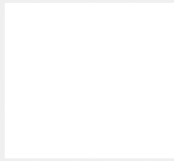
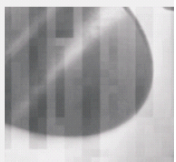
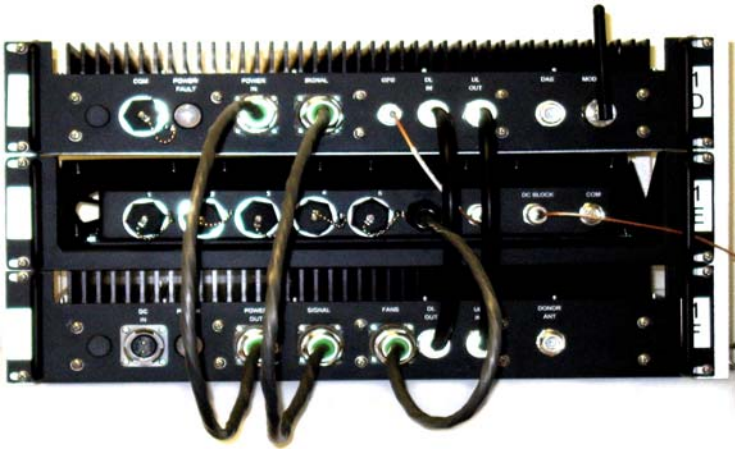


csi

Product Manual



CS12-555-400 User Manual

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This devices must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital devices, 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 areas is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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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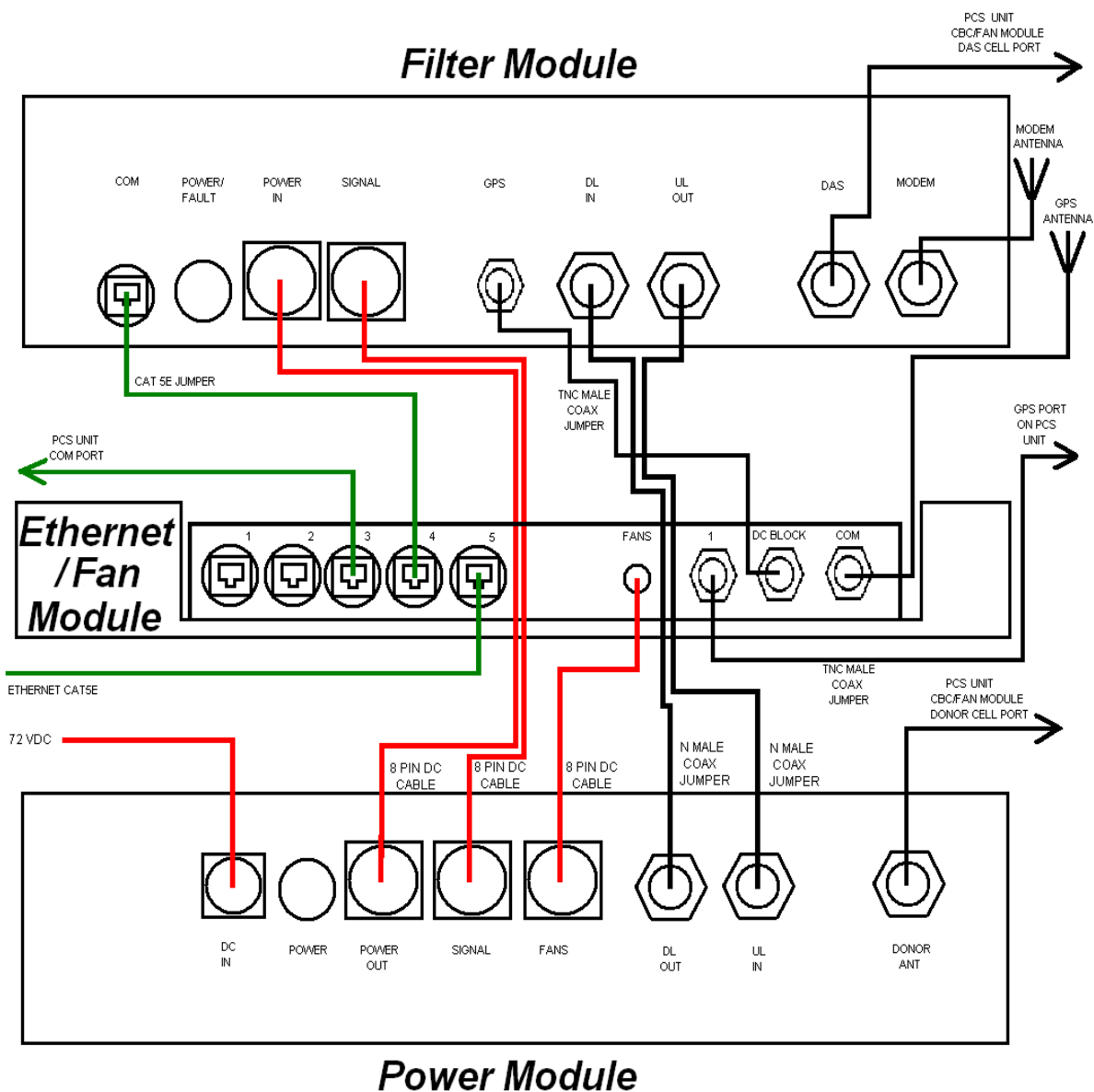
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Section 1

Hardware Configuration

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

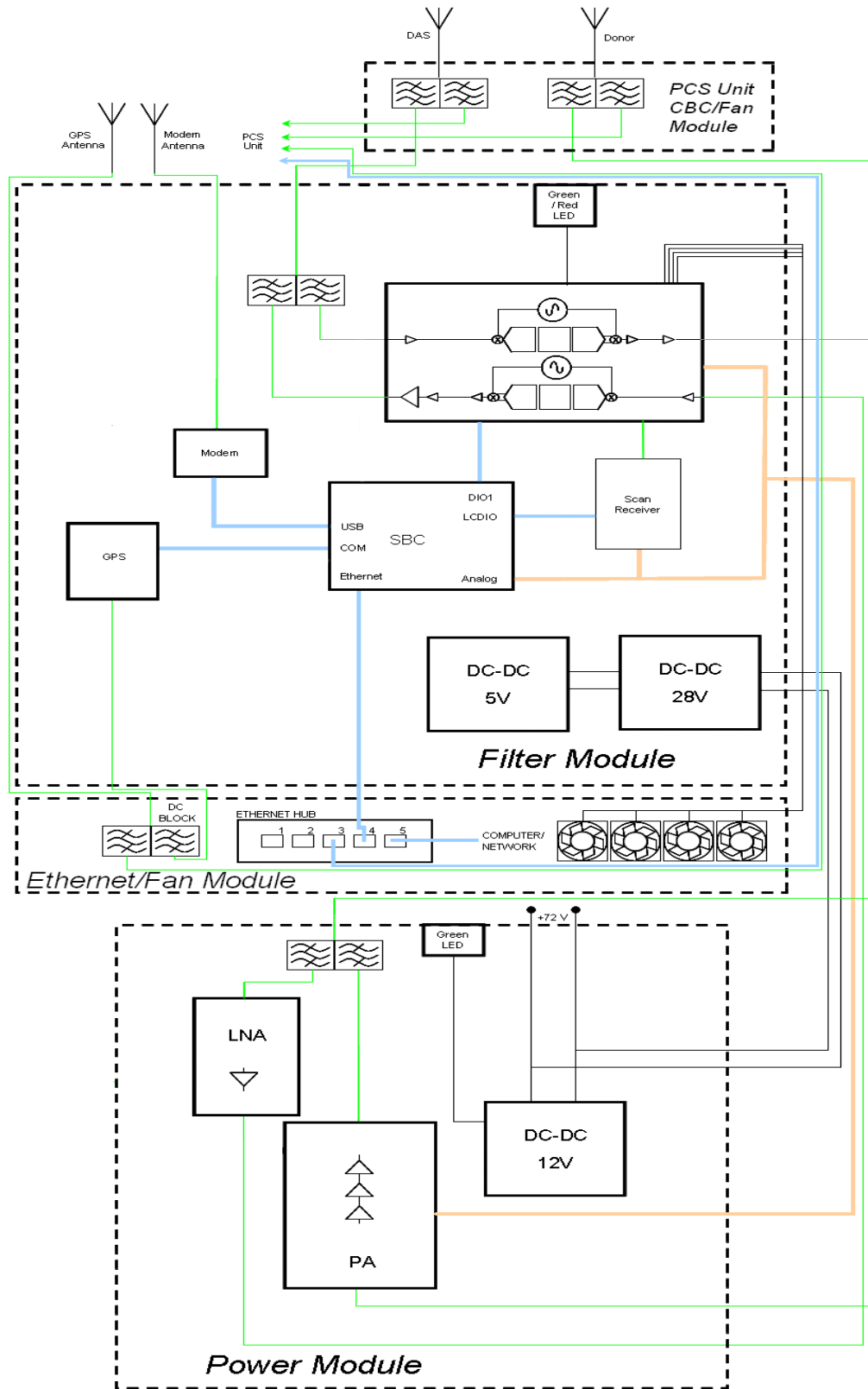
The **Filter Module** provides frequency selection and filtering. It also houses the system computer. The **Power Module** provides amplification and power distribution. The **Ethernet/Fan Module** provides, via CAT 5E cables, a computer interface access point for the existing PCS repeater system and this Cellular repeater.



System Level Block Diagram

Section 1

Hardware Configuration

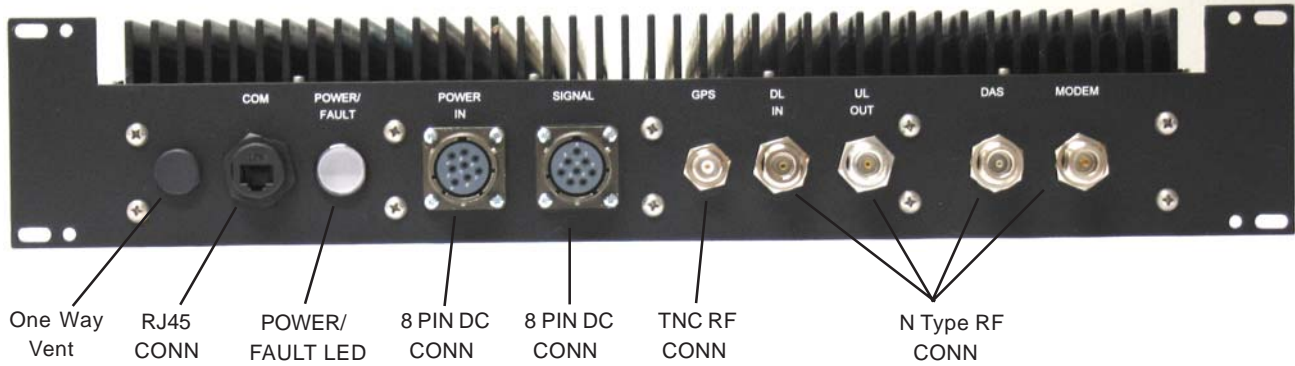


Block Diagram of the Major Components

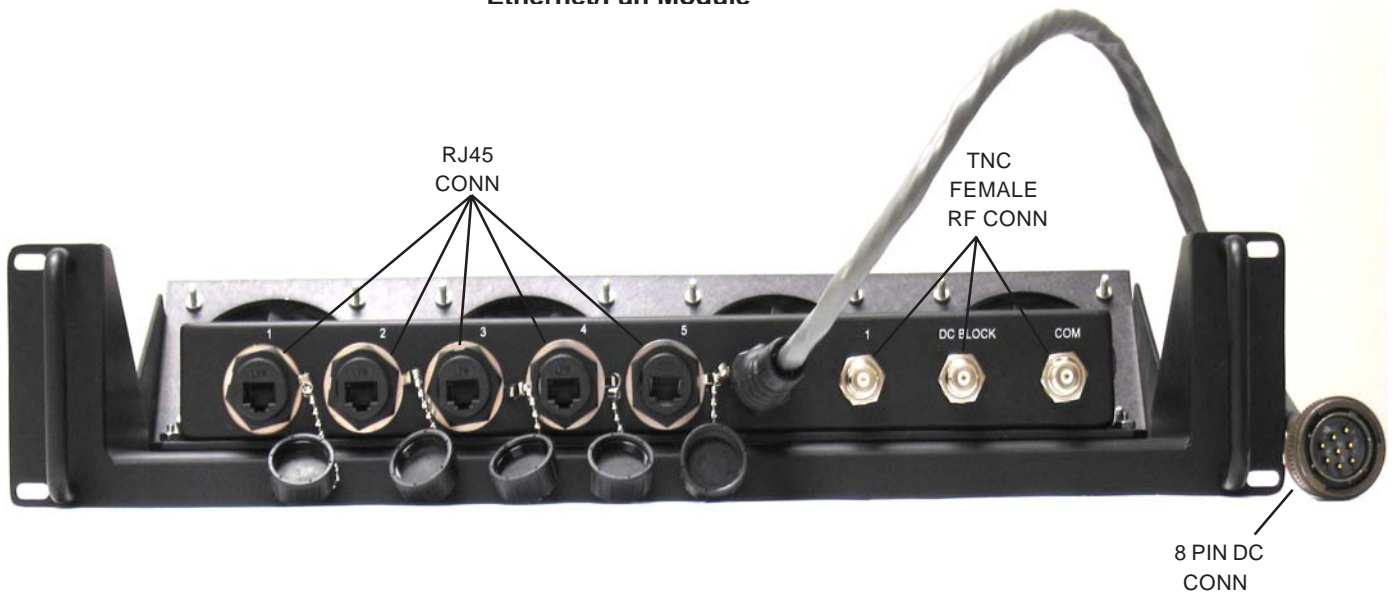
Section 1

Hardware Configuration

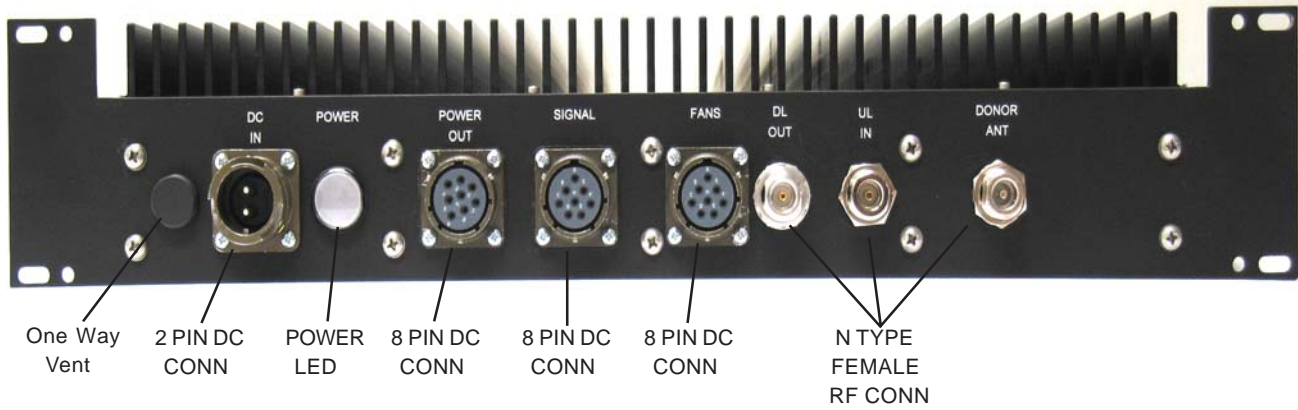
Filter Module



Ethernet/Fan Module



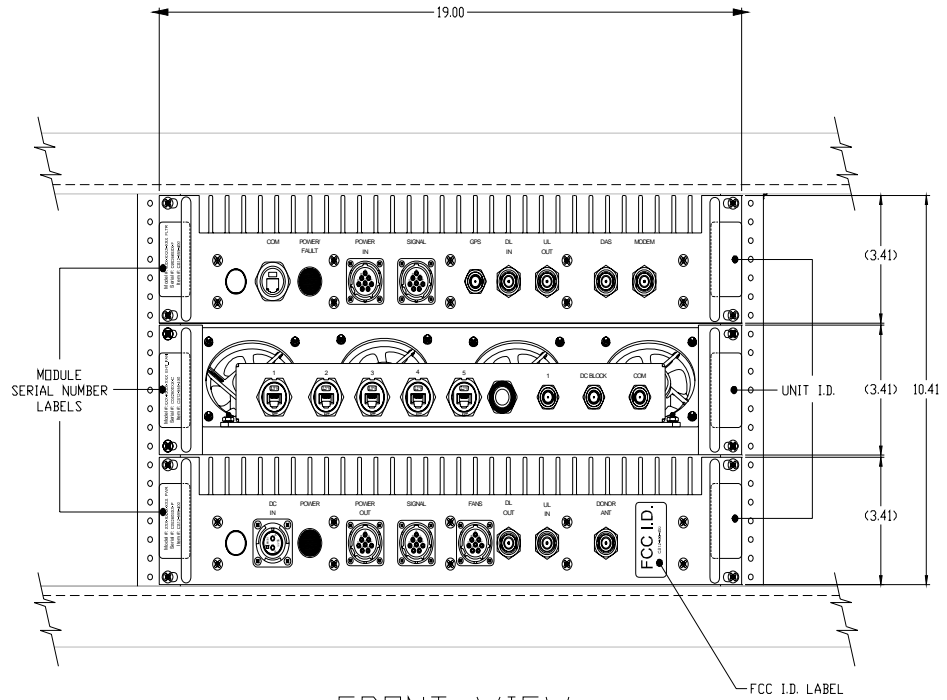
Power Module



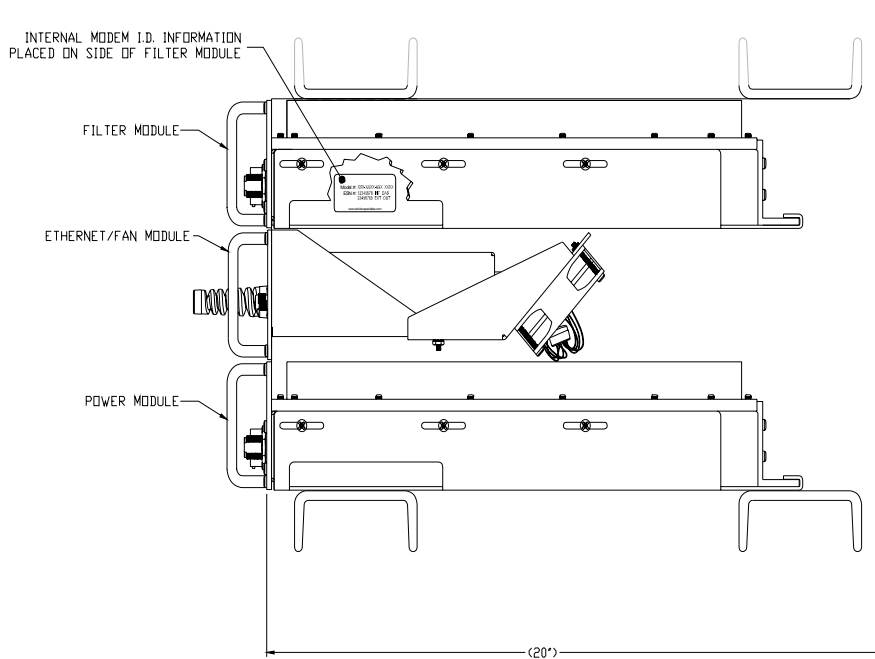
Module Face Plate Configuration

Section 1

Hardware Configuration



FRONT VIEW



RIGHT SIDE VIEW

Module Label Locations

Section 2

Installation

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 **Ethernet/Fan Module** and associated components.

2. After unpacking, the major components should include one **Filter Module**, one **Power Module**, one **Ethernet/Fan Module** and two **Repeater Mounting Brackets**.

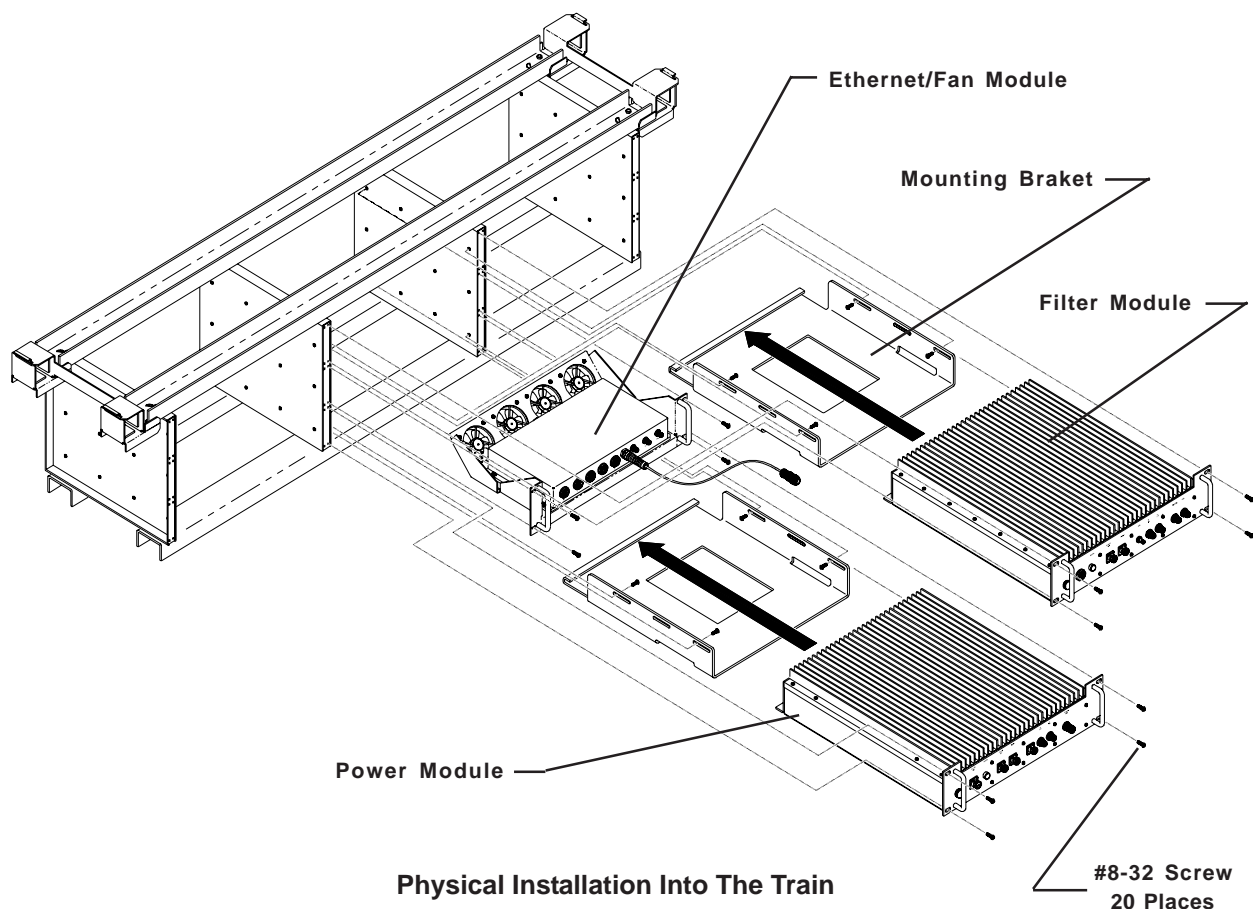
The minor components are 20 #8-32 Phillips Head Machine Screws and cabling for interconnection of the modules, which will be detailed on the next page. If any parts are discovered to be missing contact Cellular Specialties, Inc. at 1-877-844-4274 to arrange for replacements to be sent.

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 **Ethernet/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.



Section 2

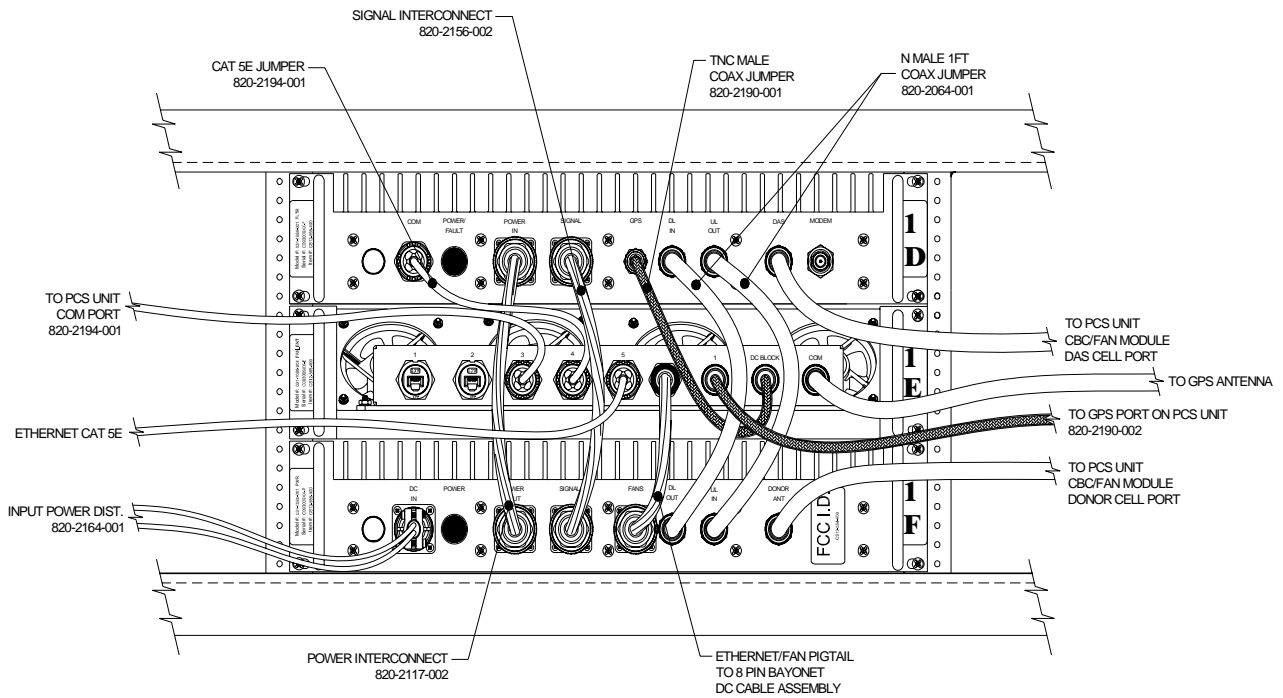
Installation

1. With each of the three modules in place, DC and RF cables can be installed. Locate the DC cable with a 8 pin bayonet type connector at each end (**820-2117-002**) 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 (**820-2156-002**) 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 from the Ethernet/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 (**820-2064-001**). 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 connection is installed from the **DAS** port on the Filter Module to the **Cell** port on the left side cross band coupler in the PCS units CBC/Fan Module. The final coax jumper is connected from the port labelled **DONOR ANT** on the Power Module to the **Cell** port on the right side cross band coupler in the PCS Units CBC/Fan Module.
6. Connect one end of the TNC coax jumper (**820-2190-001**) to the port on the Filter Module labelled **GPS** and the other end to the port labled DC BLOCK on the Ethernet/Fan Module.
7. Connect the Modem antenna to the port on the Filter Module labelled **MODEM**.
8. Connect the lead from the **GPS** antenna to port labled COM on the Ethernet/Fan module.
9. Connect the jumper (**820-2190-002**) port labled 1 to the **GPS** port on the PCS unit.
10. Connect the lead from the train's PCS system's cross band coupler in the CBC/Fan Module to the port on the Filter Module labled DAS.
11. Connect the CAT 5E cables (**820-2194-001**) as shown in the interconnect diagram on the next page.
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	RF Alarms:	System Alarms:
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

Test Point Locations and Values

The CSI repeater, CS12-555-400, by design, has no external test points. The Power and Filter modules are sealed with no user serviceable parts inside. The Ethernet/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. The first is located on the Filter Module face plate, between the COM and POWER IN ports, and is labeled POWER/FAULT. This LED 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).

Hardware Operations

Section 3

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
Downlink PA	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
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
Software Alarm Types	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
Communications	Watchdog Timer	Critical	Yes	Yes	No
	Heartbeat	Informational	No	Yes	No
	Modem Not Responding	Severe	Yes	No	No
	Modem Not Connected	Routine	No	No	No

Section 3

Hardware Operations

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

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

(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

- 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.

Section 3

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 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.

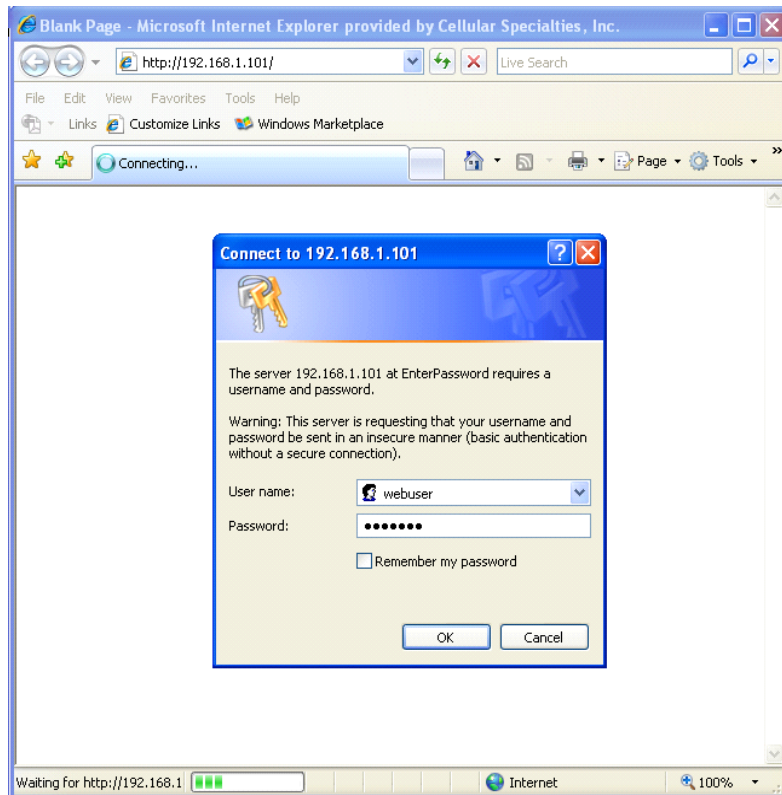
Section 4

Software Operations

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 by default with a DHCP static IP address 192.168.1.101. *

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 with a static address by default. This means it will not request or issue DHCP address and is unlike the PCS version which is configured as a DHCP Server. 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 PCS 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.

General Operation Overview

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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.". The address bar shows "http://192.168.1.101/". The page content is as follows:

System Status

Local Network

RF Configuration

Program a Filter

Remote Network

SNMP Configuration

System Health

Install & Upload

Reboot

Alarm Configuration

Log Configuration

System Status

Timestamp 2009-09-22 - 18:17:42

System Uptime 1 days 5 hours 27 minutes

Software Version 2.4.0 MJA-PAUL2

Serial Number CSI-ACELA-CELL-001

Model Number CSI-DR-ACELA-PROD8

Item Number CSI12-555-400

Location Unknown

Modem Status Information

Modem#1

Signal Strength -82 (OK)

Registration Status Modem has registered

Phone Number 9084425313

Current Band Cellular

System ID 28

Network ID 5

Temperature 32

Band Type CELL

Active Filter ccAdA0B0ApBp-0

Power	Down Link	Up Link
In-band Input ² (dBm)	≤ -90.0	-85.0
Measured Output ² (dBm)	≤ -5.0	0.0
Composite Input ² (dBm)	-61.8	≤ -63.0

Gain Control

AGC Mode On

AGC Control ---

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 2

Filter Name ccAdA0B0ApBp-0

Location Manchester

BTA 500

Satellite Count 5

NoBox Count 0

Searching Count 0

Scan Receiver	MHz	avg dBm
Run State	Enabled	
DeKey Limit	-65.0	
Filter ID	2	
Channels	8	
Channel-1	881.52	-105.9
Channel-2	882.75	-106.2
Channel-3	883.98	-107.6
Channel-4	885.21	-106.7
Channel-5	886.44	-107.4
Channel-6	887.67	-107.2
Channel-7	888.9	-107.9
Channel-8	893.31	-107.3

RF Alarms

Over Range	OK	OK
Oscillation	OK	OK
Out of Band Overdrive	OK	OK
Low Signal	OK	
No Signal	OK	

System Alarms

Synthesizer Lock	OK	OK
Voltage	OK	
Temperature	OK	
Software	OK	
Hardware	OK	

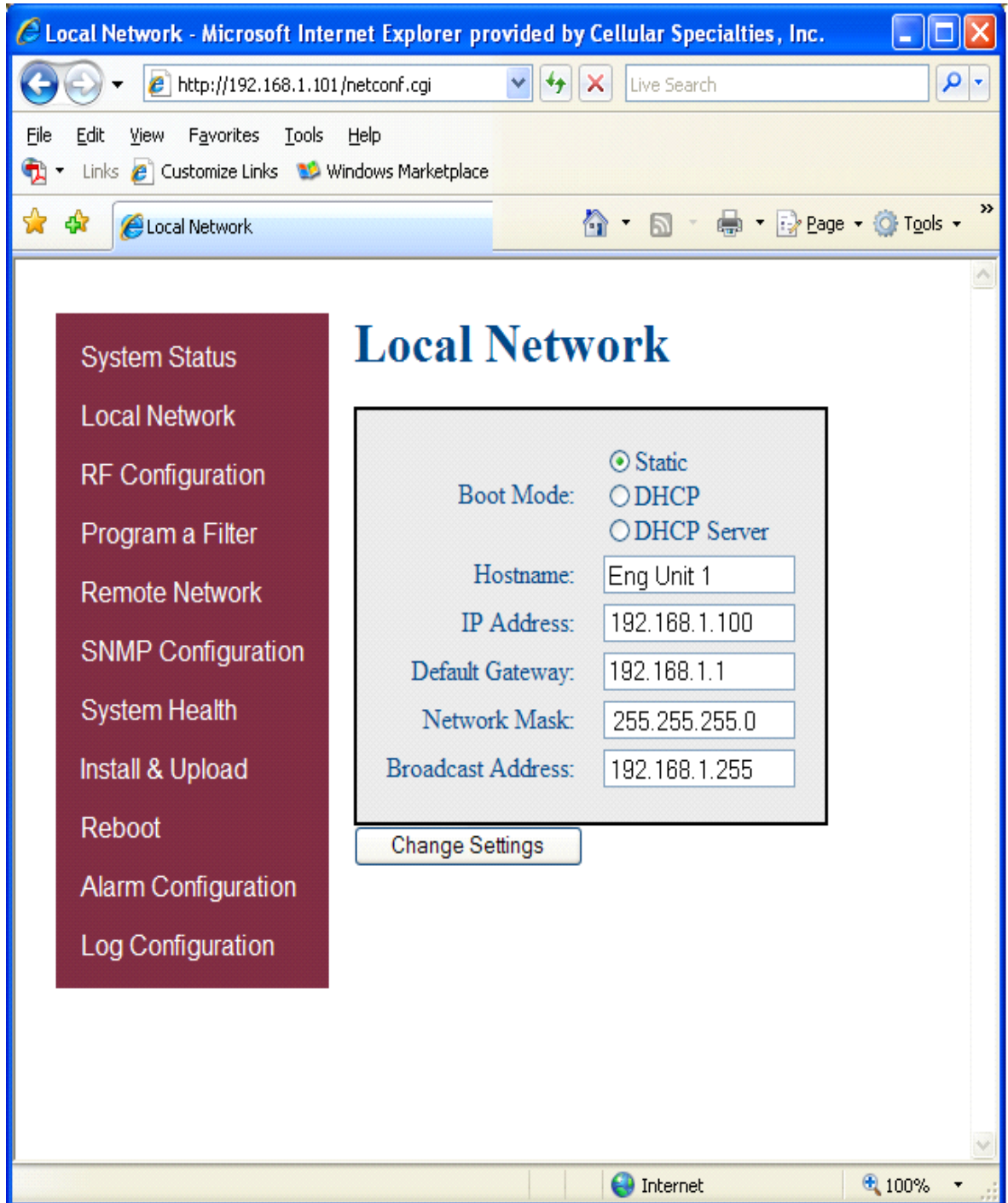
General Operation Overview

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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.

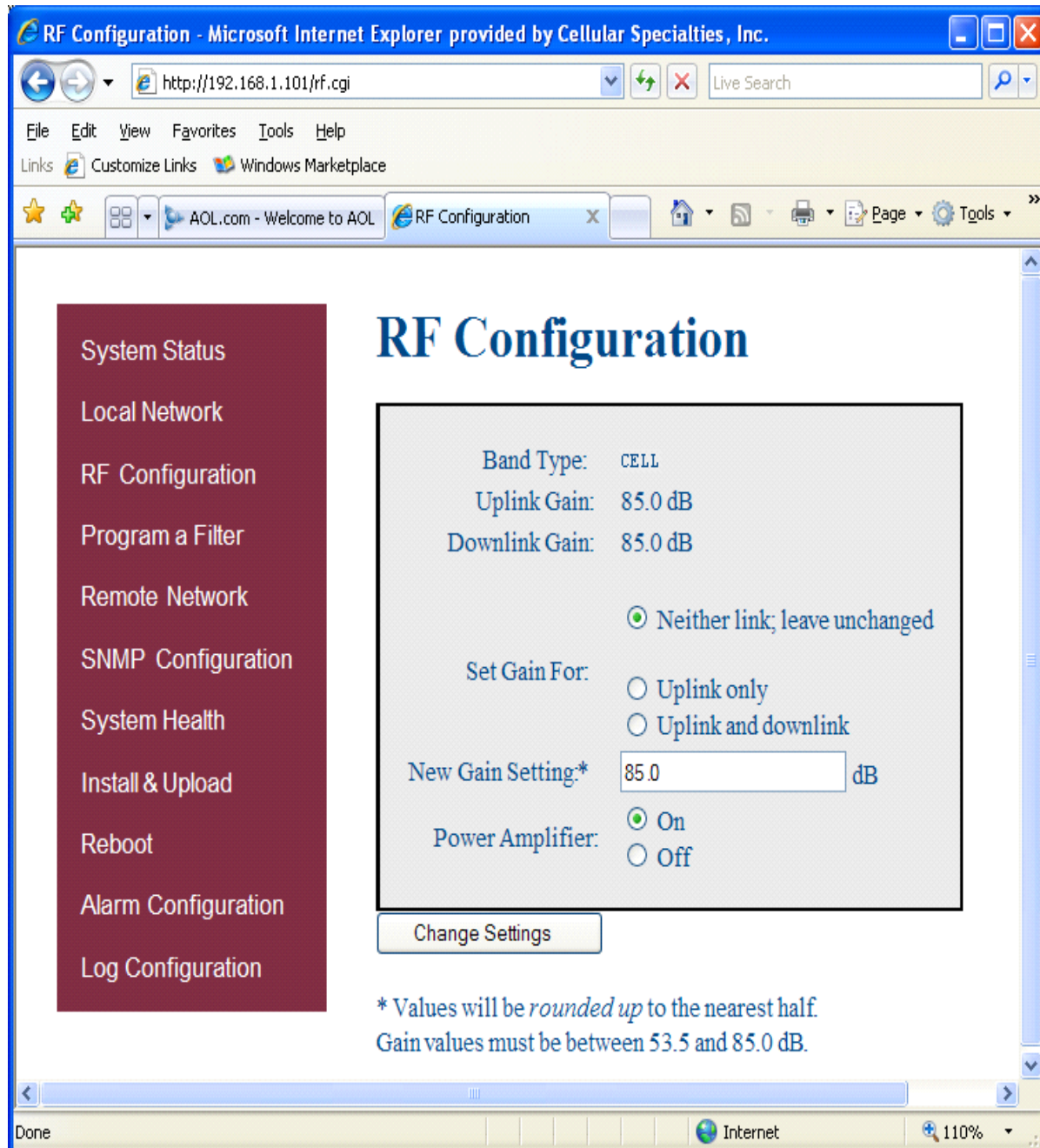


Section 4

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.

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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.

The screenshot shows a web browser window titled "Program a Filter - Microsoft Internet Explorer provided by Cellular Specialties, Inc." with the address bar showing "http://192.168.1.101/programfilter.cgi". The browser interface includes a menu bar (File, Edit, View, Favorites, Tools, Help) and a toolbar with icons for home, back, forward, print, and search. The main content area features a dark red sidebar with navigation links: System Status, Local Network, RF Configuration, Program a Filter (highlighted), Remote Network, SNMP Configuration, System Health, Install & Upload, Reboot, Alarm Configuration, and Log Configuration. The main content area has a heading "Program a Filter" and a paragraph: "Filter programming requires approximately one minute. This interface is used for programming built-in filters, but you can also [copy filters from USB](#)." Below this is a form with the following fields: "Band Type: CELL", "Status: Ready for programming", "Name: ccAdA0B0ApBp-0" (dropdown), "Modulation: Selected Filter:" with buttons for "CDMA" and "GSM", and a checkbox "Ignore the above and program this custom filter:" with a dropdown menu showing "(No custom filters are available.)". A "Program" button is located at the bottom of the form. The browser's status bar at the bottom shows "Done", "Internet", and "100%".

General Operation Overview

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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.

The screenshot shows a web browser window titled "Remote Network - Microsoft Internet Explorer provided by Cell...". The address bar shows "http://192.16...". The browser interface includes a menu bar (File, Edit, View, Favorites, Tools, Help), a Favorites bar, and a toolbar with icons for Home, RSS, Mail, Print, Page, and Safety. The main content area features a dark red sidebar with the following menu items: System Status, Local Network, RF Configuration, Program a Filter, Remote Network (highlighted), SNMP Configuration, System Health, Install & Upload, Reboot, Alarm Configuration, and Log Configuration. The main content area displays the "Remote Network" title and the following information: PPP0 Address: 166.143.7.195, PPP1 Address: 0.0.0.0. Below this is a configuration box with "Status" set to "Enabled" (radio button selected) and "Carrier" set to "Verizon" (dropdown menu). A "Change Settings" button is located below the configuration box. The browser's status bar at the bottom shows "Done", "Internet", and "100%".

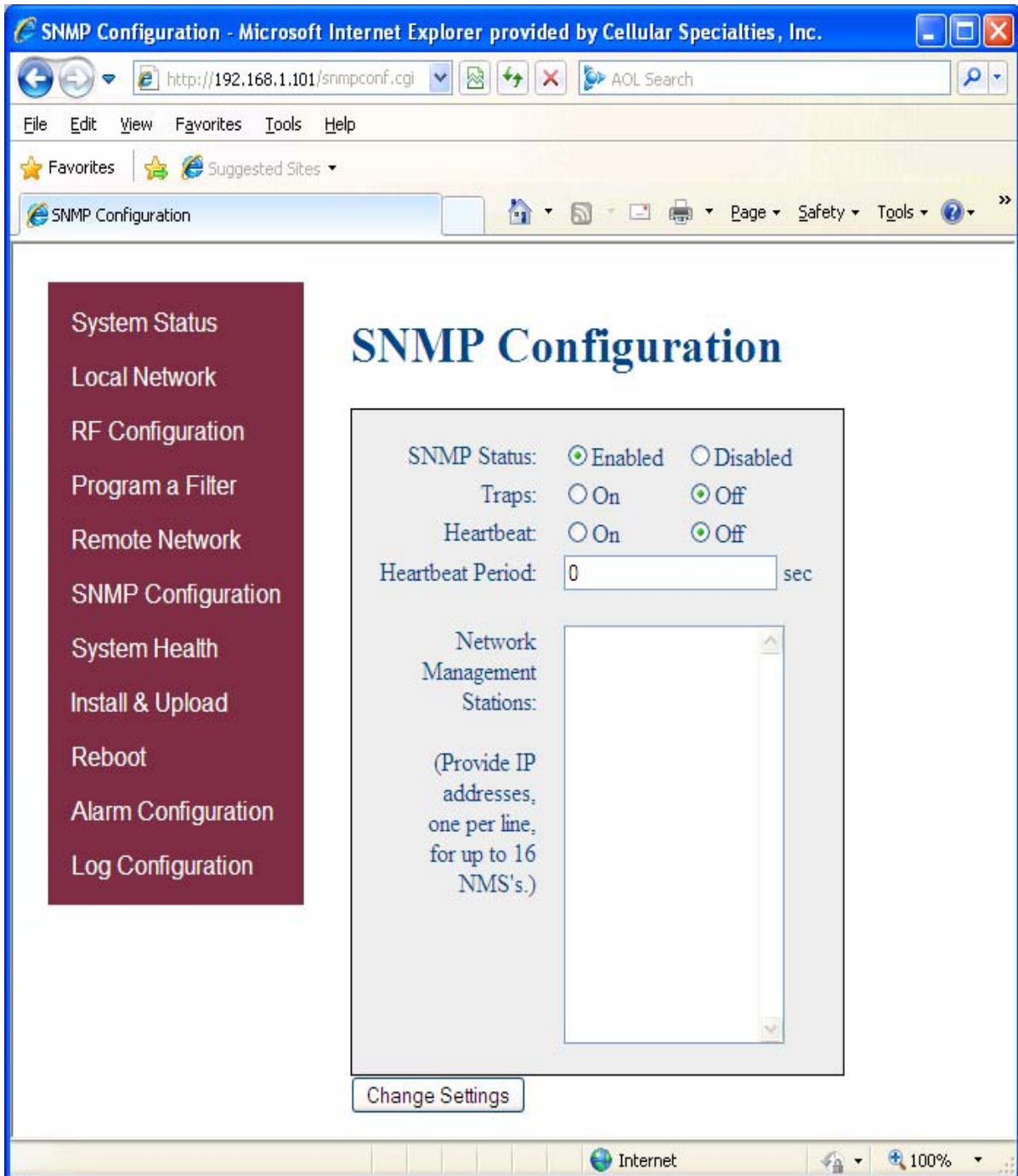
General Operation Overview

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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.



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System Health:

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

The screenshot shows a web browser window titled "System Health - Microsoft Internet Explorer provided by Cellular Specialties, Inc." with the address bar showing "http://192.168.1.101/status.cgi". The page content includes a navigation menu on the left with items like System Status, Local Network, RF Configuration, Program a Filter, Remote Network, SNMP Configuration, System Health, Install & Upload, Reboot, Alarm Configuration, and Log Configuration. The main content area is titled "System Health" and displays the following information:

Band Type	CELL
Temperature (Celsius)	51.2
Current (Amps)	2.7
Power Amplifier Status	On
Current (Amps)	2.3

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

Below the alarms table is an "Event Log" section with a "Clear Log" button and a "Trigger Test Alarm" button. The event log entry is: "ID: [csi-cell-ace1a:Unknown] [2009:09:23 - 14:54:24] [002 ---- OSCILLATION]".

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

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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 Microsoft Internet Explorer browser window titled "Install & Upload - Microsoft Internet Explorer provided by Cellular Specialties, Inc.". The address bar shows the URL "http://192.168.1.101/install.cgi". The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The "Favorites" and "Suggested Sites" bars are visible. The main content area is titled "Install & Upload" and features a dark red navigation sidebar on the left with the following menu items: "System Status", "Local Network", "RF Configuration", "Program a Filter", "Remote Network", "SNMP Configuration", "System Health", "Install & Upload" (highlighted), "Reboot", "Alarm Configuration", and "Log Configuration".

The main content area is divided into several sections:

- Upload Files:** Contains a text input field with a "Browse..." button and an "Upload" button. Below it, a message states: "Choose an update file, then click Upload. Files larger than 10 megabytes will be rejected (the connection will be reset). Duplicate files will be overwritten. Some updates are split into multiple files; all must be uploaded before installation can begin."
- Incomplete Updates:** Contains a message: "(No incomplete updates present; see below for complete updates.)" and a "Delete" button.
- Updates Ready for Installation:** Contains a message: "From the list of previously uploaded updates, choose one to install or delete:" and another message: "(No packages available; upload one, then it will be available for installation)". Below these are "Install" and "Delete" buttons.
- Install Via USB:** Contains a message: "Before clicking 'Install', insert a USB device containing software install files. Installation sometimes causes a system restart." Below this is a form with the question "Are you sure you want to install from USB?" and two radio buttons: "No" (selected) and "Yes". An "Install" button is located below the form.

The browser's status bar at the bottom shows "Internet" and a zoom level of "80%".

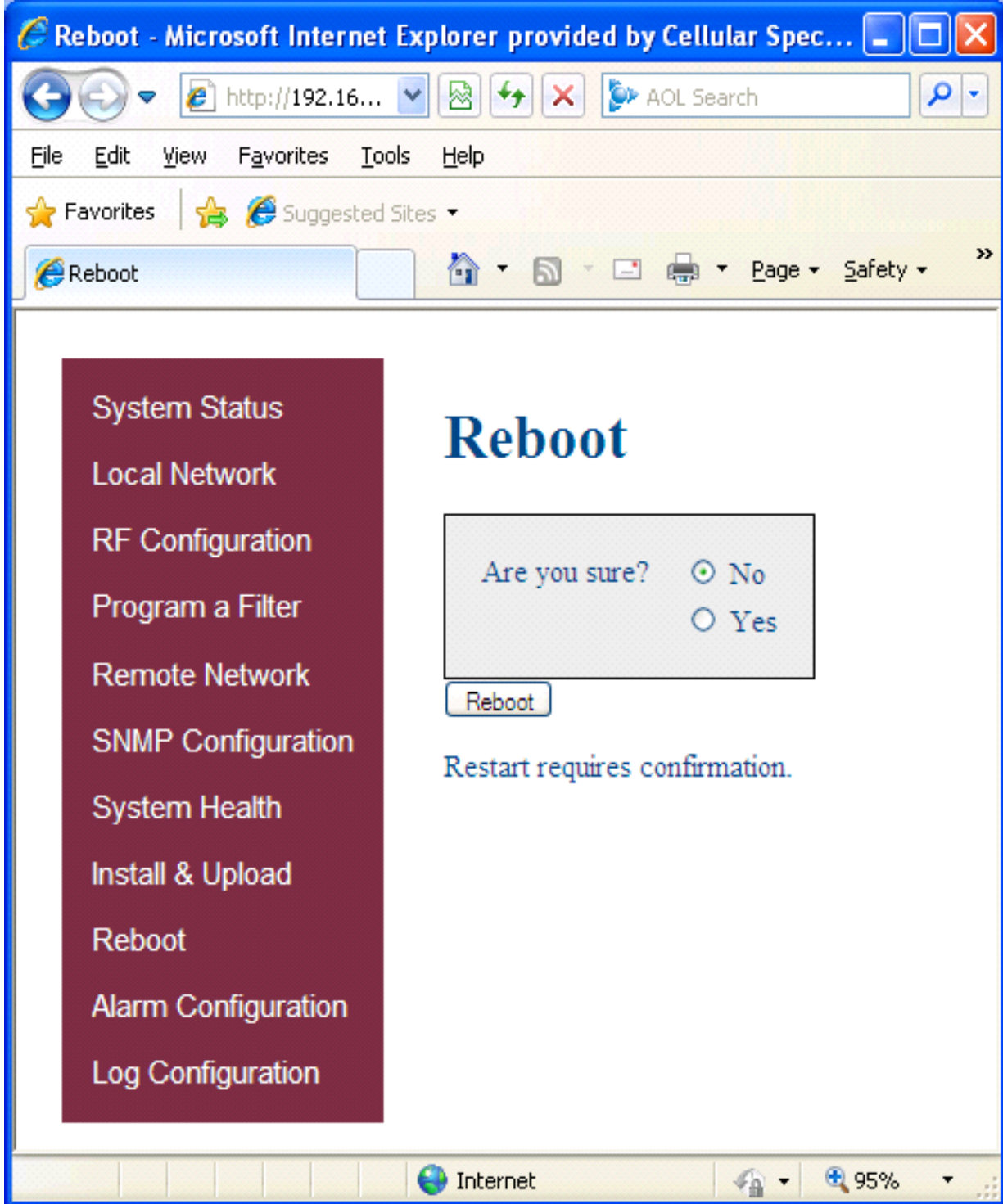
General Operation Overview

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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.



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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.

The screenshot shows a web browser window titled "Alarm Configuration - Microsoft Internet Explorer provided by Cellular Specialties, Inc." with the URL "http://192.168.1.101/alarmlconf.cgi". The page features a navigation menu on the left with items like "System Status", "Local Network", "RF Configuration", "Program a Filter", "Remote Network", "SNMP Configuration", "System Health", "Install & Upload", "Reboot", "Alarm Configuration", and "Log Configuration". The main content area is titled "Alarm Configuration" and includes an "Add Email Address" section with five input fields. Below this is a "Save" button and a note: "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." The configuration is presented in a table with three columns: "RF Alarms", "Down Link", and "Up Link".

RF Alarms	Down Link	Up Link
Over Range	<input checked="" type="checkbox"/> Over Range	
Oscillation	<input checked="" type="checkbox"/> Warning	<input checked="" type="checkbox"/> Warning
	<input checked="" type="checkbox"/> Shutdown	<input checked="" type="checkbox"/> Shutdown
Out of Band Overdrive	<input type="checkbox"/> OOB	<input type="checkbox"/> OOB
Low Signal	<input type="checkbox"/> Low Signal	
No Signal	<input type="checkbox"/> 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 type="checkbox"/> Fan Failure
	<input checked="" type="checkbox"/> LCD Failure
	<input checked="" type="checkbox"/> DAC Read Error

Below the table is an "Apply Settings" button and an "Alarm Origin Tag Settings" section with a "Location" dropdown menu set to "Unknown". A "Save" button is at the bottom.

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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 shows a Microsoft Internet Explorer browser window titled "Log Configuration - Microsoft Internet Explorer provided by Cellular Specialties, Inc.". The address bar shows the URL "http://192.168.1.101/logconf.cgi". The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. Below the menu bar is a Favorites bar with "Log Configuration" selected. The main content area features a dark red navigation sidebar 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 main content area is titled "Log Configuration" and contains a configuration form with the following fields:

Log Rotate Frequency	<input type="text" value="5"/>	minutes
Log Rotate File Size	<input type="text" value="100"/>	Kilobytes
Log Rotate File Count	<input type="text" value="10"/>	

Below the form is a "Configure Logs" button. The browser's status bar at the bottom shows "Done", "Internet", and "100%".

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Text Menu Interface:

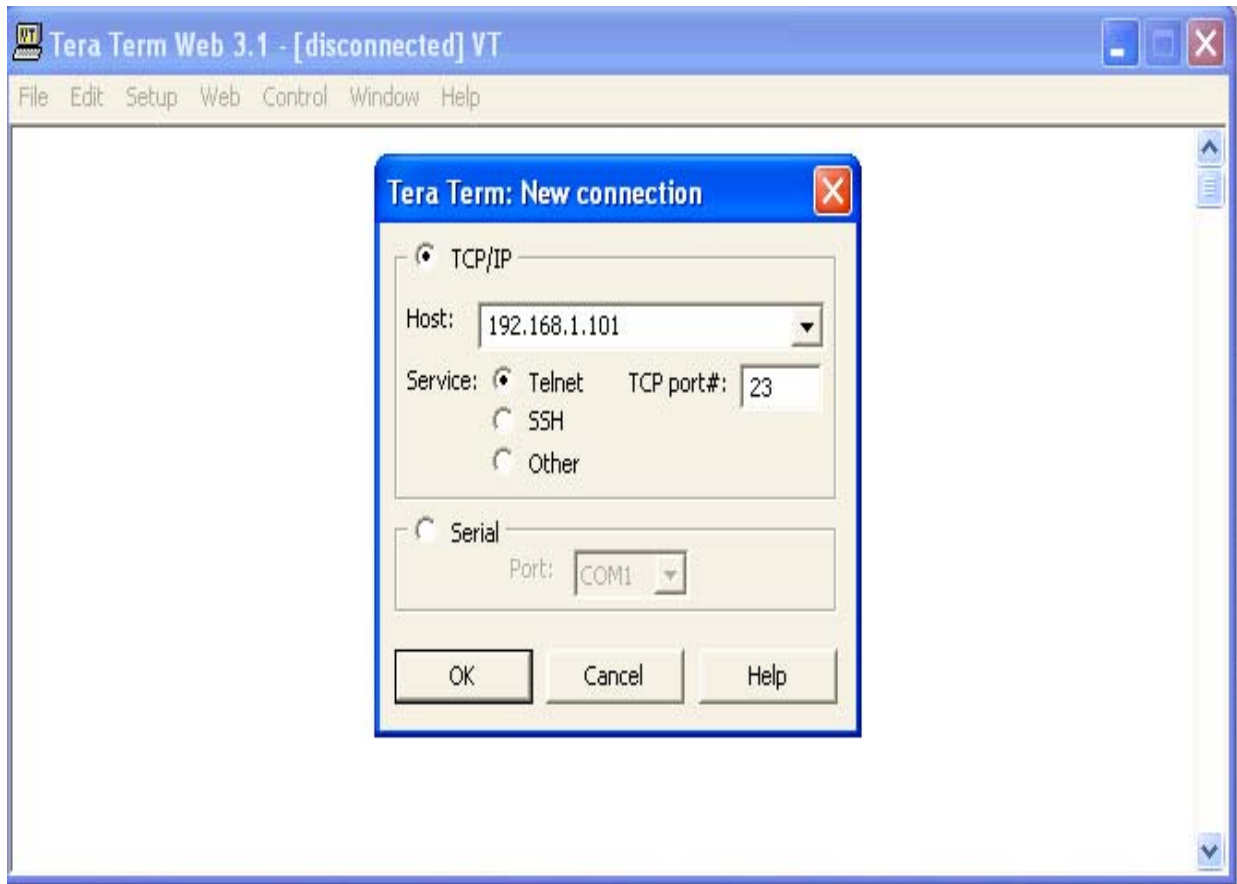
A Text Menu Interface (TMI) is provided as an alternate means of access and control of the repeater. To use the TMI, also known as the console interface, connect a CAT -5E cable to the RJ45 connector port labeled **COM** and a computer making use of a standard terminal emulation program.

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.



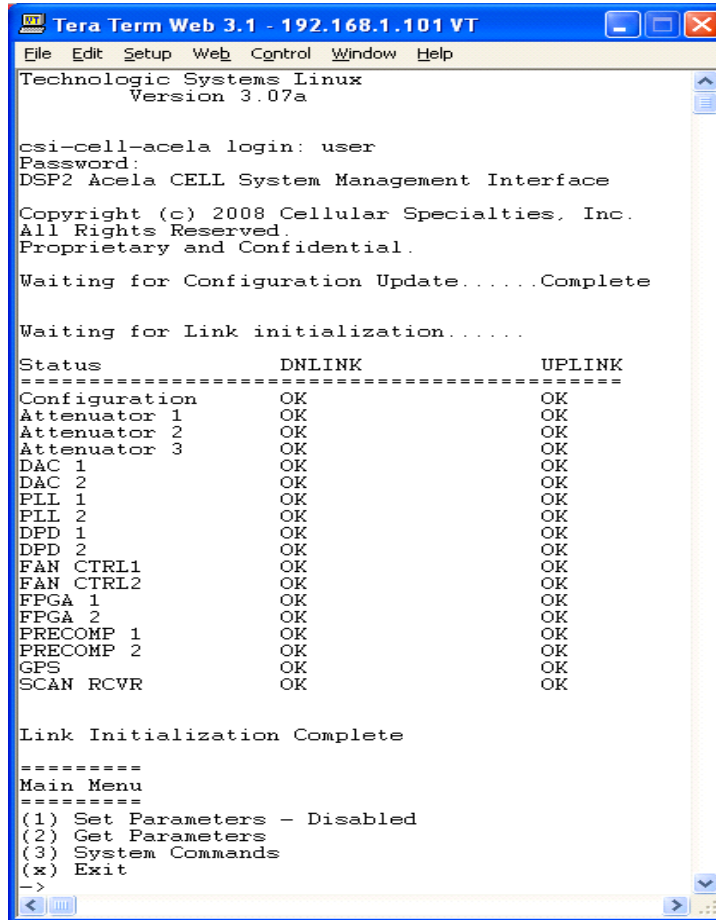
In the box labeled Host type the repeaters IP address and click OK. The user will then be prompted for a user name and password. The default user name is "user" and the password "csi1234". After entering the password and pressing return the TMI main menu will appear.

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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.



```
Tera Term Web 3.1 - 192.168.1.101 VT
File Edit Setup Web Control Window Help
Technologic Systems Linux
Version 3.07a

csi-cell-acela login: user
Password:
DSP2 Acela CELL System Management Interface

Copyright (c) 2008 Cellular Specialties, Inc.
All Rights Reserved.
Proprietary and Confidential.

Waiting for Configuration Update.....Complete

Waiting for Link initialization.....

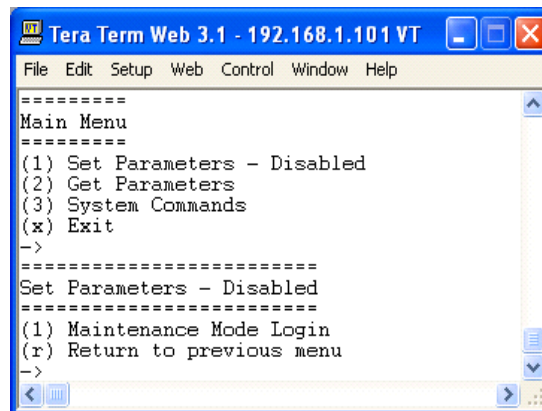
Status          DNLINK          UPLINK
=====
Configuration   OK              OK
Attenuator 1    OK              OK
Attenuator 2    OK              OK
Attenuator 3    OK              OK
DAC 1           OK              OK
DAC 2           OK              OK
PLL 1           OK              OK
PLL 2           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 - Disabled
(2) Get Parameters
(3) System Commands
(x) Exit
->
```

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.



```
Tera Term Web 3.1 - 192.168.1.101 VT
File Edit Setup Web Control Window Help

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

=====
Set Parameters - Disabled
=====
(1) Maintenance Mode Login
(r) Return to previous menu
->
```

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. Enter The default Username is: csi The default Password is: csi1234

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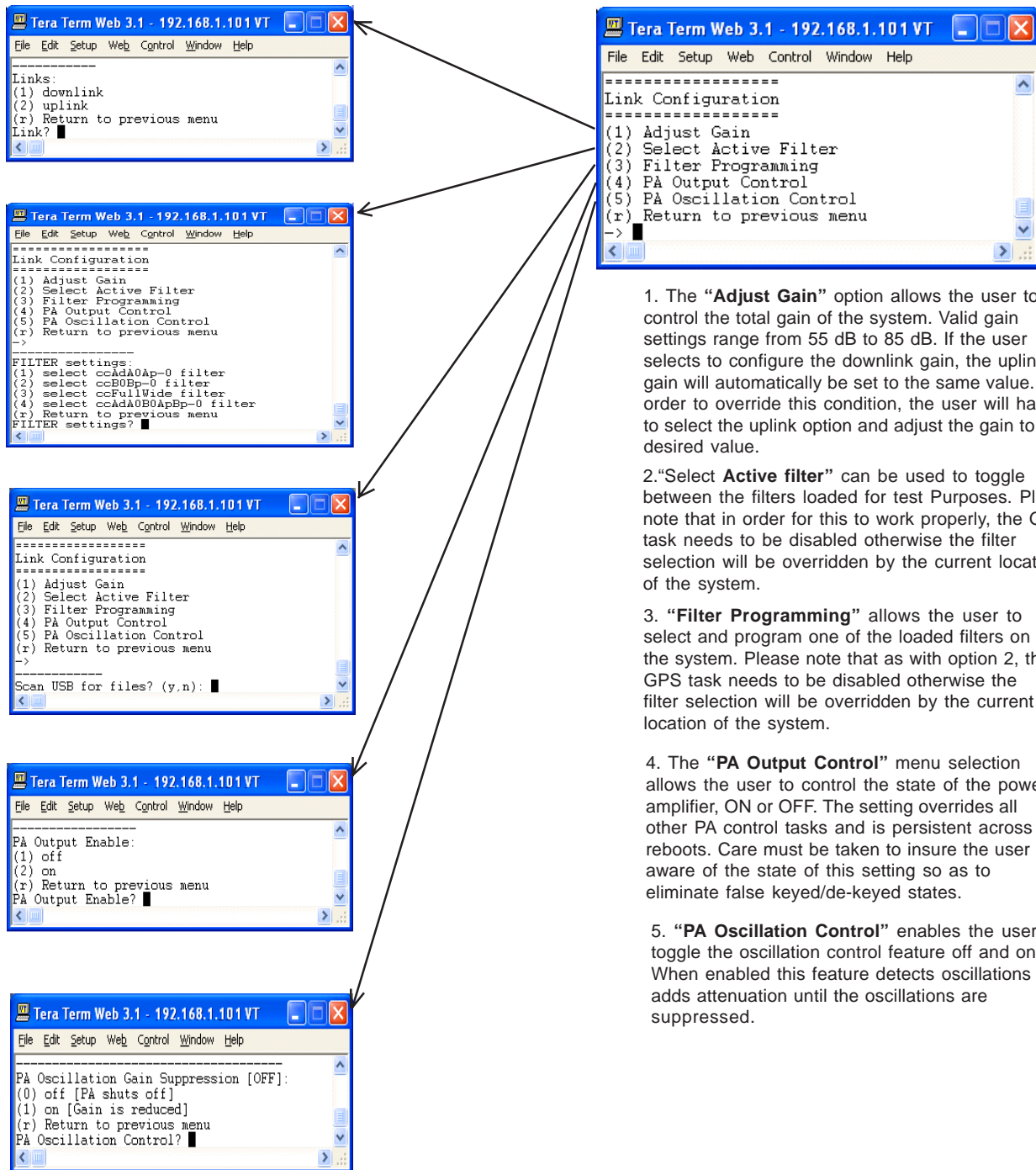
The image displays a sequence of seven screenshots from the Tera Term Web 3.1 interface, illustrating the navigation through the 'Set Parameters' menu. The first screenshot shows the 'Main Menu' with 'Set Parameters' selected. The second screenshot shows the 'Set Parameters' menu with options (1) through (6) and '(x) Return to previous menu'. Arrows point from this menu to the subsequent screenshots: (1) Link Configuration, (2) Alarm Configuration, (3) Networking Configuration, (4) Log File Configuration, (5) GPS Configuration, and (6) Scan Receiver Configuration. Each subsequent screenshot shows the specific options for that menu item.

1. The “**Link Configuration**” menu is a collection of menu options that control the RF operating characteristics of the system.
2. The “**Alarm Configuration**” menu provides options that control the alarm operating characteristics of the repeater.
3. The “**Networking Configuration**” menu contains four 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). The “Network Protocol Configuration” allows access protocols to be toggled on or off. The “SNMP Configuration” option is not used or supported in this version of product.
4. “**Log File Configuration**” menu. 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. This menu allows the user to define aspect of the log file such as rotation period, size and number of logs retained.
5. The “**GPS Configuration**” 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.
6. “**Scan Receiver Configuration**” menu. 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.

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1. 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.

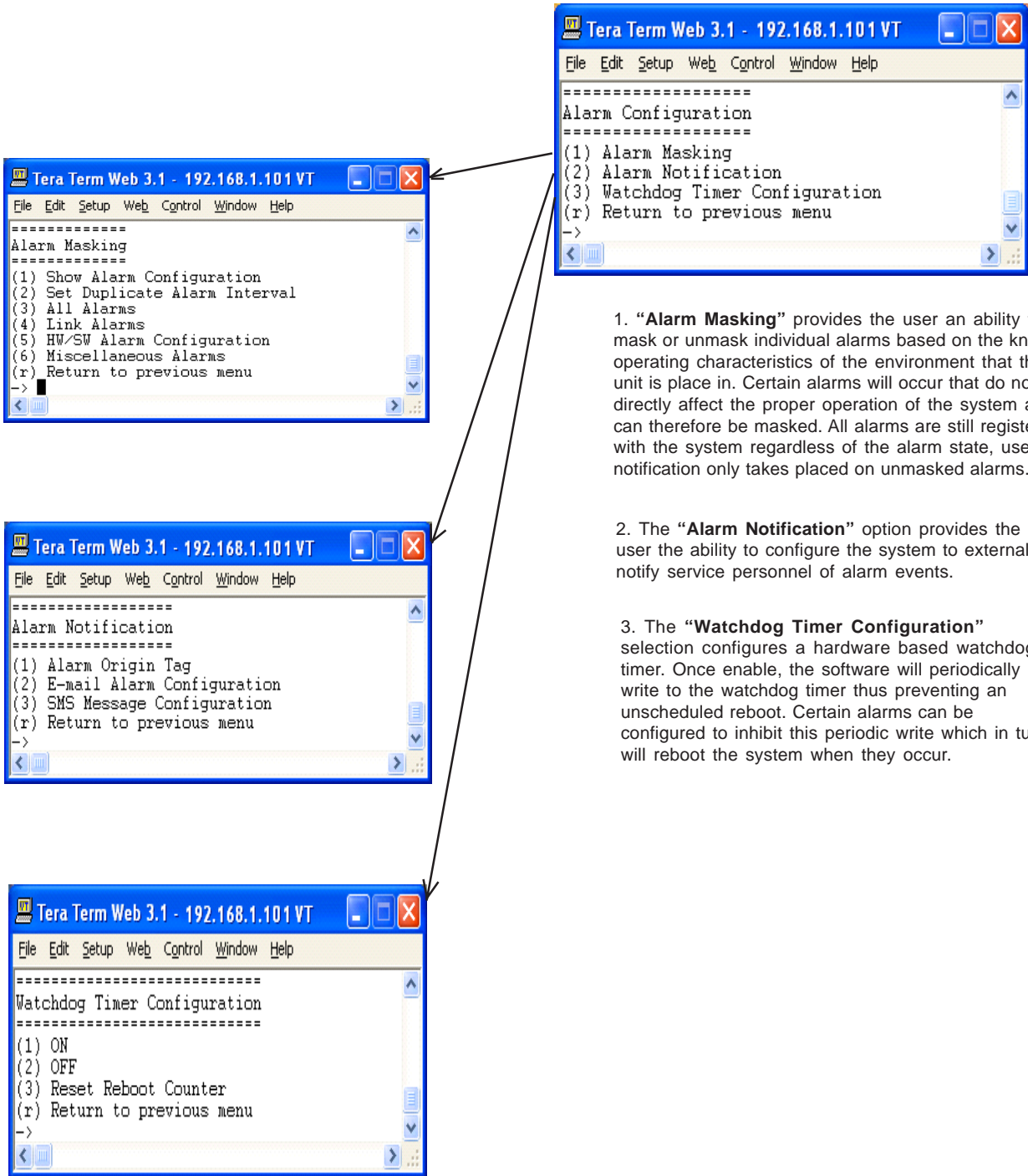
2. “**Select Active filter**” can be used to toggle between the filters loaded for test Purposes. Please note that in order for this to work properly, the GPS task needs to be disabled otherwise the filter selection will be overridden by the current location of the system.

3. “**Filter Programming**” allows the user to select and program one of the loaded filters on the system. Please note that as with option 2, the GPS task needs to be disabled otherwise the filter selection will be overridden by the current location of the system.

4. The “**PA Output Control**” menu selection 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.

5. “**PA Oscillation Control**” enables the user to toggle the oscillation control feature off and on. When enabled this feature detects oscillations and adds attenuation until the oscillations are suppressed.

General Operation Overview



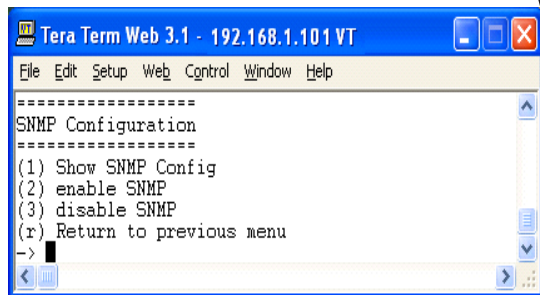
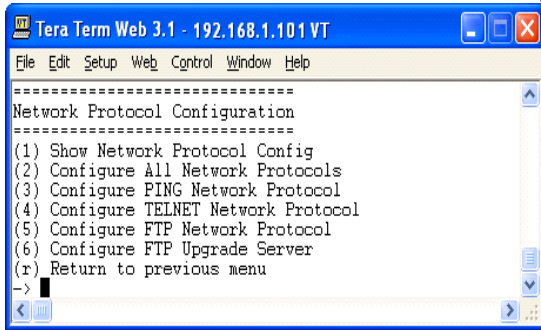
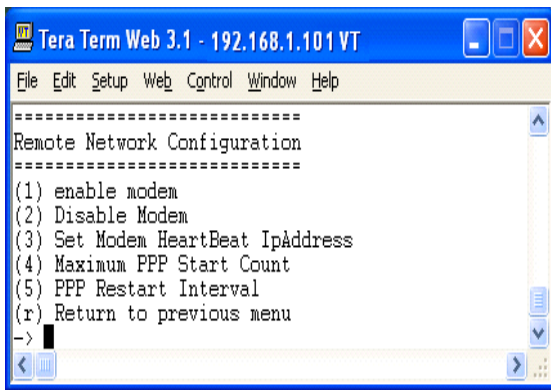
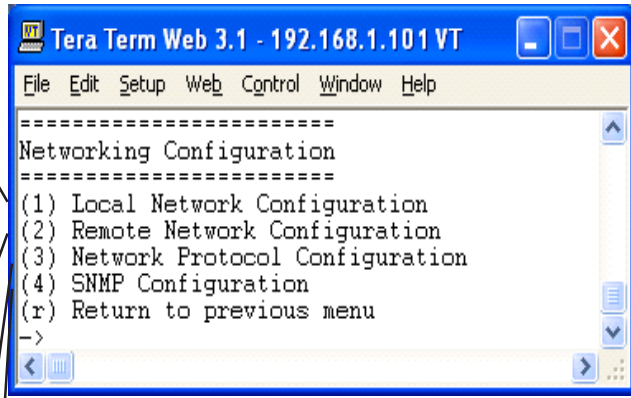
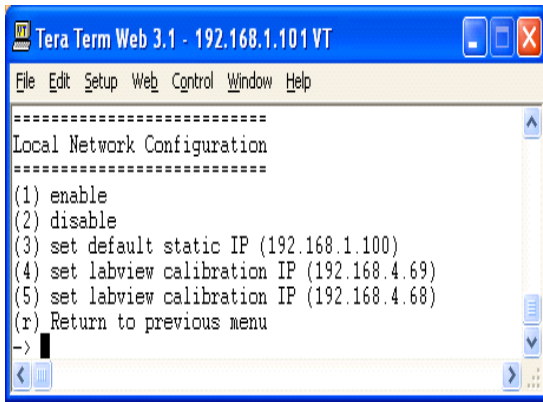
1. **“Alarm Masking”** provides the user an ability to mask or unmask individual alarms based on the known operating characteristics of the environment that the unit is place in. Certain alarms will occur that do not directly affect the proper operation of the system and can therefore be masked. All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

2. The **“Alarm Notification”** option provides the user the ability to configure the system to externally notify service personnel of alarm events.

3. The **“Watchdog Timer Configuration”** selection configures a hardware based watchdog timer. Once enable, the 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.

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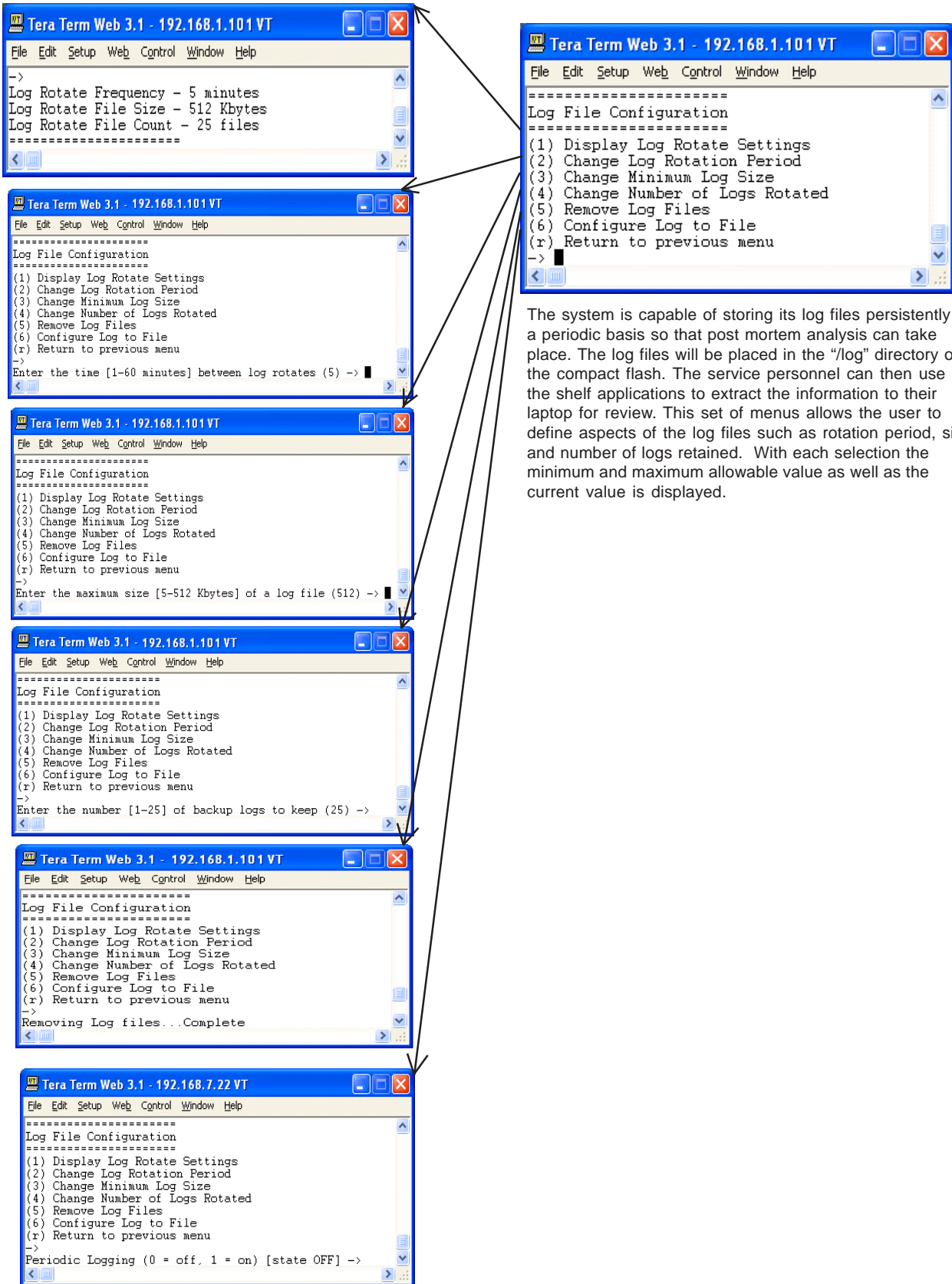


1. The “**Local Networking Configuration**” menu allows the user to configure the Ethernet port to operate in one of three modes once enabled. If the unit is configured to have a static IP address, then the user must know what the characteristics of the network are that the unit will be connected to. 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 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.

2. The menu for “**Remote Networking Configuration**” provides the user with a method 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.

3. The “**Network Protocol Configuration**” menu is used to toggle off and on each of the available protocols.

4. The “**SNMP Configuration**” menu is not supported for this revision of the product.



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. This set of menus allows the user to define aspects of the log files such as rotation period, size and number of logs retained. With each selection the minimum and maximum allowable value as well as the current value is displayed.

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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.

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.

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The screenshots illustrate the following navigation sequence:

- Screenshot 1:** Main menu with options: (1) Enable Scan Receiver, (2) Disable Scan Receiver, (r) Return to previous menu.
- Screenshot 2:** Scan Receiver Parameters screen showing: Run State (Enabled), Debug Msg Level (0), Samples/Channel (6), De-key Threshold (-65.000000), De-key Count (8), Short/Fast Count (4), Long/Slow Count (12), Key Delta (10.000000), Filter Set (2).
- Screenshot 3:** Scan Receiver Configuration menu with options: (1) Scan Receiver Operation, (2) Read Scan Receiver Parameters, (3) Channel Sample Count, (4) Key/De-key Threshold, (5) PA Recovery Time, (6) De-key Sample Count, (7) Short/Fast Key Sample Count, (8) Long/Slow Key Sample Count, (9) Fast/Slow Key Delta Value, (r) Return to previous menu.
- Screenshot 4:** Key/De-key Threshold screen showing: Scan Receiver Input Power Limit: Setting -65.00 dBm (-75.0 to -10.0), Scan Receiver Input Power Limit? []
- Screenshot 5:** PA Recovery Time screen showing: User System Recovery Timeout: Setting 30 seconds (1-300), User System Recovery Timeout? []
- Screenshot 6:** De-key Sample Count screen showing: De-key sample count [8]->
- Screenshot 7:** Short/Fast Key Sample Count screen showing: Fast key sample count [4]->
- Screenshot 8:** Long/Slow Key Sample Count screen showing: Slow key sample count [12]->
- Screenshot 9:** Fast/Slow Key Delta Value screen showing: Slow/Fast key delta value [10.00]->

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. This set of menus allows the user to define behavior of the scan receiver. With each selection the minimum and maximum allowable value as well as the current value is displayed.

Section 4

Software Operations

```
Tera Term Web 3.1 - 192.168.1.101 VT
File Edit Setup Web Control Window Help
=====
Timestamp: 2009:10:15 - 12:22:20 UTC
=====
Uptime      6 days 18 hours 42 minutes
=====
Power (dBm)      DNLINK      UPLINK
-----
IN-BAND INPUT   < -78.50   < -74.50
COMPOSITE INPUT -61.64     < -70.00
MEASURED OUTPUT < 0.00     < 0.00
=====
CALIBRATED OUTPUT 27.00      27.00
MAXIMUM OUTPUT    30.00      30.00
VSWR              -----
=====
AGC Control (dB)
=====
MODE           ON              0.00
-----
Status
=====
VOLTAGE        OK              OK
TEMPERATURE    OK              OK
SOFTWARE       OK              OK
HARDWARE       OK              OK
OSCILLATION    OK              OK
OVERRANGE      OK              OK
CALIBRATION    OK              OK
=====
DC Current
=====
AMPERAGE       2.47
-----
Temperature (Celsius)
=====
FPGA           47.75
=====
Power Amplifier
=====
STATUS         ON
AMPERAGE       0.82          1.40
TEMPERATURE    -----          54.43
=====
Fan Configuration
=====
STATE         OFF           OFF
STATUS        OK            OK
=====
System Configuration
=====
GAIN (dB)      70.00        70.00
FILTER         ccB0Bp-0     ccB0Bp-0
=====
```

```
Tera Term Web 3.1 - 192.168.1.101 VT
File Edit Setup Web Control Window Help
=====
Get Parameters
=====
(1) Link Status
(2) System Events
(3) System Information
(4) Link Status Loop
(r) Return to previous menu
->
```

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

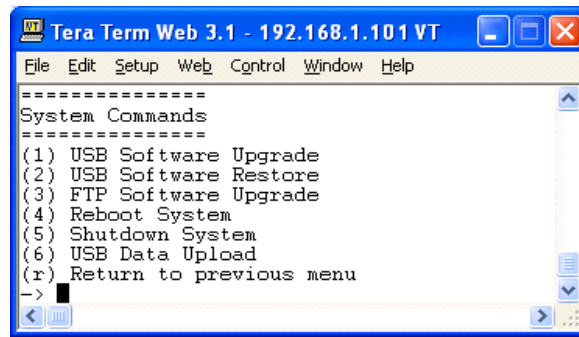
1. The “Link Status” option displays the current state of the system parameters. Information on this page is used to diagnose the health of the system.
2. The “System Events” option displays the current list of system alarms. Alarm statistics are maintained in the “Show Counts” option.
3. The “System Information” option displays the current state of the non-RF parameters.
4. The “Link Status Loop” option displays the current state of the system on a periodic basis in the form of a string that can be parsed.

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

```
Tera Term Web 3.1 - 192.168.1.101 VT
File Edit Setup Web Control Window Help
=====
System Events
=====
(1) List
(2) Show Counts
(3) Clear
(r) Return to previous menu
->
```

```
Tera Term Web 3.1 - 192.168.1.101 VT
File Edit Setup Web Control Window Help
=====
System Info: 2009:11:15 - 14:39:17 UTC
=====
Location      Unknown
Model         CSI-DR-ACELA-PRODS
Board Type    CSI-DR-EVDO
Carrier       02:05:00 MJA-5
Serial Number CSI-ACELA-CELL-001
Item Number   CSI-555-400
Date Built    11-01-2009
Watchdog Timer Enabled
=====
Local Area Network
=====
Hostname      csi-cell-acela
Boot Protocol static
IP Address    192.168.1.101
MAC Address   00:d0:69:13:49:11
Wide Area Network
=====
Modem Enabled YES
Modem Type    CDMA
PPPOE Address 166.143.7.195
PPPOE Address 0.0.0.0
SNMP Configuration:
=====
Enabled       YES
Traps/Informs NO
Heartbeat     NO
=====
MODEM Status Information
=====
MODEM #1
=====
RSSI (dBm)
Registration Sts
Phone Number
Current Band
System ID
Network ID
Temperature (C)
=====
GPS Location Data
=====
Run State     Enabled
Latitude      42.937093
Longitude     -71.467964
Filter ID     2
Filter Name   ccAda0B0ApBp-0
Location      Manchester
BTA           500
Satellite Count
NoBox Count
Searching Count
=====
Scan Receiver MHz          avg dBm
=====
Run State     Enabled
Dekey Limit   -65.00
Filter ID     2
Channel
=====
Channel-1    881.52          -86.34
Channel-2    882.75          -87.26
Channel-3    883.98          -87.98
Channel-4    885.21          -87.48
Channel-5    886.44          -88.32
Channel-6    887.67          -89.90
Channel-7    888.90          -89.14
Channel-8    890.13          -89.96
=====
```

```
Tera Term Web 3.1 - 192.168.1.101 VT
File Edit Setup Web Control Window Help
=====
(4) Link Status Loop
(r) Return to previous menu
->
Enter loop delay ->
```

The “**System Commands**” menu is available to all users, however selections 1, 2, 3, and 6 are not supported in this version of the product. It should be noted when selecting option 4 the system will immediately reboot and the current TMI interface will be disconnected. When option 5 is selected the system will shut down and remain powered off until the power is toggled back on.

Section 4

Software Operations

The repeater's operating software has 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	RF Alarms:	System Alarms:
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.

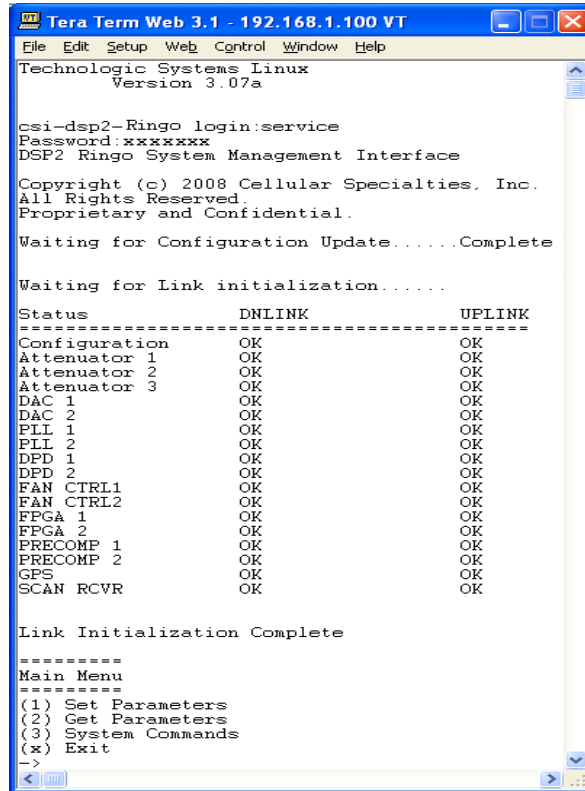
Each Alarm defined has these User Provisioned Capabilities.:

- **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

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**.



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

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