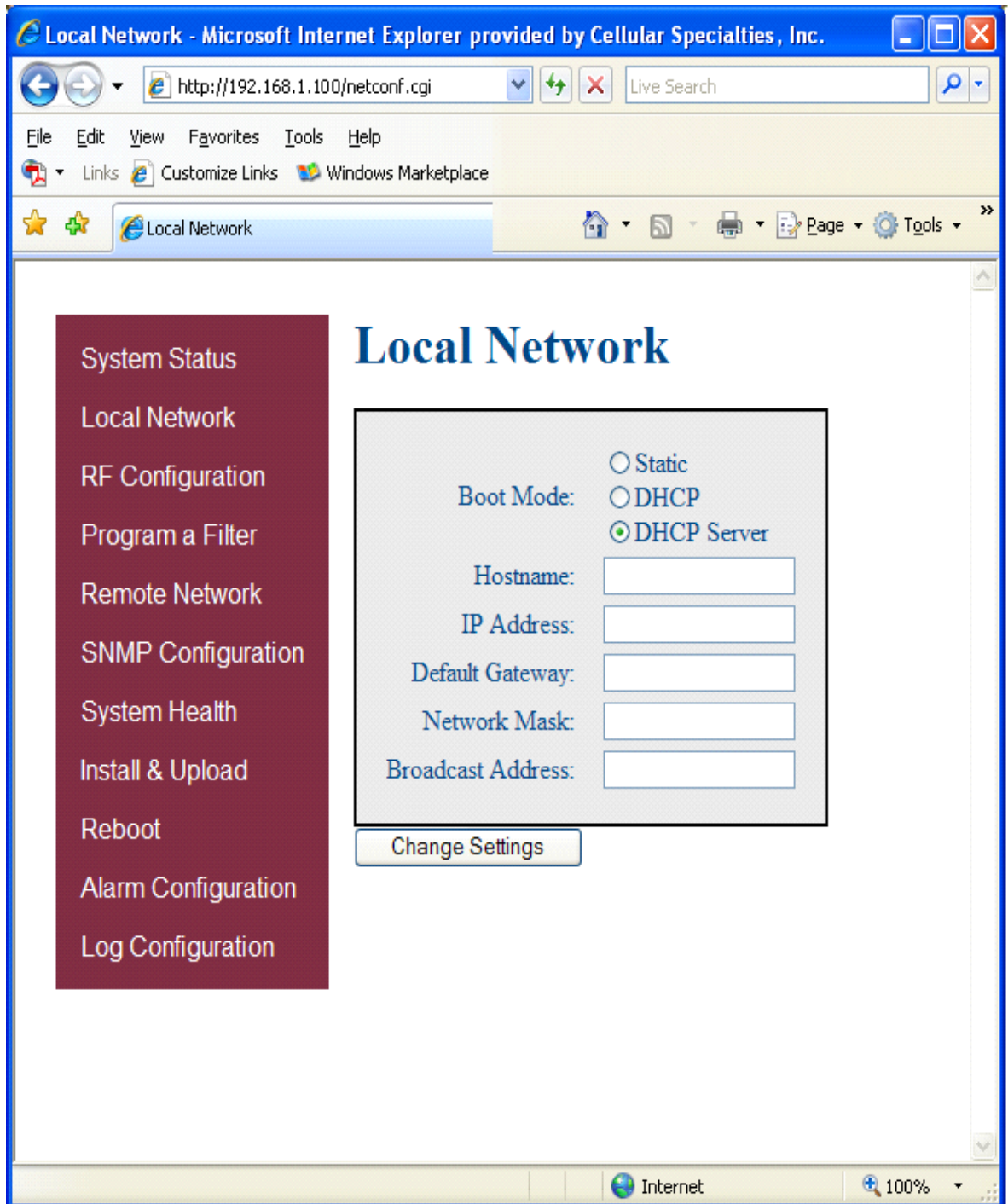
### General Operation Overview

## Section 4

### Software Operations

#### Local Network:

If the user selects Local Network from the System Status page, the following screen is displayed and from here network configuration can be modified as required. The default is set to DHCP Server. It is recommended you check with your IT department for explanation of the options and approval before you connect this repeater to your network or change the options.



### General Operation Overview

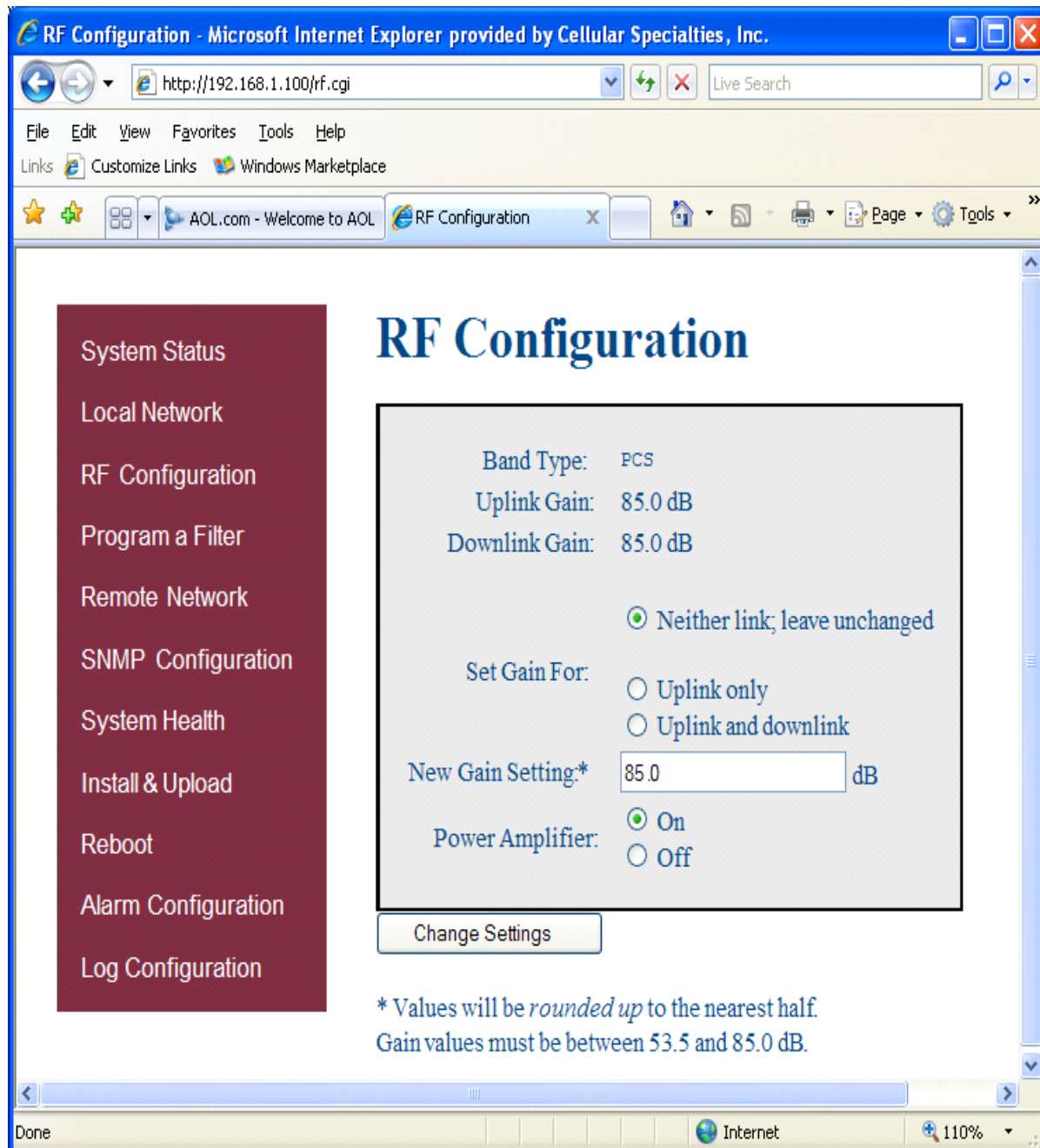


## Section 4

### Software Operations

#### RF Configuration:

From here the user may return to the System Status screen or click on the other options. If the user would like to modify RF configuration click on the words RF Configuration in the brown navigation box and the screen below is displayed.



To change gain settings the user will select the Uplink only or Uplink and Downlink radio buttons. The user then inputs the gain value desired. Gain values from 53.5 dB to 85.0 dB may be selected. The repeater will not allow the user to set values outside this range. By pressing the Change Settings button the gain change is implemented. When a new filter set is required, it may be selected by clicking Program a Filter in the navigation box.

#### General Operation Overview



## Section 4

### Software Operations

#### Program a Filter:

The user may select the desired filter by pressing the band/sub-band and modulation selection buttons. Undesired bands/sub-bands if lit will require the user to manually “deselect” them before programming. Pressing the Program button will complete the selection and load the desired filter. The time required to complete this process will take just a few moments. Note: If the filter desired is not currently in the unit, additional filters along with instructions on how to load them are available by contacting CSI.

**Program a Filter**

Filter programming requires approximately one minute.

**Band Type:** PCS  
**Status:** Ready for programming

UpLink (MHz) 1830 1865 1870 1885 1890 1895 1910  
DownLink (MHz) 1820 1845 1850 1865 1870 1875 1890

Click blocks below to add or remove them from the filter selection:

A Full		B Full		C Full																			
A2	A1	B2	B1	C2	C1																		
A3	A4	A5	D Full	B3	B4	B5	E Full	F Full	C3	C4	C5												
A6	A7	A8	A9	A10	A11	D1	D2	B6	B7	B8	B9	B10	B11	E1	E2	F1	F2	C6	C7	C8	C9	C10	C11

**Modulation:** Selected Filter:  
 CDMA  
 GSM

PCS band, CDMA modulation, A Full, D Full, B Full, E Full, F Full, C Full, with a standard guard band.

Ignore the above and program this custom filter: (No custom filters are available.)

**Program**

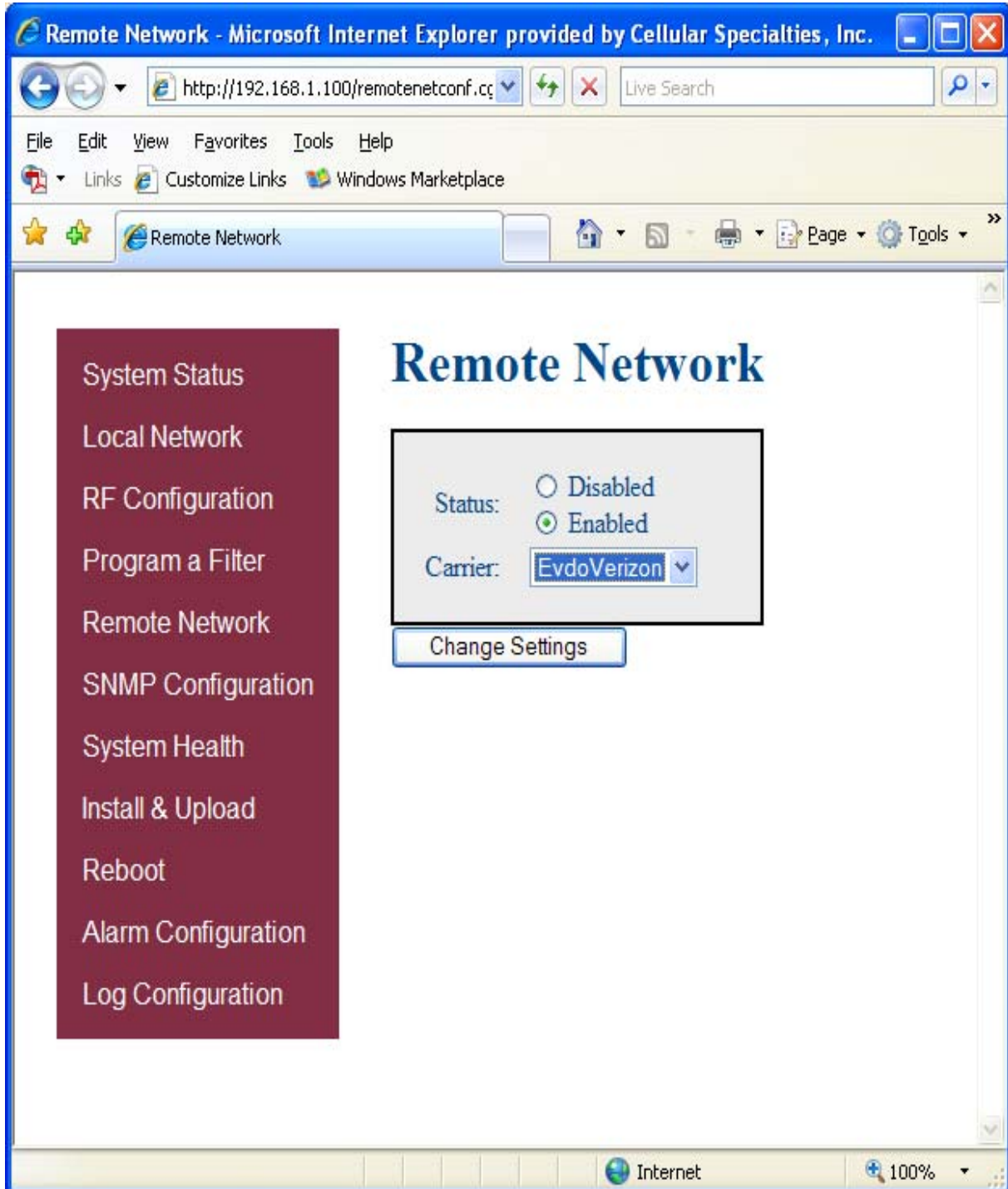
### General Operation Overview

## Section 4

### Software Operations

#### Remote Network:

Highlight the carrier on whose network the repeater and modem will be configured and click the Change Settings button. Note: the system will require restart for the change to take effect.



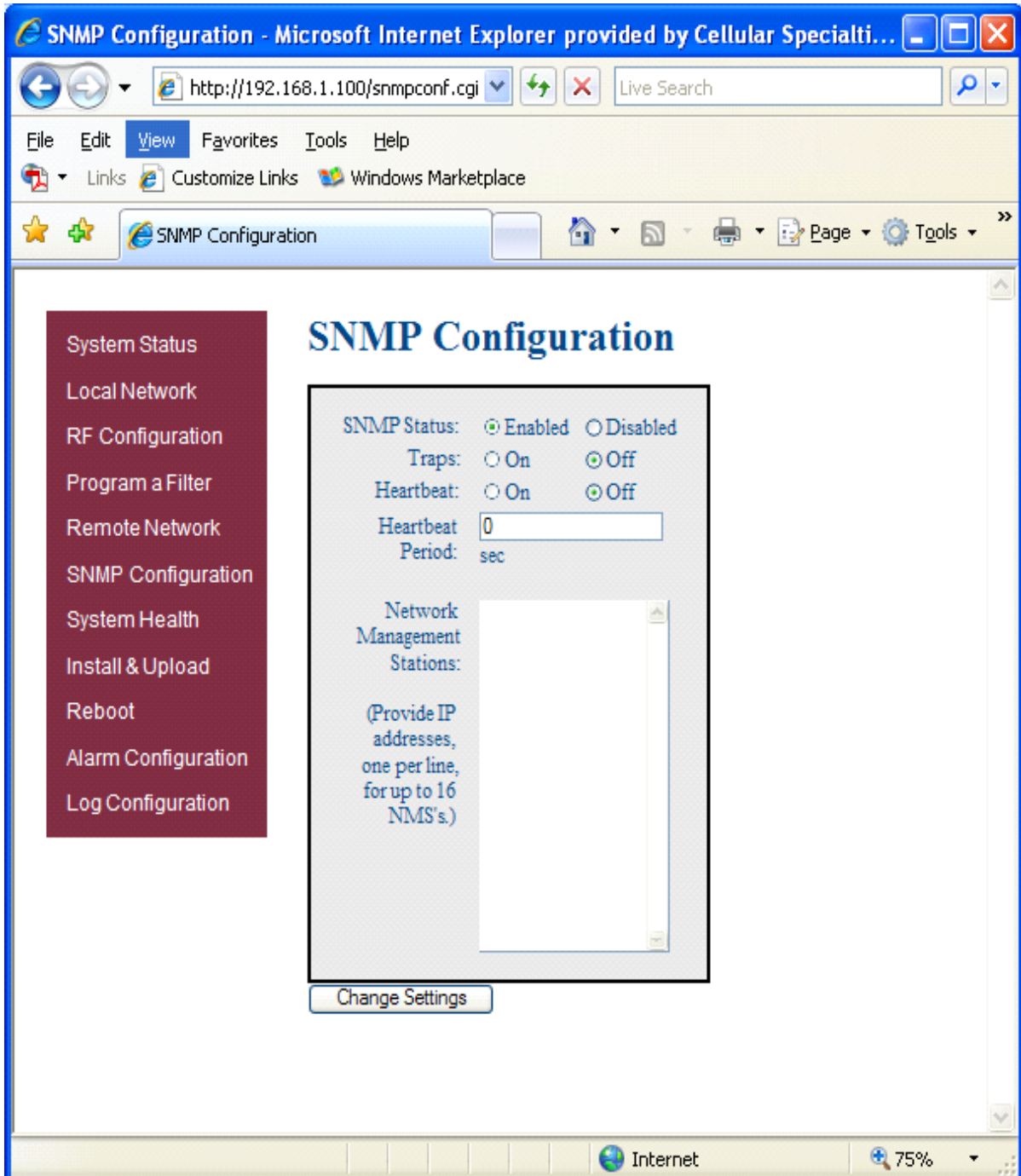
#### General Operation Overview

## Section 4

### Software Operations

#### SNMP Configuration:

To change SNMP settings click SNMP Configuration in the navigation box, the screen below will be displayed. If the user is not well versed in Simple Network Management Protocol he or she should check with their IT professional for proper setting requirements.



## Section 4

### Software Operations

#### System Health:

By clicking System Health the current state of the repeater can be reviewed.

The screenshot shows a Microsoft Internet Explorer browser window displaying the 'System Health' page. The browser's address bar shows the URL 'http://192.168.1.100/status.cgi'. The page title is 'System Health - Microsoft Internet Explorer provided by Cellular Specialties, Inc.'. The browser's menu bar includes 'File', 'Edit', 'View', 'Favorites', 'Tools', and 'Help'. The browser's toolbar includes 'Links', 'Customize Links', and 'Windows Marketplace'. The browser's status bar shows 'Done' and 'Internet'.

The main content area of the page is titled 'System Health' and features a navigation menu on the left with the following items: System Status, Local Network, RF Configuration, Program a Filter, Remote Network, SNMP Configuration, System Health, Install & Upload, Reboot, Alarm Configuration, and Log Configuration. The 'System Health' item is currently selected.

The main content area displays the following system status information:

<b>Band Type</b>	PCS
<b>Temperature (Celsius)</b>	0.0
<b>Current (Amps)</b>	0.0
<b>Power Amplifier Status</b>	On
<b>Current (Amps)</b>	0.0

Below the system status information, there is an 'Alarms' section with a table showing the status of various alarms:

Alarms	Down Link	Up Link
DAC PLL Lock	Green	Green
LO PLL Lock	Green	Green
FPGA	Green	Green

Below the alarms section, there is an 'Event Log' section with a 'Clear Log' button. The event log contains the following text:

```
ID: [csi-dsp2-RINGO:] *ROUTINE* [GPS 42.996883, -71.467697] 08/25 - 18:46:24
***
```

\*\*\*The user may clear alarms and the Event Log by clicking the Clear Log button.

### General Operation Overview

## Section 4

### Software Operations

#### Install & Upload:

Should a software install or upgrade be needed it can be done from the Install & Upload screen shown below. As with the other screens it can be reached by clicking the words in the navigation box.

The screenshot shows a web browser window titled "Install & Upload - Microsoft Internet Explorer provided by Cellular Specialties, Inc." with the address bar showing "http://192.168.1.170/install.cgi". The page content is as follows:

- System Status** (highlighted in the left navigation menu)
- Local Network**
- RF Configuration**
- Program a Filter**
- Remote Network**
- SNMP Configuration**
- System Health**
- Install & Upload** (current page)
- Reboot**
- Alarm Configuration**
- Log Configuration**

### Install & Upload

#### Upload Updates

Choose a package file, then click Upload. Files larger than 10 megabytes will be rejected (the connection will be reset). Duplicate packages will be overwritten.

#### Install Updates

From the list of previously uploaded packages, choose one to install or delete:

(No packages available; upload one, then it will be available for installation)

#### Install Via USB

Before clicking "Install", insert a USB device containing software install files. Installation sometimes causes a system restart.

Are you sure you want to install from USB?  No  Yes

Done Internet 85%

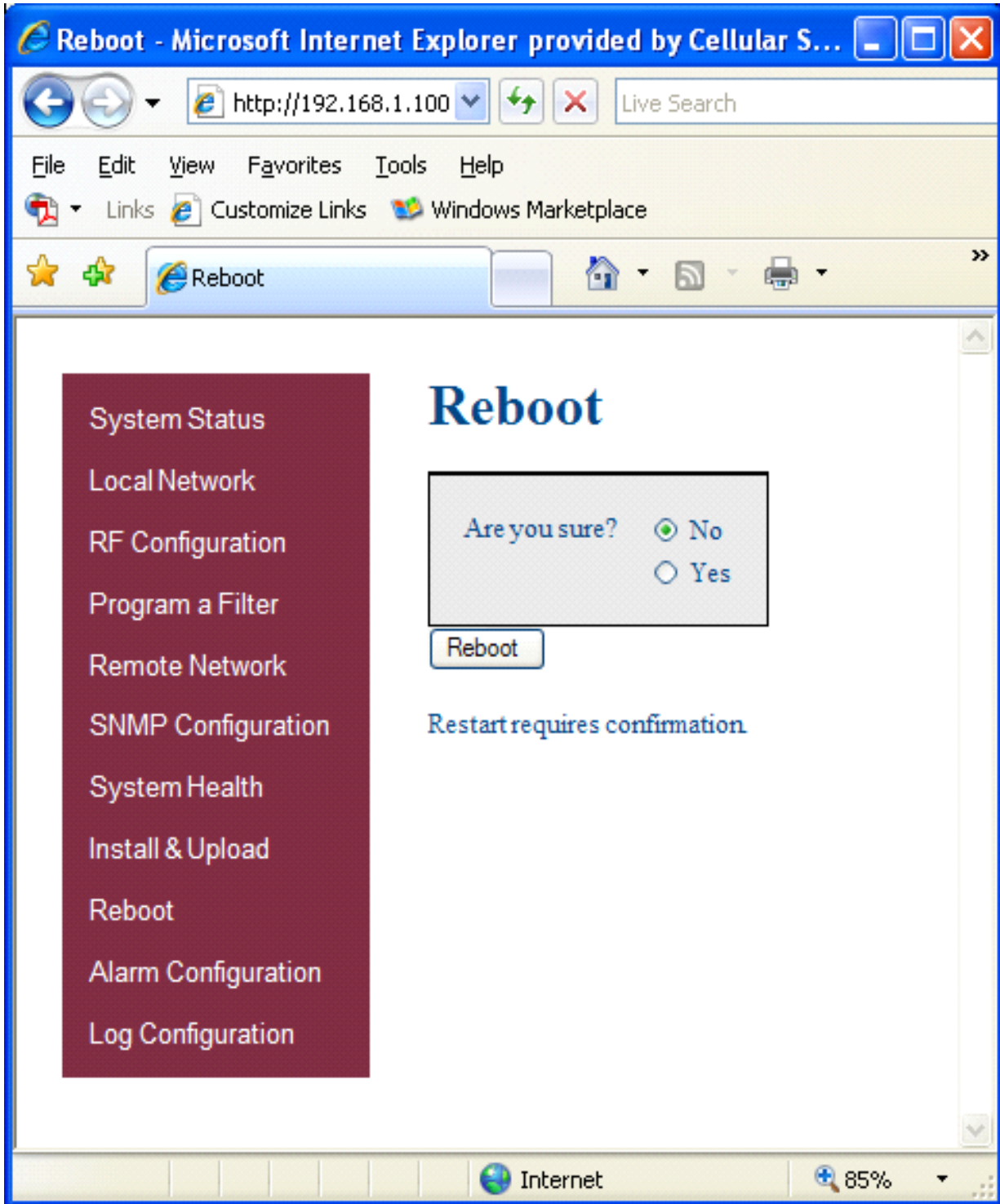


## Section 4

### Software Operations

#### Reboot:

If a reboot of the repeater becomes necessary click on the Reboot option in the navigation box and the Reboot page is displayed.



#### General Operation Overview

## Section 4

### Software Operations

#### Alarm Configuration:

In order to review and configure the system's alarms click on the Alarm Configuration line in the navigation box and page shown below is displayed.

**Alarm Configuration**

**Add Email Address**

Email Address 1	mandruchuk@cellularpediatrics.com
Email Address 2	
Email Address 3	
Email Address 4	
Email Address 5	

[ Save ]

Below is the present configuration for each alarm and their associated events. Uncheck an event to prevent it from triggering its associated alarm. This operation could take several minutes to complete.

RF Alarms	Down Link	Up Link
Over Range	<input checked="" type="checkbox"/> Over Range	
Oscillation	<input checked="" type="checkbox"/> Warning <input checked="" type="checkbox"/> Shutdown	<input checked="" type="checkbox"/> Warning <input checked="" type="checkbox"/> Shutdown
VSWR	<input type="checkbox"/> Over <input checked="" type="checkbox"/> Under	<input type="checkbox"/> Over <input checked="" type="checkbox"/> Under
Out of Band Overdrive	OOB	OOB
Low Signal	<input type="checkbox"/> Low Signal	
No Signal	No Signal	
System Alarms		
Synthesizer Lock	<input checked="" type="checkbox"/> LO Phase Lock (also affects hardware)	
Voltage	<input checked="" type="checkbox"/> PA Over Current <input checked="" type="checkbox"/> PA Under Current <input checked="" type="checkbox"/> DC Over Current <input checked="" type="checkbox"/> DC Under Current <input checked="" type="checkbox"/> Over Power Up <input checked="" type="checkbox"/> Over Power Down	
Temperature	<input checked="" type="checkbox"/> Overheat <input checked="" type="checkbox"/> Under Temp	
Software	<input checked="" type="checkbox"/> Software Abort <input checked="" type="checkbox"/> Software Error <input checked="" type="checkbox"/> Property Failure	
Hardware	<input checked="" type="checkbox"/> LO Phase Lock (also affects synth lock) <input checked="" type="checkbox"/> Filter Load <input checked="" type="checkbox"/> Fan Failure <input checked="" type="checkbox"/> LCD Failure <input checked="" type="checkbox"/> DAC Read Error	

[ Apply Settings ]

### General Operation Overview



## Section 4

### Software Operations

#### Log Configuration:

In order to review and update the system's log configuration, click on the Log Configuration line in the navigation box and page shown below is displayed.

The screenshot displays a web browser window with the following details:

- Browser Title:** Log Configuration - Microsoft Internet Explorer provided by Cellular Specialties, Inc.
- Address Bar:** http://192.168.1.100/logconf.cgi
- Navigation Menu (Left):**
  - System Status
  - Local Network
  - RF Configuration
  - Program a Filter
  - Remote Network
  - SNMP Configuration
  - System Health
  - Install & Upload
  - Reboot
  - Alarm Configuration
  - Log Configuration** (highlighted)
- Main Content Area:**

### Log Configuration

Log Rotate Frequency	<input type="text" value="2"/>	minutes
Log Rotate File Size	<input type="text" value="100"/>	Kilobytes
Log Rotate File Count	<input type="text" value="10"/>	
- Status Bar:** Done, Internet, 100%

### General Operation Overview

## Section 4

### Software Operations

---

#### Text Menu Interface:

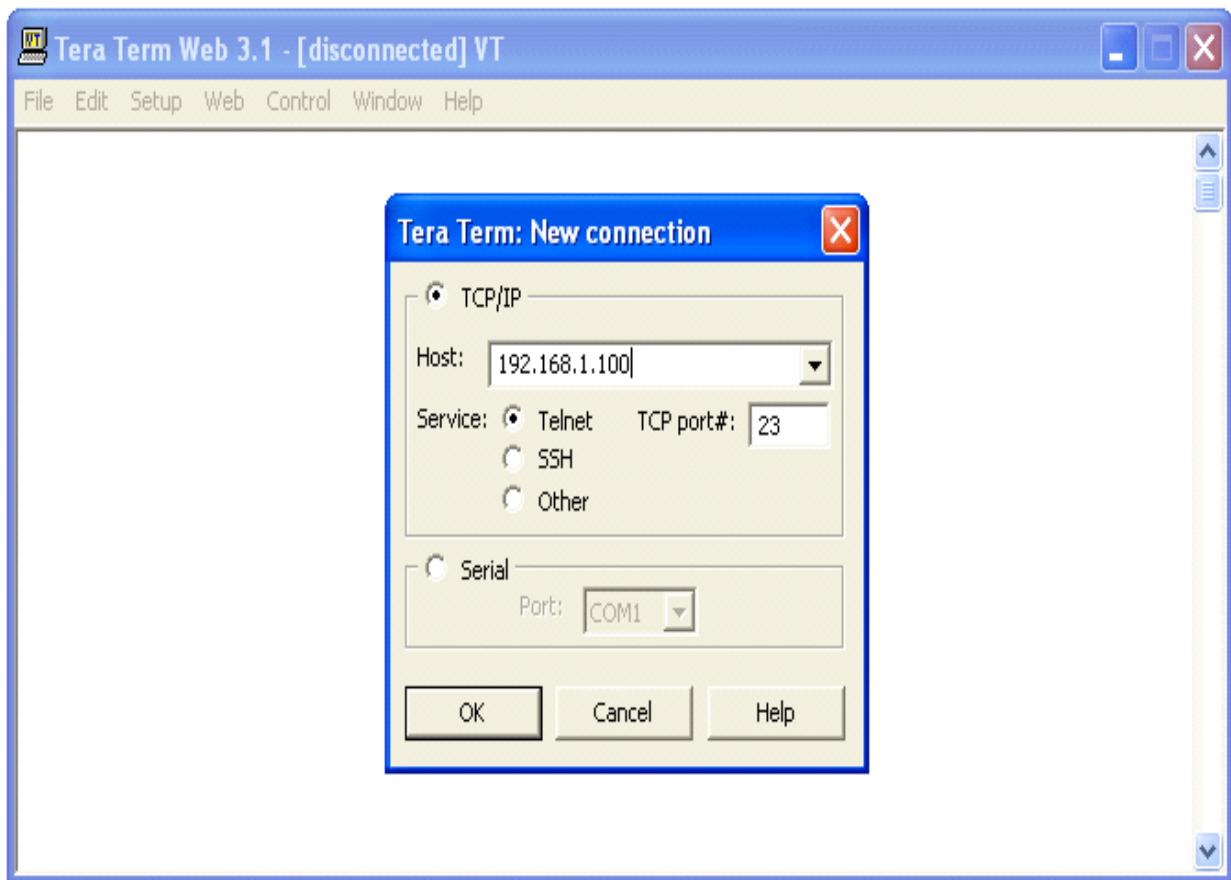
A Text Menu Interface (TMI) is provided as an alternate means of access and control of the repeater. To use the TMI, also known as the console interface, connect a CAT -5E cable to the RJ45 connector port labeled **COM** and a computer making use of a standard terminal emulation program.

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. tpro313.zip

When the program is started, the following screen is displayed.



In the box labeled Host type the repeaters IP address and click OK. The user will then be prompted for a user name and password. The default user name is "user" and the password "csi1234". After entering the password and pressing return the TMI main menu will appear.

### General Operation Overview

## Section 4

### Software Operations

---

Upon logging the user is presented with a summary of the initialization status. The data represents a top level list of the major components that must be operating properly in order to have a function system. The display will "block" until a particular component is finished being initialized.

Status	DNLINK	UPLINK
=====		
Configuration	OK	OK
Attenuator 1	OK	OK
Attenuator 2	OK	OK
Attenuator 3	OK	OK
DAC 1	OK	OK
DAC 2	OK	OK
PLL 1	OK	OK
PLL 2	OK	OK
DPD 1	OK	OK
DPD 2	OK	OK
FAN CTRL1	OK	OK
FAN CTRL2	OK	OK
FPGA 1	OK	OK
FPGA 2	OK	OK
PRECOMP 1	OK	OK
PRECOMP 2	OK	OK
GPS	OK	OK
SCAN RCVR	OK	OK

#### Link Initialization Complete

Once the initialization sequence is complete, the user is presented a top level menu used to access all of the systems operating parameters. The top level menu is organized into three main sections, settable parameters, status parameters, and system functions.

=====

#### Main Menu

=====

- (1) Set Parameters - Disabled
- (2) Get Parameters
- (3) System Commands
- (x) Exit

->

The "Set Parameters" menu is password protected (user definable) in order to prevent erroneous configurations being made by non-qualified users. The user will be prompted to enter the correct login and password on a per-session basis. Once the user has entered the correct values, subsequent access is not inhibited.

=====

#### Set Parameters - Disabled

=====

- (1) Maintenance Mode Login
- (r) Return to previous menu

->

### General Operation Overview

## Section 4

### Software Operations

---

```
-----  
Enter Username:csi  
Enter Password:csi1234  
Maintenance Mode Enabled
```

```
=====  
Main Menu
```

```
=====  
(1) Set Parameters  
(2) Get Parameters  
(3) System Commands  
(x) Exit
```

```
->
```

```
=====  
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 85 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 toggle between the filters loaded in the RFIF and IF board 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.

## Section 4

### Software Operations

---

-----  
FILTER settings:

- (1) select IF board filter
- (2) select RFIF board filter
- (3) disable both RFIF and IF board filter
- (r) Return to previous menu

FILTER settings?

#### (3) Filter Programming

The "Filter Programming" option allows the user to select and program one of the loaded filters on the system. The user will be prompted to select which board the filter will be loaded on, RFIF or IF. 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.

-----  
File names:

- (1) pcROA0D0B0E0F0C0-0
- (2) pcROA0D0B0E0F0C0-Wide
- (3) pcR1F0C3C4-0
- (4) pcR2E0C3-0
- (5) pcR3F0-0
- (6) pcR4F0C0-0
- (7) pcR5E0F0-0
- (8) pcR6D0C3C4-0
- (9) pcR7F0C3-0
- (r) Return to previous menu

Enter file number?

#### (4) Power Amplifier Output Control

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.

### General Operation Overview

## Section 4

### Software Operations

---

#### 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) All Alarms

(Sets all alarms to a given mask state (ON/OFF)).

##### (3) Link Alarms

(Sets specific alarms of a particular link to a given mask state (ON/OFF)).

##### (4) HW/SW Alarm Configuration

(Sets specific alarms of a specific sub-system to a given mask state (ON/OFF)).

##### (5) 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.

#### 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 msmtpt

(Controls the state of the e-mail sub-system, the user must first enable msmtpt 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.)

(r) Return to previous menu

->

(3) SMS Message Configuration

The "SMS Message Configuration" option configures the SMS (Short Messaging Service) I 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 reconfiguration may cause local and remote access interruptions.**

```
-----
```

```
=====
```

**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 its log files persistently on a periodic basis so that post mortem analysis can take 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 a 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 as 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) Enable/Disable Amplifier *(default enabled)*

(5) Set No Box Shutdown Mode *(default enabled)*

(6) Set No Satellites Shutdown Mode *(default enabled)*

(r) Return to previous menu

->

## Section 4

### Software Operations

---

#### (2) Set Time Interval

=====

##### Set Time Interval

=====

###### (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
->
```

(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  
(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.

## Section 4

### Software Operations

```
=====
Timestamp: 2008:11:18 - 20:51:07 UTC
=====
Uptime   : 4 days 5 hours 31 minutes
=====
Power (dBm)      DNLINK      UPLINK
=====
IN-BAND INPUT    < -85.00    < -85.00
COMPOSITE INPUT  < -70.00    < -70.00
MEASURED OUTPUT  < 0.00      < 0.00

CALIBRATED OUTPUT 26.26      35.80
MAXIMUM OUTPUT    26.26      37.00
VSWR              --         --
=====
AGC (dB)
=====
MODE              ON
ATTENUATION       0.0        0.0
=====
Status
=====
VOLTAGE           ERR         ERR
TEMPERATURE       ERR         ERR
SOFTWARE          ERR         ERR
HARDWARE          ERR         ERR
OSCILLATION       ERR         ERR
OVERRANGE        ERR         ERR
CALIBRATION       OK          OK
=====
DC Current
=====
RFIF              0.84
IF                3.43
=====
Temperature (Celsius)
=====
RFIF              38.00
IF                46.75
=====
Power Amplifier
=====
STATUS           OFF
AMPERAGE         0.00      0.13
TEMPERATURE      --         29.99
=====
Fan Configuration
=====
STATE           OFF         OFF
STATUS          OK          OK
=====
System Configuration
=====
GAIN (dB)       85.00      85.00
IF FILTER *     pcROA0D0B0E0F0C0-Wide pcROA0D0B0E0F0C0-Wide
RFIF FILTER     No Filter   No Filter
=====
```



## (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
=====
Local Area Network:
=====
Hostname      csi-ringo-prod
Boot Protocol  dhcp
IP Address    192.168.1.100
MAC Address
=====
Wide Area Network:
=====
PPP Enabled   YES
Modem Type    CDMA
PPPO Address  166.143.7.196
PPPO 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

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.

```

Enter loop delay ->
Display Mode (0 = normal, 1 = BTA changes ->

```

(r) Return to previous menu

->

## Software Operations

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		
Modem Phone Number	Longitude	<b>RF Alarms:</b>	<b>System Alarms:</b>
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.:

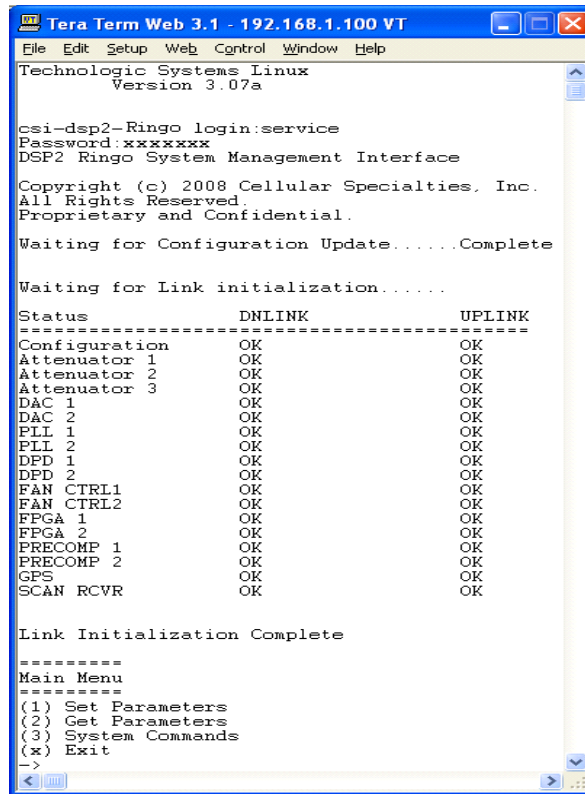
- **Disable the System:** The Operating software can disable the System (prohibit Keying) until the alarm condition is cleared.
- **Alarm Filter Conditions:** A Filter Condition (such as X number of occurrences per hour) to the alarm to prevent false or un-useful notifications if provisioned.
- **Send 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.

## Software Behavior Under Normal Conditions

## Software Operations

### Maintenance Mode:

The repeater has, in addition to its 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**.



```
Tera Term Web 3.1 - 192.168.1.100 VT
File Edit Setup Web Control Window Help
Technologic Systems Linux
Version 3.07a

csi-dsp2-Ringo login:service
Password:xxxxxxx
DSP2 Ringo System Management Interface

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Waiting for Configuration Update.....Complete

Waiting for Link initialization.....

Status          DNLINK          UPLINK
-----
Configuration   OK              OK
Attenuator 1    OK              OK
Attenuator 2    OK              OK
Attenuator 3    OK              OK
DAC 1           OK              OK
DAC 2           OK              OK
PLL 1           OK              OK
PLL 2           OK              OK
DPD 1           OK              OK
DPD 2           OK              OK
FAN_CTRL1      OK              OK
FAN_CTRL2      OK              OK
FPGA 1         OK              OK
FPGA 2         OK              OK
PRECOMP 1      OK              OK
PRECOMP 2      OK              OK
GPS            OK              OK
SCAN_RCVR      OK              OK

Link Initialization Complete

*****
Main Menu
*****
(1) Set Parameters
(2) Get Parameters
(3) System Commands
(x) Exit
->
```

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.

## Software Behavior Under Normal Conditions

## 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

## Symbols

1, Section 4

## A

AGC 8, 9, 48  
Alarm Configuration 29  
Alarm Notification Message 11  
Alarms 11

## B

Band Switching Algorithm 11  
Block Diagram of the Major  
Components 5

## C

CBC/Fan Module 4  
Circuit Operational Description  
20  
Continuing Availability of Service  
and Parts 18  
CPU 48  
Cross Band Coupler/Fan  
Module 4  
CSI 48

## D

DAS 48  
DC IN 11  
default user name 19  
DHCP 48  
DHCP server mode 19

## E

ERP 48  
Event Log 26

## F

FAULT LED 6  
Filter Module 4  
FPGA 48

## G

General Operation Overview 19  
GPS 11

## H

Hardware Configuration 4, 6  
Hardware Operations 12

## I

Indicator Lights 12  
Install & Upload 27  
Install Software 27  
Installation 8  
IP address 19

## L

LAN connection 19  
LED 48  
Local Network 21  
Log Configuration 30

## M

Maintenance Mode 47  
Module Face Plate Configuration 6  
Module Label Locations 7

## N

Normal Operation 11

## O

Operational Mode 46

## P

password 19  
PCS repeater 4  
Physical Installation Into The Train 8  
POWER IN 9  
Power Module 4  
POWER OUT 9  
Power Up 11, 12  
Powerup and System Check Out  
Procedures 11  
Primary access 19  
Product Hardware Warranty 15  
Product Software Warranty 16  
Program a Filter 22

## R

Reboot 28  
Remote Network 24  
RF 48  
RF Alarms 46  
RF and Power Cabling 9, 10  
RF Configuration 22

## S

SBC 48  
Section 1 4  
Section 2 8  
Section 3 11  
Section 4 19  
SNMP 48  
SNMP Configuration 25  
Software Behavior Under Normal  
Conditions 46  
Software Operations 19  
System Alarms 46  
System Health 26  
System Level Block Diagram 4  
System Status 11, 20, 21  
system status page 20

## T

TeraTerm 31  
Terms used in this manual 48  
Text Menu Interface 31

## U

USB 48

## V

Vent 6

## W

Warranty and Repair Procedures  
14  
warranty period 14  
Web based GUI Session 19



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