

The N-TRON® 702M12-W Industrial Wireless Radio offers outstanding performance and ease of use. It is ideally suited for connecting wireless devices to a wired network or for connecting two wired networks in an IP67 environment, where it is not possible, impractical, or too expensive to install cable.

## Product Features

- Full IEEE 802.11a,b,g,n Compliance
- IP67 Rated, Industrial Hardened Enclosure
- One 10/100BaseTX M12 Port
- Three Antennas for 3x3 MIMO Operations
- Four user definable LED's for display of signal quality
- Radio Enable, Link/Activity, and power LEDs
- 802.3af PoE Powered Device
- Extended Environmental Specifications
- Autosensing 10/100BaseTX, Duplex, and MDIX
- Redundant Power Inputs (20-49 VDC)
- Web Browser Management

## Wireless Compliance:

- IEEE 802.11a/b/g/n Compliant

## Security:

- 802.11i with AES-CCM & TKIP Encryption
- 802.1x, 64/128 bit WEP

## Data Rates:

- Legacy 802.11a/b/g (1-54Mbps),
- 802.11n (up to 300Mbps)

## Range Performance:

- Indoor (Antenna Dependent) greater than 300m
- Outdoor (Antenna Dependent) greater than 60km

## Applications

In industrial environments, the installation of fiber or Cat5e cable and associated power cables is difficult or cost prohibitive. There are also applications which require communication with mobile devices such as laptop computers, forklifts, cockpits or control centers on mobile equipment such as cranes, and other devices which are impossible to connect with copper or fiber cable. The N-TRON 702M12-W provides a wireless connection that can be quickly and easily deployed. With it's wide operating temperature range and 1 million hours MTBF, the 702M12-W offers the industrial ruggedness that customers have come to expect of N-TRON products. The IP67 sealed enclosure insures that outdoor, wash down, and the most dusty environments will present no problems to the 702M12-W. Three antennas enable the use of Multiple-In, Multiple-Out (MIMO) technology for increased throughput. Power over Ethernet (PoE) technology allows the 702M12-W to receive power through the Cat5e cable from a PoE sourcing device, such as the N-TRON 105TX-POE Switch. This eliminates the need for power cables or power supplies for the 702M12-W. Using wireless and PoE technology makes temporary deployment of network nodes much easier because only one Cat5e cable is required.



## Industrial Packaging and Specifications

The 702M12-W is specifically designed to operate in industrial environments. With it's rugged enclosure and industrial specifications such as extended shock and vibrations specs plus redundant power inputs, the 702M12-W easily meets and exceeds the operating parameters of the connected equipment.

## Multiple Wireless Modes

The 702M12-W provides a number of configuration options that allow it to be customized to suit specific application requirements.

**Station:** In "station" configuration the 702M12-W is used to connect a single device (MAC Address) to a wireless access point.

**Station, WDS (Wireless Distribution System):** In "station, WDS" mode the 702M12-W can be connected to a remote wired switch and will allow multiple devices (MAC Address forwarding) to be connected to the wireless access point with WDS activated.

**Access Point:** The "Access Point" mode allows the 702M12-W to serve as a wireless switch for the attached wireless stations. Wireless access points are commonly used to create one wireless local area network (WLAN) that spans an area around the Access Point. Each access point typically supports up to 253 stations.

**Access Point, WDS (Wireless Distribution System):** The 702M12-W in "Access Point, WDS" mode allows wireless connection of a number of access points to extend the coverage of the wireless network. The main base Access Point in WDS mode is extended using a series of relay Access points in WDS mode (Extended Service Set) and can in turn form a WLAN consisting of thousands of stations. All stations should be configured in "Station WDS" mode. Correctly configured switches using WDS will create a single network, providing station mobility throughout the wireless network.

## Multiple Network Modes

**Bridge:** In this mode the 702M12-W will operate in Layer two without network segmentation.

**Router:** Router operating mode offers Layer three routing to allow network segmentation.

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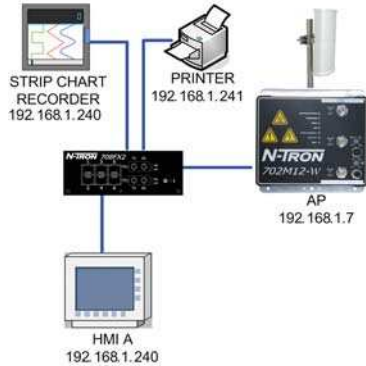
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European Headquarters: Westlink Commercial Park - Oranmore Co. Galway - Ireland  
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## Scenario 1 – Basic Bridge

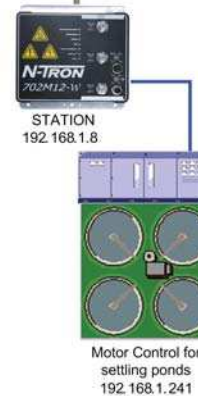
### Access Point:

The "Access Point" mode allows the 702M12-W to serve as a wireless switch for the wireless stations attached to it.



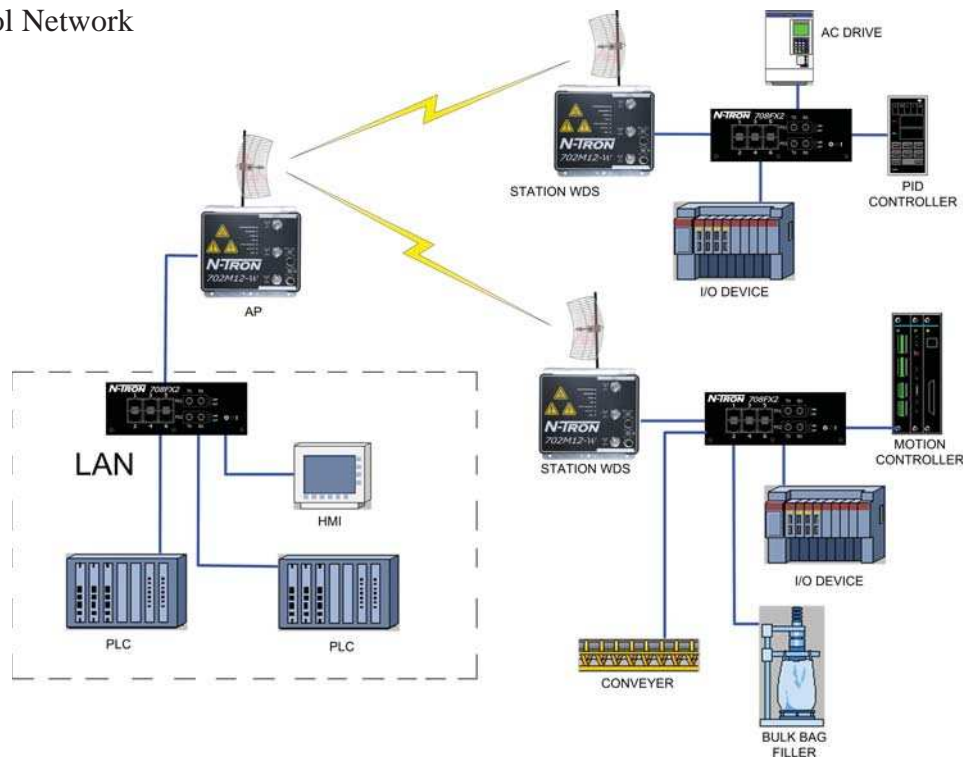
### Station:

In "station" configuration the 702M12-W is used to connect a single device (MAC Address) to a wireless access point.



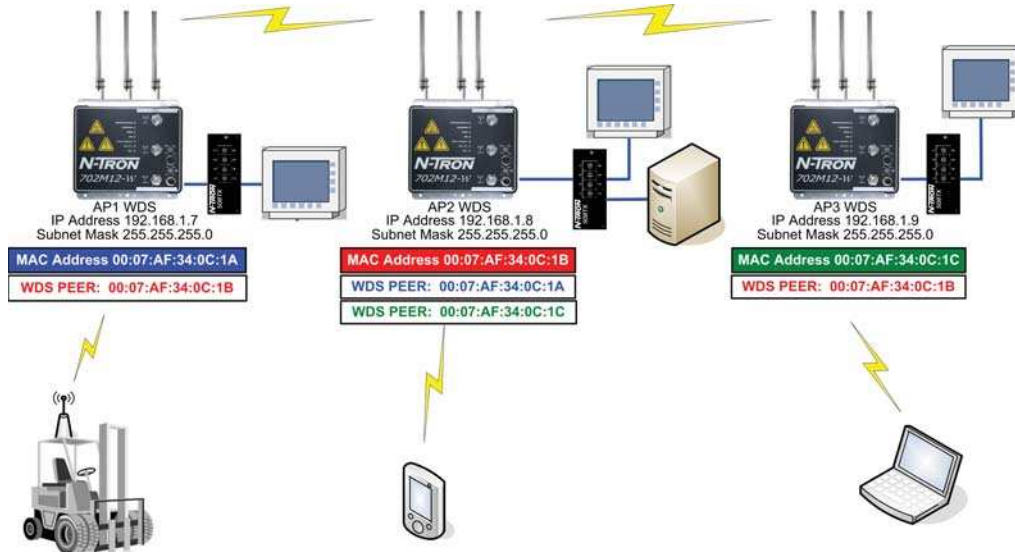
For added security, the 702M12-W supports WEP, WPA™, and WPA2™. WPA and WPA2, TKIP (Temporal Key Integrity Protocol) and CCMP (Counter Mode with Cipher Block Chaining Message Authentication Code Protocol) are available.

## Scenario 2 – Control Network



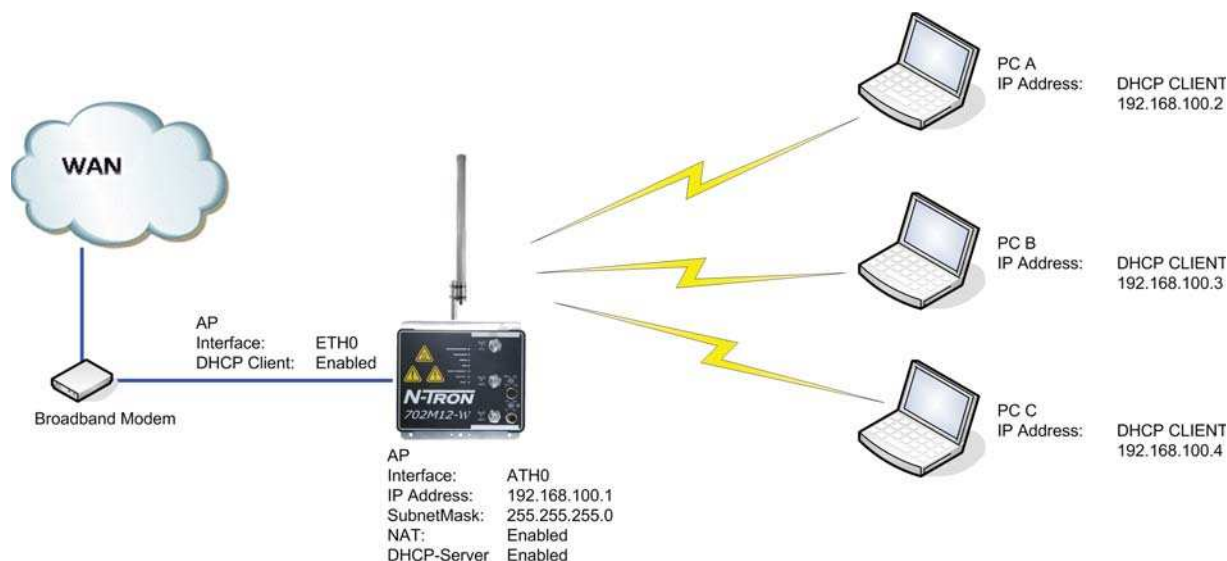
In Station WDS mode the 702M12-W can be connected to a remote wired Ethernet switch with multiple devices connected to the switch.

## Scenario 3 – WDS Peering



In this scenario, each 702M12-W has been configured as a peer of selected other 702M12-W(s) by using the MAC Addresses of the select unit(s). This allows forklifts or other mobile wireless devices to maintain communication seamlessly as they move from the area covered by one 702M12-W into the area covered by the next 702M12-W.

## Scenario 4 – Broadband Modem Wireless Router (W/ DHCP)



The N-TRON 702M12-W configured as a router can act as a DHCP server and supports the Network Address Translation (Masquerading) feature which is widely used by Access Points. This automates the assigning of IP addresses to devices as they connect. NAT will act as a firewall between LAN and WLAN networks. Additional firewall settings can be configured for layer 3 packet filtering and access control in Router mode.

## 702M12-W Specifications

### Case Dimensions

Height: (w/o antennas)	6.7"	(17.2 cm)
Width:	6.7"	(17.2 cm)
Depth:	1.8"	(4.6 cm)
Weight (max):	3.5 lbs	(1.6 kg)

### Environmental

Operating Temperature:	-40°C to 70°C
Storage Temperature:	-40°C to 85°C
Operating Humidity:	5% to 100% (Non Condensing)
Operating Altitude:	0 to 10,000 ft.
N-TRON Power Supply:	NTPS-24-1.3

### Electrical

Redundant Input Voltage:	20-49 VDC (Regulated)
Input Current (max):	200mA max @24 VDC
702M12-W Max Power:	4.8Watts max
Input Ripple:	Less than 100mV

### Reliability

MTBF:	>1 Million Hours
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### Network Media

10BaseT:	>Cat3 Cable
100BaseTX:	>Cat5 Cable
802.11abgn:	Air

### Connectors

10/100BaseTX:	One (1) M12 Copper Port PoE Powered device support
802.11abgn	(3) RP-TNC connectors

### Recommended Wiring Clearance (Antenna Dependent)

Front:	4" (10.16cm)
Side:	4" (10.16cm)
Top:	6" (15.24cm)

### Contact Information

N-TRON Corp.  
820 S. University Blvd., Suite 4E  
Mobile, AL 36609 USA  
TEL: (251) 342-2164  
FAX: (251) 342-6353  
Website: [www.N-TRON.com](http://www.N-TRON.com)  
Email: [N-TRON\\_info@N-TRON.com](mailto:N-TRON_info@N-TRON.com)

N-TRON Asia  
Suite #: 2267, 22/F, One Lujiazui  
68 Yin Cheng Road Center,  
Pudong New Area  
200120 Shanghai, P.R. China  
Phone: +86 (0) 21 6194 6777  
Fax: +86 (0) 21 6194 6699

N-TRON Europe GmbH  
Alte Steinhäuserstr 19  
6330 Cham / Zg Switzerland  
TEL: +41 41 7406636  
FAX: +41 41 7406637

Radio Output Power:			Radio Receiver Sensitivity		
Up to 250mW US					
<b>802.11a 5GHz</b>			<b>802.11a 5GHz</b>		
DataRate	Avg TX $\pm$ 2dB		DataRate	Sens. $\pm$ 3dB	
1-24Mbps	24 dBm		1-24Mbps	-96 dBm	
36Mbps	22 dBm		36Mbps	-95 dBm	
48Mbps	20 dBm		48Mbps	-94 dBm	
54Mbps	19 dBm		54Mbps	-91 dBm	
<b>802.11b/g 2.4GHz</b>			<b>802.11b/g 2.4GHz</b>		
DataRate	Avg TX $\pm$ 2dB		DataRate	Sens. $\pm$ 3dB	
1-24Mbps	24 dBm		1-24Mbps	-97 dBm	
36Mbps	22 dBm		36Mbps	-90 dBm	
48Mbps	20 dBm		48Mbps	-86 dBm	
54Mbps	19 dBm		54Mbps	-84 dBm	
<b>802.11n 2.4GHz 5GHz</b>			<b>802.11n 2.4GHz 5GHz</b>		
DataRate	Avg TX $\pm$ 2dB		DataRate	Sens. $\pm$ 3dB	
MCS0	24dBm	24dBm	MCS0	-97dBm	-96dBm
MCS1	24dBm	24dBm	MCS1	-96dBm	-95dBm
MCS2	24dBm	24dBm	MCS2	-93dBm	-92dBm
MCS3	22dBm	22dBm	MCS3	-91dBm	-90dBm
MCS4	22dBm	22dBm	MCS4	-87dBm	-86dBm
MCS5	22dBm	22dBm	MCS5	-84dBm	-83dBm
MCS6	18dBm	18dBm	MCS6	-78dBm	-77dBm
MCS7	15dBm	15dBm	MCS7	-75dBm	-74dBm
MCS8	24dBm	24dBm	MCS8	-96dBm	-95dBm
MCS9	24dBm	24dBm	MCS9	-94dBm	-93dBm
MCS10	22dBm	22dBm	MCS10	-91dBm	-90dBm
MCS11	20dBm	20dBm	MCS11	-88dBm	-87dBm
MCS12	20dBm	20dBm	MCS12	-85dBm	-84dBm
MCS13	17dBm	17dBm	MCS13	-80dBm	-79dBm
MCS14	17dBm	17dBm	MCS14	-79dBm	-78dBm
MCS15	15dBm	15dBm	MCS15	-76dBm	-75dBm

### Regulatory Approvals

UL /cUL Class I, Div 2, Groups A, B, C, D, and T4A  
ANSI/ISA-12.12.01-2007 and UL 508 and 1604  
FCC/CE (CFR 47, Part 15, Subpart B - Class A),  
EN 301 489-3, IEC 6100-4-2, 6100-4-3,  
R&TTE Directive 99/5/EC, ANSI C63.4, and ICES-003 Issue 3  
GOST-R Certified, RoHS Compliant,

Designed to comply with:  
IEEE 1613 for Electric Utility Substations  
NEMA TS1/ TS2 for Traffic control

## 702M12-W WIRELESS ETHERNET RADIO

### Ordering Information

<b>702M12-W</b>	Industrial Wireless Radio
<b>702M12-PK</b>	Pole mount kit for 702M12-W
<b>ANT-CAB-400-N-RPTNC-X</b>	Low Loss Coaxial Antenna cable 1 RP-TNC and 1 N Male connector
<b>ANT-MD24-12</b>	2.4GHz 12dBi Mini Directional Antenna
<b>ANT-PAD24-16</b>	2.4GHz 16dBi Directional Antenna
<b>ANT-PAD58-19</b>	5.8GHz 19dBi Directional Antenna
<b>ANT-PD58-32</b>	5.8 GHz Parabolic Dish 32dBi Directional Antenna
<b>ANT-LA6-NFF</b>	2-6GHz quarter wave lightning arrestor (N-female to N-female, less than 0.2dB insertion loss, IP65, -40 to 85°C)
<b>ANT-CAB-400-N-X</b>	Low loss CA-400 coaxial cable with (2) N Female connectors for use with the ANT-LA6-NFF lightning arrestor
<b>M12DRC-ISO</b>	DIN-Rail kit, two isolated plastic clips
<b>M12DRC-MTL</b>	DIN-Rail kit, two metal clips
<b>NTPS-24-1.3</b>	DIN-Rail Power Supply 24V@1.3 Amp

## Cables with M12 connectors

### Ordering Information

<b>CAT5E-M12-M12-X</b>	Straight M12 to Str. M12, Shielded
<b>CAT5E-M12-RJ45-X</b>	Straight M12 to RJ-45, Shielded
<b>CAT5E-M12-X</b>	Straight M12 to bare end, Shielded
<b>CAT5E-RM12-M12-X</b>	90° M12 to Str. M12, Shielded
<b>CAT5E-RM12-RM12-X</b>	90° M12 to 90° M12, Shielded
<b>CAT5E-RM12-RJ45-X</b>	90° M12 to RJ-45, Shielded
<b>CAT5E-RM12-X</b>	90° M12 to bare end, Shielded
<b>PWR-M12-A-X</b>	Power Cable, M12 A-Coded Straight Female to bare end, Shielded
<b>PWR-RM12-A-X</b>	Power Cable, M12 A-Coded 90° Female to bare end, Shielded

Where: X = length of cable, fill in desired amount in feet.  
Example: CAT5E-RM12-10 (for a 10ft cable)

