



CSI-DSP85-CP
Installation Manual

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Product Registration Information

The serial number may be found on the label on the rear panel of the unit. Note this number below. Retain this manual, along with proof of purchase, to serve as a permanent record of your purchase.

MODEL NUMBER

SERIAL NUMBER

DATE OF PURCHASE

POINT OF SALE COMPANY

DISCLAIMER: All information and statements contained herein are accurate to the best of the knowledge of Cellular Specialties, Inc. (CSI), but Cellular Specialties makes no warranty with respect there to, including without limitation any results that may be obtained from the products described herein or the infringement by such products of any proprietary rights of any persons. Use or application of such information or statements is at the users sole risk, without any liability on the part of Cellular Specialties, Inc. Nothing herein shall be construed as licence or recommendation for use, which infringes upon any proprietary rights of any person. Product material and specifications are subject to change without notice. Cellular Specialties' standard terms of sale and the specific terms of any particular sale apply.

Document Purpose / Intended Users

The purpose of this document is to provide a step-by-step procedure to help the experienced technician/engineer install and commission an in-building wireless enhancement repeater system using CSI's "Wireless Engine" Digital Repeater. Following the procedures outlined will minimize risks associated with modifying a live system and preclude service interruptions. This document assumes the technician/engineer understands the basic principles and functionality involved with Repeater and in-building systems. It is geared to the practical concerns of the installer.

Application

This guide should be applied whenever a need exists to add Digital Repeater capability to an existing system or when this capability is being included with a new installation.

Safety Guidelines

The general safety information in this guideline applies to both operating and service personnel. Specific warnings and cautions will be found in other parts of this manual where they apply, but may not appear in this summary. Failure to comply with these precautions or specific warnings elsewhere in the manual violates safety standards of design, manufacture, and intended use of equipment. Cellular Specialties, Inc. assumes no liability for the customer's failure to comply with these requirements:

Grounding

This Digital Repeater system is designed to operate from 100-240 VAC and should always be operated with the ground wire properly connected. Do not remove or otherwise alter the grounding lug on the power cord.

Explosive Atmospheres

To avoid explosion or fire, do not operate this product in the presence of flammable gases or fumes.

Lightning Danger

Do not install or make adjustments to this unit during an electrical storm. Use of a suitable lightning arrester, such as CSI's model number CSI-CAP, is very strongly recommended.

No User Serviceable Parts Inside

HAZARDOUS VOLTAGES ARE PRESENT WHEN THE COVER IS REMOVED. Opening the chassis will void your warranty. If you suspect a malfunction with this product, call your dealer or the Cellular Specialties Support Line at: **(603) 626-6677, Toll Free (USA) 1-877-844-4274.**

Terms used in this manual

AGC = Automatic Gain Control	ERP = Effective Radiated Power
APC = Automatic Power Control	FPGA = Field Programmable Gate Array
AUI = Attachment Unit Interface	LED = Light Emitting Diode
CLI = Command line Interface	RF = Radio Frequency
CPU = Central Processing Unit	SBC = Single board Computer
CSI = Cellular Specialties, Inc.	USB = Universal Serial Bus
DSP = Digital Signal Processing	UHCI = Universal Host Controller Interface
EEPROM = Electrically Erasable Programmable read- only Memory	

Product Introduction

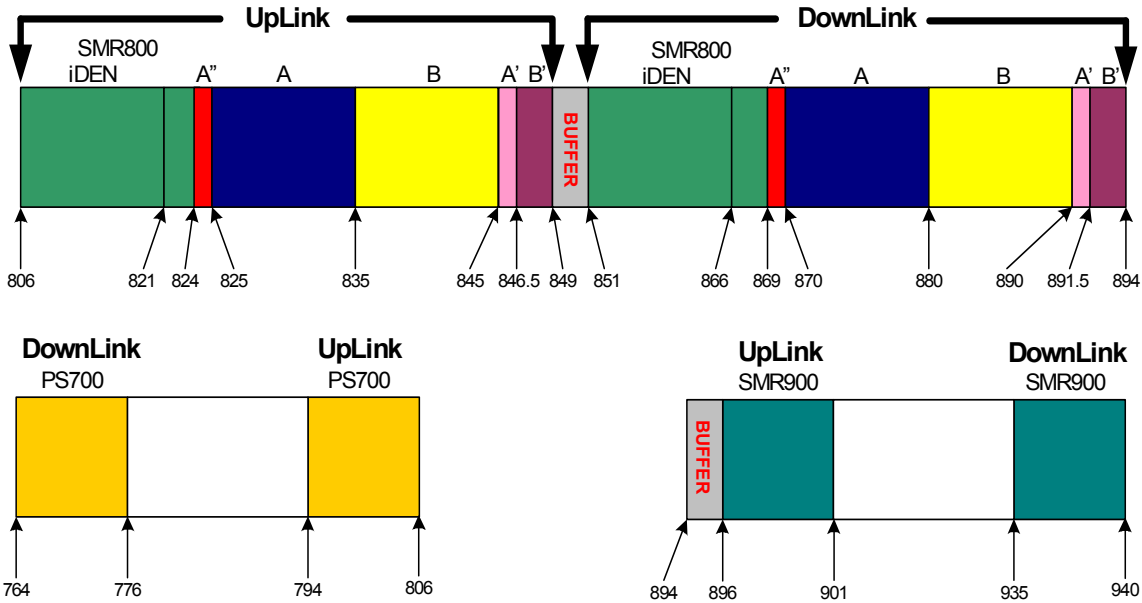
Cellular Specialties, Inc. (CSI) developed the Wireless Engine digital repeater for use within enclosed structures where sufficient signal from local cell sites to operate cell phones is unavailable. Adequate signal must be available outside the structure as a prerequisite to achieving in-building coverage. The Digital Repeater is connected to an external antenna, usually on the roof, and to one or more internal antennas placed strategically throughout the area where wireless service is desired.

The external antenna typically is directional, such as a "yagi". Internal antennas are typically omnidirectional, although various other types may be used depending on the coverage application. The **CSI's DSP Repeater** amplifies both the "uplink"(phone to tower) & "downlink"(tower to phone) signals thus facilitating communications to and from the intended wireless infrastructure.

With a maximum total of **+85dB** nominal gain on both the up and down links, gain can be adjusted over a range from +55dB to +85dB in 0.5dB steps. Control of the repeater is achieved utilizing a computer connected to comm. port 1 or 2 or via Ethernet cable connected to the Ethernet port. There are also LED indicators near the display to indicate ALARM status, AGC status, UL PWR, DL PWR, OSC, SHUT DWN and a D/L SIGNAL STRENGTH bargraph.

A specific filtering process modifies each amplification chain. This process digitally converts the assigned spectrum and then applies digital signal processing (DSP) techniques. DSP is used to create passbands that selects the RF energy passing through either the uplink or downlink paths. After the digital processing is complete, the information is converted back to an analog signal that is applied to the remaining stages of amplification. The resulting signals emitted by the repeater are specific to the network service providers' requirements. If these requirements change, only the DSP configuration parameters need change in order to adapt. Configuration parameters are created at the factory and supplied as files that may be downloaded to the repeater. The filter set configurations stored in memory determine the unit's adaptability to various field applications. The following pages describe the Cellular and PCS band plans as well as the convention CSI uses to identify and store the files that make up the filter set.

Cellular Frequency Band Plan



Cellular Filter File Naming Convention

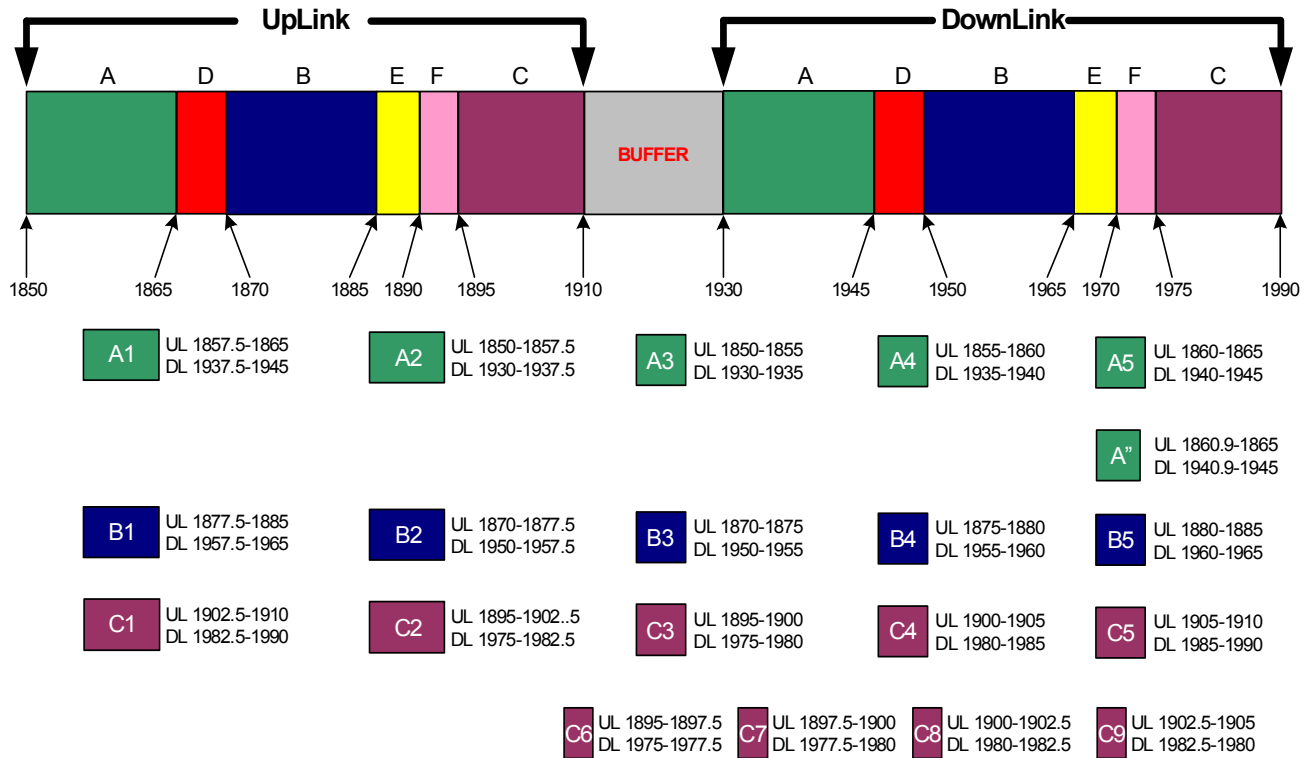
POSITION:	1	2	3	4	5	6	7	8	9	10	11	12
Definition:	Band	Mod Type	Block 1	Sub Block 1	Block 2	Sub Block 2	Block 3	Sub Block 3	Block 4	Sub Block 4	Separator	Variant/Guard Band
	c = Cellular	g = GSM c = CDMA w = WCDMA i = iDEN	A - B	0 = Full p = prime (') d = double prime ('')	A - B	0 = Full p = prime (') d = double prime ('')	A - B	0 = Full p = prime (') d = double prime ('')	A - B	0 = Full p = prime (') d = double prime ('')	-	0 = CDMA 600 KHz (-1dB point in from band edge) GSM - 100 KHz (-1dB point in from band edge) A-Z = Custom <i>lbd</i>

Note: These position columns are added as additional blocks are needed.

Notes:
 Modulation type determines the guard band at the edges of each passband. The Variant/Guard Band field will be used to indicate both standard guard bands and a carrier who has unique sub-block designation.
 SMR band block and sub-block designators do not exist and will be internally defined.
 Up to four sub-blocks may be defined, resulting in a maximum filename length of 12 characters.
 Example: ccAdAp-0 (Cellular band, CDMA Mod typ, A', A', with -1dB point 600 KHz in from band edge.)

Note: All frequencies are shown in MHz

PCS Frequency Band Plan



PCS Filter File Naming Convention

POSITION:	1	2	3	4	5	6	7	8	9	10	11	12
Definition:	Band	Mod Type	Block 1	Sub Block 1	Block 2	Sub Block 2	Block 3	Sub Block 3	Block 4	Sub Block 4	Separator	Variant/Guard Band
	p = PCS	g = GSM c = CDMA w = WCDMA	A - F	0 = Full 1-5 = Sub	A - F	0 = Full 1-5 = Sub	A - F	0 = Full 1-5 = Sub	A - F	0 = Full 1-5 = Sub	-	0 = CDMA 600 KHz (-1dB point in from band edge) GSM - 100 KHz (-1dB point in from band edge) 1 = CDMA (same as 0 but with -5dB gain at B4) GSM - n/a KHz (-3dB point at band edge) 2 = CDMA same as 0 GSM - same as 0 w/WCDMA in A3 3 = CDMA lbd KHz GSM - SAME AS 0 EXCEPT FREQ ARE 1895.2-1902.6 & 1975.2-1982.6 4 = CDMA lbd KHz GSM - lbd KHz 5 = CDMA lbd KHz GSM - lbd KHz 6 = CDMA lbd KHz GSM - lbd KHz 7 = CDMA lbd KHz GSM - lbd KHz 8 = CDMA lbd KHz GSM - lbd KHz 9 = CDMA lbd KHz GSM - lbd KHz A-Z = Custom lbd
Notes:	Modulation type determines the guard band at the edges of each passband. Variant/Guard Band field will be used to indicate both standard guard bands and a carrier who has unique sub-block designation or power requirement.											
	Up to four sub-blocks may be defined, resulting in a maximum filename length of 12 characters.											
Example:	pgA4D0B4-1 (PCS band, GSM Mod Typ, A4, D Full, B4 with a -3dB point at band edge.)											

Note: All frequencies are shown in MHz

Functional Overview

The CSI-DSP85-C/P repeater incorporates the following features for convenient operation, access, protection, and control.

- Network Configuration and Control using either a webpage style GUI through any standard browser or a menu driven user interface using the serial port.
Note: GUI does not require Internet access.
- User Gain Control (affects all passbands)
- Automatic Gain Control
- Automatic Power Control
- Oscillation Protection
- Over Drive Protection (P.A. limiting)
- Under/Over Voltage Protection
- Fault Protection
- Alarm Notification - Local/Remote
- Upgrade Support - Local/Remote
- External Interfaces - USB/Ethernet/Serial
- Re-loadable filters - Local/Remote
- Web-based monitoring and control - Local/Remote
- Persistent Status and Error information

LED Indicators

Automatic safety precautions are built into the amplifier system. In the case of a catastrophic system event, a shutdown circuit is incorporated that will disable all emissions should the uplink input or downlink input be overdriven or should an oscillation or output overpower event occur. The amplifier will periodically attempt to recover from the detected condition automatically. Warning light indicators are as follows:



Alarm:	Indicated by a red LED. The unit has sensed an alarm condition. This LED may light alone or in conjunction with one of the other indicator LEDs. In both cases the cause(s) can be review by going to the System Health menu.
AGC:	Indicated by a yellow LED. The gain of the unit has been reduced in order to prevent very strong input signals from overloading the amplifier. The amplifier will attempt to recover from this condition at periodic intervals.
UL PWR:	Indicated by a red LED. Uplink power has been affected by a system event and will need to be addressed by either the system software or a technician to be reset to original system settings, using the GUI or menu driven user interface. See the event log to determine the nature of the fault.
DL PWR:	Indicated by a red LED. Downlink power has been affected by a system event and will need to be addressed by either the system software or a technician to be reset to original system settings, using the GUI or menu driven user interface. See the event log to determine the nature of the fault.
OSC:	Indicated by a red LED. An oscillation event has occurred or is occurring. The system has been affected by the event and the problem will need to be addressed by the system software or a technician to be reset to original system settings. This is an indication of a major fault.
SHUT DWN:	Indicated by a red LED. The RF stages of the unit are disabled due to an unresolved system event such as oscillation, effectively taking the unit off the air. The problem will need to be addressed by a technician before the on air operation can be restarted. The repeater is not equipped with an ON/OFF power switch, for a hard power down the unit is unplugged.
D/L SIGNAL STRENGTH:	Indicated by a green LED bargraph. This indicates the relative signal strength being received from the cell site. Note: the last bar of the bargraph will turn red in the event of very strong adjacent channel interference.

Approximate Signal Strengths of Bargraph Display

ILLUMINATED BARS	SIGNAL AT INPUT CONNECTOR
10	Adjacent Channel Interference
9	-54dBm to -51dBm
8	-58dBm to -55dBm
7	-62dBm to -59dBm
6	-66dBm to -63dBm
5	-70dBm to -67dBm
4	-74dBm to -71dBm
3	-78dBm to -75dBm
2	-81dBm to -79dBm
1	-85dBm to -82dBm
0*	< -85 dBm

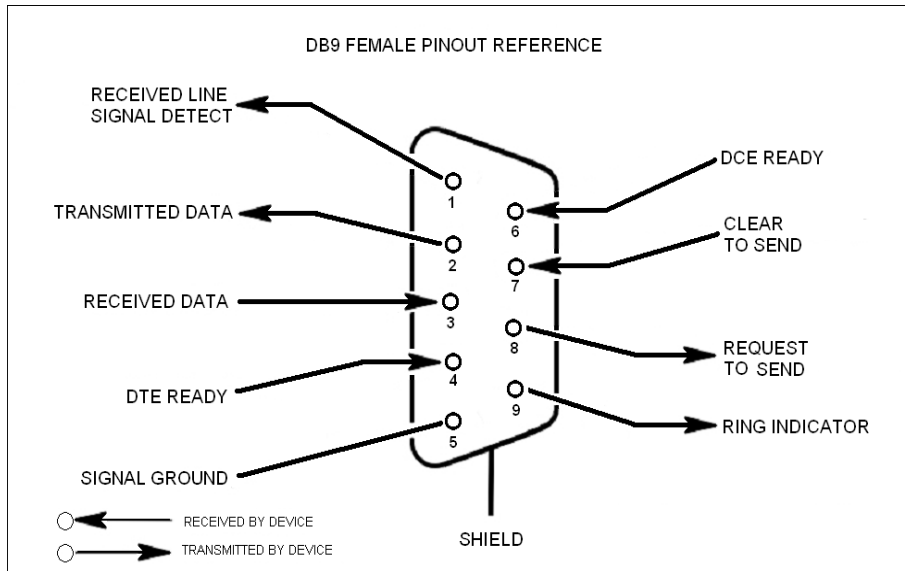
*Note: During Power up, the CSI-DSP85-CP will require a few moments for the internal computer to boot up. During this time the LEDs on the front panel will light and go out several times. When boot is complete the CSI logo will be lit. Part of the LED bargraph may also be lit, depending on the strength of the signal being received from the donor site. Signals weaker than -85dBm will not illuminate any bars.

Local Communication Interface Ports

To allow monitoring and control, the CSI-DSP85-CP is equipped with four ports that provide external communication access (1 Ethernet CAT-5, 2 DB-9 serial, and 1 USB). The Ethernet, CAT-5 port is provided as a primary communications port to the PC. One serial interface provides communications to local PC and the second to an external modem when provided. The USB interface provides a means to download files from a memory device and may also be used by an internal or external modem. The DB-9 pin assignments conform to the standard Electronic Industries Association (EIA232) specification. A diagram of the pin descriptions is provided on this page for reference.

Connecting a null modem cable to one of the COM ports and using a terminal emulation program with a PC will allow communication to the control processor's Command Line Interface (CLI). See command line interface section for further detail.

EIA232 Pin Specifications



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

USB Interface

The Universal Serial Port (USB) interface conforms to Intel's Universal Host Controller Interface (UHCI) version 1.1 dated March 21, 1996. This interface will support data transfer rates up to 12 Mbps.

Ethernet

The Ethernet AUI conforms to IEEE 802.3 and is capable of supporting 10/100 Mbps communications speeds.

Monitoring & Alarms

There are no physical connections provided to specifically communicate system status or alarm status. This information is embedded in data accessible via the communication ports described earlier.

Troubleshooting

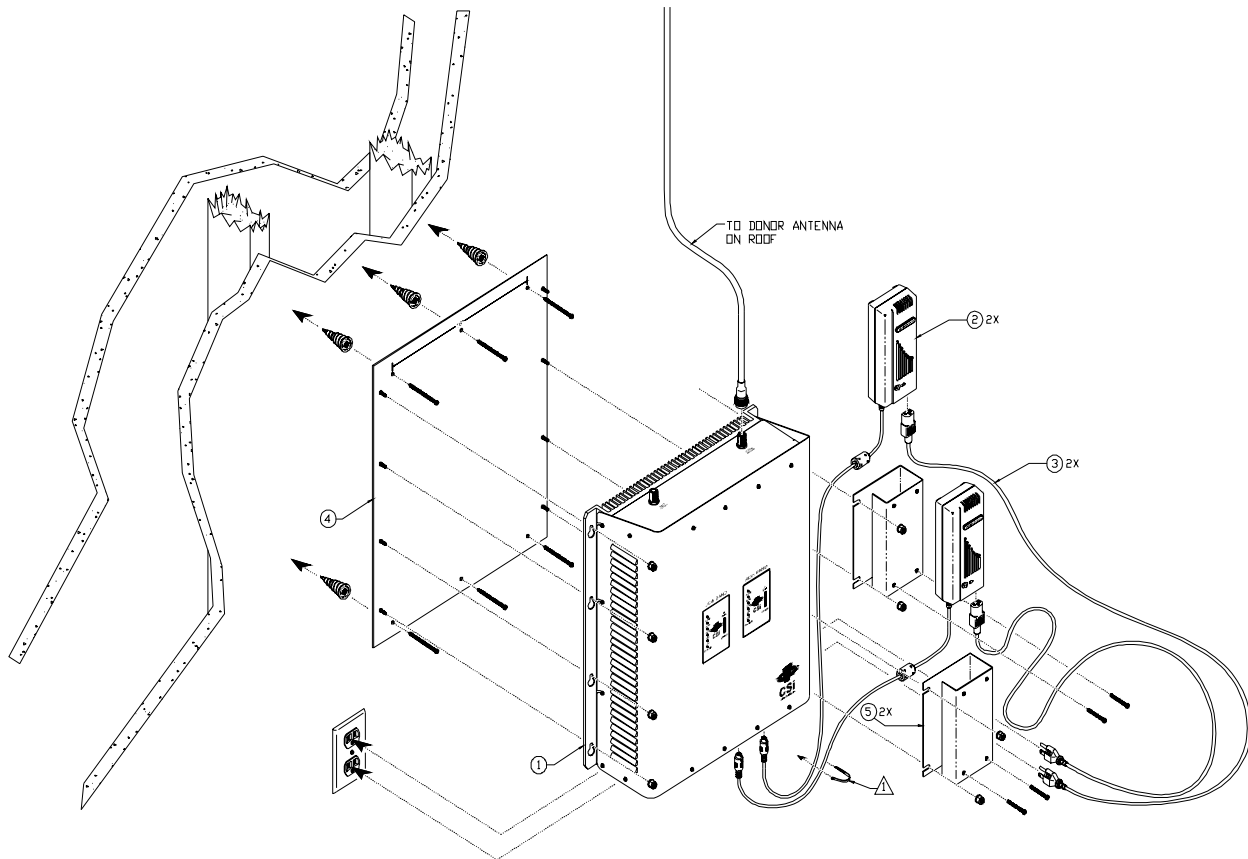
All cables should be checked for shorts and opens.


The rooftop antenna (Donor Antenna), if directional, should be checked for proper alignment along the calculated compass heading. Typically, the directional antenna would be aimed at the same site that your handset uses, but it may not always be so. **It is critical the installer contact the service provider for information on, and approval of the cell site he or she has selected before the system is turned on.**

If cables and alignment are acceptable and the problem persists, it may be necessary to use a spectrum analyzer to examine the signal environment in which the CSI-DSP85-CP is operating. The existence of strong signals within the frequency bands can cause the AGC to reduce the amplifier's gain. In some cases additional filtering might be required to reject these unwanted signals. In some instances, the directional outside antenna can be reoriented horizontally, to place the interference source in an antenna pattern "null". There also may be some cases where the interference from outside signals is so great that they cannot be filtered or otherwise reduced or eliminated without expensive and possibly prohibitive measures. In these cases it may not be practical to use the CSI-DSP85-CP for providing coverage to these sites.

Wall Mounting the CSI-DSP85-CP, “Frequency Agile Repeater”

The following diagram illustrates the best method for mounting the repeater to a wall in a typical installation. Note: for optimal cooling the unit should be mounted vertically on a wall with the antenna ports up.



NOTE:
 TIE WRAP CABLES AS NEEDED.

ITEM#	QTY	PART #	DESCRIPTION
1	1EA	CS10-370-403	DSP85-CP REPEATER
2	2EA	453-1010-001	24V POWER SUPPLY
3	2EA	780-0510-001	LINE CORD (AC POWER)
4	1EA	750-2171-001	MOUNTING PLATE (OPTIONAL)
5	2EA	750-2172-001	P/S MOUNTING BRACKET

Optional Accessories

A complete line of accessories is available from Cellular Specialties, Inc. Check with your CSI distributor for any additional items needed. Below are just a few examples suitable for most in-building needs.

- Outside Donor Antenna
 - PCS - model number CSI-AY/1.85-1.99/10
 - Cellular - model number: CSI-AY/806-960/14
- Inside Omnidirectional Antenna
 - PCS - model number (CSI-AS/1.85-1.99/2)
 - Tri-band - model number (CSI-AO/800/2.5K/3)
- Power Dividers
 - 2:1 - model number (CSI-S2BSC)
 - 3:1 - model number (CSI-S3BSC)
 - 4:1 - model number (CSI-S4BSC)
- Grounding Kit - model number (CSI-GKIT)
- Lightning Arrestor - model number (CSI-CAP)
- Directional Couplers and Cross Band Couplers are also available.
 - 6dB - model number (CSI-DC6/800-2K/N)
 - 10dB - model number (CSI-DC10/800-2K/N)
 - 15dB - model number (CSI-DC15/800-2K/N)
 - 20dB - model number (CSI-DC20/800-2K/N)
 - 30dB - model number (CSI-DC30/800-2K/N)

Important Installation Notes

- Inadequate isolation between the outside and inside antennas may cause re-generative feedback in the system. This feedback can cause the amplifier to emit a continuous signal at maximum amplitude and, in some cases, interfere with normal operation of the cell site. Careful consideration of the layout and placement of the system is imperative.
- The installer should refer to the safety precautions, in the following section, for proper antenna selection and installation. To avoid serious injury or death and damage to the repeater do not install donor or server antennas near overhead power lines or high power components. Allow enough distance so that if antennas should fall they will not come in contact with those components.
- Close proximity to the donor or server antennas with the repeater in operation may expose the user or installer to RF fields that exceed FCC limits for human exposure.

WARNING! AMPLIFIER OR HANDSET DAMAGE **MAY** OCCUR IF A HANDSET IS CONNECTED DIRECTLY TO THE REPEATER OR THE COAX THAT LEADS TO THE REPEATER.

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 14dBi gain, or any combination of gain and loss that equates to 14dB 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 directional antenna having a maximum gain of 14 dBi is used, precautions should be taken to prevent personnel from routinely passing through the main radiation beam at a distance closer than specified.

Circuit Operational Description

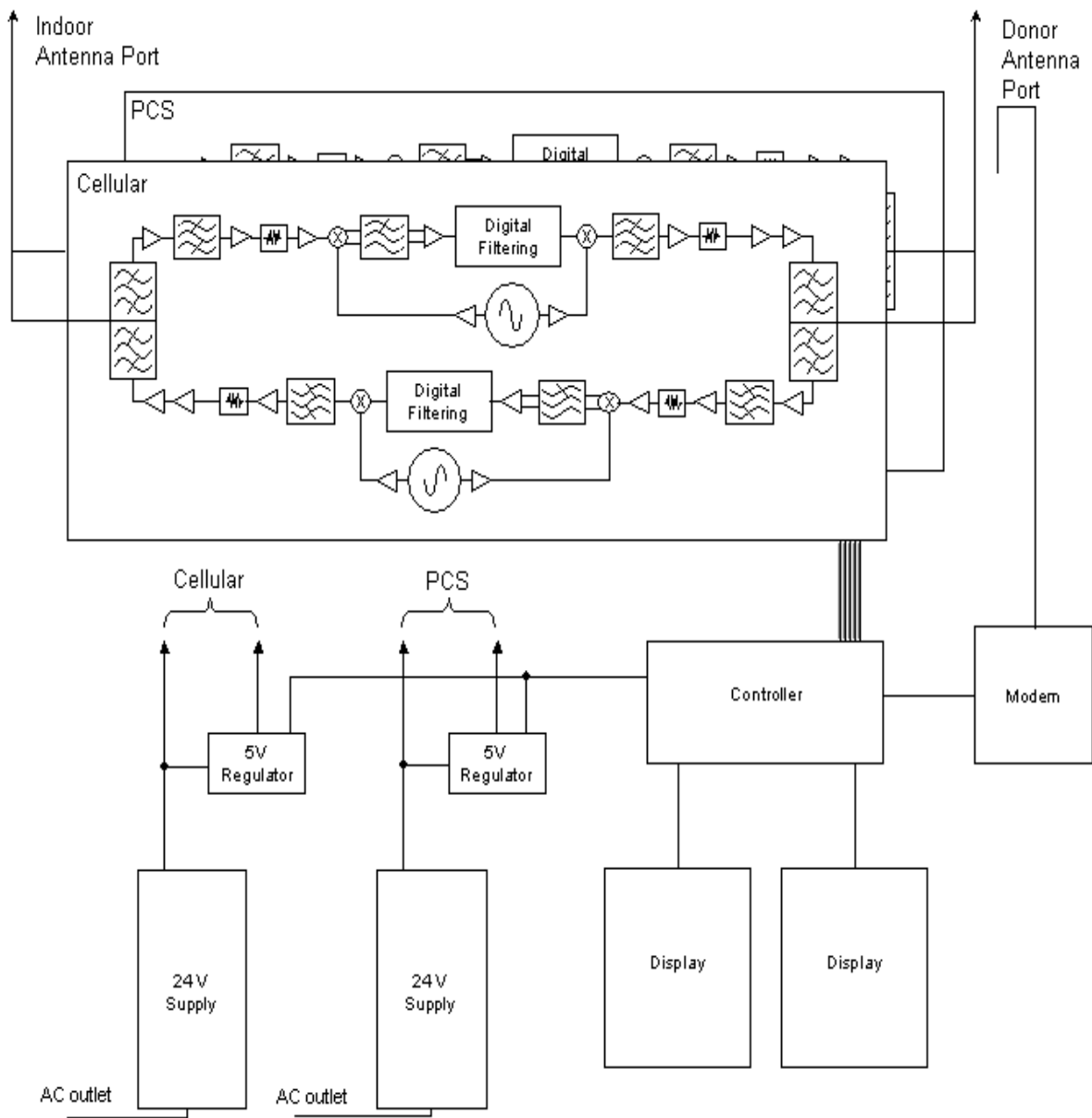
The repeater uses a single down-conversion/up-conversion scheme. There are multiple RF amplifier stages prior to each down-converting mixer. The down-converting mixers are followed by a single IF amplifier. A Digital Signal Processor block then processes the resultant digitized IF signal that was previously generated by an Analog-to-Digital Converter. The processed (filtered) digital signal is fed to a Digital-to-Analog converter and then up-converted to RF. A driver amplifier and a final power amplifier make up the final gain stages before application to the diplexer. The maximum total system gain (diplexer input to diplexer output) is nominally 85 dB for either the downlink or the uplink paths with both links having independent manual and automatic gain controls (AGC).

AGC reacts to analog power detection on both the input and output of the uplink and downlink RF chains. A control algorithm continuously monitors these detected values and dynamically adjusts various gain stages such that the net system gain value, entered manually, is maintained without either exceeding FCC parameters or overdriving the A/D converters.

LEDs on the front panel display provide immediate visual indications of the unit's primary power and major or minor alarm status. The repeater features automatic shutdown protection as a safety measure should excessive drive be applied to the input or an oscillation condition occur. When in a protected mode, a control algorithm determines the appropriate method of recovery to a normal, previously defined state, or maintains the protection until manually reset. If recovery has been established, the associated LED(s) will either be extinguished or available to be reset. The events that trigger the error will be save in the event log.

Digital signal processing is performed concurrently on the complete spectral band allocation. Therefore, in the case of the US PCS band, digitization of 60 MHz (up or down links) is first accomplished. Next, "Filter Files" are applied to a mathematical algorithm that has been established in a specialized Field Programmable Gate Array (FPGA) processor.

The filter file used in the DSP process is stored in nonvolatile memory and recalled when a filter set is required. Remaining sets are stored in flash memory. Because of the size of the filter files, replacing the EEPROM file with one stored in flash memory takes just a few moments.



Functional Block Diagram

Mechanical Specifications

Parameter	Specification	Notes
Repeater Size		
Height	4.69 in.	
Width	18.62 in.	
Depth	19.25 in.	
Box Weight	35.0 / 15.9 lbs/kg	
Box Thermal Management	Convection cooled	Large heatsink
Surface Coating	Powder Coat	
Color	Satin Black	

AC Power Specifications

Parameter	Specification	Notes
AC Voltage	100 - 240 VAC	External Power Supply
AC Current	3.2 Amps 1.7 Amps	@ 120 VAC @ 230 VAC
AC Power Frequency	47 - 63 Hz	
Power Consumption	150 Watts (Max)	

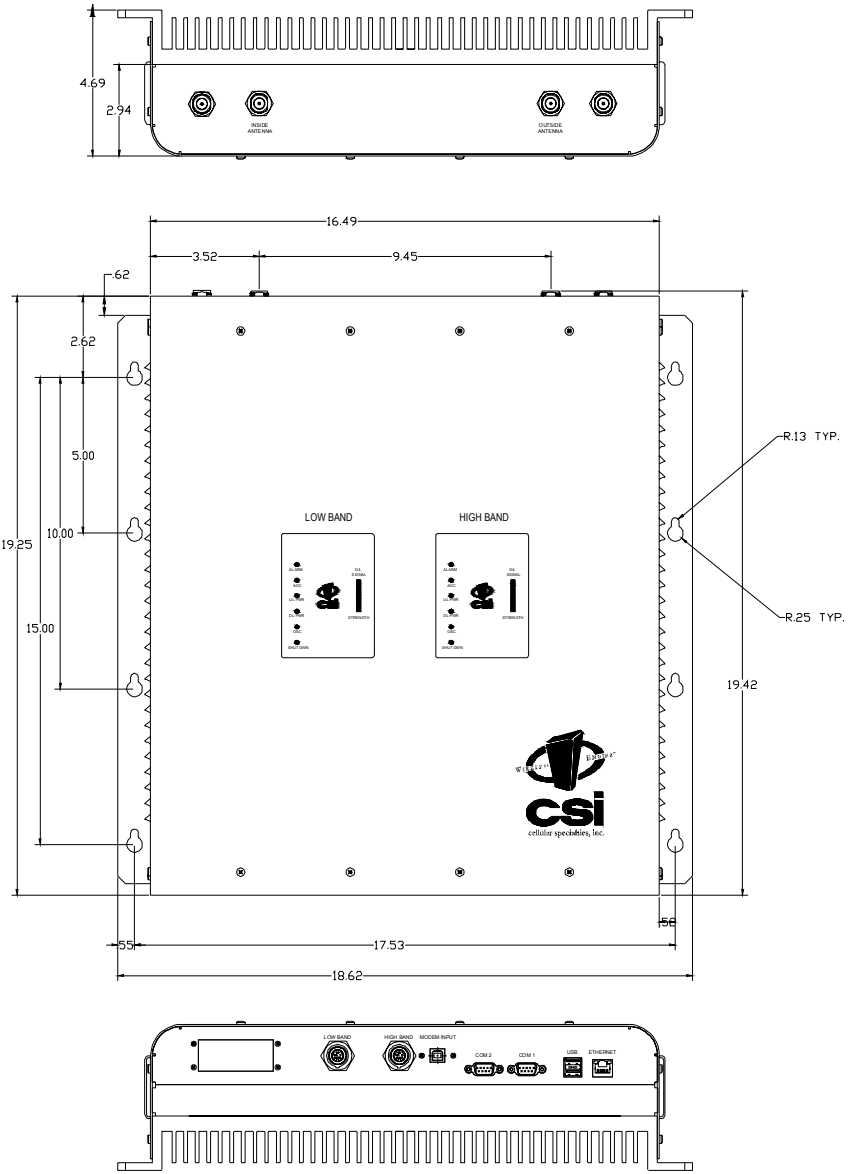
Dual Band Operating Power Parameters

Parameter	Specification	Notes
Maximum RF input Power without damage	+10 dBm	
Linear Gain	85 dB	Factory Calibrated Gain
Pass Band Ripple	+/-1.5 dB	
Automatic Gain Control (AGC)	30 dB max range	In 0.5 dB steps
Manual Gain Control	55-85 dB max	In 0.5 dB steps
Liner Output Power	+ 27 dBm	Uplink and Downlink
OIP3	+ 41 dBm	Measured with 2 CW tones at 14 dBm/tone
Noise Figure (Avg)	6.0 dB	At Maximum Gain
1dB Compression	+ 31 dBm	Uplink and Downlink
Input VSWR (Typ)	<1.5:1	
Propagation Delay	<2.5 usec	
RMS Vector Error(EVM)	3% max	TDMA,EDGE,W-CDMA,CDMA2000
CDMA RHO	0.98 min	CDMA2000, 1x-EVDO
Connectors	N-Female (2)	
Spurious Emissions & Applicable Documents		
FCC	-13 dBm max	Per FCC part 2, 22, 24
Industry Canada	-13 dBm max	

Environmental Requirements

Parameter	Specification	Notes
Temperature Range	-30° to +48° C (-22° to +118° F)	
Relative Humidity	5% to 95%	Non-condensing
Industrial Dust	<15mg/m3	Telcordia GR-63-CORE

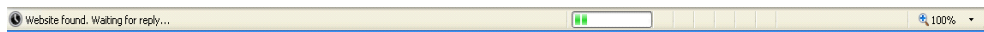
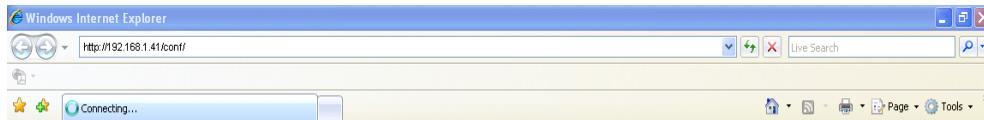
Mechanical Drawing



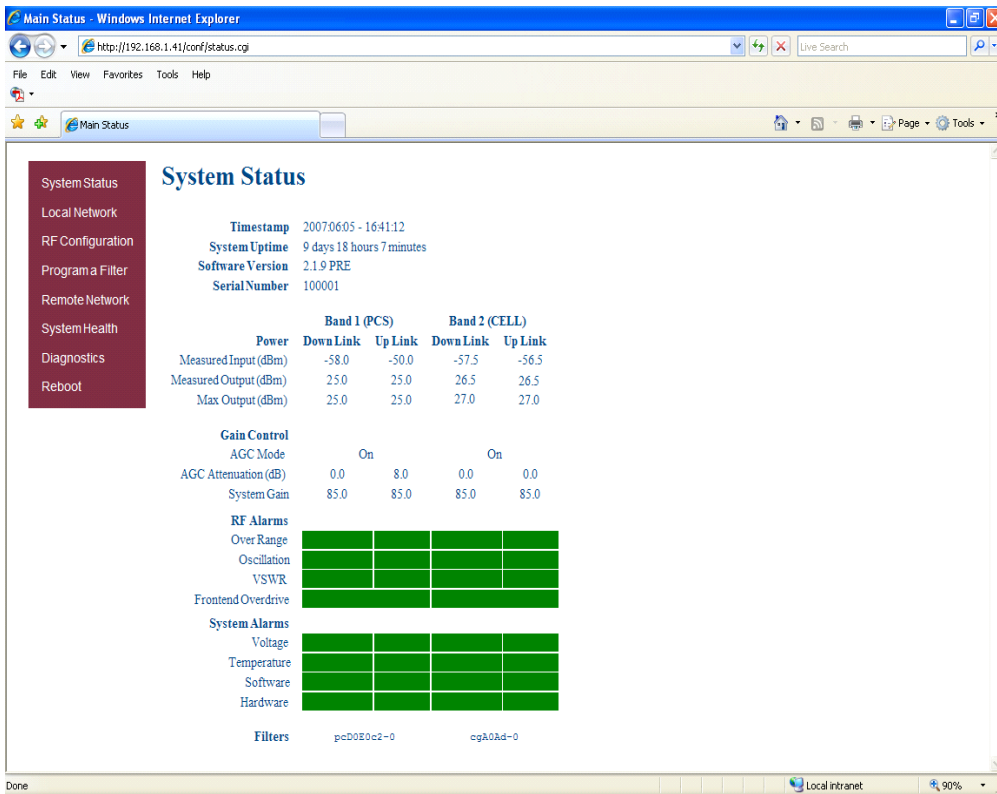
Web based GUI Session

Primary access to the repeater can be gained through a LAN connection and a web browser program such as Firefox by Mozilla, or Internet Explorer from Microsoft. The repeater ships with the default IP address of 192.168.1.100, but it can be changed as required and in the following examples we will be using an address of 192.168.1.41.

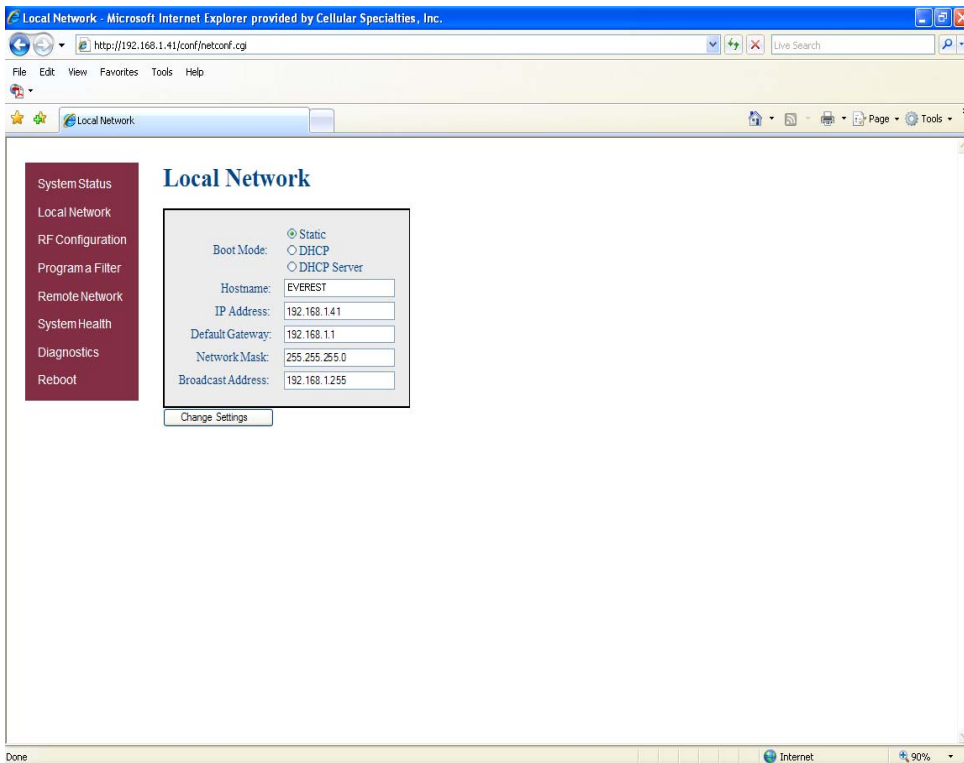
If connecting directly to the CSI-DSP85-CP from a laptop or PC with a crossover CAT-5E cable or over a LAN the user only needs to type the IP address of the repeater into the browser address line to connect. At this point the user will be prompted for a user name and password. For the purpose of the GUI session, the default user name is **dualband** and the password is **csi1234**. Please note this can be changed as required. Note: internet access is not required to use the GUI.



When login is complete the user is brought to the system status page. The links on the page are activated by clicking on them. Note: some of the settings available in the CLI are not available in the GUI session.

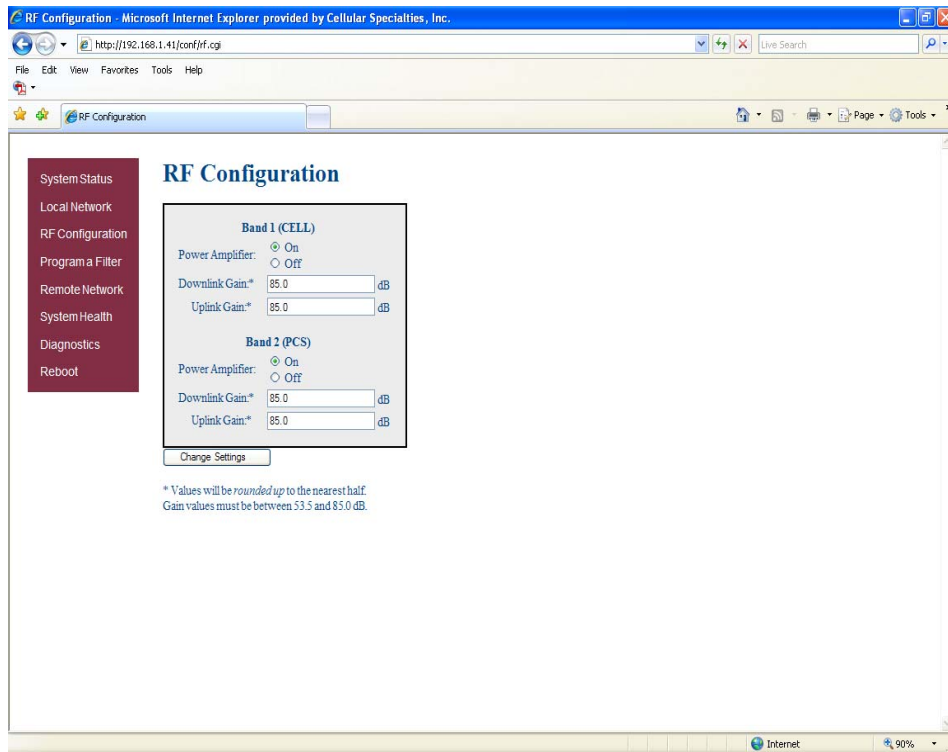


If the user selects Local Network from the System Status page, the following screen is displayed and from here network configuration can be modified as required. The default is set to Static, check with your IT department for explanation and approval of the DHCP and DHCP Server options before you select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

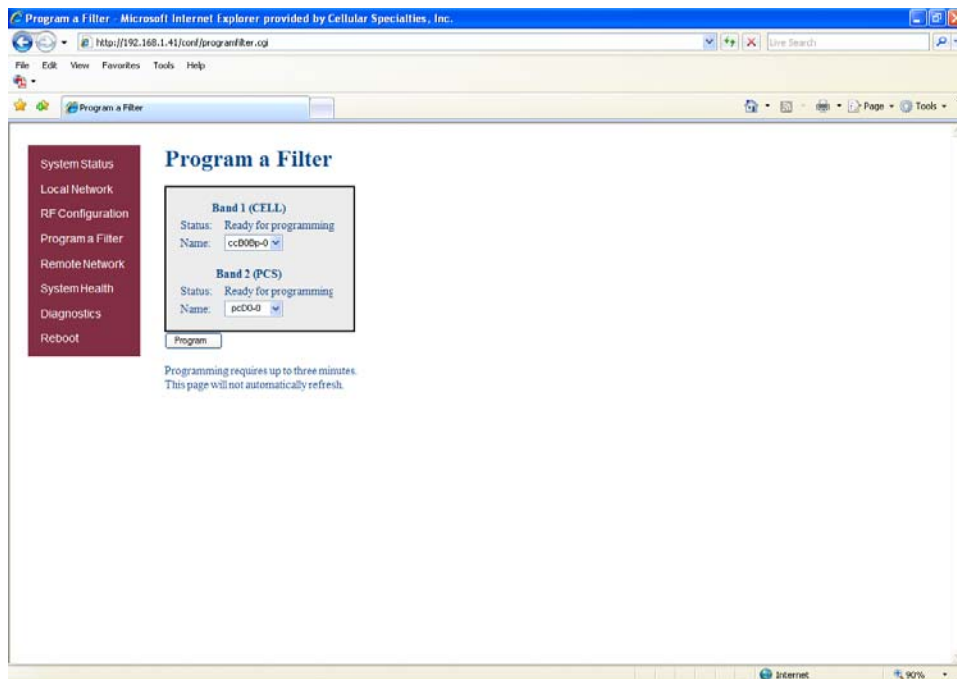


After any changes are made press the refresh button to review the fields and assure the change made is correct. Note: changing network settings may cause the current TCP/IP connection to fail because change will take effect immediately.

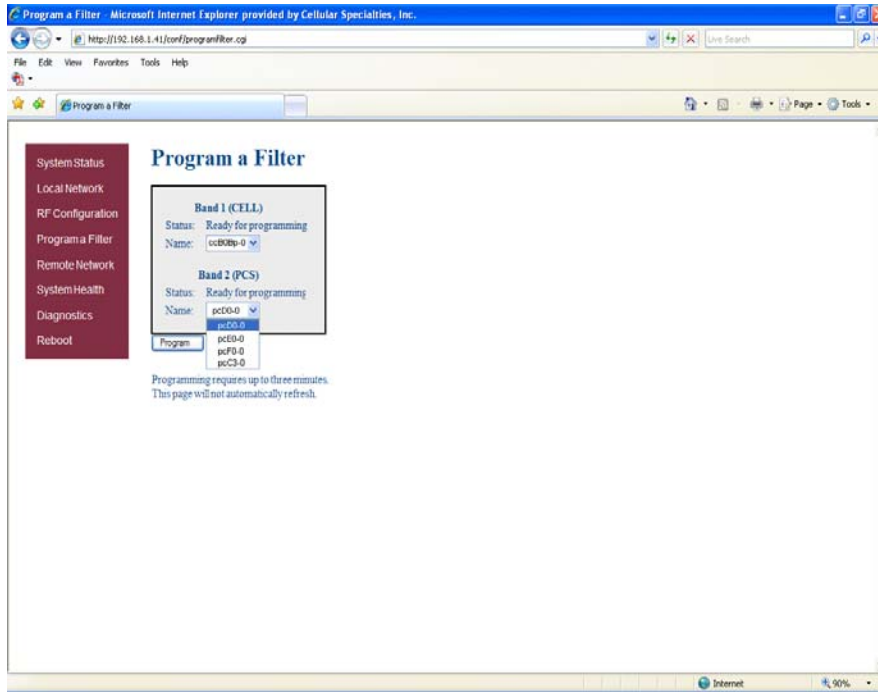
From here the user may return to the System Status screen or click on the other options. If the user would like to modify RF configuration click on the words RF Configuration in the brown navigation box and the screen below is displayed.



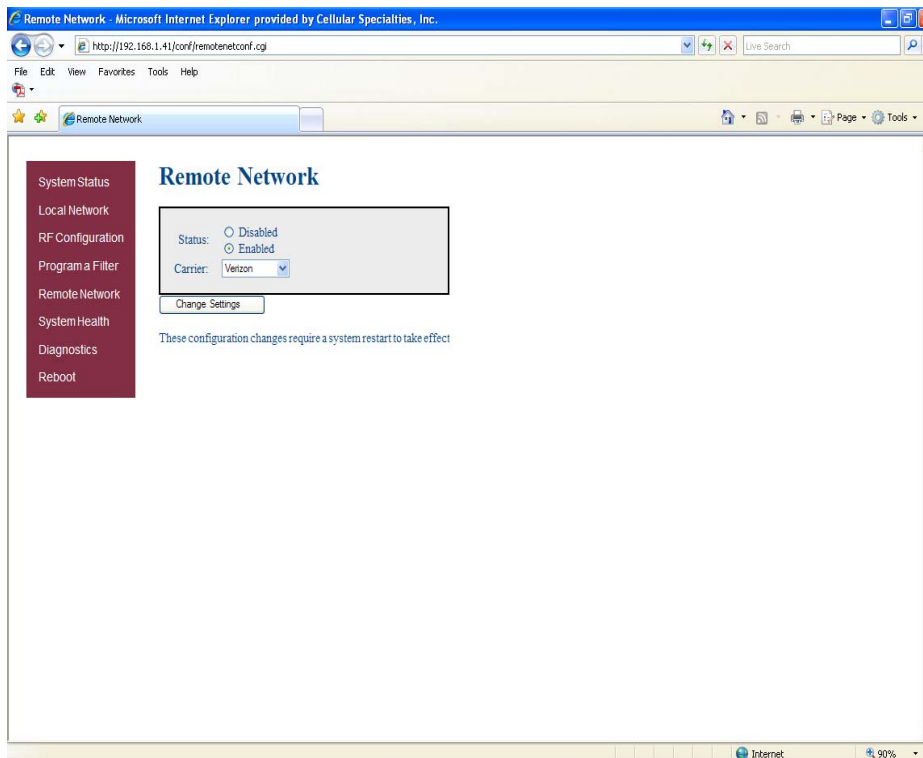
The user inputs the gain value desired. Gain values from 53.5 dB to 85.0 dB may be selected. The repeater will not allow the user to set values outside this range. If a new filter set is required, the new filter may be selected from the "Program a Filter page" below.



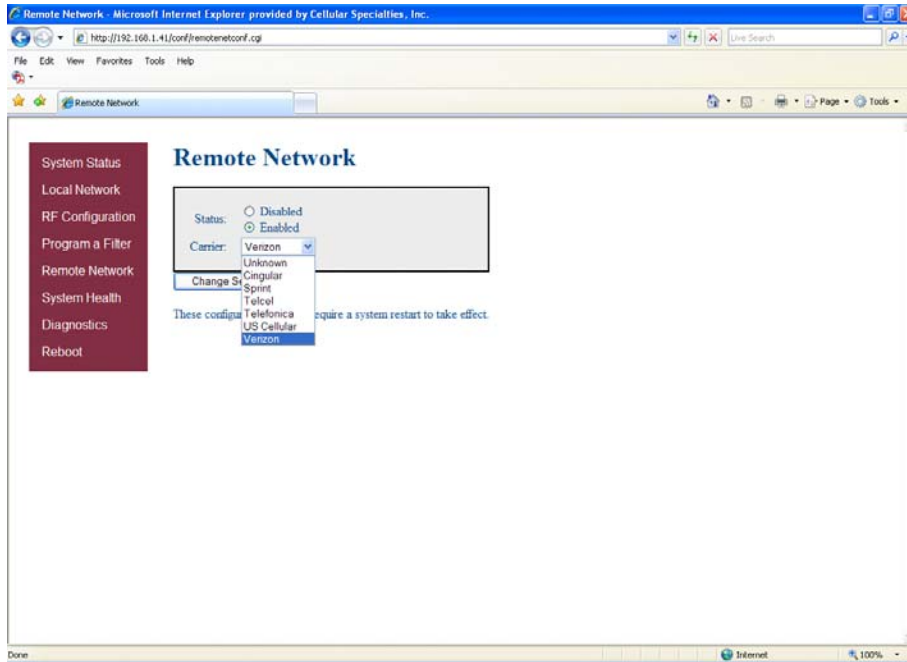
The user may select the desired filter from the dropdown menu. Pressing the Program button will complete the selection and load the desired filter. Note: the time required to complete this process will take just a few moments. Note: If the filter desired is not currently in the list, additional filters along with instructions on how to load them are available by contacting CSI.



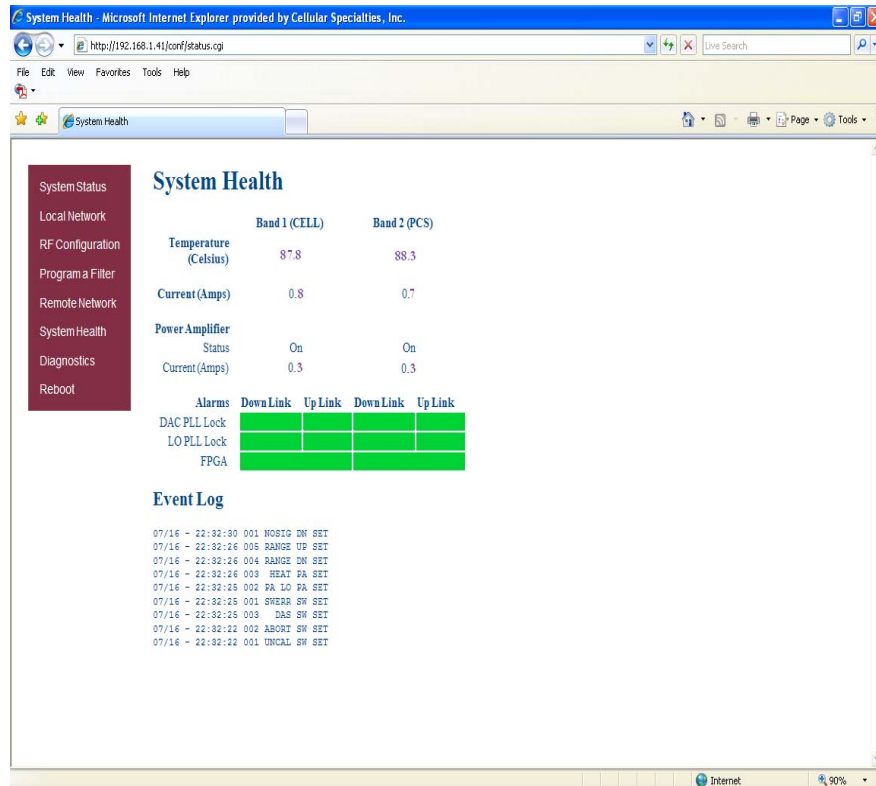
When the CSI-DSP85-CP includes an internal modem requiring provisioning for the service providers network click on Remote Network in the brown navigation box and the screen below is displayed.



Highlight the carrier for whom you want to configure the modem for and click the Change Settings button. Note: the system will require restart for the change to take effect.



By clicking System Health the current state of the CSI-DSP85-CP can be reviewed.



Clicking Diagnostics will bring up the page shown below. The Diagnostics page will show additional data not found on the System Status page.

Diagnostics

Timestamp: 20070717 - 16:47:43
 System Uptime: 0 days 18 hours 15 minutes
 Software Version: 2.1.14 PRE
 Serial Number: 100001

Power	Band 1 (CELL)		Band 2 (PCS)	
	Down Link	Up Link	Down Link	Up Link
Measured Input (dBm)	-58.0	-50.0	-57.5	-56.5
Measured Output (dBm)	25.0	25.0	26.5	26.5
Max Output (dBm)	25.0	25.0	27.0	27.0
Input (dBm)	-58.0	-50.0	-57.5	-56.5
Calibrated Output (dBm)	25.0	25.0	27.0	27.0

Gain Control

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

RF Alarms

Over Range				
Over Saturation				
VSWR				
Frontend Overdrive				

System Alarms

Voltage				
Temperature				
Software				
Hardware				

Filters: cuB0p-0 pc00-0

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

Reboot

Are you sure? No Yes

Reboot

Restart requires confirmation.

To end the session exit the browser, the user will be automatically logged out.

Command Line Interface (Local Access)

Local access to the CSI-DSP85-CP CLI, also known as the console interface, is made by connecting a serial cable, as shown in figure 1, from the serial connector of the laptop to either of the serial ports on the bottom end panel of the FAR. These connectors are labeled COM 1 and COM 2. In some cases, if the gender of the connector is not the same as shown, a null modem adapter as shown in figure 2 may also be required.



Figure 1



Figure 2

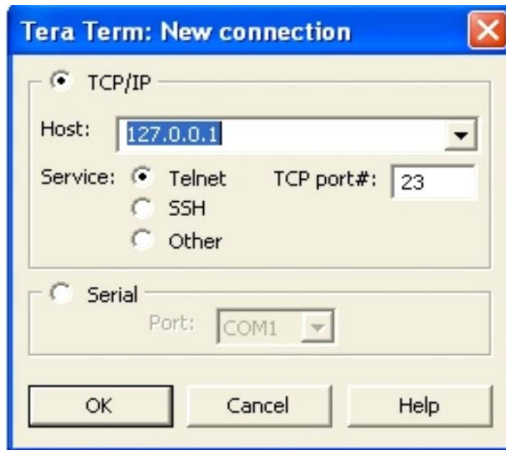
Many terminal emulation programs will work if properly configured. In the following description, "TeraTerm" is used to establish the CLI session. This program is readily available via the Internet and is free from Ayera Technologies at:

<http://www.ayera.com/teraterm/>

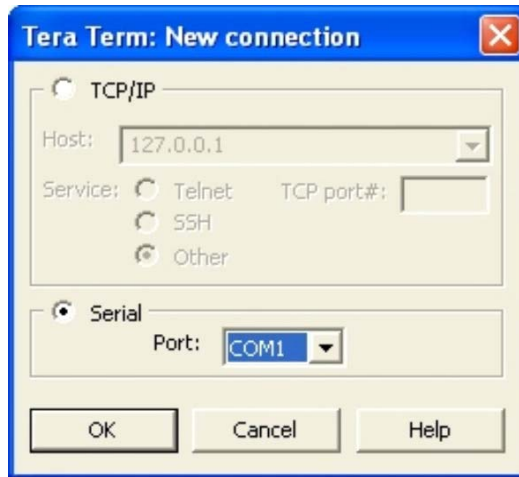
TeraTerm Pro Web works on Windows 95/98, 2000, XP. Here is the latest TeraTerm Pro Web release:

Version 3.1.3, October 8, 2002. tpro313.zip

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

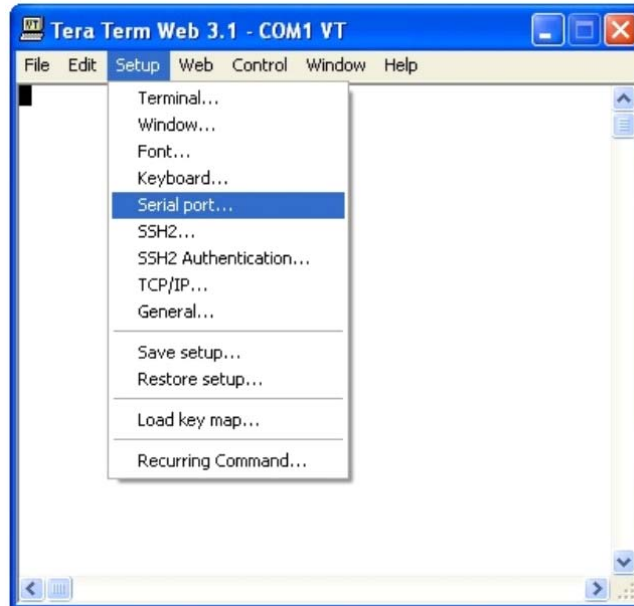


Select the Serial radio button and press OK as shown below.

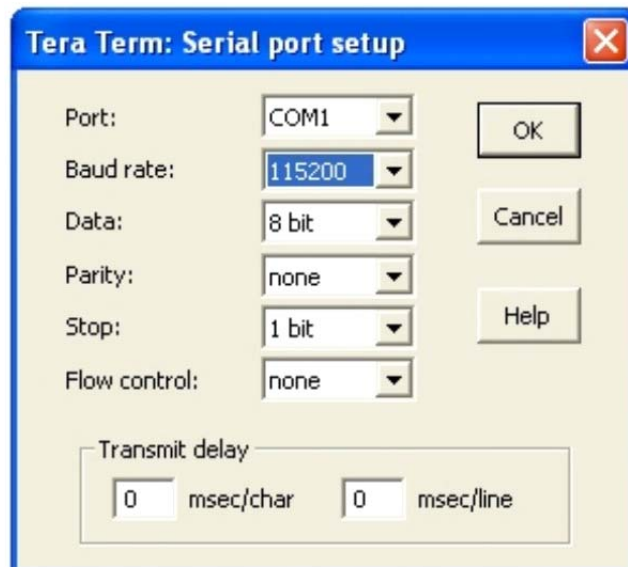


Note: It may be necessary, in the System Properties section of the control panel; using Device Manager to determine what COM port your computer uses for the communications port. In this case it is COM 1. This is not to be confused with the serial port on the bottom panel of the FAR labeled COM 1

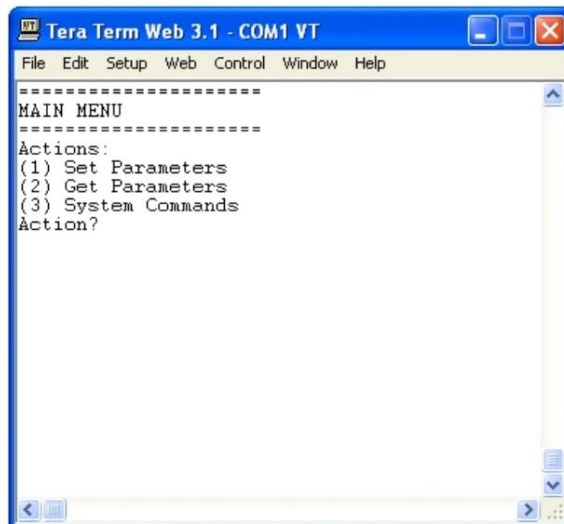
Pressing "OK" will open up a blank dialog screen. Go to the setup dropdown menu and select Serial port to make changes to the serial port setup.



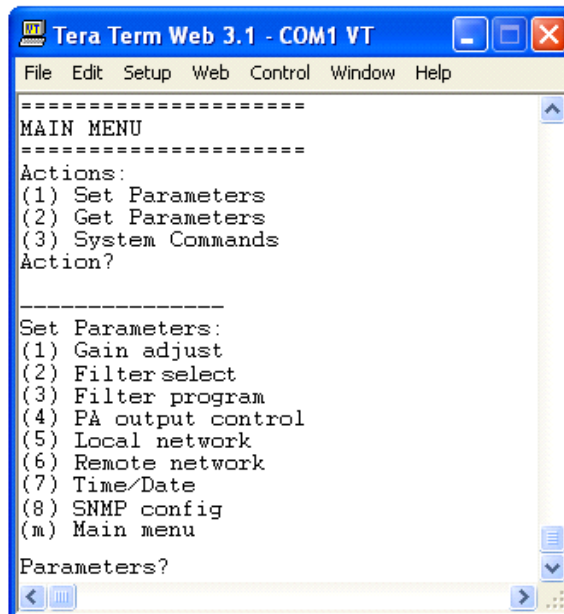
Configure the terminal program for the correct COM port, in this case COM 1 and 115200 baud rate as shown below.



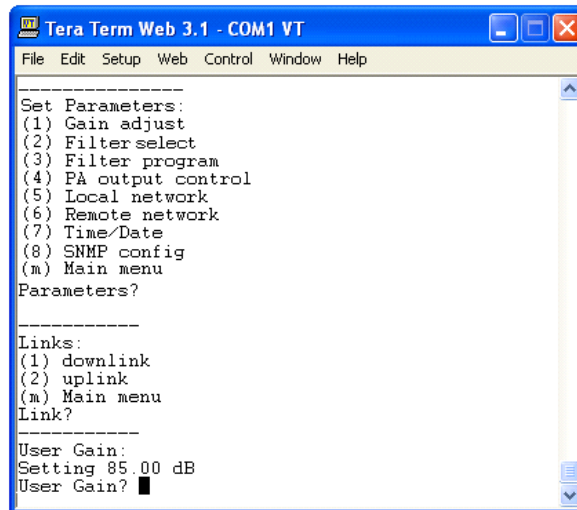
After completing the serial port changes, the user will be prompted for a user name and password. In dual band units each band is changed independently and requires an independent login. To make changes to the cellular band, the default user name is "cellband". The password for both bands is "csi1234". The user name for changing the PCS band is "pcsband". After entering the password and pressing return the CLI main menu will appear.



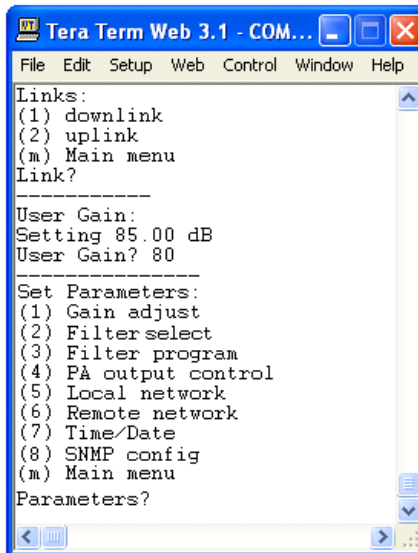
The actions displayed are self-explanatory. Pressing "1" will continue to expand this session screen and allow the following parameters to be set.



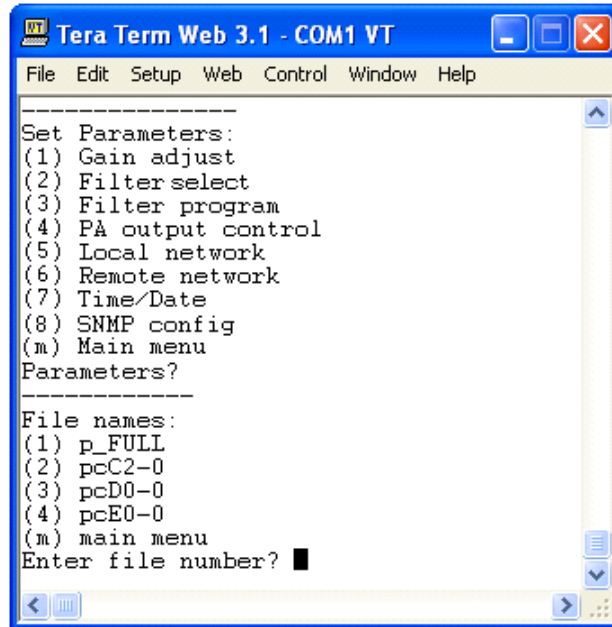
Each "Set Parameter" selection, when chosen will be expanded to allow changing or setting of that parameter.



After selecting option 1, downlink, the current user gain is displayed and the option to change it is accomplished by typing the desired gain at the prompt. The user is then returned to the previous menu.



All the other options operate in much the same way. Some of the options will offer the user additional selections and will be self-explanatory. Below is one example of these additional options, this one for filter selection.



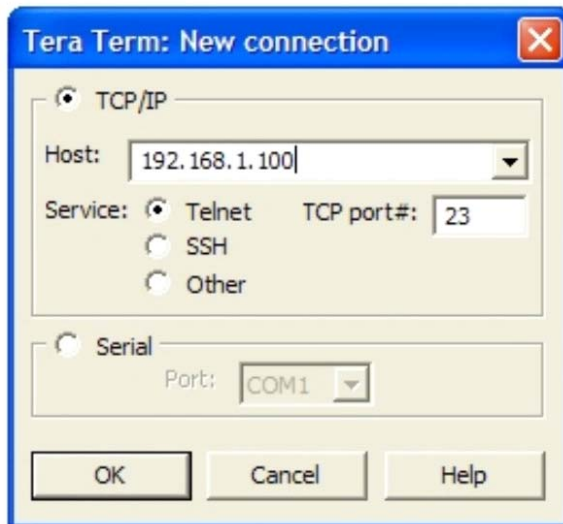
Note: Graceful session termination is important. Use Disconnect under the file dropdown menu to terminate a session, otherwise the port may become disabled and force the system to be rebooted.

Telnet Session (Remote Access)

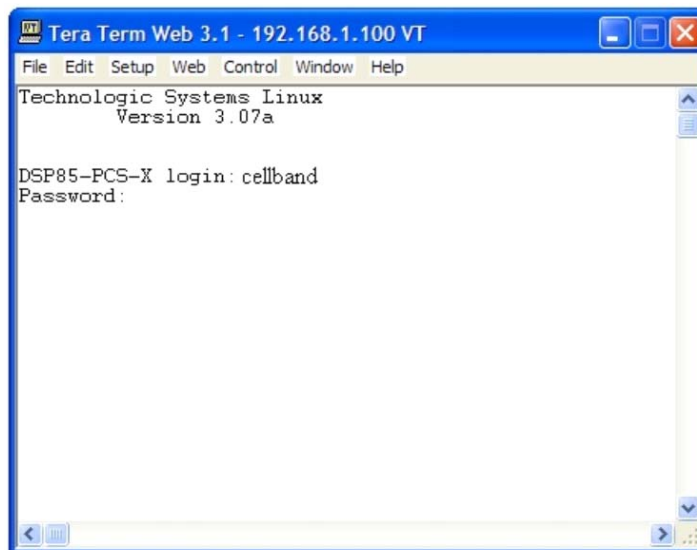
Remote access to the repeater may be gained through a LAN connection and a terminal emulation program for TCP/IP. As with the serial connection CSI suggests the use of TeraTerm. In the following description, again, "Teraterm" is used to establish the Telnet session. Also, it will be required that the network configuration of the computer and the repeater being controlled be set up with the same Sub Net and Sub Net Mask in order to establish a link.

In other words, the IP addresses of both the computer used and the repeater must use the same group of IP address number sets. For example, the repeater ships with the default IP address of 192.168.1.100 and a Sub Net Mask of 255.255.255.0. In order to connect, the computer to be used for the link would normally need an IP address of something like 192.168.1.12 with a Sub Net Mask of 255.255.255.0, the same Sub Net Mask as the repeater. In this example note: the last digit of the IP address may be any number except 1,100 and 255. Configuring your PC is normally fairly straight forward but because it does vary somewhat with the operating system involved, this manual will not detail the procedure. If you require assistance, contact your IT department and they will be able to set up your PC for you.

When the Tera Term program is started, the following screen is displayed. Change the default host IP address to the IP address of the repeater to be controlled. In the case of a new install, the default address is 192.168.1.100 and has been assigned at the factory. Select the service Telnet. The TCP Port must be 23.



Pressing the “OK” button will bring the user to the following screen, which will require the user to log in. In dual band units, each band is changed independently and requires an independent login. To make changes to the cellular band the default user name is “**cellband**”. The default user name for changing the PCS band is “**pcsbnd**”.



In the field after the prompt “DSP85-PCS-X login;” type the user name for the band to be changed. The default password is “**csi1234**” for both bands. After typing the password press the enter key and the main menu will be displayed as shown next.

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

DSP85-PCS-X login: pcsband
Password:

Copyright (c) 2005 Cellular Specialties, Inc.
All Rights Reserved.
Proprietary and Confidential.

Waiting for Link initialization.....Complete

=====
MAIN MENU
=====
Actions:
(1) Set Parameters
(2) Get Parameters
(3) System Commands
(x) Exit
Action?
```

Telnet and serial sessions both provide access to the same CLI interface. We have already shown many of the options available with the Set Parameters selection, so next you will find examples of the screens and options available when Get Parameters and System Commands are chosen.

```
Tera Term Web 3.1 - 192.168.1.100 VT
File Edit Setup Web Control Window Help
DSP85-PCS-X login: pcsband
Password:

Copyright (c) 2005 Cellular Specialties, Inc.
All Rights Reserved.
Proprietary and Confidential.

Waiting for Link initialization.....Complete

=====
MAIN MENU
=====
Actions:
(1) Set Parameters
(2) Get Parameters
(3) System Commands
(x) Exit
Action?
-----
Get Parameters:
(1) Link Status
(2) System Events
(3) System Information
(m) Main menu
Parameters?
```


Selection of Link Status will provide useful information about the current repeater status and performance. Below is an example of the status screen.

```

Tera Term Web 3.1 - 192.168.1.100 VT
-----
File Edit Setup Web Control Window Help
-----
Timestamp: 2007:05:23 - 09:03:49 UTC
-----
Uptime : 0 days 21 hours 14 minutes
-----
Power (dBm)      DNLINK      UPLINK
-----
INPUT_CALC      -115.73      -104.85
INPUT           -57.54      -57.62
OUTPUT          -3.33       9.25
CALIB           27.40      29.10
MAX             29.50      30.00
VSWR            ----
-----
AGC (dB)
-----
MODE            ON
ATTENUATION     0.0        0.0
-----
Status
-----
VOLTAGE         ERR         ERR
TEMPERATURE     OK          OK
SOFTWARE        OK          OK
HARDWARE        OK          OK
OSCILLATION     OK          OK
OVERRANGE      OK          OK
CALIBRATION     OK          OK
-----
Temperature (Celsius)
-----
FPGA            65.00
-----
Power Amplifier
-----
STATUS          ON
AMPERAGE        1.14
-----
System Configuration
-----
GAIN (dB)       85.00      85.00
FILTER          PCS_EFC3    PCS_EFC3
-----
Get Parameters:
(1) Link Status
(2) System Events
(3) System Information
(m) Main menu
Parameters? █

```

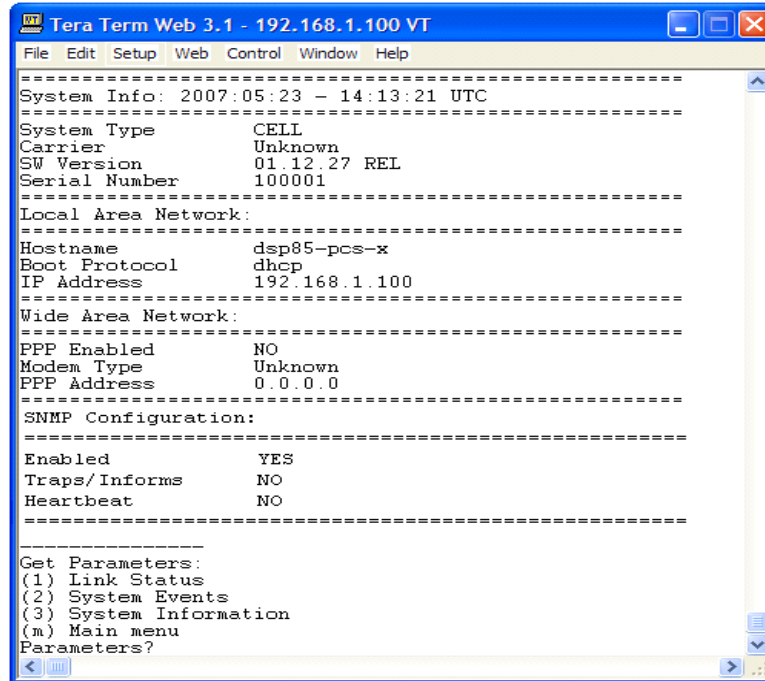
Selection of the System Events option will bring up the following set of sub-options.

```

Tera Term Web 3.1 - 192.168.1.100 ...
-----
File Edit Setup Web Control Window Help
-----
-----
Get Parameters:
(1) Link Status
(2) System Events
(3) System Information
(m) Main menu
Parameters?
-----
Events:
(1) list
(2) clear
(m) Main menu
Events?
-----

```

The System Information selection will display the following screen.



```
Tera Term Web 3.1 - 192.168.1.100 VT
File Edit Setup Web Control Window Help
=====
System Info: 2007:05:23 - 14:13:21 UTC
=====
System Type      CELL
Carrier          Unknown
SW Version       01.12.27 REL
Serial Number    100001
=====
Local Area Network:
=====
Hostname         dsp85-pcs-x
Boot Protocol    dhcp
IP Address       192.168.1.100
=====
Wide Area Network:
=====
PPP Enabled      NO
Modem Type       Unknown
PPP Address      0.0.0.0
=====
SNMP Configuration:
=====
Enabled          YES
Traps/Informs   NO
Heartbeat        NO
=====
Get Parameters:
(1) Link Status
(2) System Events
(3) System Information
(m) Main menu
Parameters?
```

Modem Interface (Remote Access with login)

A modem can also be used to gain remote access to the unit provided the repeater has been properly equipped. A selection of modems is available as an option. If the modem requires a SIM card for activation, it must be added to the repeater before site installation and operation. Special requirements must be met for the SIM card to become fully functional, contact the service provider. In addition, an IP address must be obtained and entered into the CSI-DSP85-CP.

Once the modem has been installed and activated, it can be accessed from any terminal emulation program just as in the serial and Telnet examples provided earlier. Access response time will depend on many factors, some of which are:

- Quality of the connection (RF signal in the case of wireless modems)
- Technology (CDMA, EDGE, GPRS, etc.)
- Network congestion (Throughput)

When a connection has been established, the same login screen shown in both the serial and Telnet examples is presented.

One Year Limited Warranty

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Industry Certifications/Registration Numbers:
FCC: NVRCSI-DSP85-CP

Notes

Notes



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