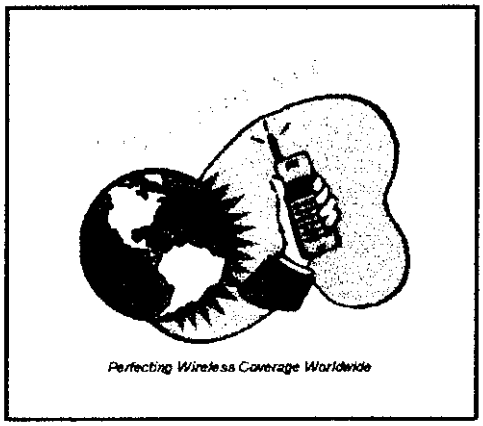
RepeaterNet Craft for the

OA1900C NR



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RepeaterNet Software Version 2.1

August 1998

Repeater Technologies

Perfecting Wireless Coverage Worldwide

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Revision B

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Contents

Chapter 1. Installing RepeaterNet

This chapter briefly describes the components of the RepeaterNet software, identifies minimum system requirements, and describes the installation procedure.

RepeaterNet Craft Software

The RepeaterNet **Craft** software (Craft) provides Windows 95- and Windows NT-based configuration management and alarm monitoring for individual Repeater Technologies repeaters and dynamically manages sessions in real time through one of these connections:

⇒ A ***laptop*** computer with a ***direct*** connection to the repeaters—a technician can visit repeater sites and connect to the repeaters directly using the serial port on the laptop.

⇒ A ***laptop*** or ***desktop*** computer with a ***modem*** connection to the repeater—with the modem connection, a technician need not visit the physical repeater sites to connect to the repeaters.

The Craft user interface varies, depending upon the model repeater being configured or monitored.

NOTE: *You must have Administrator priviledge to install Craft 2.1 software when running Windows NT.*

Minimum System Requirements

Craft system requirements include:

⇒ Pentium 120 MHz running Windows 95 with 32 MB of memory

⇒ Approximately 10 MB of free disk space

⇒ Modem (if a modem connection is to be used)

NOTES:

⇒ *The Craft system must be used with Windows 95 with Service Pack 1 Update (Version 4.00.950 A) or later releases or Windows NT, Service Pack 3 Update.*

⇒ *Use "Hayes-compatible" modems only. "Connect with Rockwell" certified for modems of 56K and above. US Robotics modems are not supported.*

⇒ *If you use a fax program such as Microsoft Fax, make sure that the Auto Answer feature is disabled. See* ***Appendix D. Troubleshooting*** *on page 33, Problem 7, for how to disable Auto Answer for Microsoft Fax.*

Installation Procedure

The OA1900C NR Craft software is distributed on 3 HD floppy disks. To install:

1. Insert **Disk 1** in your **a:** drive.
2. From the Windows **Start** menu, select **Run**.
3. Type **a:\setup** and click on **OK**.
4. Follow the online instructions to install the Craft software.

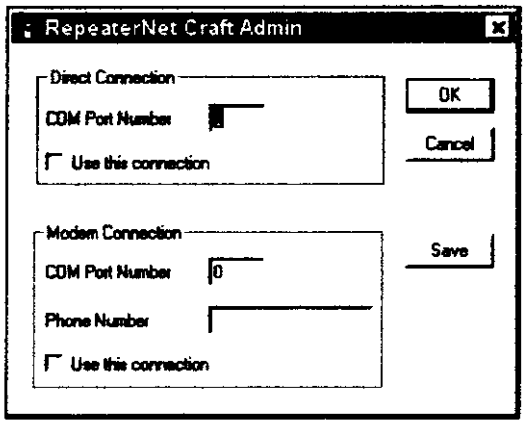
The Craft software comes with default configuration files, which you can download to your repeater according to the repeater type and number of channels. This eliminates the need to configure the properties manually. See **Download Properties** on page 22.

Configuring the Repeater Connection

You must use the **RepeaterNet Craft Admin** program to configure the connection to the repeater before you can access the RepeaterNet Craft software. Follow this path from the **Start** menu to invoke the RepeaterNet Administrator:

Start -> Programs -> RepeaterNet Craft 2.1 -> RepeaterNet Craft Admin

When you invoke the Administrator, a window such as the following is displayed:



You can save both **Direct** and **Dial-Out (Modem)** configurations, but remember to assign a unique **COM Port Number** to each. Also, be sure to check **Use this connection** for only one of the configurations. The connection checked is the connection RepeaterNet Craft uses to connect to the repeater.

For example, you may assign the connection type as **Direct** through **COM Port 1**. You can check the **Use this connection** box to make this your default configuration. Click on **Save**.

Next, you can save a **Modem** configuration to another COM port, such as **COM Port 2**:

1. Assign a **COM Port Number** that is different from the COM Port Number used for **Direct** connection.
2. Click on **Save**, then click on **OK** to exit RepeaterNet Admin.

Starting Craft

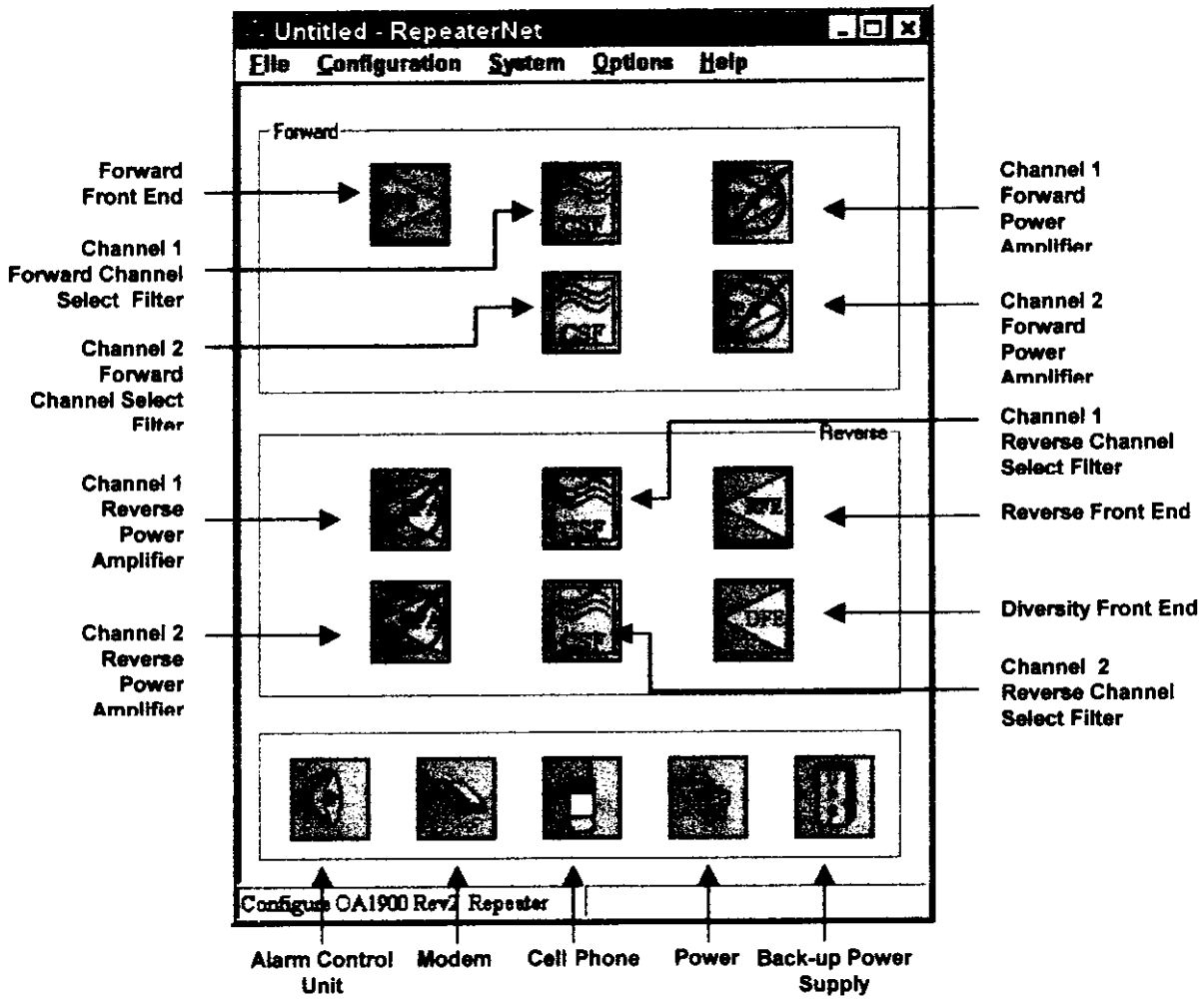
Double-click the Craft icon to display this window.

RepeaterNet connects to the repeater and displays the Craft Main Control screen for the OA1900C NR.

OA1900C NR Craft Main Control Screen

The Craft Main Control screen provides access to all monitor and control functions of the OA1900C Network Repeater (NR).

Main Control screen icons (labeled on the following screen) provide access to subsystem status screens and report alarms.



OA1900C NR Craft Main Control Screen

NOTES:

⇒ *All units are shipped with PAs turned OFF as indicated by the PA OFF indicator (a circle with a slash through it) displaying over each PA subsystem icon (FPA and RPA). PAs should remain OFF until gain is adjusted.*

⇒ *The Main Control screen displays differently depending on the hardware configuration of the unit. For example, Channel 2 icons are grayed-out (unavailable) for a single-channel repeater.*

Configuration

Configure the OA1900C NR on subsystem **Properties** screens, which you can display from the Craft **Configuration** menu.

The Configuration menu contains the following:

Front End.....Forward, Reverse, and Diversity
Channel 1 .....Available on all units
Channel 2 .....Available on 2-channel units only
Alarm Control Unit .....ACU
Modem .....Internal or external modem option
Cellular phone .....Cellular option only
Power System .....Input, battery, and internal
UPS .....Backup power system

Status Reporting

Once you have configured the repeater, you can monitor and control repeater system functions on subsystem **Status** screens. Click a subsystem icon to open its status screen.

When an alarm is triggered, the subsystem icon changes appearance, blinks, and activates an audible alarm. Clicking on the icon and viewing the subsystem status screen stops the blinking and the audible alarm. The display of the icon does not revert to normal until the alarm condition is cleared.

The display of the Forward PA and Reverse PA icons also indicate the operational status of the PAs. If a PA is OFF, a circle with a slash is displayed over the associated icon.

When RepeaterNet displays a subsystem as disabled, that subsystem is not available to the repeater. For example, in repeaters without a cellular phone, the cellular icon is displayed in light gray.

Alarm Status Reporting on the Main Control Screen

RepeaterNet uses a color system to report subsystem alarm status on the Main Control screen. The meanings of the colors, and color independent icons, is shown in the following table.

Subsystem Alarm Status	Icon Color	Color-Independent Icon	Action
Normal—No Alarm	Green	N/A	N/A
Critical Alarm	Red	X	Call Out
Major Alarm	Yellow	\	Call Out
Minor Alarm	Blue	.....	Call Out
Event	White	None	None
Disabled	Dark Gray*	N/A	None
System Not Available	Light Gray	N/A	N/A
* When all alarms in an individual subsystem are disabled or set to event severity, the icon color displays in dark gray.			

When an alarm is triggered, the icon color of the affected subsystem changes from green (normal) to the color of the alarm definition, and the icon blinks.

RepeaterNet also offers two optional alarm features:

- ⇒ **Color Independent Icons** is provided for operators unable to distinguish colors
- ⇒ **Alarm Sounds** adds an audible alarm

Should more than one alarm within an individual subsystem be triggered, the higher severity alarm is reported on the Main Control screen.

For example, if both a major and a minor Reverse PA alarm triggers, a yellow subsystem icon is reported. If the major alarm is cleared while the minor alarm remains active, a blue subsystem icon is reported. Color-independent icons also report the higher severity alarm, should more than one alarm on an individual subsystem be triggered..

NOTE: *When an subsystem alarm is triggered, click the icon (to open the status screen) to terminate the icon blinking feature and silence the audible alarm. Icon color continues to report and a color independent icon (if applicable) continues to display until the alarm is cleared. Color reporting does not apply to subsystems set to Event severity.*

Defining Alarm Severity

The OA1900C NR is factory-configured with a standard set of alarm severity settings. Adjust alarm severity on the subsystem **Properties** screens. See **Chapter 3. Configuring OA1900C NR Properties** on page 6 for more information about alarm severity and the factory configuration.

The levels of alarm severity are:

- ⇒ Critical
- ⇒ Major
- ⇒ Minor
- ⇒ Event
- ⇒ Disabled

To define alarm severity:

1. Login to a session with the repeater.
2. Select **Configuration** from the Main Control menu bar, then select a subsystem to open its **Properties** screen. For example, select **Configuration -> Channel 1**.

   The **Alarms** tab is displayed.
3. Click the down-arrow next to an **Alarm** field to select a new alarm severity.
4. Click **Apply** or **OK**.

Chapter 3. Configuring OA1900C NR Properties

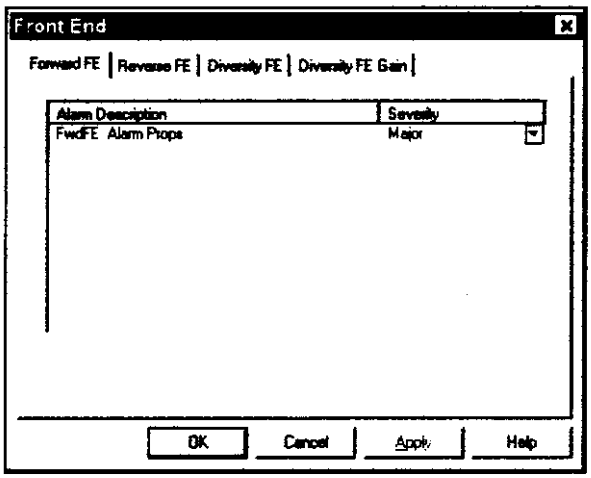
Use the subsystem **Properties** screens to perform configuration of the repeater. To open a Properties screen, select a subsystem from the **Configuration** menu.

- ⇒ Front End
- ⇒ Channel 1
- ⇒ Channel 2
- ⇒ Alarm Control Unit
- ⇒ Modem
- ⇒ Cellular Phone
- ⇒ Power System
- ⇒ UPS

The Properties screens display tabs specific to each subsystem. Some subsystem Properties screens include tabs for redefining alarm severity and specifying operational settings; others have a single tab for redefining alarm severity.

Configuration includes:

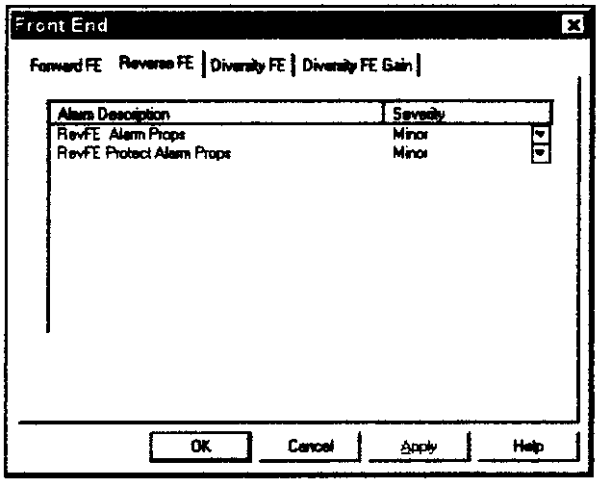
- ⇒ Redefining alarm severity
- ⇒ Specifying operational settings for the repeater



Front End Properties

The **Front End Properties** screen lets you configure the Front End subsystems. This screen includes tabs that let you set the alarm severity for:

- ⇒ Forward FE
- ⇒ Reverse FE
- ⇒ Diversity FE



Forward FE Tab

The **Forward FE** tab lets you set the alarm severity of the Forward FE alarm. The Forward FE alarm is activated when the forward signal power level is too strong and is being attenuated to protect the repeater from possible damage.

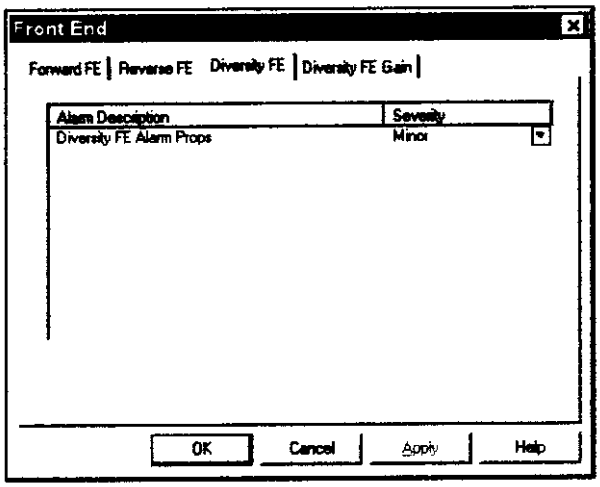
NOTE: *Do not adjust power amplifier gain while this alarm is active.*

Reverse FE Tab

The Reverse FE tab lets you set the alarm severity of the Reverse FE alarm. The Reverse FE alarm is activated when the reverse signal power level is too strong and is being attenuated to protect the repeater from possible damage.

NOTE: *Do not adjust power amplifier gain while this alarm is active.*

Diversity FE Tab



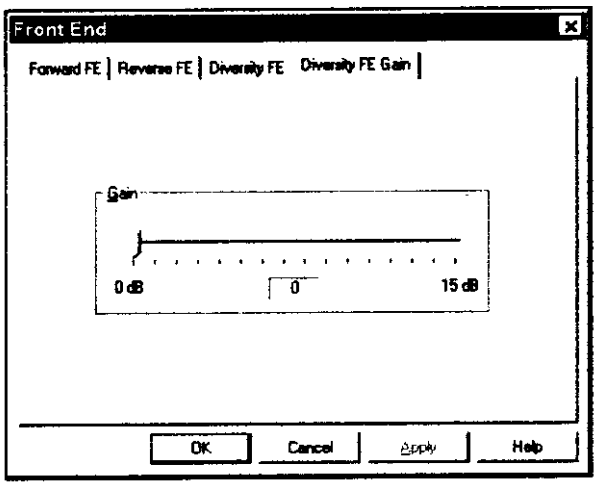
The **Diversity FE** tab lets you set the alarm severity of the Diversity FE Alarm and set the gain of the Diversity receiver.

The Diversity FE alarm is activated when the Diversity Receive signal power level is too strong and is being attenuated to protect the repeater from possible damage.

NOTE: *Do not adjust power amplifier gain while this alarm is active.*

Diversity FE Gain Tab

Gain must be carefully balanced in any application to ensure proper hand-off and system operation. Note that RepeaterNet detects the configuration of the repeater and displays the applicable gain range on the **Diversity FE Gain** tab. You can adjust the Diversity FE gain. The adjustable gain range depends upon the type of repeater you are using and the power level of the power amplifiers.



To adjust Diversity FE gain:

1. Select **Configuration ->Front End** to open the Front End Properties screen.
2. Click the **Diversity FE Gain** tab.
3. Click-drag the horizontal sliders to define forward and reverse gain, noting that gain adjusts in 2 dB increments. The gain value box (centered under slider) displays selected gain.
4. Click **Apply** or **OK**.

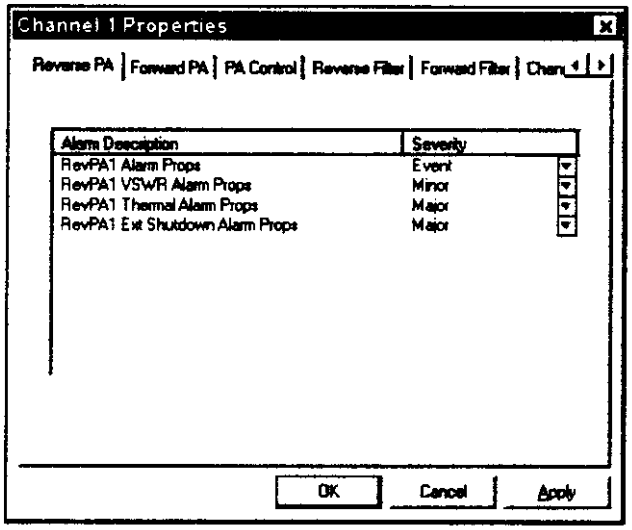
Channel Properties

From the Main Control screen menu bar, select **Channel 1** or **Channel 2** (for 2-channel units only) to open a Channel Properties screen.

Channel properties include:

- ⇒ Reverse PA
- ⇒ Forward PA
- ⇒ PA Control
- ⇒ Reverse Filter
- ⇒ Forward Filter
- ⇒ Channel #
- ⇒ Gain

Channel Reverse PA Tab



The Reverse PA tab shows the most recent alarm state, including severity, date, and time, for these alarms:

PA Alarm
Indicates a component failure in the power amplifier; the repeater is inoperative.

VSWR Alarm
Indicates a problem with the Voltage to Standing Wave Ratio.

Thermal Alarm
Indicates the system temperature has exceeded the alarm threshold. The repeater has been shut down. When the temperature falls below subsystem tolerances, the repeater automatically reactivates the PA.

External Shutdown Alarm
Indicates that the repeater has been shut down by a user; also activates one RPA alarm.

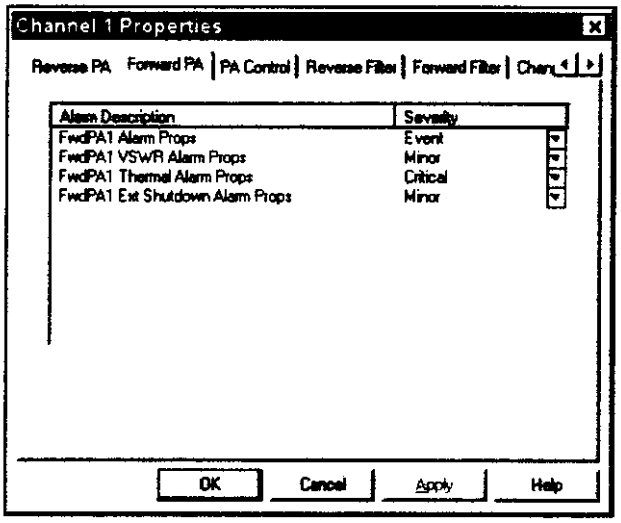
Redefine alarm severity for the **Reverse PA** subsystem on this tab.

1. Click the down-arrow next to an **Alarm** field to select a new alarm severity.
2. Click **Apply** or **OK.**

See **Forward PA** for a sample screen.

Channel Forward PA Tab

The Forward PA tab shows the most recent alarm state, including severity, date, and time, for these alarms:



PA Alarm
Indicates a component failure in the power amplifier; the repeater is inoperative.

VSWR Alarm
Indicates a problem with the Voltage to Standing Wave Ratio.

Thermal Alarm
Indicates the system temperature has exceeded the alarm threshold. The repeater has been shut down. When the temperature falls below subsystem tolerances, the repeater automatically reactivates the PA.

External Shutdown Alarm
Indicates that the repeater has been shut down by a user; also activates one RPA alarm.

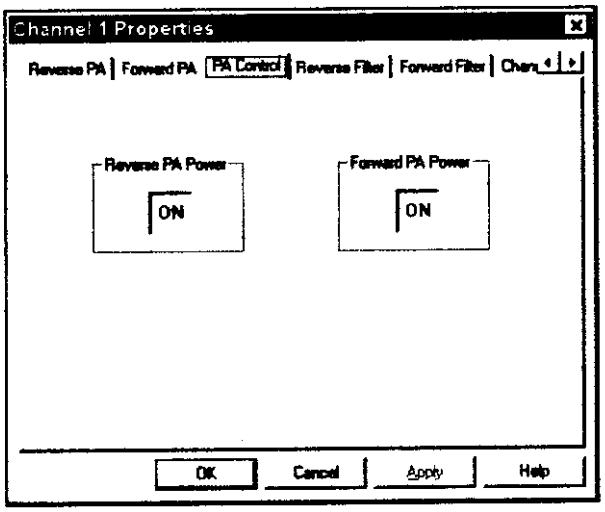
Redefine alarm severity for the **Forward PA** subsystem on this tab.

1. Click the down-arrow next to an **Alarm** field to select a new alarm severity.
2. Click **Apply** or **OK**

Channel PA Control Tab

The **PA Control** tab provides a switch to turn PA power ON or OFF.

1. Click on **ON** or **OFF** in the **PA Power** box to change the value.
2. Click **Apply** or **OK** for the setting to take effect.



Channel Reverse Filter Tab

This tab displays the most recent alarm state for a single channel select filter alarm. A failure in the Reverse Filter assembly triggers an alarm and the filter becomes inoperative.

Redefine alarm severity for the **Reverse Filter** subsystem on this tab.

1. Click the down-arrow next to an **Alarm** field to select a new alarm severity.
2. Click **Apply** or **OK**

Values are Disabled, Event, Minor, Major, and Critical.

See **Forward Filter** for a screen example.

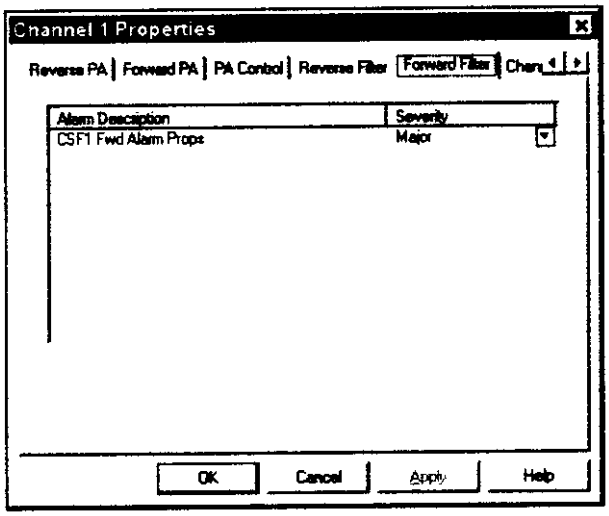
Channel Forward Filter Tab

This tab displays the most recent alarm state for a single channel select filter alarm. A failure in the Forward Filter assembly triggers an alarm and the filter becomes inoperative.

Redefine alarm severity for the **Forward Filter** subsystem on this tab.

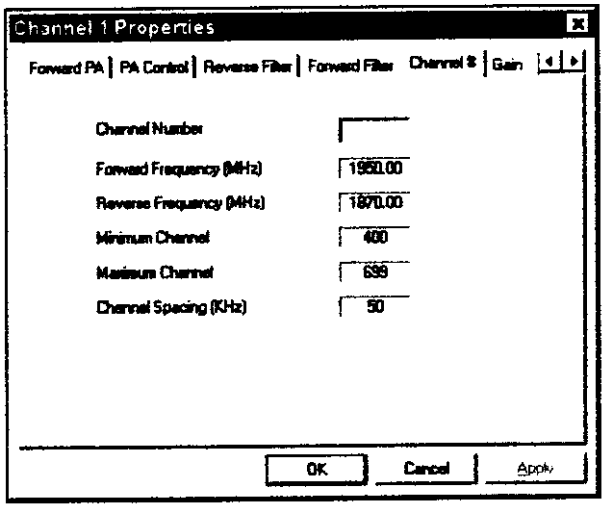
1. Click the down-arrow next to an **Alarm** field to select a new alarm severity.
2. Click **Apply** or **OK.**

Values are Disabled, Event, Minor, Major, and Critical.

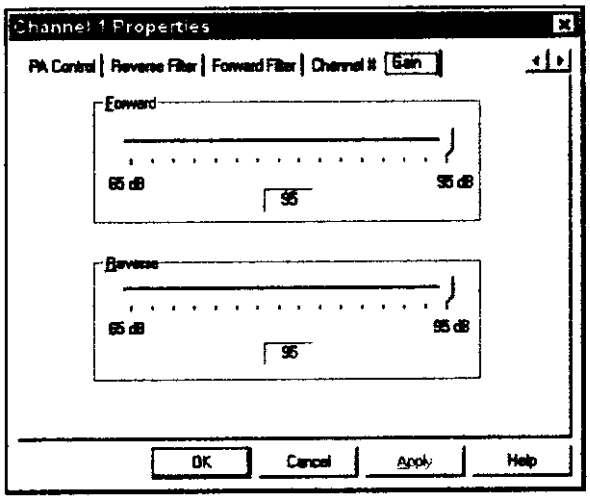


Channel # Tab

The **Channel #** tab lets you set the operating channel or band for Channel 1 or Channel 2. Once you select a channel, the corresponding frequencies are displayed. Consult your network administrator or the system Site Plan for the proper channel or band setting.



Channel Gain Tab



RepeaterNet detects the configuration of the repeater and displays the applicable gain range on the **Gain** tab. You can adjust Forward and Reverse gain for the selected channel.

The adjustable gain range depends upon the type of repeater you are using and the power level of the power amplifiers. RepeaterNet limits gain adjustment to valid selections only.

NOTE: *Set gain for the Diversity Receiver on the Diversity FE tab of the Front End Properties screen.*

Gain must be carefully balanced in any application to ensure proper hand-off and system operation.

To adjust Forward PA or Reverse PA gain:

1. Select **Configuration ->Channel 1** ***or*** **Channel 2** to open the Channel Properties screen.
2. Click the **Gain** tab.
3. Click-drag the horizontal sliders to define forward and reverse gain, noting that gain adjusts in 2 dB increments. The gain value box (centered under each slider) displays selected gain.
4. Click **Apply** or **OK**.

ACU Properties

Select **Alarm Control Unit** from the Main Control screen **Configuration** menu to open the **ACU Properties** screen. This screen includes tables for **I/O Descriptions**, **I/O Control**, **Alarms**, and **DC Voltage Alarm Threshold**.

The ACU subsystem provides alarm and control functions for the repeater. The ACU monitors all the repeater subsystems and reports status to a connection device or to remote devices through a dial-up modem connection. In addition to monitoring the repeater system, the ACU contains a number of external inputs and outputs to monitor and control external devices.

Inputs and Outputs

RepeaterNet lets you monitor two digital alarm inputs and one DC voltage input from external devices. You also can activate up to four external devices with two relay outputs and two digital outputs.

NOTE: *Alarm settings for digital input 1 and digital input 2 are initially set to Disabled.*

The inputs and outputs are as follows:

Relay Outputs 1 and 2

The two relay outputs are configured with three leads in a Form C Contact Closure, with normally closed and common connectors closed with the switch in the OFF position and normally open and common connectors closed with the switch in the ON position.

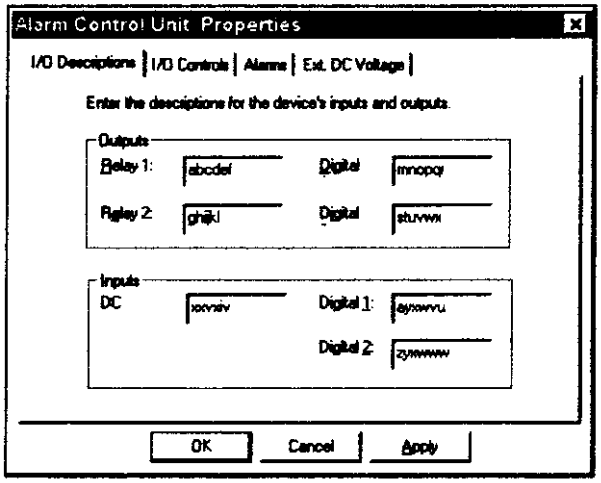
Digital Outputs 1 and 2

The two digital outputs each have two leads that provide an opto-isolated circuit that presents a low impedance connection when the switch is in the ON position and a high impedance connection when the switch is in the OFF position.

Digital Inputs 1 and 2

The two digital inputs each have leads that generate an alarm condition if the leads form a low impedance circuit (a closed contact), and a clear condition if the leads form a high impedance circuit (an open circuit).

For information about connecting inputs and outputs to the repeater, see the *OA1900C NR Operations Manual.*

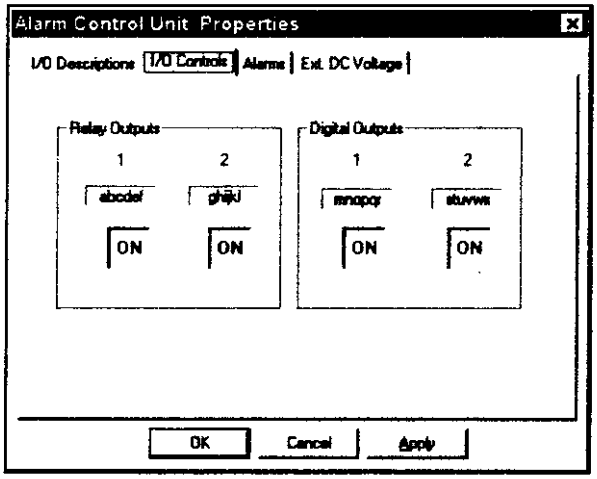


ACU I/O Descriptions Tab

Label external equipment connected to the repeater's inputs and outputs using the **I/O Descriptions** tab. External equipment could be a security light or any other site equipment.

To add I/O Descriptions:

1. Select **Configuration->Alarm Control Unit** to open the ACU Properties screen. The I/O Descriptions tab is active.
2. Provide I/O Descriptions in available data fields.
3. Click **Apply** or **OK**.



ACU I/O Controls Tab

The I/O Controls tab contains switches to turn Relay Outputs and Digital Outputs for channels 1 and 2 ON or OFF.

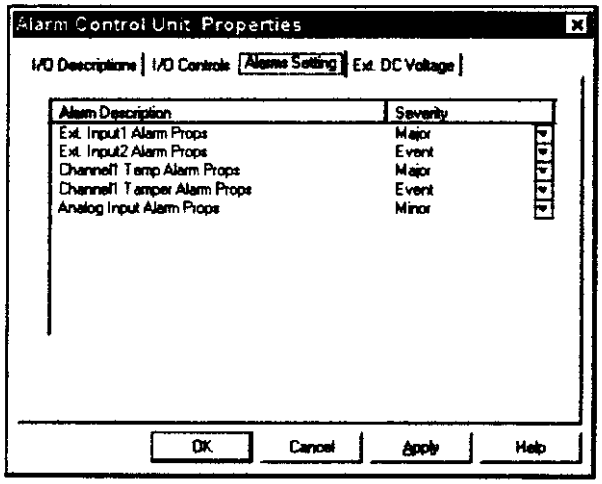
See **Inputs and Outputs** on page 10.

ACU Alarms Setting Tab

Redefine alarm severity for ACU subsystems on the **Alarms Settings** tab.

1. Click the down-arrow next to an **Alarm** field to select a new alarm severity.
2. Click **Apply** or **OK.**

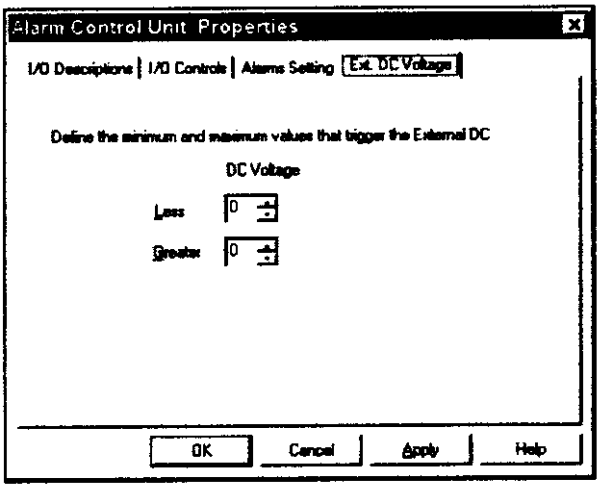
Values are Disabled, Event, Minor, Major, and Critical.



ACU DC Voltage Alarm Threshold Tab

RepeaterNet can monitor an external DC voltage power source (a battery) in a range of 0 to 60 volts in 250 mV increments. In addition to monitoring the voltage level, you can define upper and lower limits for the voltage that is to activate the DC Voltage alarm in the ACU subsystem.

Monitor the voltage of a DC power source (supplied by you) used to power external site equipment using the **DC Voltage Alarm Threshold** tab. An alarm is triggered if the voltage fluctuates from a defined operating range.



To define an operating range for DC voltage:

1. Select **Configuration->Alarm Control Unit** to open the ACU Properties screen.
2. Click the **DC Voltage Alarm Threshold** tab.
3. Define (type in or arrow-click) the normal operating range for the DC power source in the **Less Than** and **Greater Than** data fields.
4. Click **Apply** or **OK**.

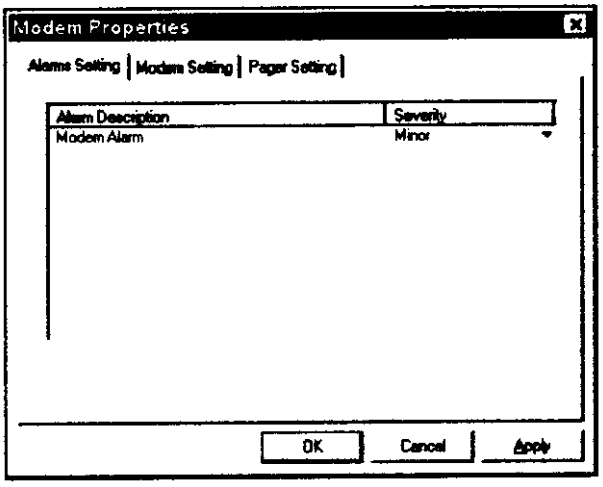
Modem Properties

From the Main Control screen menu bar, select **Configuration->Modem** to open the Modem Properties screen. This screen has two tabs:

Alarm Setting
Lets you set the alarm severity for the Modem alarm. This alarm indicates a failure of the internal modem.

Modem Setting
Lets you define the port settings for the internal or external modem.

Pager Setting
Lets you configure a pager to be notified when a certain severity level alarm occurs.



Alarm Setting

Use the **Alarm Setting** tab to redefine alarm severity for the repeater's modem.

1. Click the down-arrow next to an **Alarm** field to select a new alarm severity.
2. Click **Apply** or **OK.**

Values are Disabled, Event, Minor, Major, and Critical.

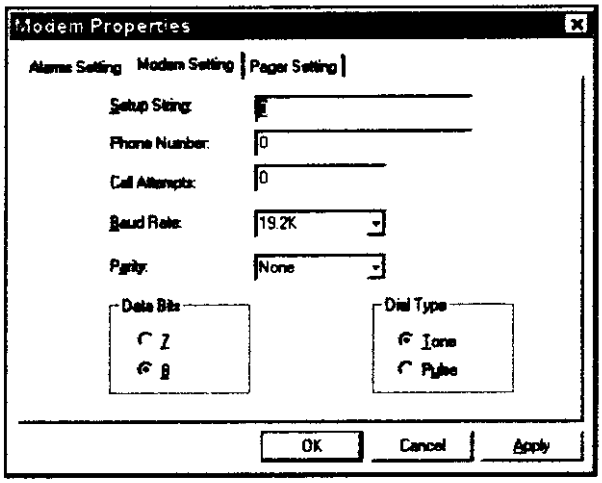
Modem Setting

Define modem settings for the repeater's modem using the **Modem Properties** tab.

To define modem settings:

1. Select **Modem** from the Main Control screen **Configuration** menu to open the Modem Properties screen.
2. Click the **Modem Settings** tab.
3. Define the **Setup String**, **Phone Number**, and **Call Attempts**.

   Setup String is reserved for configuring a cell phone or modem.



***NOTE**: The cell phone setup string is 537=6*

   Phone Number is the phone number of a remote computer to be called. This value is 0 unless you are using RepeaterNet Network Management software or other network management software.

   Call Attempts is the number of callout attempts before disconnecting; a zero (0) disables calling.

4. Click **Apply** or **OK**.

Changes made to the default settings on the Modem Properties screen take effect upon exiting RepeaterNet.

Note the following about modem settings:

⇒ **Baud Rate** is adjusted automatically downwards by the modem when necessary

⇒ **Parity** must be set the same as the computer's modem

⇒ **Data Bits** must be set the same as the computer's modem

⇒ **Dial Type** usually is **Tone**

In addition:

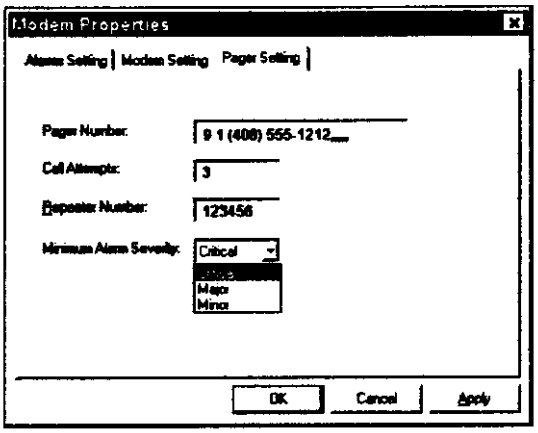
⇒ If you configure a repeater to automatically call out and report alarm status, the repeater COM port settings **must match** the settings of the modem to be called.

⇒ For users to log in to the repeater with a modem, the port settings of their computer's modem (defined in the configuration file) **must match** the settings of the repeater modem.

⇒ If the repeater is equipped with an internal modem, the setup string is controlled automatically by the repeater's hardware. If the repeater is connected to an external modem, consult the modem's documentation for the setup string.

⇒ Changes you make to the default settings on the Modem Properties screen take effect upon exiting RepeaterNet.

Pager Setting



You can set RepeaterNet to send out a page when a certain severity level alarm occurs with the **Pager Setting** tab.

A page is generated if the summary alarm severity is greater than or equal to the **Minimum Severity** you select. When a page request is detected, the repeater terminates any current modem connection and generates a page. The page format consists of the repeater number followed by the severity level; for example, 123456-2.

If a change in the current alarm severity is detected, note the following:

⇒ If the **Minimum Severity** is set to **Major** and a **Major** alarm comes in, a page with a severity of **2** is generated.

⇒ If a **Critical** alarm is detected, page is generated again with a severity of **3** (Critical plus Major).

⇒ If the **Major** alarm is cleared but the **Critical** alarm remains, a page is generated with a severity of **1** (Critical)

⇒ If the **Critical** alarm is cleared, a page is generated with a severity of **0**.

⇒ If a **Minor** alarm is detected, no page is generated because the **Minimum Severity** is set to **Major**.

⇒ **Events** do not generate a page.

Severity numbers are:

No Alarms	0	Minor	4
Critical	1	Critical + Minor	5
Major	2	Major + Minor	6
Critical + Major	3	Critical + Major + Minor	7

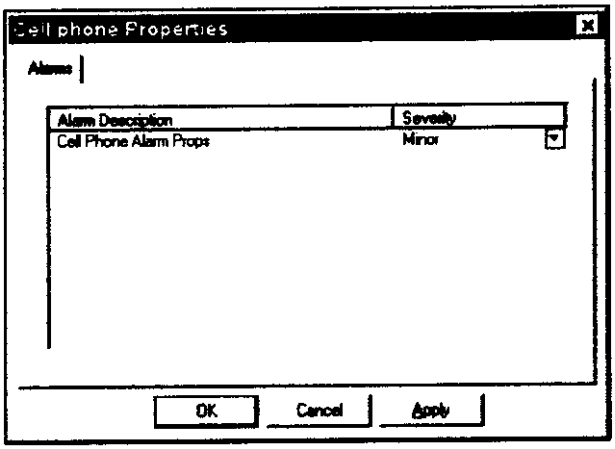
To set a pager:

1. Click on the **Pager Setting** tab of the **Modem Properties** screen.
2. Enter the **Pager Number**, the number of times RepeaterNet should attempt to call the pager number (**Call Attempts**), and the number of the repeater (**Repeater Number**).

   The **Pager Number** is the phone number to be called. This reflects the pager phone number, including networking access number (9), 1, and area code (if needed). Access the network dial number and wait 5 seconds before sending the page sequence.

   Several commas must follow the phone number—each comma generates a delay of 1 second. Generally, it takes about 3 seconds for the pager company to pick up the line, and a maximum of 5 seconds before they drop the connection. A good delay would be 5 seconds, in which case you would add 5 commas; for example, **9 1 (408) 555-1212,,,,,** . Spaces, dashes, and parentheses are ignored.
3. Enter the **Call Attempts,** which are the number of retry calls to be attempted. A value of 0 in this field disables paging.
4. Enter the **Repeater Number** (a system identification number or description).
5. Select the minimum alarm severity for paging. Values can be **Critical**, **Major**, or **Minor**.
6. Click on **Apply** to set the values without exiting the properties screen; click on **OK** to set the values and exit.

Cell Phone Properties



From the Main Control screen **Configuration** menu, select **Cellular Phone** to open the **Cell Phone Properties** screen.

The **Alarms** tab lets you set the alarm severity for the Cellular Alarm. This alarm indicates a failure of a cellular phone.

To change alarm severity:

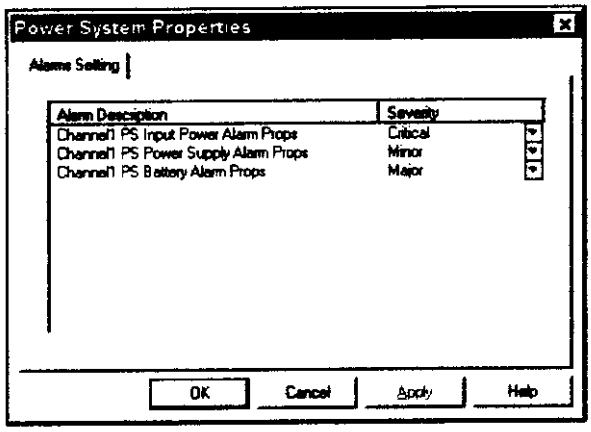
1. Click the down-arrow next to an **Alarm** field to select a new alarm severity.
2. Click **Apply** or **OK**.

Severity levels include **Disabled**, **Event**, **Minor**, **Major**, and **Critical**.

NOTE: *This severity should be minor. The Cell Phone alarm is generated when the cell phone fails to report an alarm after all retry attempts by either the modem or the pager. This alarm clears when the cell phone succeeds in reporting an alarm.*

When there is no cell phone, the Cell Properties selection is disabled.

Power System Properties



From the Main Control screen **Configuration** menu, select **Power System** to open the **Power System Properties** screen. This screen lets you access initial configuration settings for the power subsystem.

Redefine alarm severity for Power systems using the **Alarms** tab.

1. Click the down-arrow next to an **Alarm** field to select a new alarm severity.
2. Click **Apply** or **OK.**

   Values are **Disabled**, **Event**, **Minor**, **Major**, and **Critical**.

The **Alarm Settings** tab lets you set the alarm severity of the following alarms:

Input Power Alarm
The input power to the repeater is out of system tolerances.

Power Supply Alarm
The internal system power of the repeater is out of tolerances.

Battery Alarm
The voltage of the internal battery is below tolerances. This battery supplies power to the ACU, modem, and cell phone in the event of a system power failure, letting the repeater call out and report its status. It also supplies power to the memory that stores the Alarm and Event Log.

Battery Charger Alarm
The internal battery charger is not charging the internal battery.

NOTE: *The internal battery does not provide power for RF components and the repeater will not be able to provide RF coverage during a power failure.*

Backup Power System (UPS) Properties

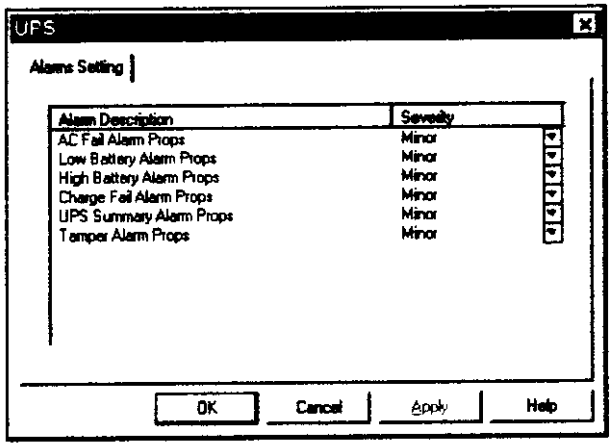
The UPS Properties screen lets you access initial configuration settings for the optional, external backup power supply.

From the Main Control screen menu bar, select **Configuration -> UPS** to open the **UPS Properties** screen.

Redefine alarm severity for backup power systems using the **Alarms Setting** tab.

1. Click the down-arrow next to an **Alarm** field to select a new alarm severity.
2. Click **Apply** or **OK.**

Values are Disabled, Event, Minor, Major, and Critical.



You can set the severity for the following alarms:

AC Fail Alarm
Indicates that the input power to the BUPS has failed. In this case, the BUPS provides 40 or 80 amp-hours (depending upon which BUPS model is installed) of backup power for the repeater before shutdown. (The AC source powers the charger.)

Battery Low Alarm
Indicates that battery voltage of the BUPS is below operating tolerances and the BUPS cannot power the repeater.

Battery High Alarm
Indicates that battery voltage of the BUPS is above operating tolerances and the BUPS cannot power the repeater.

Charge Fail Alarm
Indicates that the internal charger of the BUPS has failed and the BUPS is unable to recharge its batteries.

Summary Alarm
Indicates that one or more of the BUPS alarms have been triggered.

Tamper Alarm
Indicates that the door of the BUPS is open.

Chapter 4. Monitoring OA1900C NR Status

Monitor and control repeater system functions on subsystem **Status** screens. Click a subsystem icon to open its **Status** screen.

Each Status screen includes one or more of the following tabs:

Alarms
Reports present subsystem alarm states, with date and time stamps.

Measurements
Reports power and operational temperature measurements, including Low and High values. A Reset Low/High button resets values.

Voltages
Reports present voltages for a subsystem.

Control
Includes ON/OFF switches for internal and external subsystem hardware.

Status screens for the OA1900C NR are:

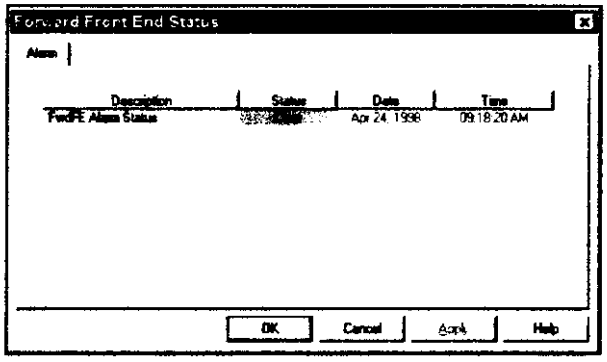
- ⇒ Front End Status
- ⇒ Channel Status
  - ◊ Filter Status (Forward and Reverse)
  - ◊ PA Status (Forward and Reverse)
- ⇒ Alarm Control Unit (ACU) Status
- ⇒ Modem Status
- ⇒ Cellular Phone Status
- ⇒ Power System Status
- ⇒ UPS Status

Front End Status

Click an FFE (Forward Front End) icon to display the **Front End Status** screen. The Front End Status screen **Alarm** tab reports these alarms:

Forward FE alarm
Activated when the forward signal power level is too strong and is being attenuated to protect the repeater from possible damage.

Reverse FE alarm
Activated when the reverse signal power level is too strong and is being attenuated to protect the repeater from possible damages.



Diversity FE alarm

Activated when the Diversity Receive signal power level is too strong and is being attenuated to protect the repeater from possible damage.

Channel Filter Status

Click a Channel 1 or Channel 2 filter icon (sine waves) to open a filter Status screen, which reports a CSF1 Forward Alarm (Forward Filter) and CSF1 Reverse Alarm (Reverse Filter) with date and time stamps. A failure in the Reverse or Forward filter assembly triggers an alarm.

Channel PA Status

Click a Channel 1 or Channel 2 FPA or RPA icon to open a PA Status screen.

PA Alarm Tab

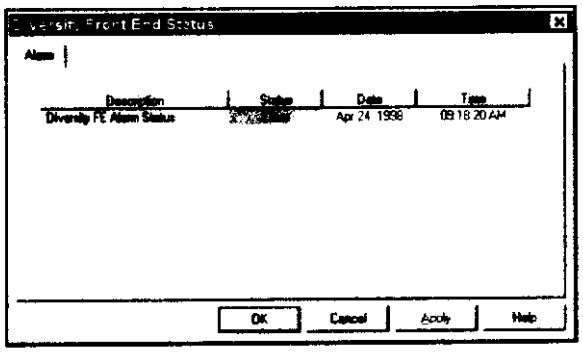
The PA **Alarms** tab reports subsystem alarms with date and time stamps: A failure in the Forward or Reverse PA assembly triggers an alarm.

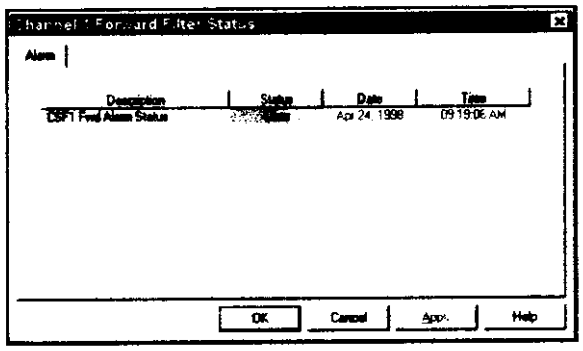
PA Measurement Tab

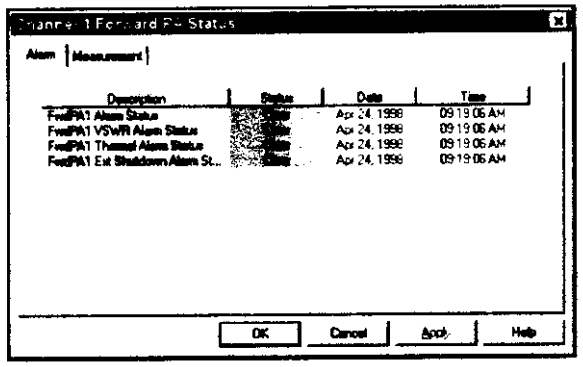
The Channel 1 and Channel 2 PA **Measurement** tabs reports the output power of the repeater, including low and high output values. To reset low and high output values, click **Reset Low/High**.

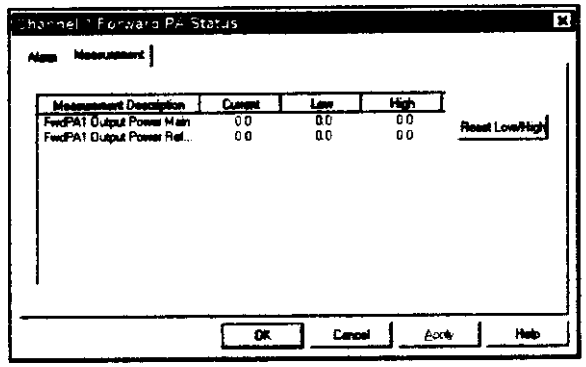
ACU Status

Click the ACU icon to open the **ACU Status** screen. There are two tabs—**Alarm** and **Measurement**.









ACU Alarm

The **Alarm** tab reports subsystem alarms with date and time stamps. A failure in the ACU assembly triggers an alarm.

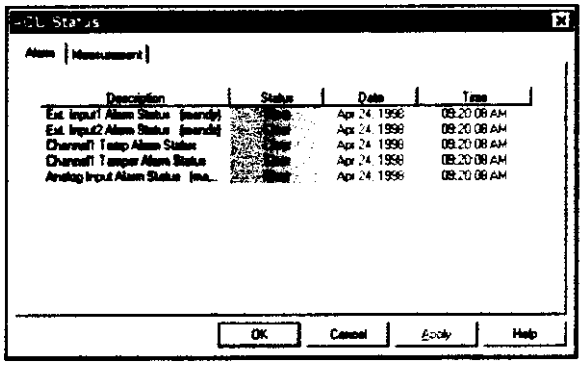
The ACU alarms include:

External Input Alarms (1 and 2)
An alarm generated from optional, external equipment.

Temperature Alarm
The system temperature threshold has been exceeded.

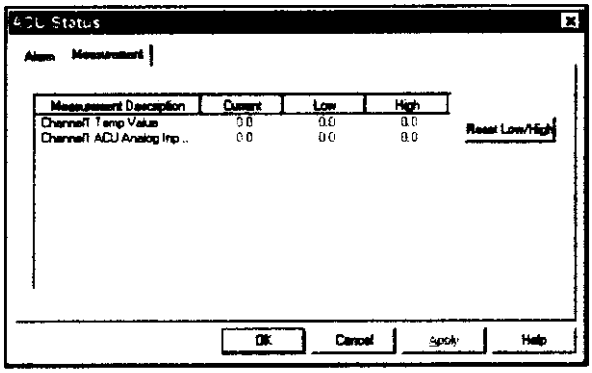
Tamper Alarm
The repeater door is open.

Analog Input Alarm
The upper or lower limits for monitoring of the analog input DC voltage source have been exceeded.



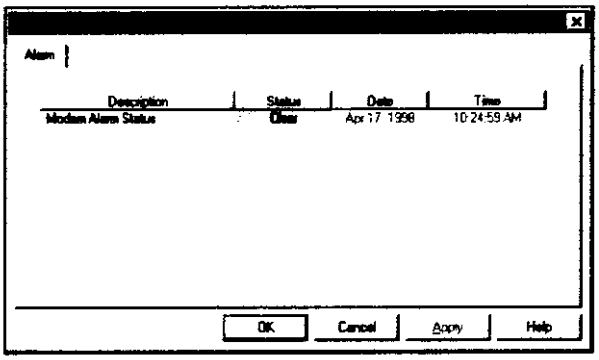
Measurement

The **Measurement** tab reports current, low, and high system temperature and DC voltage source values. Click on the **Reset Low/High** button to reset the low and high values.



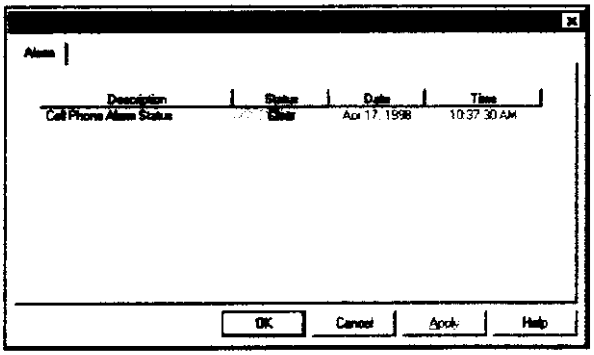
Modem Status

Click the Modem icon to open the **Modem Status** screen, which reports a modem alarm with a date and time stamp. Internal modem component failure triggers an alarm.



Cell Phone Status

Click the Cell Phone icon to open the Cell Phone Status screen, which reports a Cell Phone Alarm with a date and time stamp. Internal cellular phone component failure triggers an alarm.

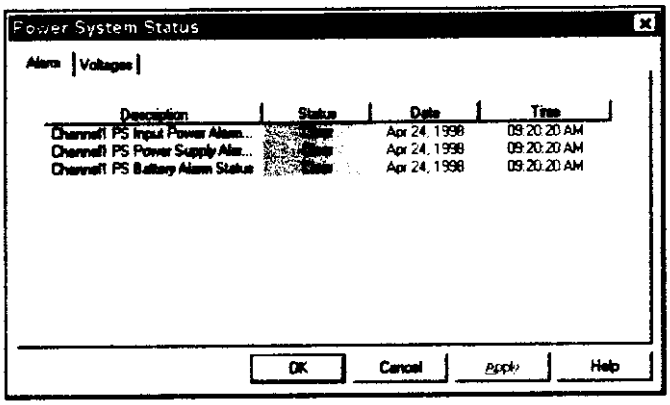


Power System Status

Click the Power icon to open the **Power System Status** screen. This screen allows access to monitoring and operating tasks for the repeater's power subsystem.

Alarm

The **Alarms** tab reports the status of the following alarms with severity, date, and time information for each:



Input Power Alarm
Indicates the input power to the repeater is out of tolerances.

Power Supply Alarm
Indicates system power of the repeater is out of tolerances.

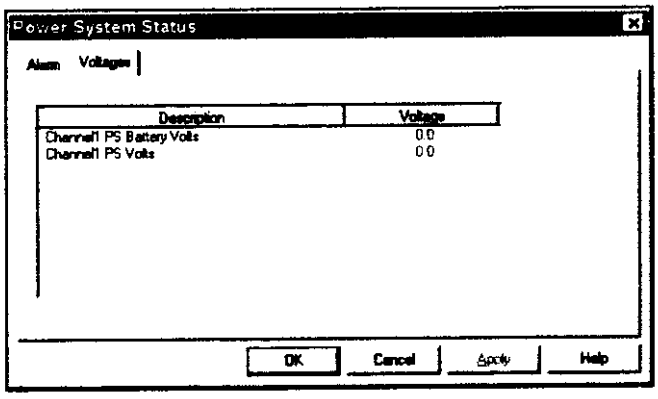
Battery Alarm
Indicates the voltage of the internal battery is out of tolerances. This battery supplies power to the ACU, modem, and cellular phone in the event of a system power failure, letting the repeater call out and report its status. It also supplies power to the memory that stores the Alarm and Event Log.

Battery Charger Alarm
Indicates that the internal battery charger is not charging the internal battery.

NOTE: *The internal battery does not provide power for RF components and the repeater will not be able to provide RF coverage during a power failure.*

Voltages

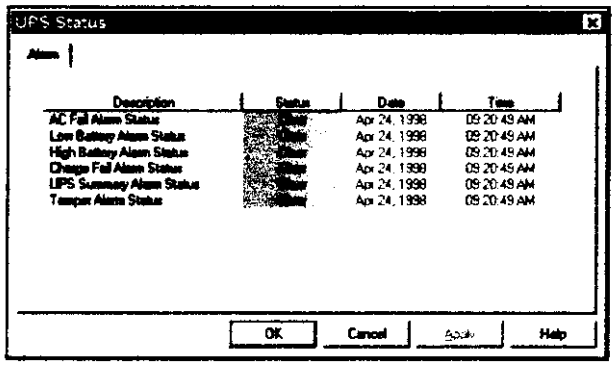
The Voltages tab shows the current power values for Battery Volts, Channel 1 PA Volts, and Channel 2 PA volts.



UPS Status

The **UPS Status** screen allows access monitoring of the optional, external backup power supply.

This screen includes an **Alarms** tab, which displays the alarm status of the following alarms:



AC Fail Alarm
Indicates that the input power to the BUPS has failed. In this case, the BUPS provides 40 or 80 amp-hours (depending upon which BUPS model is installed) of backup power for the repeater before shutdown. (The AC source powers the charger.)

Battery Low Alarm
Indicates that battery voltage of the BUPS is below operating tolerances and the BUPS cannot power the repeater.

Battery High Alarm
Indicates that battery voltage of the BUPS is above operating tolerances and the BUPS cannot power the repeater.

Charge Fail Alarm
Indicates that the internal charger of the BUPS has failed and the BUPS is unable to recharge its batteries.

Summary Alarm
Indicates that one or more of the BUPS alarms have been triggered.

Tamper Alarm
Indicates that the door of the BUPS is open.

Chapter 5. RepeaterNet Commands

Commands available from the OA1900C NR Main Control screen's menu bar are described in this chapter.

File Menu—OA1900C Craft

Open the Main Control screen **File** menu to display the RepeaterNet commands described in this section.

Download Properties

You can download all settings previously uploaded to a repeater with the **Download Properties** command. You can use **Download Properties** to:

⇒ Download the default configuration file distributed with your Craft software to avoid having to manually configure each setting.

⇒ If you have used the **Upload Properties** command to store repeater configuration settings.

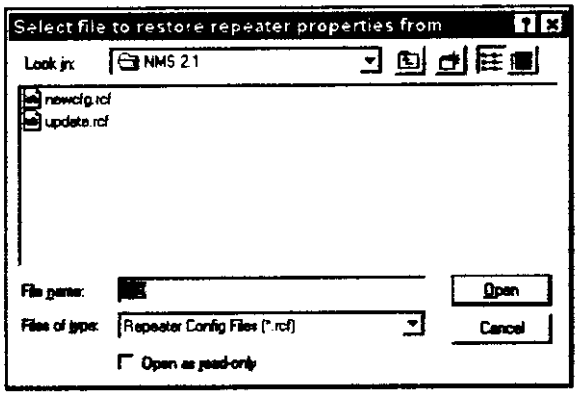
The following preset configuration files are distributed with RepeaterNet Craft installation software and can be found by following this path:

Program Files -> Repeater Technologies -> RepeaterNet Craft 2.1 -> Config Files

Configuration File	Configuration
OA1900C_2_Chan_NMS.rcf	OA1900C repeater *without* modem or phone
OA1900C_2_Chan_ModemPhoneNMS.rcf	OA1900C repeater *with* modem or phone

To download settings to a repeater using the standard repeater configuration file:

1. From the Craft Main Control **File** menu, select **Download Properties;** a confirmation box is displayed to give you an opportunity to change your mind about the download operation.
2. Click on **OK** to proceed; a **Select file to restore** box is displayed.
3. Select the repeater configuration file whose properties you want to download.
4. Click on **Open** to proceed with the download.

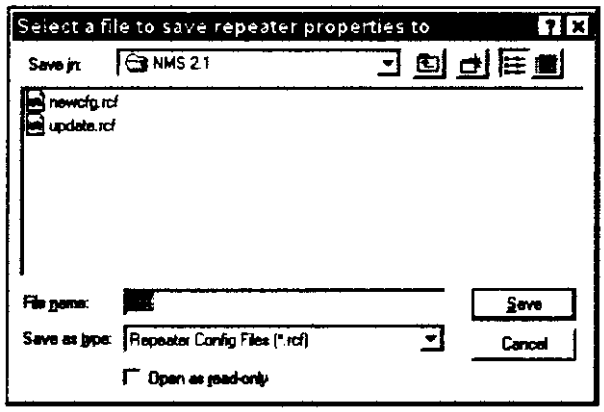


Upload Properties

System settings are stored in a repeater configuration (.rcf) file, which you can use to download all settings from one repeater to additional repeaters in a network, or to configure a replacement unit.

Once you have configured a repeater, you can upload the configuration from that repeater to your workstation with the **Upload Properties** command. You then can use the **Download Properties** command to copy the configuration to individual repeaters in your network.

To upload system settings and create a repeater configuration file:



1. Select a repeater and open Craft.
2. Select **File->Upload Properties** to open the **Select a file to save repeater properties to** dialog box.
3. Enter a name for the file without a file extension. An .rcf extension is added automatically to the file name; for example, *filename.rcf*.
4. Click **Save** to initiate the upload.
5. Click **OK** when the upload is complete.

Save a copy of the repeater configuration file on a floppy disk for safekeeping.

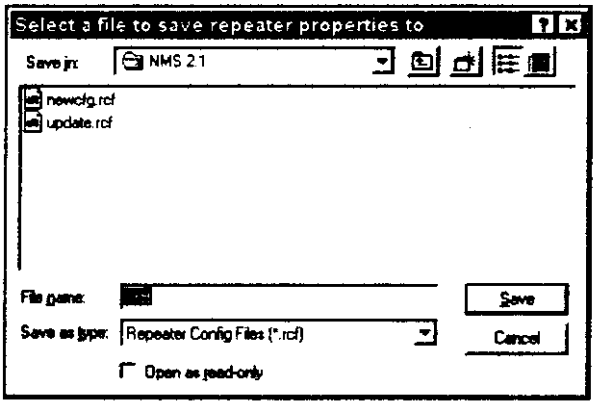
NOTES:

⇒ *When you create a backup file, be aware that Repeater Configuration (.rcf) files created using a Network Monitor login include IDs and passwords.*

⇒ *The Repeater Configuration (.rcf) file is saved in the RepeaterNet program directory.*

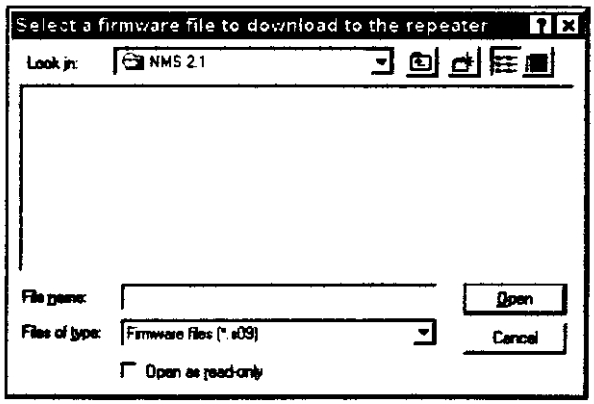
Update Repeater Firmware

Install a firmware upgrade with the **Update Repeater Firmware** command. Note that firmware updates are sent automatically to the designated point of contact for every affected owner of the repeater. Update packages are sent using overnight delivery and include a detailed notice, a floppy disk, and installation instructions. Any questions concerning the update should be directed to the Repeater Technologies Customer Service Department.



To install a firmware upgrade:

1. Read documentation provided with the firmware upgrade.
2. Login to a session with the repeater to be upgraded.
3. Insert the upgrade disk into the computer's floppy drive.
4. From the Main Control screen menu bar, select **File->Update Repeater Firmware.**



An **Open** dialog box is displayed to let you save the repeater's configuration. You can choose to select a file into which the configuration should be saved, or click on **Cancel** to proceed with the firmware update.

- To save the configuration and continue with the firmware update, select an .rcf file and click **Open.**
- If you do not want to save the repeater configuration, click on **Cancel**.
- Clicking **Open** or **Cancel** causes the upload operation to proceed; an **Uploading Repeater** window displays the progress of the upload.

5. When the upload is complete, the **Select a firmware file to download to the repeater** box is displayed. In the **Look In** box, select the drive in which the upload disk is located.
6. Double-click the upgrade file. It is labeled with an **.s09** extension—for example, *filename.s09*. The previous firmware version is overwritten.
7. When the upgrade is complete, the repeater's configuration is restored automatically from the file you chose in the **Open** dialog.

Exit

The **Exit** command ends an active session with RepeaterNet and returns to the Welcome screen.

Configuration Menu—OA1900C NR Craft

Initial configuration of the repeater is done from the Configuration menu commands. See **Chapter 4. Configuring OA1900C NR Properties** on page 6 for detailed information.

System Menu—OA1900C NR Craft

Open the **System** menu to display the **Properties** and **Alarm and Event Log** commands described in this section.

Properties

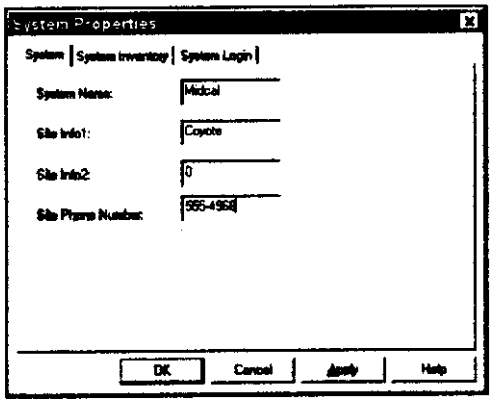
Select **Properties** from the **System** menu to open the **System Properties** screen.

NOTE: *When the repeater is on a network, the system name must be entered to match that at the Network Management Station in order for unsolicited alarms to be recognized.*

System Tab

The **System** tab includes data fields for storing site-specific information—the system name (name of the repeater), brief site information (such as a network name or city location), and the repeater phone number for a repeater with a modem option.

Entering summary data on the System Tab, although optional, is recommended. As a minimum, type a name for the repeater in the **System Name** field: during automatic reporting, the repeater name is displayed in the title bar of the Main Control screen, identifying the selected repeater.



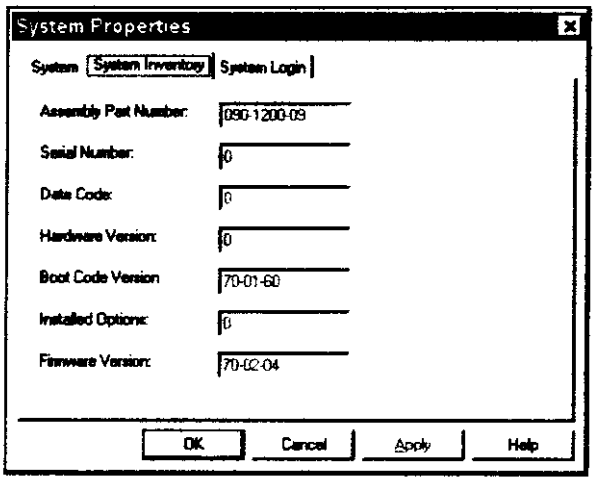
To record system data:

1. Type required information in the data fields.
2. Click **Apply** or **OK**.

System Inventory Tab

The **System Inventory** tab includes data fields that provide information about the repeater to which you are connected. RepeaterNet reads this information directly from the repeater upon successful login.

These information-only fields are described as follows:



Assembly Part Number
The part number of the repeater (for example, 090-1200-09).

Serial Number
The 9-digit serial number of the repeater.

Date Code
The date the repeater was built.

Hardware Revision
The repeater hardware revision (such as Rev. A).

Boot Code Version
The version of the boot code installed in the repeater.

Installed Options
Optional internal equipment in the repeater (such as a cell phone).

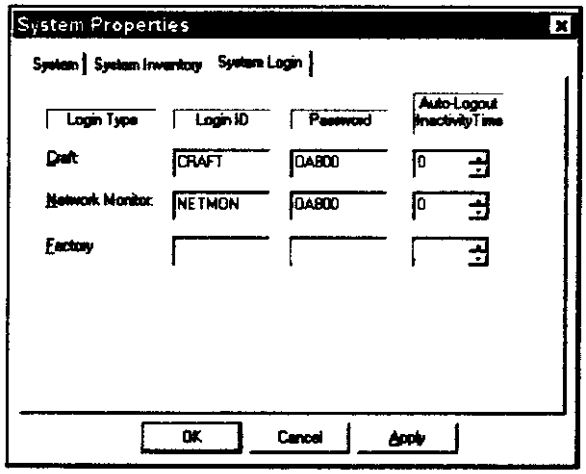
Firmware Version
The firmware version installed in the repeater.

Login Tab

The **Login** tab includes fields to type in login IDs and passwords and to configure the Auto-Logout function.

In the **Auto-Logout Inactivity Time** field, define how long RepeaterNet should wait, during a period of inactivity, before terminating a session. A time interval in minutes between 1 and 60 can be defined independently for each access level. If you enter a zero in a time field, this feature is disabled.

NOTE: *When the repeater is part of a network, the time field must be zero (0).*



To change a login ID or password:

1. Login to the repeater (as an administrator).
2. Select **Properties...** from the **System** menu.
3. Click the **Login** tab.
4. Type the new login ID or password (using six or fewer characters) into the appropriate fields.
5. Write down login IDs and passwords and secure in a safe place.

6. Click **Apply** or **OK** to set the new information.
7. Notify affected operators of ID and password changes.

NOTE: *When the repeater is networked, this information also must reside in the NMS Database.*

Alarm and Event Log

Open the **Alarm and Event Log** from the System menu to view the alarm and event history of the OA1900 NR. The log is dynamically updated during viewing.

Line entries in the Alarm and Event Log are organized as follows:

1. Subsystem affected by an alarm or event
2. Alarm severity
3. Date and time stamp

Saving , Printing, and Editing the Log

Alarm and Event Log entries can be printed, saved, or edited using Notepad. Click on **Run Notepad**; a copy of the Alarm and Event Log is displayed in a Notepad window, in which you can edit the log. To print or save the log, select **Print** or **Save as...** from the Notepad **File** menu.

Options Menu—OA1900C NR Craft

Open the **Options** menu to display the **Color Independent Icons** and **Alarm Sounds** RepeaterNet commands.

Color Independent Icons

Color Independent Icons are special graphic indicators designed to assist operators unable to distinguish colors. As part of the alarm reporting system, Color Independent Icons display on the Main Control screen for a Critical, Major, or Minor alarm. By default, the Color-Independent Icons feature is OFF.

From the Main Control screen menu bar, select **Options->Color Independent Icons** to turn ON this feature.

Alarm Type	Color Independent Icon
Critical Alarm	 through subsystem icon
Major Alarm	 through subsystem icon
Minor Alarm	 through subsystem icon

Alarm Sounds

The Alarm Sounds feature allows for an intermittent alarm to activate when a subsystem triggers an alarm. By default, the Alarm Sounds feature is OFF.

From the Main Control screen menu bar, select **Alarm Sounds** from the **Options** menu to turn ON this feature.

NOTE: *During an alarm, either clicking a subsystem icon to open the Status screen or clearing the alarm silences an audible alarm.*

Hold Connection

The Hold Connection feature maintains the direct or dial-in connection to the repeater for monitoring until you terminate the connection.

Help Menu—OA1900C NR Craft

RepeaterNet on-line help is designed to provide quick access to information related to the operation of the repeater.

⇒ To open RepeaterNet Help, select **Help->Help Topics**.

⇒ To learn about the version of RepeaterNet Craft, RepeaterNet NMS, or RepeaterNet Administrator installed, select **About...** from the **Help** menu of any program window.

Navigating Help

⇒ From the **Contents** tab, double-click a book icon to open its contents, then double-click a topic icon to open its Help page. A help page provides detailed topic information. Help pages can contain links—identified by green, underlined text—to related topics.

⇒ From the **Index** tab, type a topic name in the data field to automatically jump to a topic or use the scroll bar to locate a topic entry. Double-click an index entry to open its Help page.
Click the **Index** tab to open the **Find Setup Wizard** utility, which searches for specific words and phrases instead of searching by category. Follow the prompts.

⇒ To find out the version of RepeaterNet in use, select **About** from the Main Control screen **Help** menu.

Exiting RepeaterNet

To exit RepeaterNet, return to the Main Control screen **File** menu and select **Exit**.

Appendix A. Default Alarm Settings

Subsystem	Option	Alarm	Default Setting
Front End	Forward	Fwd FE Alarm	Critical
	Reverse	RevFE Alarm RevFEProtect Alarm	Critical Critical
	Diversity	DiversityFE Alarm	Critical
Channel 1	Reverse PA	Rev PA Alarm Rev PA VSWR Alarm Rev PA Thermal Alarm Rev PA Ext Shutdown Alarm	Critical Critical Major Major
	Forward PA	Fwd PA Alarm Fwd PA VSWR Alarm Fwd PA Thermal Alarm Fwd PA Ext Shutdown Alarm	Critical Critical Major Major
	PA Control	Reverse PA Forward PA	OFF OFF
	Reverse Filter	CSF Rev Alarm	Event
	Forward Filter	CSF Fwd Alarm	Event
	Gain	Forward and Reverse	65DB
Channel 2	Reverse PA	Rev PA Alarm Rev PA VSWR Alarm Rev PA Thermal Alarm Rev PA Ext Shutdown Alarm	Critical Critical Major Major
	Forward PA	Fwd PA Alarm Fwd PA VSWR Alarm Fwd PA Thermal Alarm Fwd PA Ext Shutdown Alarm	Critical Critical Major Major
	PA Control	Reverse PA Forward PA	OFF OFF
	Reverse Filter	CSF Rev Alarm	Event
	Forward Filter	CSF Fwd Alarm	Event
Alarm Control Unit (ACU)	(*If external inputs or equipment are used, set alarm severity as appropriate.)	External Input 1* Alarm External Input 2* Alarm Temperature Alarm Tamper Alarm Analog Input Alarm Ext. Growth Box Alarm	Disabled Disabled Minor Major Disabled Disabled
Power Supply		Channel PS Input Power Power Supply Alarm Battery Alarm Battery Charger Alarm	Critical Critical Minor Disabled
Backup Power Supply		AC Fail Alarm Low Battery Alarm High Battery Alarm Charge Fail Alarm UPS Summary Alarm Tamper Alarm	Disabled Disabled Disabled Disabled Disabled Disabled
Modem		Modem Alarm	Minor
Cell Phone		Cell Phone Alarm	Minor

Appendix B. RepeaterNet Executables

The installation program installs all necessary application executables and associated support drivers in a Windows folder you select or, by default, in `c:\Program Files\Repeater Technologies\ RepeaterNet`. The installation program also provides entries into the system registry.

The main RepeaterNet executable files are:

CraftAdmin
: The Database Administrator program used to configure and select the communications port used by RepeaterNet Craft.

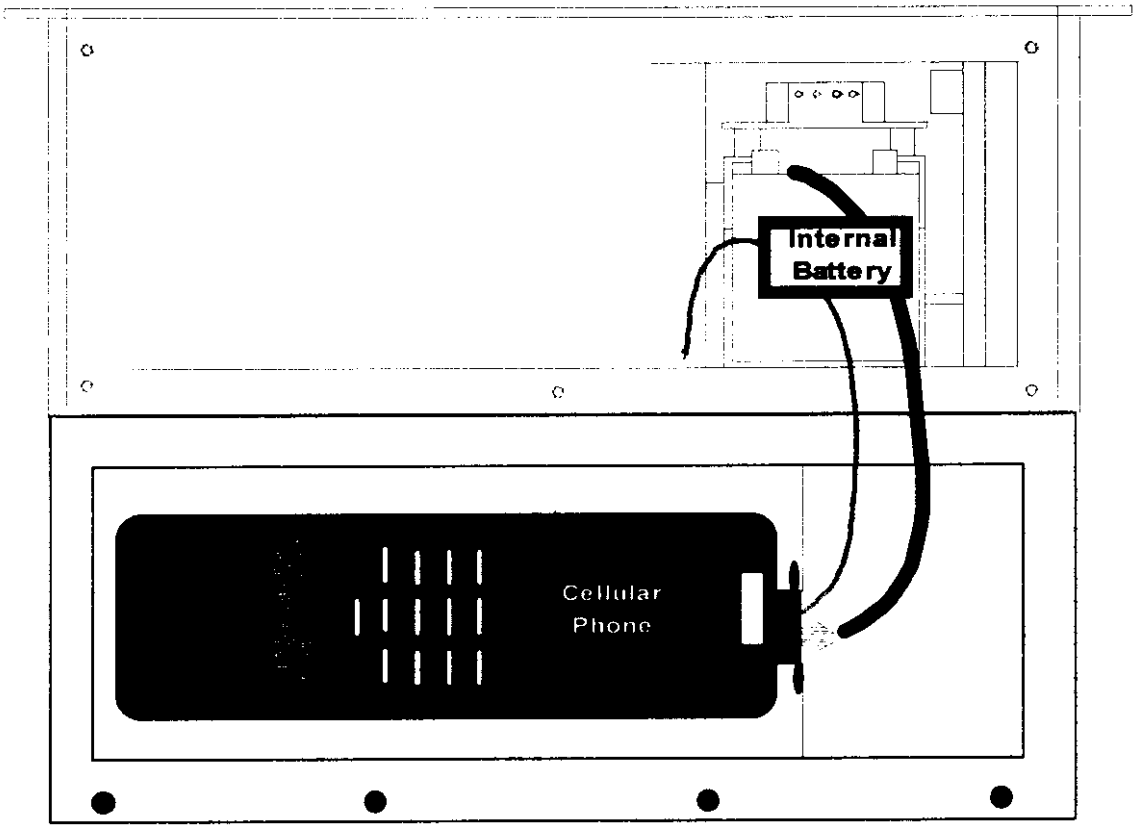
RepeaterNet
: The Craft graphical user interface for different repeater hardware types. Used in the setting and viewing of individual repeater items.

When any of these executable files are running, an icon is displayed on the Windows Task Bar.

Appendix C. The Oki Cellular Phone

Accessing the OKI Cellular Phone

The cellular phone is located on the inside door of the OA1900C NR entry box. Unscrew the four screws securing the metal box lid.



NOTE: *The AC charger and cell phone antenna are provided in the accessory kit.*

Programming the OKI Cellular Phone

An abbreviated set of instructions for NAM programming of your Oki Phone is provided in this section. For more detailed information, see your OKI PHONES 1400 Series documentation.

Programming Mode Access

1. Turn the power on and press **Rcl + Func** keys at the same time.
2. Enter your 5-digit special password within 30 seconds.
3. After the special password is logged in successfully, **ESN/HEZ Number** and **Software Version Number** are displayed for two seconds each.
4. Two seconds later the **Speed Dial Memory reset prompt** is displayed.
5. Proceed to the next section, "Speed Dial Memory Clear," or press volume ▼▲ to scroll within the NAM Programming menu.

Speed Dial Memory Clear

Scroll the NAM Programming Menu until "**Spd dial**" appears n the display, followed by the reset prompt ("reset-0"). Press **0** to clear the Speed Dialing Memory.

Default Data Set

Scroll the NAM programming menu until "**def data**" appears on the display, followed by the reset prompt (""reset-0"). Press **0** to reset all user programmable functions to the Manufacturer's default.

Lock/Unlock Code Programming

1. Scroll the NAM Programming Menu until "Uloc and (current code)" appears on the display. The default is "1234."
2. Enter a new 1-to-4 digit unlock code and press **Sto** key.

Telephone Number Programming

1. In this menu, you can program information that is unique to Telephone #1. Follow the instructions or press **Clr** to skip to Telephone #2 or the next item on the main NAM Programming menu.
2. The display indicates "**tel.no 1**" followed by the last seven digits of the current phone number. Enter the new number (area code plus telephone number) and press **Sto**.

Authentication Key Programming

The display indicates "**Auth.no**." followed by "**Entr.no**." Enter the authentication key provided by the carrier (up to 26 digits) and press **Sto**. If an invalid number is entered, the display shows "**not good**" followed by "**Entr.no.**"

Home SID Programming

Enter a 5-digit SID number and press **Sto**. The IPCH Number Initial paging channel number is set automatically depending on the stored Home SID number.

ACCOLC Number

The current number is displayed. Enter a new number if required, then press **Sto**.

GID Number

1. The current number is displayed. Enter a new number if required, then press **Sto**.
2. Press **Clr** to return to the main NAM Programming menu.

Emergency Number

1. The display shows "**Help no.**" and the current setting. Enter a new number (up to 11 digits) if required.
2. Press **Sto**.

Preferred SID Programming

1. Scroll the Preferred NAM Programming menu. Press **Rcl** and enter the desired Preferred SID number (5 digits).
2. Press **Sto**. You can enter up to 50 SID locations.
3. Press **Clr** key to advance to the next programming option.

Language Option Set

Press **Rcl** and scroll through the available options.

When the desired language is displayed, press **Sto**.

System Options Programming

1. Scroll the NAM Programming menu and press **Rcl** to enter the **Option Programming** menu.
2. While in this menu, press **Rcl** to change settings and **Sto** to save and go on to the next setting. Press **Clr** at any time to return to the main NAM Programming menu.

Option bits are defined as follows: 0 0 0 1 1 0 1 0

0 = Reserved for future use
0 = Reserved for future use
0 = Reserved for future use
1 = MINMK = Mobile ID Number Mark (0=No, 1=Yes)
1 = LUMK = Local Use Mark (0=No, 1=Yes)
0 = AMMK = Audio Mute Mark (0=Call, 1=Always)
1 = HFMK = Handsfree Mark (0=No, 1=Yes)
0 = HAMK = Horn Alert Mark (0=No, 1=Yes)

Appendix D. Troubleshooting

The following attempts to identify the most common problems associated with the successful operation of the RepeaterNet system. The steps listed to resolve the problem may not include all of the possible reasons for non-operability, but may assist in identifying the actual difficulty. The problem attributes in the following paragraphs have been ordered with the most likely problem listed first.

If you continue to have problems, call Repeater Technologies Customer Support for assistance. See inside the front cover of this document for current telephone numbers.

Problem 1: ***The RepeaterNet Server reports that it cannot open the NMS database.***

Either the DSN is configured improperly, does not point to the proper location, or the system did not find the DSN itself. Call Customer Support for assistance.

⇒ The correct DSN or User ID is not identified.
⇒ The Windows ODBC drivers are not installed.
⇒ The database file pointed to by the DSN is corrupted or needs repair.

Problem 2: ***The Process Manager component of the RepeaterNet Server reports that it cannot read the database Ports table.***

No ports have been configured in the system database.

The Ports table in the database may be corrupted. Repair the database and retry.

Problem 3: ***The System starts up without error but, when a repeater graphical user interface is launched, no detailed data is displayed..***

Wait for up to 4 minutes (cell modem connection) to see whether the program can connect to the repeater. If not, a warning will pop-up indicating communications could not be established.

Problem 4: ***A specific port does not seem to be in use and an Alert exists, or the database log reports the error "Unable to initialized port COMn" where n is the designation of the non-functioning port.***

The port number has been configured incorrectly or the port does not exist.

The port is assigned to another program operating in the same PC. Windows does not permit the sharing of communications ports between active programs. Shut down the other program.

Problem 5: ***The system reports "Unable to connect to repeater..."***

This can be an indication of:

⇒ The cellular carrier is not handling the call

⇒ The phone number provided is incorrect or out of service

⇒ A problem with the modem or phone line

⇒ A problem with the repeater

Problem 6: ***The system reports the message "An unsupported operation was attempted."***

This message appears when the installation failed to register the OLE controls for alarm bitmaps.

Problem 7: ***RepeaterNet conflicts with Microsoft Fax.***

To disable the auto answer mode:

1. Open the mail icon from the **Control Panel**.
2. Select **Microsoft Fax** from the **Services** tab.
3. Click on the **Properties** button.
4. Select either **Manual** or **Don't answer radio** button.

Click **OK** to save.

Problem 8: ***NMS Client reports "Cannot find application RepeaterNet Server."***

This can occur when the Server is not running or a network failure prevents the NMS Client from connecting to the Server. Verify that the Server is running and that the Server's host is accessible.

Another possibility is a conflict with the port assigned to the Server. This problem has been known to occur with a port number that previously had no conflict. Run the program "RepNetConfig.exe" in the RepeaterNet directory and increase the value of "Server Port" by one. Restart the Server and NMS Client.