



*The advanced KR900 frequency hopping data radio sets the standard for professional high speed serial data communications in the license free 900MHz band.*

*With maximum range and virtually unlimited system coverage due to its unique LinkXtend™ network bridging and KwikStream™ high speed repeater capabilities, the industrial strength KR900 is ideally suited for the most demanding Point-to-Multi-point and Point-to-Point wireless SCADA and Telemetry applications. The highly versatile KR900 also offers dual user ports with MultiStream™ data routing and TRIO TVIEW+ network-wide diagnostics compatibility.*



### **.: Features**

The KR900 combines class leading performance with unprecedented flexibility to allow cost effective implementation of even the most complex wireless SCADA and Telemetry solutions that may not have otherwise been achievable, and with unlimited expansion capability. Some of the many outstanding features which make the KR900 so unique.

### **.: Outstanding and highly versatile operational capability**

- Point to point and point to multi-point operation
- Configurable personality – master-remote-bridge-repeater
- KwikStream™ high speed single radio repeater mode \*
- Unlimited coverage networks
- No restriction on the number of radios in any system
- Unique dual antenna LinkXtend™ technology increases usable range
- Repeater and Bridge units support locally connected user devices
- ChannelShare™ collision avoidance for unsolicited remote transmissions allowing simultaneous polling and spontaneous reporting
- 1+1 redundant Hot Standby base / repeater station for highest system reliability

*\* Up to 140km (90 miles) single repeater system range with 6dB antennas*

### **.: A Radio and Modem that extend performance boundaries**

- License free operation in 900MHz ISM frequency bands
- 256k high speed over-air data rate (can be reduced to 128k, 64k or 32k for longer range)
- Robust, frequency hopping spread spectrum technology for superior interference immunity
- Ultra Long Range high performance receiver\*



- 1 Watt (+30dBm) maximum allowable transmitter power
- Advanced error free data delivery with CRC plus selectable FEC and ARQ
- Multiple security layers including 256-bit AES data encryption (export restrictions may apply)
- Multi-Master synchronization mode for interference reduction with co-located master radios
- High VSWR protection

*\* Up to 70km (45 miles) maximum single hop line-of-sight range with 6dB antennas*

## **.: Comprehensive and adaptable User Data interfacing, control and transmission**

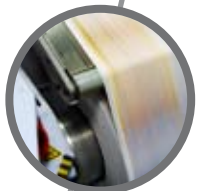
- Dual independent user configurable data ports
- Separate on-line system port avoids the need to interrupt user data for configuration access
- Selectable 300-230 k bps asynchronous RS-232 and RS-485 interfaces
- User selectable hardware handshaking or 3 wire data port interface
- Suitable for most industry standard data protocols. e.g.: MODBUS, DNP-3, IEC 870-5-101, etc.
- Low latency pseudo full duplex Point-Point mode (for sensitive protocols, e.g., SEL Mirrored Bits®)
- Multistream™ simultaneous data stream delivery allows for multiple vendor devices/protocols to be transported on the one radio network - compatible with Trio E Series and M Series
- Flexible data stream routing providing optimum radio channel efficiency

## **.: A Data Radio for the harshest environments and places**

- Reliable operation in environmental extremes (-40oC to +70oC)
- Hazardous Environment Certification – Class I, Division II (Groups A,B,C and D)
- FCC certification - accepted in multiple regions
- Compact, rugged alloy housing
- Low power consumption with smart sleep mode operation
- 10-30Vdc power supply
- Dual industry standard TNC antenna connectors

## **.: Total command of the radio system with TVIEW +™ Network Management and Remote Diagnostics**

- Remote and local fully transparent simultaneous Network Management and Diagnostics
- Network wide access from any radio modem
- Full SCADA style features such as database, trending and networking
- Full graphical Diagnostics presentation (HMI)
- User friendly Windows™ GUI configuration software
- Over-the-air reconfiguration
- Powerful system commissioning and troubleshooting tools
- Integrated graphical spectrum analysis
- Seamless integration with Trio E Series and M Series diagnostics and remote configuration
- Field upgradeable firmware



## System Advantages

The KR900 puts an end to reduced transmission range and limited coverage previously associated with license free spread spectrum radio systems. Although conventional repeaters can be used to increase range and coverage, they incur a penalty of 50% or greater reduction in data throughput and an equivalent increase in data latency. Conventional repeaters also sacrifice antenna gain because only a single omni directional antenna can be used to access both the master radio as well as all the remote sites.

The KR900 now redefines the benchmark with a combination of its KwikStream™ high speed, low latency repeater and its LinkXtend™ dual antenna network bridge.

### Point to Multipoint via KwikStream™ Repeater



< The KwikStream™ repeater is used in Point-to-Multipoint (PTMP) systems where one repeater with a single omni antenna is sufficient to provide coverage to all remote sites, but where the sheer number of remote sites, or the user data necessitate high data throughput with the lowest possible latency.

In situations where a repeater is needed to extend the range of a Point-to-Point (PTP) link, but where a single omni antenna at the repeater cannot provide the desired transmission range, TRIO's LinkXtend™ dual antenna bridge will allow the use of dual directional antennas with much higher gain.



### Point to Point with LinkXtend™ Bridge



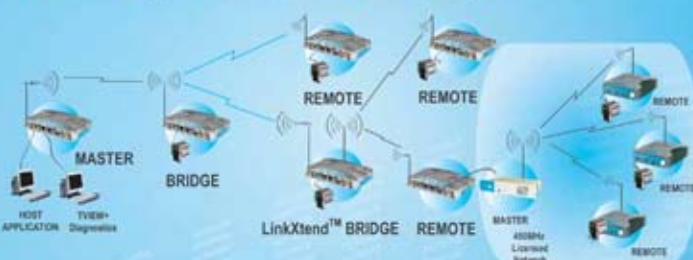
< If more than one repeater is required for wide area PTMP coverage, then these radios are configured as bridges to optimize data throughput by ensuring that all radios in the system remain synchronized. They can be equipped with a single omni antenna or, where this does not achieve adequate coverage, configured as dual antenna LinkXtend™ bridges equipped with one much higher gain directional antenna for uplink access, as well as an omni antenna for downlink communications with the remote sites.

Due to restrictions on maximum allowable signal levels in license free bands, the transmitter power for each of the two antenna ports can be individually adjusted in line with the two different antenna gains, to maximize the transmitted signal levels from both antennas.

With a combination of bridges and MultiStream™ data routing, the KR900, allows networks carrying multiple simultaneous user applications with totally separate protocols to be extended literally without limit.

Any TRIO KR900 may be configured as a KwikStream™ high speed low latency repeater or as a LinkXtend™ network bridge with Multistram™.

### Point to Multipoint with LinkXtend™ Bridge



## .: Radio

**Frequency Range:** 902-928 MHz

Region Specific Versions Available

**Frequency Accuracy:**  $\pm 2.5$ ppm

**Aging:**  $\leq 1$ ppm/annum

**Operational Modes:** Half Duplex,  
Psuedo Full Duplex

**Configuration:** All configuration via  
Windows based software

### Compliances:

FCC PART 15

IC RSS 139 (RSS 210)

ACA AS1468-2003

CSA Class I, Division II, Groups  
(A,B,C,D) for Hazardous  
Locations ANSI/UL  
equivalent)

## .: Transmitter

**Tx Power:** 0.01 - 1W (+30 dBm)

0.5 dB steps. User configurable with  
over-temperature and reverse power  
protection. (VSWR)

**Modulation:** 2 Level GFSK

**Tx Keyup Time:**  $< 50$ uS

**Tx Spurious:**  $\leq -50$  dBc

## .: Receiver

**Selectivity:** Better than 50 dB

**Intermodulation:** Better than 65 dB

**Spurious Response:** Better than 70  
dB

## .: Diagnostics (Optional)

Network wide operation from any  
remote terminal.

Non intrusive protocol - runs simul-  
taneously with the application.

Over-the-air re-configuration of user  
parameters.

Storage of data error and channel oc-

cupancy statistics.

In-built Error Rate testing capabili-  
ties.

## .: Connections

**User Data Ports:** 2 in total - 1 x DB9  
female port wired as DCE (modem)  
and 1 x RJ45

**System Port:** RJ45 for diagnostic,  
configuration and re-programming

**Antenna:** 2 x TNC female bulkhead.  
Separate connectors for LinkXtend™  
or separate TX/RX antennas.

**Power:** 2 pin locking, mating connec-  
tor supplied

**LED Display:** Multimode Indicators  
for Pwr, Tx, Rx, Sync, TxD and RxD  
data LEDs (for both port A and B)

## .: Modem

**Data Serial Port A:** RS232 or RS485,  
RJ-45, 600-230,000 bps asynchro-  
nous

**Data Serial Port B:** RS232, DCE,  
DB-9 300-38,400 bps asynchronous

**System Port:** RS232, 19,200 bps  
asynchronous

**Flow Control:** Selectable hardware or  
3 wire interface

**RF Channel Data Rate:** 32,000/  
64,000/128,000 or 256,000 bps

**Bit Error Rate:**  $< 1 \times 10^{-6}$  @ -108 dBm

**Encryption:** 256-bit AES encryption\*

**Collision Avoidance:** Unique Chan-  
nelShare™ collision avoidance system

**Multistream™:** Unique simultaneous  
delivery of multiple data streams  
(protocols)

**Firmware:** Field upgradeable Flash  
memory

## .: General

**Temp Range:** -40 to + 70oC

**Power Supply:** 10-30 Vdc (13.8 Vdc  
nominal)

**Transmit Current:** 500 mA nom@ 1W

**Receive Current:**  $< 120$ mA nom

**Sleep Mode:** Software Controlled &  
External

**Dimensions:** Rugged Diecast  
Enclosure 100 x 34 x 165mm (4.0 x  
1.4 x 6.5 inches)

**Mounting:** Integrated Mounting  
Holes

**Weight:** 0.5kg (1.1lbs.)

## .: Options

TVIEW+™ Configuration, Network  
Management and Diagnostic Win-  
dows GUI Software

DIAGS/K Network Management and  
Remote Diagnostics Option

## .: Related Products

ER450 Remote Radio

MR450 Remote Radio

EB450 Base Station

EH450 Hot Standby Base Station

KR240 2.4GHz Remote Radio

OM900 900MHz Remote OEM  
Module

OM240 2.4GHz Remote OEM  
Module

MSR/9 Port Stream Router Multip-  
lexer

