

Application Note

IP Nano (IPn920F & IPn920T) & Centracs Compatibility

February 2013

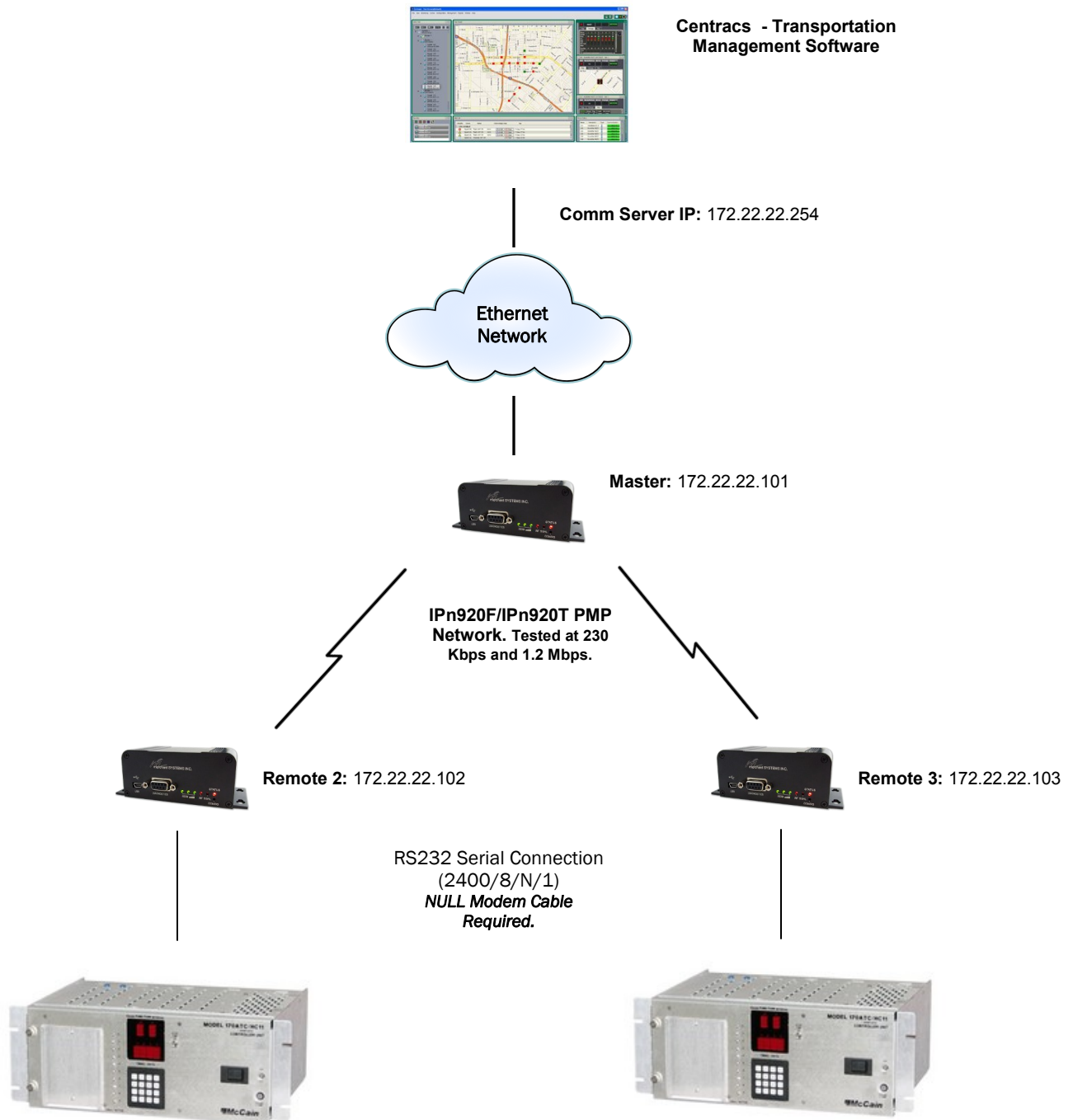


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Overview

This document describes the setup on the IPn920 Radio's demonstrating successful compatibility between Microhard IP Nano Series radios (IPn920F & IPn920T), Centrats Traffic Management Software & Serial Based Traffic Controllers, as seen in the diagram below.



Radio Setup

This test included a PMP (Point to Multipoint) radio network topology with 1 unit configured as a Master, and 2 units configured as Remotes. The following screen shots describe the setup of each radio.

Master Radio

System Configuration

System Operation Mode: Bridge Router

Radio Description: MasterF

Date(yyyy-mm-dd): 2012-09-06

Time(hh:mm:ss): 12:29:58

UTC Time Offset(+/-hh:mm): 00:00

Console Timeout(s): 60

Traffic Watchdog Timer(s): 0

System Default Button: Enable Disable

Submit Reset

Synchronize with NTP Server

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System Configuration

Operating Mode: Bridge

Radio Description: Set as "Master" to differentiate between radios, for reference only, not required. (Can be set to anything...)

Rest as defaults as shown.

Submit

Network Configuration

Local IP Config...

IP Address Mode: static dhcp

IP Address: 172.22.22.101

IP Subnet Mask: 255.255.255.0

IP Gateway: 172.22.22.254

DHCP Timeout: 60

DNS Mode: static automatic

Preferred DNS Server: 0.0.0

Alternate DNS Server: 0.0.0

Submit Reset

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Network Configuration

IP Address Mode: Static

IP Address: 172.22.22.101 (Set as a valid IP address for YOUR network.)

IP Subnet Mask: 255.255.255.0

IP Gateway: 172.22.22.254

Rest as defaults as shown.

Submit

Radio Configuration

Network Mode: Standard

Operation Mode: Master

Network Name: Lab_TestF

Link Rate: 230 Kbps

RF Output Power: 20 dBm

Retransmissions: 1

Network Type: Point to Multipoint

Repeater: No Yes

Optimization: 20ms

Zone Restriction: None

Frequency Restriction...

Submit Reset

Radio Configuration

Operating Mode: Master

Network Name: Lab_TestF (Each "radio network" must have a unique name)

Link Rate: 230 Kbps (Each unit in a network must have the same link rate) (Tested 1.2Mbps on IPn920T as well)

Network Type: Point to Multipoint

Rest as defaults as shown.

Submit

Radio Setup (Continued...)

Master Radio (Continued...)

<ul style="list-style-type: none"> System Configuration Network Configuration Radio Configuration COM1 Configuration COM2 Configuration USB Configuration Security Configuration System Information System Tools Logout 	<h3>COM1 Configuration</h3> <p>Port Status: <input type="radio"/> Disable <input checked="" type="radio"/> Enable</p> <p>Channel Mode: RS232</p> <p>Data Baud Rate: 2400</p> <p>Data Format: 8N1</p> <p>Flow Control: None</p> <p>Pre-Data Delay(ms): 100</p> <p>Post-Data Delay(ms): 100</p> <p>Data Mode: <input type="radio"/> Seamless <input checked="" type="radio"/> Transparent</p> <p>Character Timeout: 20</p> <p>Maximum Packet Size: 1024</p> <p>Priority: Normal</p> <p>No-Connection Data Intake: <input type="radio"/> Disable <input checked="" type="radio"/> Enable</p> <p>Modbus TCP Config...</p> <p>IP Protocol Config: UDP Point to Point</p> <hr/> <p>UDP Point to Point</p> <p>Remote IP Address: 172.22.22.254</p> <p>Remote Port: 50102</p> <p>Listening Port: 50102</p> <p>UDP Timeout(s): 10</p>
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COM1 Configuration

In this test a controller was not connected to the master, but these are the settings required if there was:

Channel Mode: RS232

Data Baud Rate / Data Format: 2400/8/N/1 (As defined by traffic controller, must match)

Character Timeout: 20 (This was the key field that needed to be changed from the default configuration to get Centrac's working, less than 20 did not work)

IP Protocol Config: UDP Point to Point

Remote IP Address: 172.22.22.254 (Address of Centrac's comms server)

Remote Port: 50102 (Must be specified in Centrac as the "Source" port)

Listening Port: 50102

Rest as defaults as shown.

Submit

Radio Setup (Continued...)

Remote 2

System Configuration

Remote2F

System Operation Mode: Bridge Router

Radio Description: Remote2F

Date(yyyy-mm-dd): 2012-09-06

Time(hh:mm:ss): 12:24:02

UTC Time Offset(+/-hh:mm): 00:00

Console Timeout(s): 60

Traffic Watchdog Timer(s): 0

System Default Button: Enable Disable

Submit Reset

Synchronize with NTP Server

System Configuration

Operating Mode: Bridge

Radio Description: Set as "Remote2F" to differentiate between radios, for reference only, not required. (Can be set to anything...)

Rest as defaults as shown.

Submit

Network Configuration

Remote2F

Local IP Config...

IP Address Mode: static dhcp

IP Address: 172.22.22.102

IP Subnet Mask: 255.255.255.0

IP Gateway: 172.22.22.254

DHCP Timeout: 60

DNS Mode: static automatic

Preferred DNS Server: 0.0.0.0

Alternate DNS Server: 0.0.0.0

Submit Reset

Network Configuration

IP Address Mode: Static

IP Address: 172.22.22.102 (Each Radio has its own IP Address.)

IP Subnet Mask: 255.255.255.0

IP Gateway: 172.22.22.254

Rest as defaults as shown.

Submit

Radio Configuration

Remote2F

Network Mode: Standard

Operation Mode: Remote

Network Name: Lab_TestF

Link Rate: 230 Kbps

Unit Address: 2

RF Output Power: 20 dBm

Retransmissions: 1

Network Type: Point to Multipoint

Roaming Address: 1

Tx Control: On Off

Zone Restriction: None

Radio Configuration

Operating Mode: Remote

Network Name: Lab_TestF (Each radio in a network must have the same Network name)

Link Rate: 230 Kbps (Each unit in a network must have the same link rate)

Unit Address: 2 (Each unit needs a address, this is not related to the IP address.)

Network Type: Point to Multipoint

Rest as defaults as shown.

Submit

Radio Setup (Continued...)

Remote 2 (Continued...)

COM1 Configuration

Port Status: Disable Enable

Channel Mode: RS232

Data Baud Rate: 2400

Data Format: 8N1

Flow Control: None

Pre-Data Delay(ms): 100

Post-Data Delay(ms): 100

Data Mode: Seamless Transparent

Character Timeout: 20

Maximum Packet Size: 1024

Priority: Normal

No-Connection Data Intake: Disable Enable

[Modbus TCP Config...](#)

IP Protocol Config: UDP Point to Point

UDP Point to Point

Remote IP Address: 172.22.22.254

Remote Port: 50102

Listening Port: 50102

UDP Timeout(s): 10

COM1 Configuration

Channel Mode: RS232

Data Baud Rate / Data Format: 2400/8N/1 (As defined by traffic controller, must match)

Character Timeout: 20 (This was the key field that needed to be changed from the default configuration to get Centrac working, less than 20 did not work)

IP Protocol Config: UDP Point to Point

Remote IP Address: 172.22.22.254 (Address of Centrac's comms server)

Remote Port: 50102 (Must be specified in Centrac as the "Source" port)
Listening Port: 50102

Rest as defaults as shown.

Submit

Remote 3

The configuration for Remote 3, as well as any additional remotes is identical to the steps listed to this point. Remember that each radio needs a different IP address, and unique radio address (unit address).

Once the configuration is submitted all radio's should be communicating. To verify you can (a) look at the RSSI Led's and ensure they are solid and not scrolling, (b) connect a PC to the Ethernet port of the Master (set a static IP that matches the network settings i.e 172.22.22.200, and ping each radio or, (c) Under System tools > Network Discovery on the Master you should see something like what is shown in the screen shot below: (If connected to a remote you will only see the Master and the Remote you are connected to, not all the remotes)

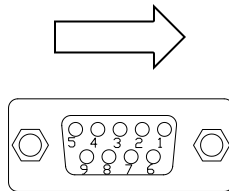
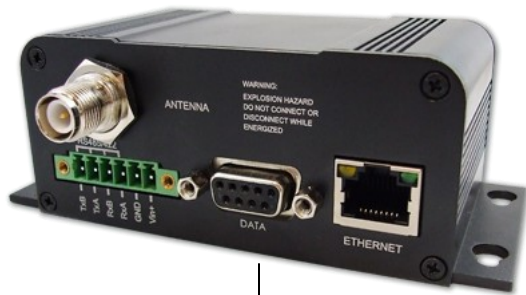
System Tools

Network Discovery

No.	MAC Address	IP Address	Unit Address	Description
01	00:0F:92:00:8A:9B	172.22.22.101	1	MasterF
02	00:0F:92:00:8A:AA	172.22.22.103	3	Remote3F
03	00:0F:92:00:8A:A3	172.22.22.102	2	Remote2F

Cabling

This application requires a serial connection between the IPn920 and the Traffic Controller. We found that a NULL modem cable was required between the IPn920 Data Port (The rear DB(port)) and the Traffic Controller. This means that the devices are cross connected, the TX of the IPn920 is connected to the RX of the Controller and so on. The pin out of the IPn920 is shown below for reference.



RS232 Serial Connection
(2400/8/N/1)
**NULL Modem Cable
Required.**

Name	Data Port	Input or Output
DCD	1	O
RXD	2	O
TXD	3	I
DTR	4	I
SG	5	
DSR	6	O
RTS	7	I
CTS	8	O
RING	9	O

Data RS232 Pin Assignment



Testing

Now that the radio's are powered up and communicating and the controller has been connected to the radio, Centrats should be able to communicate with the controller through the Microhard Radio's. To verify communication on the radio's, navigate to the WebUI of the connected radio, and go to the System Information > COM1 Connection Status:

The screenshot shows a web browser window with the URL <http://172.22.22.102/>. The page header includes the Microhard Systems Inc. logo and the slogan "Leaders in Wireless Communications". A navigation menu on the left lists various configuration options: System Configuration, Network Configuration, Radio Configuration, COM1 Configuration, COM2 Configuration, USB Configuration, Security Configuration, System Information, System Tools, and Logout. The main content area is titled "System Information" and "COM1 Connection Status". It displays the following information:

COM1 Port Status:	Enable
COM1 Connect As:	UDP Point to Point
COM1 Connect Status:	Active
Received Packet Statistics	
Receive bytes:	14497
Receive packets:	1468
Receive errors:	0
Drop packets:	0
Receive fifo:	0
Receive frame:	0
Compressed:	0
Receive multicast:	0
Transmitted Packet Statistics	
Transmit bytes:	29232
Transmit packets:	1466
Transmit errors:	0
Drop packets:	0
Transmit fifo:	0
Collisions:	0
Transmit carrier:	0
Transmit compress:	0

At the bottom, there is a "Refresh Interval(s):" field with the value "3" and "Submit" and "Reset" buttons.

As shown above the "COM1 Connect Status" shows as Active, meaning that Centrats has successfully sent packets to the IPn920, and the Transmit and Receive bytes show that data is flowing from Centrats, to the Controller and back, through the IPn920 Radio's

