

**City of Knoxville
INVITATION TO BID**

Spread Spectrum Radios and Accessories

Sealed bids, invited by the City of Knoxville, will be received by the Purchasing Agent of the City of Knoxville, in Room 667-674, City County Building; 400 Main Avenue; Knoxville, Tennessee, until 11:00:00 a.m. (Eastern Time) on January 12, 2017, at which time they will be opened and publicly read aloud and a fixed price agreement awarded as soon thereafter as practicable. Term of the agreement shall be for one year with two optional one-year renewals.

The City of Knoxville wishes to make an initial purchase of six (6) Microhard spread spectrum radios and six (6) 9 Mhz antennae for installation by City staff. Note that the initial antennae purchase shall be for three Wavelink PRO902-8 Omnis (or comparable) and three Wavelink PRO890-12 Yagis (or comparable). **See "Important Note" below regarding brand names and comparable.**

Additionally, the City intends to award a fixed price agreement to the most responsive, responsible bidder, reserving the right to exercise the option to purchase additional radios and antennae as specified herein at the same terms and conditions within the term of the agreement. The City does not guarantee nor does it commit to the purchase of additional systems.

SPECIFICATION

IMPORTANT NOTE: The following specification is for the Microhard spread spectrum radio and specified accessories. The City has approved the brand named procurement on the basis of achieving standardization of equipment City-wide and City staff training in troubleshooting, maintenance, and programming of this equipment. No brand substitutions will be accepted. Comparable antennae are acceptable, but must be accompanied by detailed specifications for review by the City; the City will determine if proffered antennae are in fact comparable to the specified named brand, and its decision shall be final.

Bids must be accompanied by written warranty information.

Detailed specifications for required equipment are included in this solicitation document.

INSTRUCTIONS AND CONDITIONS

1. Sealed bids will be received by the Purchasing Agent of the City of Knoxville in Room 667-674, City/County Building; 400 Main Avenue; Knoxville, Tennessee 37902 until **January 12, 2017, at 11:00:00 a.m.**, at which time they will be publicly opened and read aloud and the contract awarded as soon as practicable. **No bid will be received or accepted after the above-specified time for the opening of bids.** Bids that arrive late due to the fault of U. S. Postal Service, United Parcel Service, DHL, FEDEX, any delivery/courier service, or any other carrier of any sort are still considered late and shall not be accepted by the City. Such bids shall remain unopened and will be returned to the submitting entity upon request.

2. The City of Knoxville reserves the right to reject any or all bids, to accept or reject any items thereon, to waive technicalities or informalities, to split orders if in the best interest of the City, to evaluate bids by various criteria, and to accept any bid which, in its opinion, may be for the best interest of the City.
3. Included in the Invitation to Bid is an affidavit in proof that the undersigned has not entered into any collusion with any person in respect to this bid or any other bid. The Bidder will be required to execute and submit this affidavit with the sealed bid.
4. **Each bid must be submitted in a sealed mailing envelope, addressed to the Purchasing Agent, City of Knoxville, Room 667-674, City/County Building, 400 Main Street, Knoxville, Tennessee, 37902. Each sealed mailing envelope containing a bid must be plainly marked on the outside as: "Spread Spectrum Radios."**
5. **NO CONTACT POLICY:** After the posting of this solicitation to the Purchasing Division's website, any contact initiated by any proposer with any City of Knoxville representative concerning this proposal is strictly prohibited, unless such contact is made with the Purchasing Division representative listed herein or with said representative's authorization. Any unauthorized contact may cause the disqualification of the proposer from this procurement transaction.
6. **INCLEMENT WEATHER:** During periods of inclement weather, the Purchasing Division will enact the following procedures with regard to solicitations and weather delays:
 - If City offices are closed due to inclement weather on the date that bids/proposals/qualifications/letters of interest are due into the Purchasing Office, all solicitations due that same day will be moved to the next operational business day.
 - The City of Knoxville shall not be liable for any commercial carrier's decision regarding deliveries during inclement weather.
7. All bids must be made on the Bid Form supplied with the contract documents, and no interlineations, excisions, or special conditions shall be made or included in the Bid Evaluation Sheet by the Bidder. **Any bid on which there is an alteration of or departure from the Bid Form may be considered irregular and may be rejected.** All bids must be signed in full by the Bidder or Bidders in their business name or style when submitted and must show his or their complete address.
8. No bidder may withdraw his bid for a period of 60 days after the actual date of the opening thereof.
9. Prior to submitting their bids, bidders are to be registered with the Purchasing Division by setting up a Vendor Self-Service Account. Instructions for registering on-line are available at www.knoxvilletn.gov/purchasing. **Bid submissions from un-registered bidders may be rejected.**
10. Payment for completed services delivered to and accepted by the City shall be at the contract price.
11. State make or brand on each item. If bidding on other than the make, model, or brand specified, the manufacturer's name and catalog number must be given, along with warranty information and detailed specifications. Because the City is committed to environmentally sound practices, brands are expected to be procured with environmental responsibility in mind.

12. Time of delivery is part of the consideration and must be stated in definite terms; time of delivery is guaranteed by the bidder and must be adhered to upon award. If time varies on different components, the bidder shall so state.
13. All bids must be signed with the firm name and by a responsible officer or employee. Obligations assumed by such signature must be fulfilled.
14. Bidders shall verify bids before submission, as bids cannot be withdrawn or corrected after being opened. Bids will be evaluated by unit price.
15. Prices are considered FOB Knoxville unless otherwise stated in the Invitation to Bid.
16. By execution and delivery of a bid submission, the bidder agrees that any additional terms and conditions, whether submitted to the City purposely or inadvertently, shall have no force or effect.
17. Regarding the Equal Business Opportunity Program contracting, the appropriate Form 1 or Form 2 **must** be submitted with the bid. Successful bidders who include Form I with their bid, stating their intent to use MOB or WOB subcontractors for any part of the contract, will be required to submit Form III, Statement of Payments to MOB/WOB Subcontractor(s) & Supplier(s). Contractors will use Form III to report the amount(s) they have paid to MOB and/or WOB subcontractors on June 30th and December 31st of each year during the life of the contract and with the final payment. Failure to submit this reporting data may result in a delay of payments. Final payment will not be released by the City until Form III is submitted.
18. Bidders must comply with the President's Executive Orders No.11246 and 11375 which prohibit discrimination in employment regarding race, color, religion, sex or national origin. Bidders must not maintain or provide for their employees any facilities that are segregated on the basis of race, color, religion or national origin. Bidders must also comply with Title VI of the Civil Rights Act of 1964, Copeland Anti-Kick Back Act, the Contract Work Hours and Safety Standard Act, Section 402 of the Vietnam Veterans Adjustment Act of 1974 and Section 503 of the Rehabilitation Act of 1973, all of which are herein incorporated by reference.
19. All bidders must comply with Title VI of the Civil Rights Act of 1964, as codified in 42 U.S.C. 2000d. The successful bidder must follow Title VI guidelines in all areas including hiring practices, open facilities, insurance, and wages. The City of Knoxville reserves the right to review all compliance records by a contract compliance officer designated by the City.
20. No interpretation of the meaning of the plans, specifications, or other pre-bid documents will be made to any bidder orally. Each request for such interpretation should be in writing addressed to Janice McClelland, Assistant Purchasing Agent for the City of Knoxville, 400 Main Street, Room 667, Knoxville, TN 37902, or emailed to her at jmcclelland@www.knoxvilletn.gov. To be given consideration, such requests/questions must be received no later than close of business on January 5, 2017. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be posted to the City's website at www.knoxvilletn.gov. Submitting organizations are strongly encouraged to view this website often to see if addenda are posted. Failure of any bidder to receive such addendum or interpretation shall not relieve such Bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the Contract Documents.

21. Attention of all bidders is directed to the set off provision contained in Article II, Section 24-33, entitled, "Debts owed by persons receiving payments other than salary", and Section 2-1049 entitled "Receipt of benefits from City contracts by council members, employees, and officers of the City" of the Code of the City of Knoxville.
22. Where applicable, the successful Bidder will be required to pay prevailing wages to those whom they employ (to include any sub contractors). Information regarding the prevailing wage rates may be obtained on the following State of Tennessee website: www.state.tn.us/labor.
23. Before a Purchase Order is issued, the submitting entity, if selected, **must** provide the City Purchasing Division with a copy of its valid business license **or** with an affidavit explaining why it is exempt from the business licensure requirements of the city or county in which it is headquartered. If a contract is signed, the contractor's business license shall be kept current throughout the duration of the contract, and the contractor shall inform the City of changes in its business name or location. Any Agreement to purchase resulting from this Invitation to Bid shall be governed by and construed in accordance with the substantive laws of the State of Tennessee and its conflict of laws provisions. Venue for any action arising between the City and the Vendor from the Agreement shall lie in Knox County, Tennessee.
24. By acceptance and delivery of the Purchase Order resulting from the award of this Invitation to Bid, the Vendor agrees to the following:

Contractor shall defend, indemnify and hold harmless the City, its officers, employees and agents from any and all liabilities which may accrue against the City, its officers, employees and agents or any third party for any and all lawsuits, claims, demands, losses or damages alleged to have arisen from an act or omission of Contractor in performance of this Agreement or from Contractor's failure to perform this Agreement using ordinary care and skill, except where such injury, damage, or loss was caused by the sole negligence of the City, its agents or employees.

Contractor shall save, indemnify and hold the City harmless from the cost of the defense of any claim, demand, suit or cause of action made or brought against the City alleging liability referenced above, including, but not limited to, costs, fees, attorney fees, and other expenses of any kind whatsoever arising in connection with the defense of the City; and Contractor shall assume and take over the defense of the City in any such claim, demand, suit, or cause of action upon written notice and demand for same by the City. Contractor will have the right to defend the City with counsel of its choice that is satisfactory to the City, and the City will provide reasonable cooperation in the defense as Contractor may request. Contractor will not consent to the entry of any judgment or enter into any settlement with respect to an indemnified claim without the prior written consent of the City, such consent not to be unreasonably withheld or delayed. The City shall have the right to participate in the defense against the indemnified claims with counsel of its choice at its own expense.

Contractor shall save, indemnify and hold City harmless and pay judgments that shall be rendered in any such actions, suits, claims or demands against City alleging liability referenced above.

The indemnification and hold harmless provisions of this Agreement shall survive termination of the Agreement.

BID SUBMISSION REQUIREMENTS

Bidders must furnish the following information in writing with their submission:

1. Bid Form showing bidder's name, address, quoted price, business license number, date of expiration of business license. A copy of the bidder's current business license may be submitted in lieu of providing the license expiration date.
2. Warranty Information
3. Non-Collusion Affidavit
4. Iran Divestment Act of 2014 Certification of Noninclusion
5. Form I *or* Form II to indicate Title VI compliance

CITY OF KNOXVILLE

BID FORM

TO: Purchasing Agent
City of Knoxville
Suite 667-674
City/County Building
400 Main Street
Knoxville, TN 37902

Having carefully examined the specifications entitled "Spread Spectrum Radios and Accessories" to open on January 12, 2017, at 11:00:00 a.m. and the other Contract Documents and addenda, and having familiarized ourselves with the existing conditions of the job, we hereby propose to furnish the supervision, labor, materials, equipment, delivery, and services to do the work as stated for the following sum:

BID FOR FIXED PRICE AGREEMENT:

Microhard IPn920 Radio – price per unit: _____

PRO890-12 Yagi (or comparable) – price per unit: _____

Pro902-8 Omni (or comparable) – price per unit: _____

GUARANTEE of initial delivery no later than: _____

Firm Name: _____

Official Address: _____

(By)

(Name Typed)

(Title)

Date _____

Terms _____

email address _____

Telephone _____

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____

County of _____

_____, being first duly sworn, deposes and says that:

- (1) He is owner, partner, officer, representative, or agent of _____, the Bidder that has submitted the attached Bid;
- (2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
- (3) Such Bid is genuine and is not a collusive or sham Bid;
- (4) Neither the said Bid nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from proposing in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, firm, or person to fix any overhead, profit, or cost element of the bid price or the bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the City of Knoxville or any person interested in the proposed Contract; and
- (5) The price or prices quoted in that attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

Signed: _____

Title: _____

Subscribed and sworn to before me this ____ day of _____, 2____.

My commission expires: _____

IRAN DIVESTMENT ACT of 2014
Certification of Noninclusion

NOTICE: Pursuant to the Iran Divestment Act of 2014, Tenn. Code Ann. § 12-12-106 requires the State of Tennessee Chief Procurement Officer to publish, using credible information freely available to the public, a list of persons it determines engage in investment activities in Iran, as described in § 12-12-105. Inclusion on this list makes a person ineligible to contract with the state of Tennessee; if a person ceases its engagement in investment activities in Iran, it may be removed from the list. A list of entities ineligible to contract in the State of Tennessee Department of General Services or any political subdivision of the State may be found here:

https://www.tn.gov/assets/entities/generalservices/cpo/attachments/List_of_persons_pursuant_to_Tenn._Code_Ann._12-12-106_Iran_Divestment_Act-July.pdf

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to T.C.A. § 12-12-106.

Vendor Name (Printed)	Address
By (Authorized Signature)	Date Executed
Printed Name and Title of Person Signing	

NOTARY PUBLIC:

Subscribed and sworn to before me this _____ day of _____, 2_____.

My commission expires: _____

EQUAL BUSINESS OPPORTUNITY PROGRAM

Contracting Component

SECTION I

EQUAL BUSINESS OPPORTUNITY PROGRAM "GOOD FAITH EFFORT PLAN"

The City of Knoxville strongly encourages contractors to employ minority owned businesses and women owned businesses as subcontractors whenever feasible. This is viewed favorably by the City of Knoxville. In fact, the City's goal for minority and women owned business participation is 10 percent of the contract amount.

Prime contractors will consider all competitive sub-bids and quotations received from minority owned businesses (MOB) and women owned businesses (WOB). When a subcontract is not awarded to the MOB/WOB submitting the lowest bid, the prime contractor must document the reason(s) the award was not made in writing. If the Contractor terminates an agreement and/or subcontract with a MOB/WOB, then the contractor is required to strongly consider selection of another MOB or WOB as a replacement.

GOOD FAITH EFFORTS

1. Soliciting through all reasonable and available means.
 - a. Advertising
 - b. Written notices to all certified MOB's and WOB's who have the capability to perform the work or provide the service.
 - c. Solicitation of interest must be within sufficient time to allow MOB's and WOB's to respond to the solicitation.
 - d. Faxes, direct mailings, and telephone requests.
2. Providing interested MOB's and WOB's with adequate information about plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
3. Negotiating in good faith with interested MOB's and WOB's.
 - a. It is the **bidder's/proposer's** responsibility to make opportunities available to MOB's and WOB's subcontractors and suppliers and to select opportunities consistent with the available MOB/WOB business subcontractors and suppliers. Evidence of such negotiations includes the names, addresses, and telephone numbers of MOB's and WOB's considered.

- (1) A description of the specifications for the work selection for subcontracting
 - (2) Evidence why agreements could not be reached for MOB's and WOB's to perform the work.
4. Effectively using the services of available minority, women contractor groups, local minority and women business assistance offices, small business groups, and other organizations on a case-by-case basis to provide assistance in the recruitment and placement of minority/women business.

SECTION II

MOB/WOB SUBMITTAL TIME FRAME

The Contractor will submit the following forms with the **bid/proposal**:

1. "Statement of Intent for MOB/WOB Utilization" (Form I Attached)

This form will be submitted by the bidder/proposer if he/she plans to subcontract any portion(s) of the work with a MOB and/or a WOB. This form illustrates the areas the Contractor has identified as potential MOB and/or WOB subcontract opportunities and the **dollar value** associated with these opportunities. The purpose of "Form I" is to measure the Contractor's "**Good Faith Efforts.**" It does not commit the prime to subcontracting these areas only to MOB and WOB firms or release the prime from negotiating with MOB/WOB firms for subcontract opportunities.

OR

2. "Statement of Intent of Performing Work Without Subcontracting" (Form II Attached)

This form will be submitted if the **bidder/proposer** does not plan to subcontract any portion(s) of the work and if there are not any sufficient material purchases in which MOB/WOB firms can be utilized. The **bidder/proposer** must certify that this has been a typical practice on projects of similar scope and dollar value. By submittal of Form II, the Contractor certifies that:

- (1) He/she does not typically subcontract on projects of similar scope and dollar value.
- (2) He/she will not enter into any subcontract for duration of the project, and if he/she does decide to subcontract any portion of the work, he/she will: notify the City immediately of the decision to subcontract and adhere to the provision of "**Good Faith Efforts**" in filling that subcontract opportunity.

The Purchasing Division may request the apparent low bidder/proposer to provide additional information to clarify the bidder's/proposer's responsiveness and intent in this regard.

These documents will be received by the Purchasing Division upon submission of a proposal/bid. Additionally, prime contractors who submit Form I stating their intent to use MOB or WOB subcontractors for any part of the contract are required to report the amount(s) they have paid to these

subcontractors on June 30th and December 31st of each year. Failure to submit this reporting data may result in a delay of payments. At the time of the final request for payment, the prime shall submit a Statement of Final Payments to MOB and WOB Subcontractors and Suppliers (Form III attached). Final payment will not be released by the City until Form III is submitted.

SECTION III

DEFINITIONS

Minority: A person who is a citizen or lawful admitted permanent resident of the United States and who is a member of one (1) of the following groups:

- a. Black American, which includes persons having origins in any of the Black racial groups of Africa;
- b. A Hispanic American, which includes persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race;
- c. Native American, which includes persons who are American Indians or Alaska Native;
- d. An Asian-Indian American, which includes persons whose origins are from Indian, Pakistan or Bangladesh.
- e. An Asian Pacific Islander, which includes persons whose origins are from Japan, China, Taiwan, Korea, Vietnam, Laos, Cambodia, the Philippines, Samoa, Guam, the U. S. Trust Territories of the Pacific and Northern Marianas.

Minority-Owned Business (MOB), Women-Owned Business (WOB): A business which is at least (51%) owned and controlled by minority group members or European American female(s). A MOB/WOB is bonafide only if the minority group interests are real and continuing and not created solely to meet the MOB/WOB requirement. In addition, the MOB/WOB must perform satisfactory work or services to provide supplies under the contract and not act as a mere conduit. In short, the contractual relationship must be bonafide.

Owned and Controlled: A business which is (1) a sole proprietorship legitimately owned by an individual who is a minority or European American female; (2) a partnership or joint venture controlled by minorities or European American females, and in which at least (51%) of the beneficial ownership interests legitimately are held by minorities or European American females; or (3) a corporation or other entity controlled by minorities or European American females, and in which at least 51% of the voting interests and 51% of the beneficial ownership interests are legitimately held by minorities or European American females. In addition, these persons must control the management and operation of the business on a day-to-day basis.

Subcontractor: Any named person, firm, partnership, or corporation which supplies any work, labor, services, supplies, equipment, materials, or any combination of the foregoing contract with the contractor on a public contract.

FORM I

STATEMENT OF INTENT OF MOB/WOB UTILIZATION (TO BE SUBMITTED WITH THE BID/PROPOSAL)

We, _____, do certify that on the
(Bidder/Proposer)

(Project Name)

(_____)
(Dollar Amount of Bid)

MOB/WOB's will be employed as subcontractor(s), vendor(s), supplier(s), or professional service(s). The estimated **dollar value** of the amount that we plan to pay the MOB or WOB subcontractor(s), vendor(s), supplier(s), or professional service(s) is \$ _____.

Description of Work	MOB/WOB Utilization		Name of MOB/WOB
	MOB Amount	WOB Amount	

The undersigned understands that they are to report the annual amount disbursed to these MOB(s) /WOB(s) on June 30th of each year. Moreover, the undersigned understands that he/she is required to report the total amount disbursed to MOB(s)/WOB(s) for this project at the completion of the project and that payments may be withheld until these reporting requirements are met.

DATE: _____ COMPANY NAME: _____

SUBMITTED BY: _____
(Authorized Representative)

TITLE: _____

ADDRESS: _____

CITY/STATE/ZIP CODE: _____

TELEPHONE NO: _____

FORM II

STATEMENT OF INTENT TO PERFORM WORK WITHOUT SUBCONTRACTING (TO BE SUBMITTED WITH BID/PROPOSAL)

We, _____, hereby certify that it is our
(Bidder/Proposer)

intent to perform 100 % of the work required for the _____

_____ contract.
(Name of Project)

In making this certification, the **Bidder/Proposer** states that:

1. It is a normal business practice of the bidder/proposer to perform all elements of this type contract with its own work forces without the use of subcontracts.

AND

2. If it is necessary to subcontract some portion of the work at a later date, the **bidder/proposer** will comply with all requirements of the "**Good Faith Efforts**" in providing equal opportunity to MOB/WOB Firms to subcontract the work.

The undersigned hereby certifies that he/she has read the terms and agrees to the terms of this statement.

Signature and title of authorized official of the company and the date must be properly executed on this document and a list of previous projects of similar scope and dollar value as stated in Section II attached or the bid may be deemed non-responsive.

DATE: _____ COMPANY NAME: _____

SUBMITTED BY: _____
(Authorized Representative)

TITLE: _____

ADDRESS: _____

CITY/STATE/ZIP CODE: _____

TELEPHONE NO: _____

FORM III

STATEMENT OF PAYMENTS TO MOB/WOB SUBCONTRACTOR(S) & SUPPLIER(S) (TO BE SUBMITTED ON JUNE 30 AND DECEMBER 31 OF EACH YEAR FOR THE LIFE OF THE CONTRACT AND TO BE WITH FINAL PAYMENT REQUEST)

Project:
Contract#: _____

Contractor's
Name: _____

Cert. #	MOB	WOB	Name of Firm / Address & Phone#	Total Amount Paid	Contact Person

I hereby certify that this statement is true and that above payments have been made.

Contractor: _____

Address: _____

By: _____
Contractor's Signature Title

Subscribed and sworn to before me this _____ day of _____ 20____

Notary
Public: _____

My Commission
Expires: _____

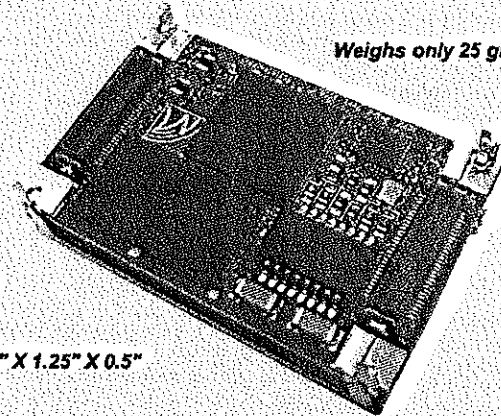
Miniature OEM Wireless Ethernet/Serial/USB Gateway

The Nano IP Series adds Ethernet capability to the miniature, yet powerful Nano platform. This incredibly small Ethernet Bridge and Serial Gateway provides robust wireless communication of simultaneous serial data and IP/Ethernet packets to extend serial data and IP networks.

Applications

- IP/Ethernet Wireless Extension
- Legacy Networks/Devices Migration
- Video/Voice over IP
- SCADA (PLCs, Modbus, HART)
- GPS Vehicle Data/Tracking, DGPS
- Electric, Oil & Gas Utilities/Metering

Microhard Systems Inc.'s proprietary radio technology excels in the most demanding RF and physical environments.



Weighs only 25 grams!

2" X 1.25" X 0.5"

World's Smallest Ethernet /Serial/USB Gateway!

The Nano IP platform is the smallest form factor (2" x 1.25" x .5", weighing only 25 grams) available which offers a full Ethernet/Serial/USB bridge and routing functionality. The Nano IP OEM module can be directly integrated into OEM systems or applications using a variety of interface options. With the LAN out interface ready to wire directly to CAT5 cable OEMs can integrate this unit quickly and efficiently. The Nano IP Series also features flexible maintenance utilities, secure firewall features and network management facilities. Robust Frequency Hopping with excellent receiver sensitivity and interference rejection allow for long range, high speed communications.

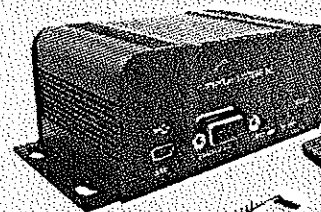
Features of the Nano IP Series

- Low Power Consumption
- Up to 1.2 Mbps Wireless Link Rate*
- Master, Slave, Repeater operation in a single unit
- HV Option provides a quick wiring solution with Ethernet and Serial Levels and Power (7-30 VDC)
- 2 Serial Com Ports, 1 USB Port, and 1 Ethernet Port
- Supports Point-to-Point, Point-to-Multipoint, Repeater, Peer-to-Peer
- Adjustable transmit power (100mW - 1W)
- Radius Server Support
- Full VLAN Support (for separate management and Data networking)
- User interface through local console, telnet, and web browser
- Network management capability with SNMP V1, V2, V3
- Local and remote wireless firmware upgrading through FTP
- QoS Routing on Serial, IP, or Logic Ports

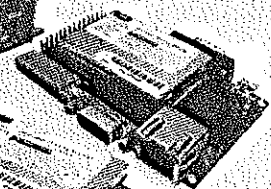
* For Faster Link Rates Contact Microhard

Interface Options

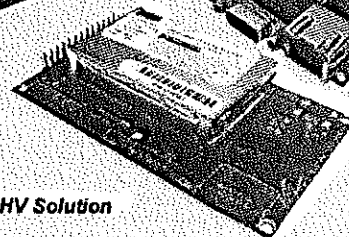
Enclosed Solution



Motherboard Solution



HV Solution



IPn920

Specifications

Frequency	902 - 928 MHz
Spread Method	Frequency Hopping / DTS
Link Rate	Up to 1.2Mbps (See Order Options)
Error Detection	32 bits of CRC, ARQ
Encryption	128-bit WEP/WPA (Canada & USA only. NOT AVAILABLE for export, see -AES option)
Range	Up to 30+ miles (50+ km) @ 1.2Mbps Up to 60+ miles (100+ km) @ 172kbps
Sensitivity	-108dBm@172kbps link rate -106dBm @ 230kbps link rate -97dBm @ 1.2Mbps link rate
Output Power	100mW - 1W (20-30dBm)
Serial Interface	RS232, RS485, RS422
Serial Baud Rate	300bps to 921kbps
USB	USB 2.0 USB Console Port USB to Serial Data Routing USB to Ethernet Data Routing
Ethernet	10/100 BaseT, Auto - MDI/X IEEE 802.3
Network Protocols	TCP, UDP, TCP/IP, TFTP, ARP, ICMP, DHCP, HTTP, HTTPS*, SSH*, SNMP, FTP, DNS, Serial over IP, QoS (* Only available in -AES)
Operating Modes	Point-to-Point, Point-to-Multipoint, Store & Forward Repeater, Peer-to-Peer
Management	Local Serial Port Console, Telnet, WebUI, SNMP, FTP & Wireless Upgrade, RADIUS authentication, VLAN
Diagnostics	Battery Voltage, Temperature, RSSI, and remote diagnostics
Rejection	Excellent strong signal interference & rejection characteristics
Input IP3 (Antenna Connector)	+12 dBm

Input Voltage	OEM 3.3VDC Nominal (+/- 0.3V) Enclosed 7-30VDC Interface Card 7-30VDC
Power Consumption (Typical with n920F @ 12V with Motherboard)	Sleep: < 1mA Idle: 35mA Rx: 110mA to 145mA Tx: 350mA to 500mA
Connectors:	OEM Antenna OEM - MMCX Data OEM - 60 Pin OEM Header x2 Enclosed Antenna RP-TNC Female Bulkhead Data RJ-45 (Ethernet) Female DB9 Mini-USB
Environmental	Temperature -40°F to 185°F (-40°C to +85°C) Humidity 5-95%, non-condensing
Weight (Including Radio)	OEM Approx. 25 grams Enclosed Approx. 250 grams w/ Interface Board Approx. 70 grams (No Conn. 50g)
Dimensions	OEM Approx. 1.25" x 2.0" x .50" (32mm x 51mm x 13mm) Enclosed Approx. 2.25" x 3.85" x 1.70" (57mm x 98mm x 43mm)
Approvals	FCC Part 15.247 IC RSS210

Order Options

-C1D2	Class 1 Div 2 (for use in hazardous environments)
-AES	128/256-bit AES Encryption, Secure Shell, HTTPS (Canada & USA only. NOT AVAILABLE for export)
-EXP	Export Version, removes encryption
-869	869.4 - 869.65 MHz Operation
IPn920F	115kbps - 230kbps
IPn920T	345kbps - 1.2Mbps

Contact Information

Microhard Systems Inc.
150 Country Hills Landing N.W.
Calgary, AB, Canada T3K 5P3

Email: info@microhardcorp.com
Tel: (403) 248-0028
Fax: (403) 248-2762



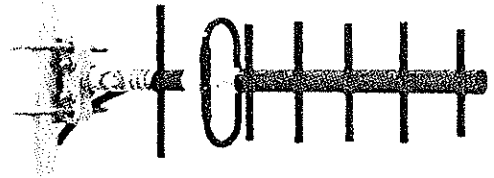
www.microhardcorp.com

PROFESSIONAL GRADE YAGI PRO890-12

890-960 MHz

ANTENNA SPECIFICATIONS

Operating Frequency (VSWR \leq 1.5) MHz	890-960
Nominal Gain (dBi)	12
Horizontal Beamwidth (Deg-3dB)	56
Vertical Beamwidth (Deg-3dB)	46
Front To Back Ratio (dB)	20
Power Rating (W)	200
Length (inches)	24
Width (inches)	6.8
Antenna Weight (lbs.)	2
Cross Sectional Area (Max. Ft ²)	0.24
Lateral Thrust at 100mph (lbs.)	6
Rated Wind Velocity (mph)	125
Rated Wind Velocity with 1/2" radial ice (mph)	120



PRO890-12 is equipped with a standard feed line length of 2' LMR400 UltraFlex® cable and N-Female connector. Please contact our sales staff for alternate connector requirements.

Extended feed line available in 5' increments up to a maximum of 50'. All extended feed line antennas equipped with LMR400 cable and N-Male connector.

The **PRO890-12** is engineered to meet or exceed the requirements of a broadband, high gain, *Professional Grade 900 MHz Yagi antenna*.

The **PRO890-12** provides **12 dBi** gain and operates effectively across the frequency band of **890-960 MHz** with a VSWR of 1.5:1 or less.

All *WaveLink Professional Grade* antennas are manufactured using high strength 6061-T6 aluminum. The dipole and directive elements are fully welded to the boom completely eliminating misalignment problems. The antenna is also electrically **one piece**, effectively eliminating intermod issues and future performance degradation.

The dipole design incorporates an integral feed cable available in lengths up to 50 feet.

The extended feed line option offers many benefits:

1. Dramatically reduces install time, by up to 2 hours per site
2. Completely eliminates the connector at the antenna
3. Improves signal strength ½ to ¾ of a dB
4. Eliminates connector weatherproofing concerns
5. Significantly reduces long term cost of ownership

The **PRO890-12** is anodized to protect against environmental degradation even in the most severe environments.

To view polar plots for this antenna please visit www.wavelinkantenna.com/plots



includes mounting bracket
C1001A

Easily permits vertical or horizontal polarization
Mounts on 1"-2 1/2" OD pipe.

PROFESSIONAL GRADE OMNI PRO902-8

902-928 MHz

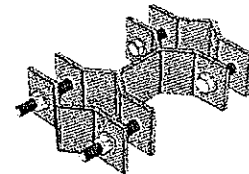
ANTENNA SPECIFICATIONS

Operating Frequency (VSWR \leq 1.5) MHz	902-928
Nominal Gain (dBi)	8.5
Horizontal Beamwidth (Deg-3dB)	360
Vertical Beamwidth (Deg-3dB)	15
Power Rating (W)	200
Length (inches)	72.5
Width (inches)	2.5
Antenna Weight (lbs.)	10
Cross Sectional Area (Max. Ft ²)	1.17
Lateral Thrust at 100mph (lbs.)	29.25
Rated Wind Velocity (mph)	150
Rated Wind Velocity with 1/2" radial ice (mph)	125

The **PRO902-8** is engineered to meet or exceed the requirements for a rugged, high gain outdoor omni-directional antenna. This antenna provides **8.5 dBi** gain and operates effectively across the operating range of **902- 928 MHz** with a VSWR of 1.5:1 or less. Every **WaveLink Professional Grade** Omni is built using a UV-resistant fiberglass radome, coupled to a machined, heavy duty aluminum base. The 6061-T6 aluminum base is anodized to protect against environmental degradation. The elongated N-Female connector is recessed within the base to minimize exposure, while the large inside diameter allows easy access for the connection. The antenna is supplied with two heavy duty mounting brackets.



PRO902-8 equipped with integrated N-Female connector



Includes mounting brackets
C1002 (2 included)