
NEXTEL®



iR1200 Rugged Modem
iR1200 GPS-Enabled Modem

Installation Guide

Powered By

e-Lutions™

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IMPORTANT!
Please Read Safety Notice on Page 55
before using the iR1200 Modem.

Last Updated
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May 2003

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iR1200 Modem

FCC Compliance

DECLARATION OF CONFORMITY
Per FCC CFR 47 2.989



Responsible party name: eLutions, Inc.
Address: 5905 Breckenridge Parkway
Suite F
Tampa, FL 33610
Phone number: 1-800-836-9909

Hereby declares that the product:

Product name: iR1200 GPS-Enabled Modem
Model Number: 4000-C5-RFM

Product name: iR1200 Rugged Modem
Model Number: 4100-C5-RFM

Conforms to the following regulation:

FCC Part 15, subpart B
FCC Part 90, subpart S
Class B Digital device

Date: May 16, 2003

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 and 90 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. The equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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Before You Begin Installation



Before you begin installing the iR1200 Rugged Modem or the iR1200 GPS-Enabled Modem, you must obtain the required installation accessories and download the Administrators Guide.

For a list of approved accessories, consult the Accessories Table on page 5.

To order the required installation accessories, and the Administrator's Guide, contact your sales representative, technology administrator or designated field care representative.

Box Contents:

The iR1200 modem ships with the following:

- iR1200 Modem
- Installation Guide
- Quick Reference Guide (for operators/end users)
- Warranty Card

Required Installation Components

The following table lists the items that are required to successfully install your modem:

Vehicle Installation

- | |
|---|
| <ul style="list-style-type: none">• Approved Cellular Antenna |
| <ul style="list-style-type: none">• Vehicle Power Harness |

iR1200 Modem

<ul style="list-style-type: none">• Data Cable for computer (laptop/MDT)
<ul style="list-style-type: none">• Approved GPS Antenna (iR1200 GPS Enabled Modem only)
<ul style="list-style-type: none">• Data cable for GPS (iR1200 GPS-Enabled Modem)
<ul style="list-style-type: none">• 4 screws

Stationary Installation

<ul style="list-style-type: none">• Approved Cellular Antenna
<ul style="list-style-type: none">• AC Power Adapter
<ul style="list-style-type: none">• Data Cable for computer (laptop/MDT)
<ul style="list-style-type: none">• 4 screws



Use only an approved antenna. Unauthorized antennas, modifications or attachments could impair call quality, damage the modem, or result in the violation of FCC mandates.

Required Accessories

The following table lists the required accessories that have been approved for use with the iR1200 Rugged Modem and the iR1200 GPS-Enabled modems. Please contact your Nextel sales representative or visit www.elutions.com/wireless to order these items.

Part No.	Description
5000-C5-RFM	Mag Mount Cellular Antenna
5030-C5-RFM	Mag Mount GPS Antenna
5100-C5-RFM	Vehicle Power Harness
5200-C5-RFM	AC Power Adapter (standard temperature)
RFM-4200-5015	Administrator's Guide

iR1200 Modem

Introduction

Welcome to Nextel®

Thank you for purchasing the Nextel iR1200 modem. This modem is designed to work specifically within the iDEN® network. Once installed and configured, the iR1200 modem provides you with wireless data communications.

This chapter includes:

Using This Guide	Page 7
Nextel® Coverage	Page 7
Nextel® Customer Care Information	Page 8

Using This Guide

This guide provides instructions for the installation of the iR1200 Rugged Modem and the iR1200 GPS-Enabled Modem.

Nextel® Coverage

For details on Nextel digital cellular and data coverage, visit nextel.com.

NOTE: Transmission and reception speed may vary, based on your relative position within the coverage area. If you are in a marginal location (close to the border of the coverage area), the throughput of your modem during data transmission may be affected.

Nextel® Customer Care

For domestic customer care issues, including installation, technical support, or to order accessories contact your technology administrator or designated field care representative.

When you call, please have a detailed description of your problem. To provide you with fast and quality support, our Customer Care representative may ask for the following:

- Computer operating system (Windows 95/98/NT/2000/CE).
- Version of the operating system (e.g. NT 4, Windows 95 Version B, CE 2.1, etc.).
- Information regarding the modem (most can found on the diagnostic menu).
- Geographic location of use.
- IMEI Number
- SIM ID Number
- Account Number

Overview

This chapter contains general details about the iR1200 modem.

This chapter includes:

General Overview	Page 9
Modem Operating Modes	Page 10
Modem Configurations	Page 10

General Overview

The iR1200 Modem is an iDEN[®] data modem that consists of a modem card and an optional GPS (iR12000 GPS-Enabled Modem) receiver, contained in a rugged enclosure, to provide wireless data communications. The iR1200 modem is easy to mount, whether in a mobile or stationary environment.



Figure 1. iR1200 GPS-Enabled Modem

Modem Operating Modes

The iR1200 provides the following data connection modes:

- **Packet Data:** A wireless modem connection used for accessing the Internet, sending and receiving e-mail, and transferring small files over the packet data network using standard IP protocols.

Data is sent in packets (blocks) of data at high speed.
- **Circuit Switched Data:** A wireless modem connection for sending and receiving data (faxes, files, etc.) over the circuit-switched cellular channel, providing a direct point-to-point connection with the destination device.

Modem Configurations

Nextel offers two models of the iR1200 Modem. Both are designed to provide wireless communication for rugged environments. The distinction between the two models is the optional GPS feature.

The iR1200 modem can be purchased with the following configurations:

- **iR1200 Modem (Base Model)** - Available in bulk or individual packaging
- **iR1200 GPS-Enabled Modem** - Available in bulk or individual packaging

iR1200 Modem

The following diagram displays the components that exist on the rear panel of the iR1200 Modem.

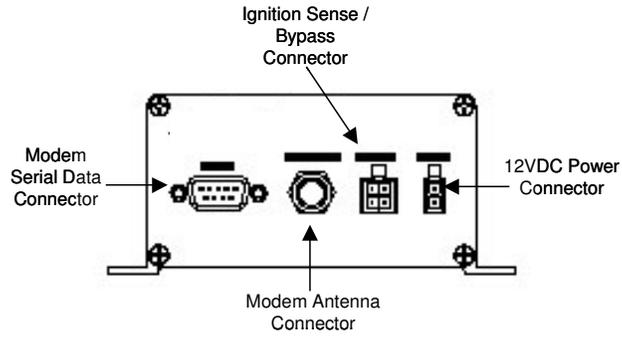


Figure 2. Rear Panel of iR1200 Rugged Modem

iR1200 GPS-Enabled Modem

The following diagram shows the components that exist on the rear panel of the iR1200 GPS-Enabled Modem.

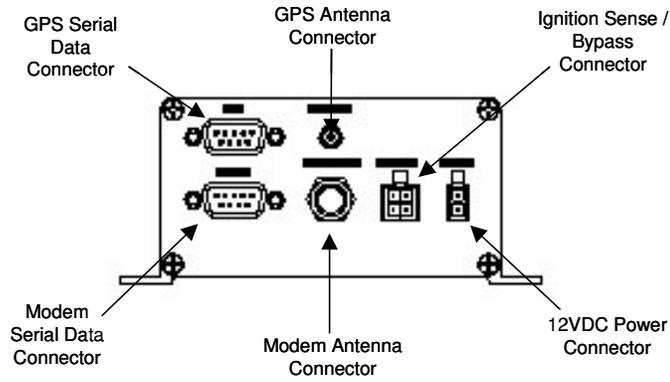


Figure 3. Rear Panel of iR1200 GPS-Enabled Modem

iR1200 Modem

Installation Preparation

In this chapter, you will learn how to begin installing your iR1200 modem.

This chapter includes:

Before You Start Installing	Page 13
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Planning Modem Location	Page 14
Modem Dimensions	Page 14
Planning Antenna Location	Page 16
Planning Cable Layout	Page 16
Serial Cable Routing	Page 17
Installation Tools	Page 17

Before You Start Installing

Only experienced technicians familiar with installing similar types of hardware equipment should install the modem. For safety and to avoid damage to the modem or vehicle wiring, the installer should have knowledge of the following subjects.

- Automotive wiring (if applicable)
- Vehicle cable routing (if applicable)
- Antenna location

Installation Planning

Planning is the key to a quick and simple installation. Before drilling holes or running wires, you should inspect the vehicle or area of the building to

iR1200 Modem

determine how and where you intend to mount the modem, antenna and accessories. (See Required Installation Components listed on page 3).

Planning Modem Location

Factors to consider when planning for the location or placement of your iR1200 modem:

- **Easily Accessible** – You should allow easy access to the modem (for troubleshooting purposes).
- **Easily Visible** – You should allow a clear view of the modem’s LED indicators.
- **Proximity of the Cables** – The distance between connections affects performance, especially the distance between the modem and antenna. The shorter the distance between these components, the better the signal. **(Please refer to the antenna’s Safety Warranty for proper installation of modem and antenna.)**
- **Environment Considerations:**



- **Heat** - Placing the modem, antenna or cables near a heat source can cause several problems, including radio interference. Select a location away from a source of heat and make sure the modem has at least a 1-inch clearance on all sides for cool air to circulate.
- **Wetness** – The modem should not be mounted in an area where it would be directly exposed to water.
- **Direct Sunlight** – The modem should not be mounted in direct sunlight.

Modem Dimensions

Consider the size of the modem. Will the modem fit in the area where you want to perform the installation?

The following diagram outlines the modem's dimensions:

NOTE: This diagram depicts the dimensions of both the iR1200 Rugged and iR1200 GPS-Enabled Modems and should not be used as a template for mounting the modem.

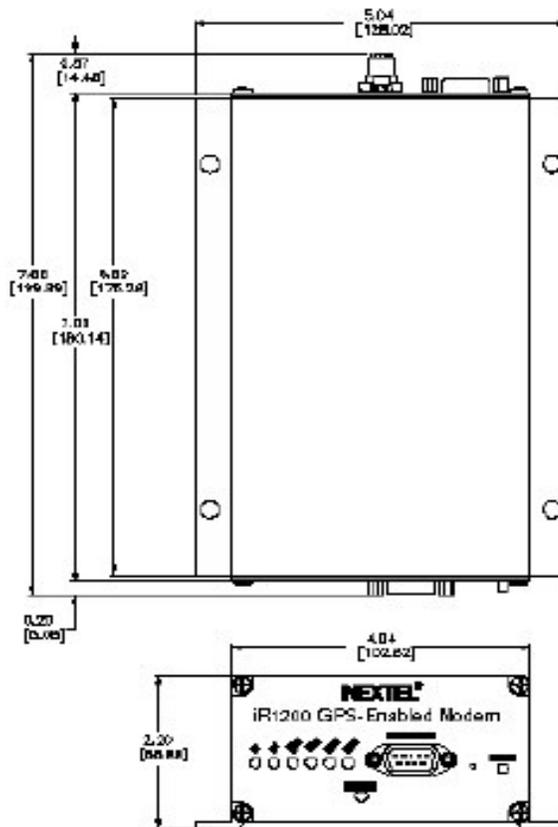


Figure 4 – Dimensions of iR1200 GPS-Enabled Modem

iR1200 Modem

The following table describes the overall dimensions of the iR1200 modem.

Component	Dimension
Overall dimensions from connector to connector	7.86in. [199.69mm]
End panel to end panel	7.09in. [180.14mm]
Width (including mounting tabs)	5.04in. [128.02mm]
Width of enclosure	4.04in. [102.62mm]
Height of enclosure	2.20in. [55.88mm]

Planning Antenna Location

Factors to consider when planning for the location or placement of the antenna:

- Choose a location with easy access to cable routing to ease the process of connecting the antenna to the modem.
- In vehicle installation, mount the modem antenna on the center of the outside trunk for optimum signal reception.
- In a stationary (building or desk) environment, position the GPS antenna where it has a direct line-of-sight to the sky. In some cases, this can be accomplished by placing the antenna adjacent to a window. In most cases it will require mounting outside of the building.

Planning Cable Layout

Once you have chosen the location of the modem and antenna and before the installation, layout the cables to determine:

- If the cables can reach the modem and antenna.
- If the distance between components is adequate and allows you to make adjustments to receive a better signal. (Please refer to the manufacturer's installation manual for safe installation of your antenna).

Installation Preparation

- If there are kinks or bends in the cable or obstructions in the vehicle that could affect routing.

Serial Cable Routing

Serial cable routing is the most important factor to ensure a trouble-free operation. The serial cable should be as stable as possible (e.g., it should experience little or no movement and have very few or no bends or kinks).

NOTE: The majority of the problems occur because of serial cable failure.

Installation Tools

You will need these tools to install the iR1200 modem.

- Portable Drill
- Center Punch
- Four #10 self-tapping sheet metal screws
- Hammer
- Connector Crimp tool
- Phillips Screwdriver

iR1200 Modem

Vehicle Installation

In this chapter, you will learn how to install your iR1200 modem and antennas in a vehicle.

This chapter includes:

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Select Modem Location	Page 20
Mount the Modem	Page 21
Mounting the Antenna(s)	Page 21
Approved Antennas	Page 22
Select Antenna Location	Page 22
Mount the Antenna	Page 22
Mount the GPS Antenna	Page 23
Route and Connect Cables	Page 23
Approved Cable	Page 23
Route and Connect Power Cable	Page 24
Route and Connect Ignition Cable	Page 26
Connect Antenna Cable	Page 27
Connect Data Cable	Page 27

Installation Steps

To install, you must complete the following steps:

- **Mount Modem** – Mount the modem in the desired location.
- **Mount Antenna** – Mount the antenna using the instructions included with your selected antenna's installation guide.
- **Route and Connect Power Cable** – route the power cable from modem to the vehicle's power supply (ignition switch).
- **Route and Connect the Ignition Cable** – Route the ignition cable from the modem to the ignition.
- **Connect Antenna Cable** – Connect cable to the mounted modem and antenna.
- **Connect Data Cable** – Connect the data cable from the modem to the mobile device.

Mounting the Modem

Select Modem Location

The following describes typical locations that you should consider for mounting the modem:

- Under seat
- Under dashboard
- Center console
- In trunk
- In accessory compartment



Mounted on side of console



Mounted on side wall of trunk

Mount the Modem

The following table lists the steps for mounting the iR1200 data modem in a vehicle.

1	Determine a convenient location in the vehicle.
2	Use the iR1200 modem and mark the positions of the holes on the mounting surface.
3	Drill the holes in the marked location.
4	Mount the unit using the #10 sheet metal screws.

Mounting the Antenna(s)

The location of the antenna should be chosen carefully.



Important things to consider when installing the antenna equipment.

- Installation of recommended equipment must be installed in accordance with Nextel's installation instructions.
- To assure compliance with United States FCC regulations on RF exposure, equipment must be installed in such a way as to maintain a separation of at least 8 inches (20 cms) between the antenna and the human body.
- Ensure that the antenna is properly installed external to the vehicle and in accordance with the requirements of the antenna manufacturer/supplier.
- Use only an approved antenna. Unauthorized antennas, modifications or attachments could impair call quality, damage the modem, or result in the violation of FCC mandates.

Approved Antennas

The following table states the approved antennas that can be used with the iR1200 modem.

Part No.	Description
5000-C5-RFM	Mag Mount Cellular Antenna
5030-C5-RFM	Mag Mount GPS Antenna

NOTE: Antennas with gain exceeding 3db do not comply with FCC RF exposure and are not allowed for use with this product.

Select Antenna Location

The following are some common layouts for co-locating an external antenna and the iR1200 modem.

- **Roof to trunk** – This layout accommodates a trunk-mounted modem and antenna that is attached to the roof.
- **Trunk to trunk** – This layout accommodates a trunk-mounted modem and antenna that is attached to the trunk.
- **Roof to console or dashboard** – This layout accommodates a console or dashboard mounted modem and the antenna attached to the roof. This setup gives you access to the modem.

Mount the Antenna(s)

The following table describes the steps for mounting an antenna.

1	Use an antenna suitable for the cellular band of frequencies (806-870 MHz) with Mini UHF jack and matched for 50-ohm impedance.
2	Mount the antenna according to the manufacturer's specifications or instructions. (Use only an approved antenna – see list of Approved Antennas above.)

NOTE: Each antenna has specific installation instructions. Please refer to the antenna installation instructions for specific requirements and details.

Mount GPS Antenna (optional)

The iR1200 GPS-Enabled modem comes equipped with a connector for a GPS antenna. Nextel has tested and recommends using the GPS Magnetic Mount Antenna (part number 5030-C5-RFM) with the iR1200 Modem.

The following table contains the steps for mounting a GPS antenna.

1	Use an antenna suitable for the GPS of frequency 1575 MHz with an MCX connector and matched for 50-ohm impedance. (Use only an approved antenna – see list of Approved Antennas on page 22.)
2	Position the antenna where it has a direct line-of-sight to the satellite.
3	Mount the antenna according to the manufacturer's specifications or instructions.

NOTE: Because of the operating frequencies involved with the GPS signal, splicing or using adapters to extend the length of the antenna coaxial cable is not recommended and will likely prevent the system from operating properly. We recommend that a single length of coax without splices or adapters be used.

Route and Connect Cables

Approved Cable

The following DC power cable must be used (sold separately, see Accessories Table for ordering information).

5100-C5-RFM – Vehicle Power Harness

iR1200 Modem

The following diagram illustrates typical installation wiring of the iR1200 into a vehicle.

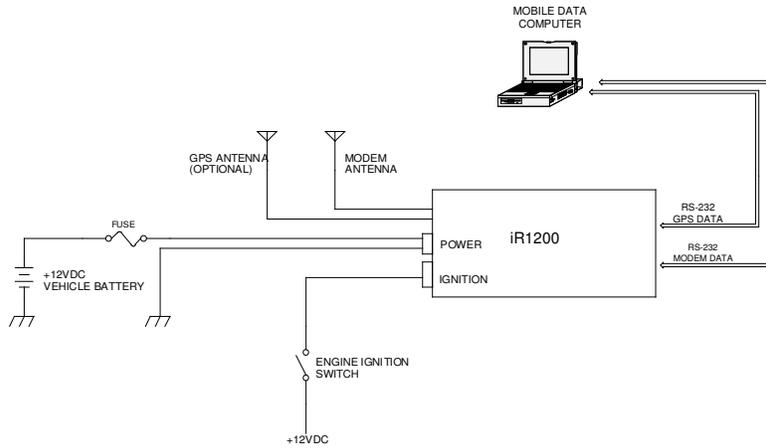


Figure 5 – iR1200 Installation Wiring Diagram (Vehicle)

Route and Connect Power Cable

Route the DC power cable using the following diagram as a guideline:

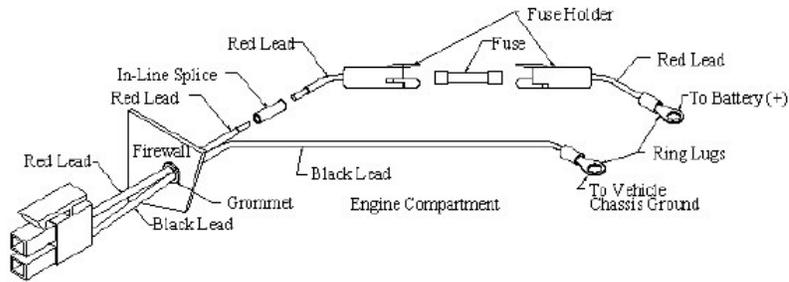


Figure 6 – Modem Power Wiring Diagram (Level 1)

The following table contains the steps for routing and connecting the power cable:

1	Determine a cable routing plan that will allow you to connect the DC power cable between the modem and the vehicle battery. Connect the male end of the power cable to the 2-prong connector labeled POWER on the modem.
2	Route the free end of the cable to the vehicle battery. If necessary, drill a hole in the vehicle firewall and route the cable through it using the supplied grommet (Refer to Figure 6 – Modem Power Wiring Diagram above).
3	Locate an available chassis ground mounting point near the battery and shorten the black lead to remove any excess cable length.
4	Crimp on the ring tongue terminal and connect the black lead directly to the chassis ground.
5	Position the fuse holder as close to the battery as possible, and away from any potentially hot components.

iR1200 Modem

- | | |
|----------|---|
| 6 | Mount the fuse holder by tie wrapping it to the other cabling wires and dress wires as necessary. |
| 7 | Shorten the red lead of the DC power cable to remove any excess length and crimp the fuse holder's red lead to it using the in-line splice. |
| 8 | Connect the ring tongue terminal from the fuse holder to the positive (+) battery terminal. |

Route and Connect Ignition Cable

Approved Cable

The following DC power cable must be used (sold separately, see Accessories Table for ordering information).

5100-C5-RFM – Vehicle Power Harness

Route Cable

Route the Ignition cable using the following diagram as a guideline:

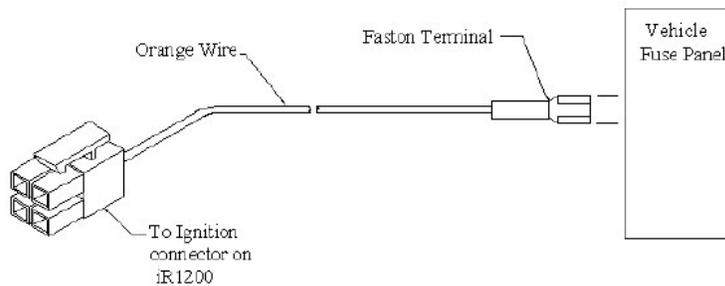


Figure 7 – Modem Power Wiring Diagram (Level 2)

- | | |
|----------|--|
| 1 | Connect the male end of the ignition cable to the 4-prong connector labeled IGNITION on the modem. |
| 2 | Connect the free end of the ignition cable to a vehicle circuit that provides 12VDC when the vehicle is running or in ACC, and no 12VDC when the vehicle is OFF or not in ACC. |

Connect Antenna Cable

The following table describes the steps for connecting the antenna cable to the modem:

- | | |
|----------|---|
| 1 | Insert the male end of the modem antenna cable to the connector labeled MODEM ANT on the modem. (Use only an approved antenna – see list of Approved Antennas on page 22.) |
| 2 | Insert the male end of the GPS antenna (optional) cable to the connector labeled GPS ANT on the modem. (Use only an approved antenna – see list of Approved Antennas on page 22.) |

Connect Data Cable

The iR1200 modem can be connected to the host DTE equipment using a standard “straight through” 9-pin male to a 9-pin female serial cable.

The following step describes how to connect the data cable:

Connect the 9-pin male end of the cable to the iR1200 communication connector and the 9 pin female end of the cable to the data terminal equipment (DTE).

iR1200 Modem

Stationary Installation

In this chapter, you will learn how to install your iR1200 modem in a stationary (i.e. building/desktop) environment.

This chapter includes:

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Select Modem Location	Page 30
Mount the Modem	Page 30
Mounting the Antenna(s)	Page 31
Approved Antennas	Page 31
Select Antenna Location	Page 32
Mount the Antenna	Page 32
Mount the GPS Antenna	Page 32
Route and Connect Cables	Page 34
Approved Cable	Page 34
Connect Power Cable	Page 34
Connect Antenna Cable	Page 35
Connect Data Cable	Page 35

Installation Steps

To install, you must complete the following steps:

- **Mount Modem** – Mount the modem in the desired location.

iR1200 Modem

- **Mount Antenna** – Mount the antenna using the instructions included with your selected antenna’s installation guide.
- **Route and Connect Power Cables** – route the power cables from modem to the power supply.
- **Connect Antenna Cable** – Connect cables to the mounted modem and antenna.
- **Connect Data Cable** – Connect the data cables from the modem to the mobile device.

Mounting the Modem

The iR1200 modem can be mounted on different types of surfaces. You should determine if the surface is able to support the weight of the iR1200 modem. The area should allow sufficient space around the modem for cool air to circulate.

Select Modem Location

The iR1200 modem within a building or stationary environment is typically installed in an area where the antenna has a direct line-of-sight to sky for maximum reception.

Mount the Modem

The following table lists the steps for mounting the iR1200 data modem in a stationary environment.

1	Determine a convenient location within the stationary environment.
2	Use the iR1200 modem and mark the positions of the holes on the mounting surface.
3	Drill the holes in the marked location.
4	Mount the unit using the #10 sheet metal screws.

Mounting the Antenna(s)

The location of the antenna should be chosen carefully.



Important things to consider when installing the antenna equipment.

- Installation of recommended equipment must be installed in accordance with Nextel's installation instructions.
- To assure compliance with United States FCC regulations on RF exposure, equipment must be installed in such a way as to maintain a separation of at least 8 inches (20 cms) between the antenna and the human body.
- Ensure that the antenna is properly installed external to the vehicle and in accordance with the requirements of the antenna manufacturer/supplier.
- Use only an approved antenna. Unauthorized antennas, modifications or attachments could impair call quality, damage the modem, or result in the violation of FCC mandates.

Approved Antennas

The following table states the approved antennas that can be used with the iR1200 modem.

Part No.	Description
5000-C5-RFM	Mag Mount Cellular Antenna
5030-C5-RFM	Mag Mount GPS Antenna

NOTE: Antennas with gain exceeding 3db do not comply with FCC RF exposure and are not allowed for use with this product.

Select Antenna Location

The following are some common layouts for co-locating an external antenna and the iR1200 modem.

- **Roof to trunk** – This layout accommodates a trunk-mounted modem and antenna that is attached to the roof.
- **Trunk to trunk** – This layout accommodates a trunk-mounted modem and antenna that is attached to the trunk.
- **Roof to console or dashboard** – This layout accommodates a console or dashboard mounted modem and the antenna attached to the roof. This setup gives you access to the modem.

Mount the Antenna(s)

The following table describes the steps for mounting an antenna.

1	Use an antenna suitable for the cellular band of frequencies (806-870 MHz) with Mini UHF jack and matched for 50-ohm impedance.
2	Mount the antenna according to the manufacturer's specifications or instructions. (Use only an approved antenna – see list of Approved Antennas on page 31.)

NOTE: Each antenna has specific installation instructions. Please refer to the antenna installation instructions for specific requirements and details.

Mount GPS Antenna (optional)

The iR1200 GPS-Enabled modem comes equipped with a connector for a GPS antenna. Nextel recommends using the GPS Magnetic Mount Antenna (part number 5030-C5-RFM) with the iR1200 Modem.

The following table contains the steps for mounting a GPS antenna.

1	Use an antenna suitable for the GPS of frequency 1575 MHz with an MCX connector and matched for 50-ohm
----------	--

Stationary Installation

	impedance.
2	Position the antenna where it has a direct line-of-sight to the satellite.
3	Mount the antenna according to the manufacturer's specifications or instructions. (Use only an approved antenna – see list of Approved Antennas on page 31.)

NOTE: Because of the operating frequencies involved with the GPS signal, splicing or using adapters to extend the length of the antenna coaxial cable is not recommended and will likely prevent the system from operating properly. We recommend that a single length of coax without splices or adapters be used.

Route and Connect Cables

The following diagram illustrates typical installation wiring of the iR1200 into a stationary environment.

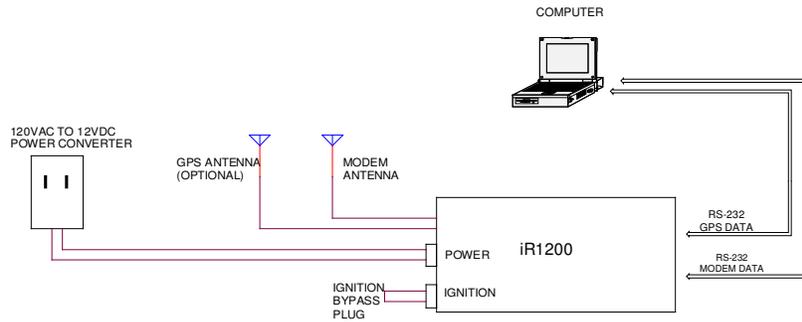


Figure 8 – iR1200 Installation Wiring Diagram (Stationary)

Approved Cables

The following DC power cable must be used (see Accessories Table for ordering information).

5100-C5-RFM – Vehicle Power Harness

Connect Power Cable

The following table contains the steps for routing and connecting the power cable:

- 1 Connect male end of the AC Power Adapter cable to the 2-prong connector labeled POWER on the modem.
- 2 Connect the free end of the power cable to a 120VAC-power outlet.

Connect Antenna Cables

The following table describes the steps for connecting antenna cables to the modem (use only an approved antenna – see list of Approved Antennas on page 31):

1	Insert the male end of the modem antenna cable to the connector labeled MODEM ANT on the modem.
2	Insert the male end of the GPS antenna (optional) cable to the connector labeled GPS ANT on the modem.

Connect Data Cables

The iR1200 modem can be connected to the host DTE equipment using a standard “straight through” 9-pin male to a 9-pin female serial cable.

The following step describes how to connect the data cable:

Connect the 9-pin male end of the cable to the iR1200 communication connector and the 9 pin female end of the cable to the data terminal equipment (DTE).

iR1200 Modem

Verifying Installation

In this chapter, you will learn how to verify that the installation of the iR1200 modem was successful.

This chapter includes:

Powering up the Modem	Page 37
Vehicle Installation	Page 37
Stationary Installation	Page 38
Communication Indicators	Page 38

Powering Up the Modem

Once you have completed the installation of the modem's hardware components and connected all the power cables, power up the modem to ensure that the installation was successful.

Powering Up – Vehicle Installation

The following table contains the steps for powering up the modem for a vehicle installation:

1	Turn on the vehicle's ignition.
2	The STATUS LED light will initially blink Red. This indicates that the modem is searching for a signal within the Nextel network.
3	A blinking Green light indicates that a signal has been found and the modem was successful in making a connection.
4	The STATUS LED should blink Green within 3 minutes from the time the vehicle's ignition was turned ON.

Powering Up – Building Installation

To turn on the iR1200 modem, an ignition signal is required at the ignition connector. Use the ignition sense short plug to simulate an ignition signal to power up the modem.

The following table contains the steps for powering up the modem for a building installation:

1	Insert the ignition bypass plug into the 4-prong IGNITION connector located in the rear panel of the modem (refer to Figures 2 and 3 on Page 11).
2	Plug the AC power cord into a standard 2-prong polarized wall socket.
3	The STATUS LED light will first blink Red. This indicates that the modem is searching for a signal within the Nextel network.
4	A blinking green light indicates that a signal has been found and the modem was successful in making a connection.
5	The STATUS LED should blink Green within 3 minutes from the time the power was activated on the modem.

Communication Indicators

Your iR1200 modem is equipped with LED indicators (see Figure 9 on page 39) that identify various communication functions.

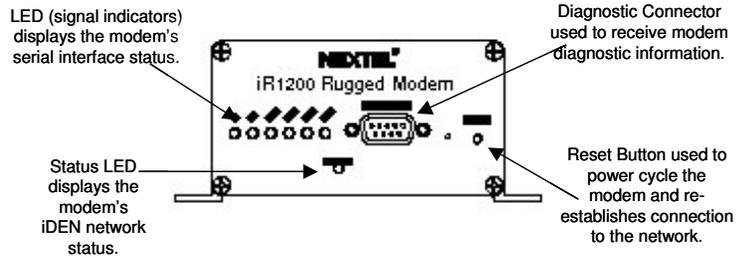


Figure 9 – iR1200 Front Panel Layout

Signal	Color	Indication
Tx	Blinking Green	Modem is transmitting data to the computer data terminal (DTE).
Rx	Blinking Green	Modem is receiving data from the computer. Modem is receiving data from the DTE.
RTS	Green (Off)	Request To Send from computer (DTE) is asserted (not asserted).
CTS	Green (Off)	Clear To Send from modem is asserted (not asserted).
DTR	Green (Off)	Data terminal equipment is ready (not ready).
DSR	Green (Off)	Modem is ready (not ready).
STATUS	Solid Red	The modem is searching for signal within the Nextel network. If the modem status changes from blinking green back to solid red, the signal has been lost and the

iR1200 Modem

		modem is attempting to re-acquire. NOTE: If after a period of several minutes it the status does not return to green, you may be out of range. The modem will attempt to re-acquire automatically when you are back in range.
--	--	---

NOTE: The STATUS indicators are different depending on the type of mode the modem is operating in.

The following tables describe the STATUS indicators for the Packet Data and Circuit Switched Data operating modes.

Packet Data

STATUS	Blinking Green	In-range (modem is connected to the Nextel network) but idle (but not passing data).
STATUS	Blinking Green	The modem is in use – Nextel network communication is active and is passing data.

Circuit Switched Data

STATUS	Blinking Green	In-range (modem is connected to the Nextel Network) but idle (but not passing data).
STATUS	Solid Green	The modem is in use – Nextel network communication is active and is passing data.

Troubleshooting

In this chapter, you will learn how to troubleshoot the most common installation problems and how to resolve them.

This chapter includes:

Common Problems	Page 41
Diagnostic Port	Page 44
HyperTerminal Setup	Page 45
Diagnostic Menu	Page 47
Unsolicited Firmware Updates	Page 51

Common Problems

The following table outlines the most common installation issues and instructions for resolution.

What's the Problem?	What it means:	How to Resolve:
Nothing happens when I power up the modem.	This indicates that there is no power being supplied to the modem.	There are several things that could be wrong. Go through this list and eliminate all the possible problems: <ul style="list-style-type: none">• Is the ignition on?• Is the ignition bypass plug inserted into the IGNITION

What's the Problem?	What it means:	How to Resolve:
		<p>connector on the modem (for building installations)?</p> <ul style="list-style-type: none"> • Check power supply and make sure that everything is connected properly. • Is the battery voltage at least 12 volt? • Check the cables and wiring.
<p>The modem has power but the LED light is not blinking green.</p>	<ul style="list-style-type: none"> - You may not be within coverage area. - Signal strength may be weak. 	<ul style="list-style-type: none"> • Antenna may be loose. Check to make sure the antenna is properly connected. • Reposition antenna.
<p>The modem doesn't appear to be communicating.</p>	<p>This could indicate a number of things (see How to Resolve column to eliminate the possibilities).</p>	<ul style="list-style-type: none"> • Is data cable plugged into the diagnostic port? • Is data cable connected properly to the mobile device or computer? • Check the RSSI • Check coverage: • Move to another location to see if

What's the Problem?	What it means:	How to Resolve:
		<p>coverage is not affected.</p> <ul style="list-style-type: none"> • Verify that your account has been activated. Contact your technology administrator or designated field care representative.
GPS does not operate.	<p>Either:</p> <ul style="list-style-type: none"> - Coverage in the area is bad. - Antenna may be improperly installed or defected. 	<ul style="list-style-type: none"> • Verify that the antenna has direct line of sight to satellite. • Move to another area. • Are you in a parking garage where GPS signal will not be received?
GPS is slow.	<p>It is normal for the GPS to take up to 5 minutes to acquire the first reading.</p>	<ul style="list-style-type: none"> • Wait for an appropriate amount of time for communication to take place. If attempts are taking longer than 5 or more minutes, contact your system administrator.

What's the Problem?	What it means:	How to Resolve:
Modem will not power up or down	The wiring to the modem may not be connected properly.	<ul style="list-style-type: none">• Check the ignition sense wiring to be sure that it is connected.• Verify that the diagnostic port is plugged in correctly.• Check LED status to see if the modem is communicating.

NOTE: The Status LED remains red for up to 3 minutes after power is applied to the iR1200 or immediately after the Reset button is pressed.

Diagnostic Port

The diagnostic port located on the front panel of the iR1200 modem (see Figure 9 on page 39) is used to retrieve data from the modem that will help to analyze and diagnose possible communication issues.

The following table describes steps to connect to the diagnostic port:

1	Insert the 9-pin male end of a serial signal cable into the RS-232 connector labeled DIAGNOSTIC PORT of the modem's rear panel and tighten the screws.
2	Connect the other end of the serial signal cable to a serial COM port on the back of your computer or mobile device and tighten the screws.

HyperTerminal Setup

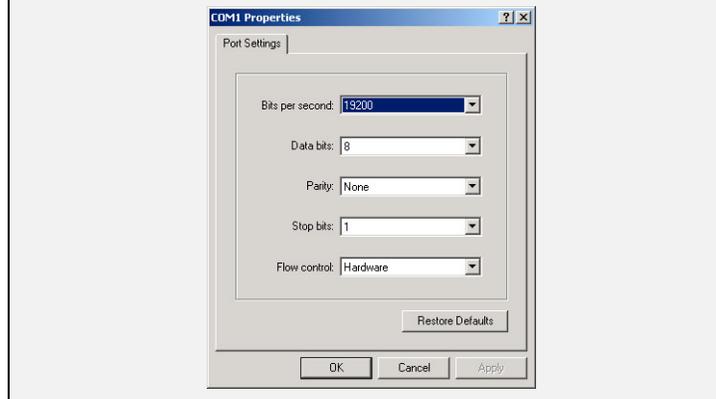
The following table outlines steps to setup a HyperTerminal session for the iR1200 modem:

1	From your computer, locate and select the HyperTerminal program.
2	The Connection Description screen appears. 
3	Type a description of the connection in the “Name:” box.
4	Select the dial function (red and yellow phone icon) and click OK .
5	The Connect To screen appears.



6 Select the appropriate communication port (typically COM1) from the “Connect Using:” drop down list then Click **OK**.

7 The **COM1 Properties** screen appears.



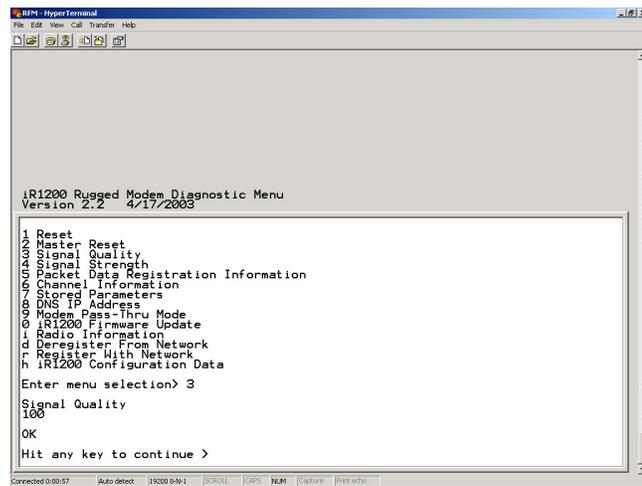
8 Select the following parameters from each of the drop-down lists on the Port Settings tab:

- **19200** for Bits per second

- **8** for Data bits
- **NONE** for Parity
- **1** for Stop bits
- **None or Hardware** for Flow control

9 Click **OK** when all the parameters have been selected.

10 Once connection to the modem is successful, the **iR1200 Rugged Modem Diagnostic Menu** appears.



Diagnostic Menu

The iR1200 modem Diagnostic Menu provides you with commands to help analyze potential problems with the modem. The menu contains actions that call the modem and receive diagnostic information.

The following table outlines the types of information that can be retrieved with the commands on the diagnostic menu.

Command	Action	Reply
1 – Reset	This command resets the radio section of the modem.	
2 – Master Reset	This command is used when certain changes are made to the firmware and the modem needs to acquire the changes.	WARNING: We do not recommend that you perform this command unless otherwise instructed by a Nextel Customer Care representative.
3 – Signal Quality	This determines the quality of the signal.	Signal quality can be 0 – 100
4 – Signal Strength	This determines the signal strength of the modem.	Signal strength can be 0 – 100.
5 – Packet Data Registration Information	This will check for packet data registration status.	<ul style="list-style-type: none">• Service type: PACKET• VALID NEI: (IP Address of the Modem)• Registration Status: REGISTERED or UNREGISTERED• MIP Registration Status: REGISTERED or UNREGISTERED

Troubleshooting

Command	Action	Reply
6 – Channel Information	This determines if channel data has been obtained.	<ul style="list-style-type: none">• Area• RSSI• Channel• State• TX Level
7 – Stored Parameters	This provides the modem's preset parameters.	<ul style="list-style-type: none">• Flow Control• Character Framing• Service Class• DTE-side Stack• WDS-side Stack• Mobile IP Activation• Mobile UP Registration Lifetime• Security Parameter Index• Home Agent IP Address• +WPNEI Prefix Length• Request Broadcast Datagrams• DCE IP Addresses• DTE IP Addresses• Data Encryption• Data Compression• Header Compression
8 – DNS IP Address	Displays the address of the Domain Name Server.	

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Command	Action	Reply
9 – Modem Pass-Thru Mode	Allows you to issue Hayes compatible AT commands to the modem during diagnostic port.	
0 – iR1200 Firmware Update	Sends updates to the firmware.	WARNING: We do not recommend that you perform this command unless otherwise instructed by a Nextel Customer Care representative.
i – Radio Information	Obtains information specific to the modem.	<ul style="list-style-type: none">• Serial Number• IMEI• SIM ID• Software Version
d –Deregister From Network	Forces the modem to deregister from the Nextel Network.	DEREGISTERED
r – Register with Network	Forces the modem to register with the Nextel network.	REGISTERED
h – iR1200 Config Data	Checks the modem's data configuration.	<ul style="list-style-type: none">• Hardware Part ID• Serial number• Boot Loader• Application ID

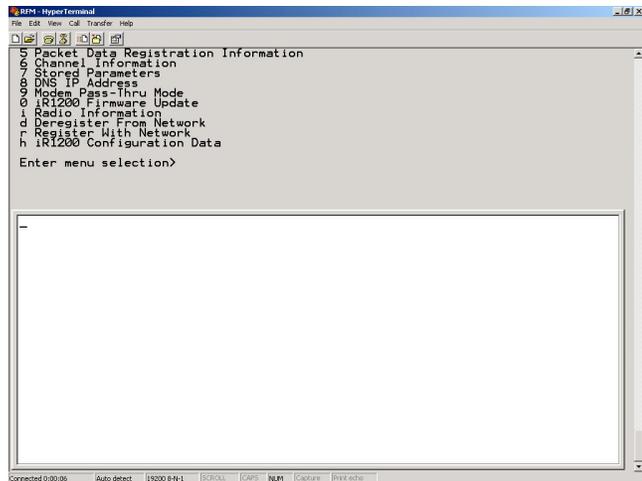
Unsolicited Firmware Updates

We want to emphasize that this diagnostic option should be executed only when instructed by a Nextel Customer Care Representative. However, there are certain sequences of events that will prompt you for a firmware update.



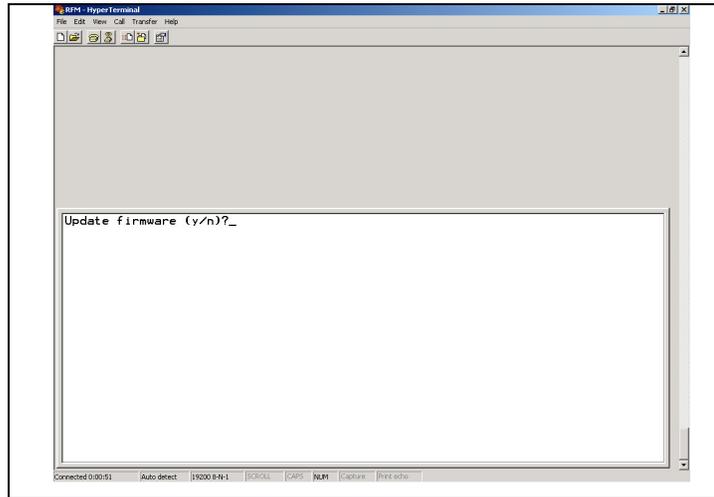
The following lists the sequence of events that will cause HyperTerminal to prompt you for firmware update.

- 1 Modem is OFF (all cables are connected except for the power connector).
- 2 The computer is ON and the HyperTerminal is active.



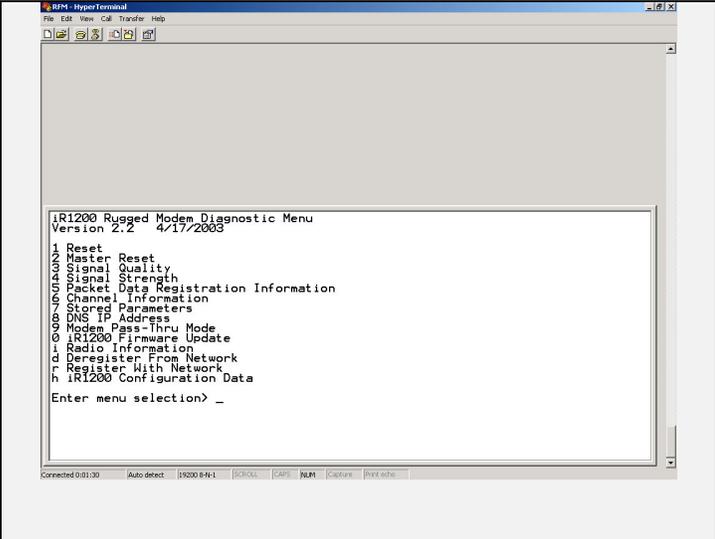
- 3 Modem is switched ON (power connector is inserted into the power slot).
- 4 HyperTerminal automatically presents the option 0 – Firmware Update prompt.

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To safely exit out of the update firmware mode, please select “N”. There will be about a 1-minute delay before the system returns you to the diagnostic menu. This is because the modem is attempting to register with the iDEN network.

- 5 Once the modem has successfully registered with the network, the HyperTerminal will present you with the Diagnostic Menu.



The screenshot shows a HyperTerminal window titled "RFM - HyperTerminal". The window contains a text-based menu for the "iR1200 Rygged Modem Diagnostic Menu". The menu items are as follows:

```
iR1200 Rygged Modem Diagnostic Menu
Version 2.2 4/17/2003

1 Reset
2 Master Reset
3 Signal Quality
4 Signal Strength
5 Packet Data Registration Information
6 Channel Information
7 Stored Parameters
8 DNS IP Address
9 Modem Pass-Thru Mode
0 iR1200 Firmware Update
i Radio Information
d Deregister From Network
r Register With Network
h iR1200 Configuration Data

Enter menu selection> _
```

At the bottom of the window, there is a status bar with the text "Connected 0:01:30" and several icons for "Auto detect", "iR1200 B-A-1", "SCROLL", "CAPS", "NUM", "Capture", and "Print echo".

6 You are safe to use the modem.

iR1200 Modem

Safety Notice

The following is important information for safe and efficient operation of the iR1200 modem. We recommend that all users read this information before using the modem.

Safe and Efficient Operation Guidelines

Your modem contains a transmitter and receiver. When it is ON, it receives and transmits radio frequency (RF) energy. The modem operates in the frequency range of 806 MHz to 870 MHz and utilizes the digital modulation techniques. This product is authorized by FCC Rule Part 47CFR2.989 (b) which states that it should be used in such a way that it maintains a distance of at least 8 inches (20 cms) between the human body and the radio's antenna or modem. When you use your modem, the system handling your call controls the power level at which your modem transmits. The output power level typically may vary over a range from 600 mW to 2.5 watts.

Exposure to Radio Frequency Energy

Your modem is designed to comply with the United States Federal Communications Commission, Code of Federal Regulations; FCC part 90-sub part S, and FCC-part 15, Class B. The modem is in compliance with FCC's national standards and guidelines regarding exposure of human beings to radio frequency electromagnetic energy.

Medical and Personal Electronic Devices

Most electronic equipment are protected from RF energy. However, certain equipment may not be shielded against the RF signals being emitted from your modem.

Pacemakers

Operators should not use the modem if individuals with pacemakers are within 6 inches (0.15 meters) of the antenna.

Hearing Aids

The modem may cause interference with hearing aid devices. Individuals who experience such interference should consult the hearing aid manufacturer to discuss alternative solutions.

Other Medical Devices

Individuals who have other medical devices not specifically mentioned in this safety notice may want to consult their physician or the manufacturer of the device to determine if it is adequately protected from external RF energy.

Interference with Other Electronic Devices

RF energy may affect improperly installed or inadequately protected electronic operating and entertainment systems in motor vehicles. Check with the manufacturer or representative to determine if these systems are adequately shielded from external RF energy. It is recommended that you also check with the manufacturer of any equipment that has been added to the vehicle.

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