Base Driven Protocol

Collision free

Info sheet

RipEX

Base Driven protocol is primarily optimized for **TCP/IP (IEC104)**, but it is also suitable for collision networks when a remote **(Hidden remote)** is not to be heard by other remotes and/or different Rx and Tx frequencies are used.

RACOM has **20 years of experience** developing protocols on the Radio channel within narrowband networks. We always used **anti-collision protocols** (branded Flexible protocol) where all units communicate spontaneously competing for the Radio channel against each other with collisions managed.

Many anti-collisions **algorithms** were simulated and **tested, including access request** when the base station reserves time slots based on **request** by remotes. The **results** were still **unsatisfactory,** especially for TCP/IP applications with short SCADA packets where request packet is numbers of collisions increased further.

RACOM developers, in cooperation with Technical University in Prague, found after two years dedicated research that **the only way** to successfully **manage TCP/IP** traffic is a **collision free protocol.**

Why? Because when the **number of collisions exceeds a certain limit** and/or stable response times are required, fully organised and managed traffic makes more efficient use of Radio channel capacity! I.e. remotes can't communicate spontaneously and **everything must be managed** by the local **base station.**

Base Driven protocol provides **optimal data throughput and stability for TCP/IP** applications, especially when high numbers of remotes with wide ranging RSS are connected.

RipEX2
- 1.7 Mbps / 200 kHz / 256QAM
- 6.25 - 300 kHz
- 4×ETH,1×SFP,2×COM,1×USB

RipEX
- 166 kbps / 50 kHz / 16DEQAM
- 6.25 - 50 kHz
- 1× ETH, 2× COM, 1× USB

Common features
- 0.1 - 10 watts, - 40 to +70 °
- Solar ready
- Wifi management
- Customized protocols
- Fast remote access
- IPsec

RipEX networks

- Future proofed
- Exceptional Data throughput
- Optimized Radio protocols
- Unlimited Network design
- Backup routes
- Native IP environment
- 3 year warranty

REMOTE #1 / REMOTE #2

2 Yes Sir, 20 packets.

5 Received successfully. Nothing to report, Sir!

4 # 2, transmitting 5 packets for you.

3 OK, be ready for the next loop #1.

1 # 1, anything to report?

6 # 3, Complete previous report !

BASE STATION

8 # 4, WAKE UP !

9 Uhh... nothing to report, Sir!

7 10 packets transmitting – finished. Over and Out Sir!

REMOTE #3

REMOTE #4

FEATURES

Stable Latency — TDMA ensures predictable, consistent latency for real-time systems like SCADA, enabling timely decision-making and improved system performance.

Low Jitter — Dynamic time-slot allocation minimizes packet timing variations, ensuring reliable data transmission for TCP/IP protocols like IEC 104 and DNP3.

Dynamic Slots — Time slots are dynamically allocated based on real-time needs, optimizing bandwidth and ensuring efficient channel use.

Fair Scheduling — Round-robin scheduling ensures all outstations have equal access to transmit data, preventing congestion and promoting fairness.

Half-Duplex — With no collisions, the protocol is highly efficient even in half-duplex. Field tests prove it outperforms full-duplex point-to-multipoint setups by optimizing bandwidth, reducing latency, eliminating idle channel time, and maintaining data integrity.
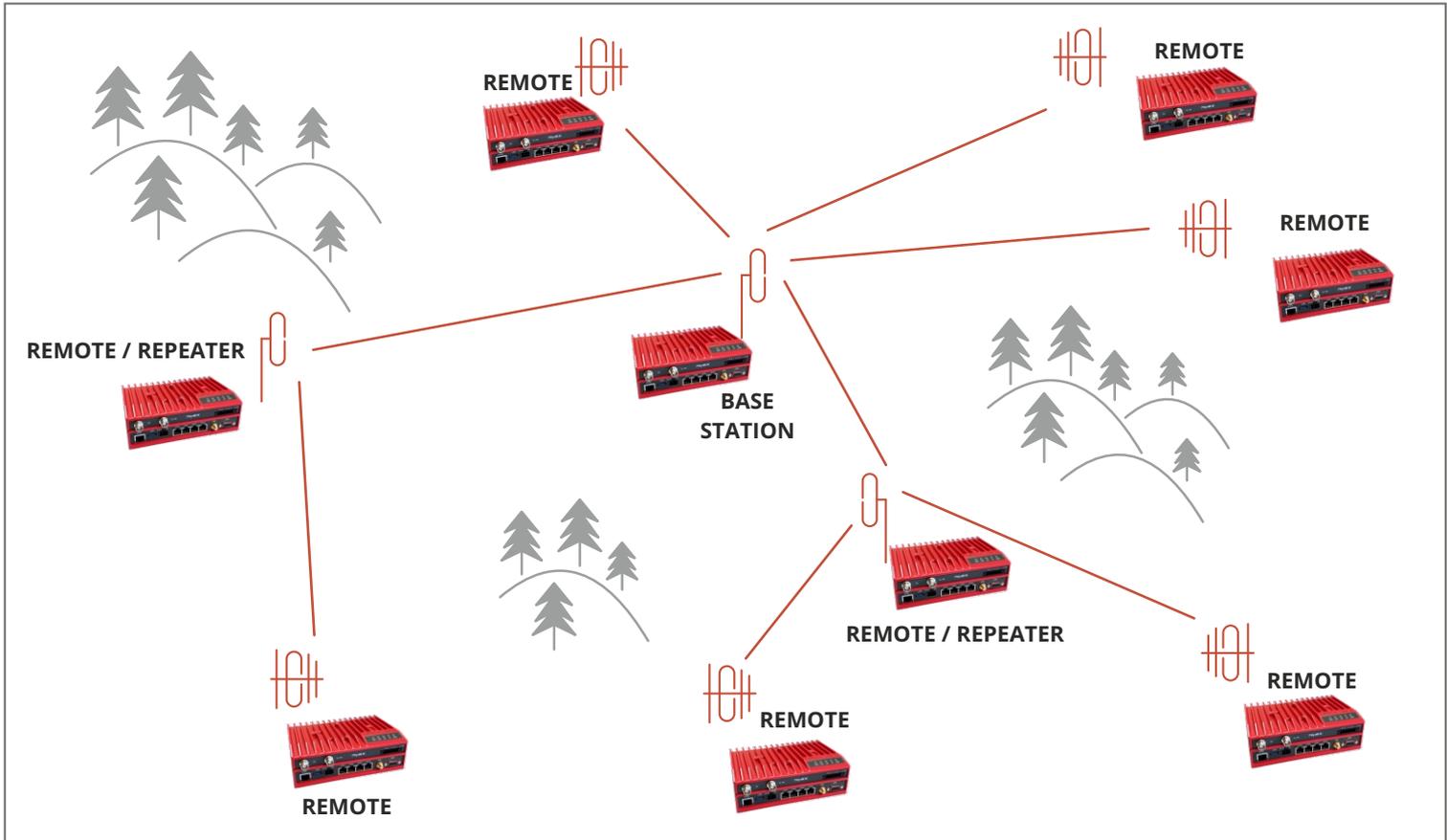
TCP / IP

TCP/IP protocols like IEC104, used by modern RTUs, create challenging problems because of unstable response times and limited data throughput.

Base Driven protocol Solution:

- TCP/IP transparent
- Optimized for IEC104
- No TCP errors
- No TCP disconnections

Field tests show that the Base Driven protocol handles 5–10x more remotes per base station with greater reliability, outperforming even full-duplex point-to-multipoint systems.

Hidden remotes

Radio protocols using Listen Before Transmit principles, create collisions with 'hidden remotes'. Different Rx and Tx frequencies create the same issues.

Base Driven protocol Solution:

- No collisions even in difficult terrain
- Suitable when different Rx and Tx frequencies are used
- Fair access to Radio channel for all remotes
- Channel capacity distributed fairly amongst all remotes

Base Driven protocol provides significantly higher user data throughput and creates much improved levels of stability and reliability !