

Radio Internet-Protocol Communications Module (RIC-M)



RIC-M is a highly versatile bridge between HDLC (V.24 or Asynchronous) and Internet Protocol (TIA Standard DFSI or RIC-M specific)*

Developed by Christine Wireless, Inc. (www.christinewireless.com) under contract to the Department of Homeland Security which licenses the sale of RIC-M

Supports:

- Analog Voice (4 Wire E and M as well as 1004 Hertz voting status tone control)
- Encrypted and Unencrypted Project 25 Voice
- Encrypted and Unencrypted Packet Data including Over-the-Air Rekey (OTAR)
- Project 25 Conventional Signaling (TSBK)
- Radio Service Software IP connection to ATAC-3000™, PDR-3500™ or Quantar™

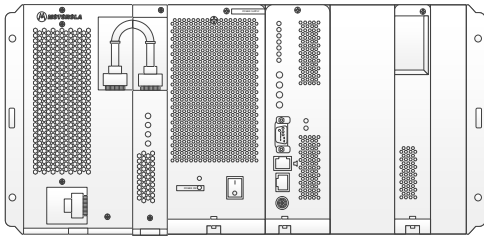
Uses:

- Provide needed IP interconnectivity without replacement of installed radio equipment
- Replace copper telephone line connections between installed Motorola equipment
- Use non-Motorola DFSI Base Stations in a Motorola ASTRO or Core system
- Use non-Motorola DFSI Dispatch Consoles in a Motorola ASTRO or Core System
- Utilize low-cost IP communications including Cellular LTE
- Replace obsolete HDLC transport equipment such as STUN and ASTRO Modem™

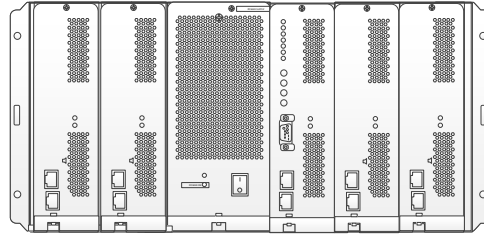
Benefits:

- Extend the service life of installed equipment without sacrificing interconnectivity
- Avoid or delay costly equipment replacement
- Provides high quality voice/data even with poor quality IP networks
- Allows for additional encryption of all IP packets in RIC-M to RIC-M exchanges
- Optional operation even without an installed V.24 card
- Efficient, high reliability HDLC transport in Tunnel Mode

Compatible HDLC Equipment



Quantar™



ATAC-3000™



DIU-3000™



GTR-8000™ with V.24 Option



GGM-8000™



CGW-8000™



PDR-8000™



PDR-3500™



TXM-2000™
(HDLC Async.)

HDLC ↔ DFSI IP

HDLC
V.24 or Async

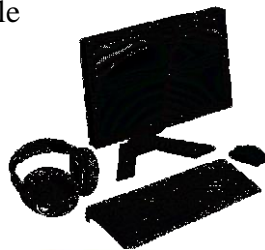


DFSI IP

RIC-M in Fixed Station Mode with Dispatch Consoles,
Host Mode with Base Stations

DFSI Dispatch Console

- Telex-Bosch
- Avtec
- Zetron
- Catalyst
- (Mind Share)



ICOM/RFT Eclipse
DFSI Base Station



Codan DFSI
Base Station

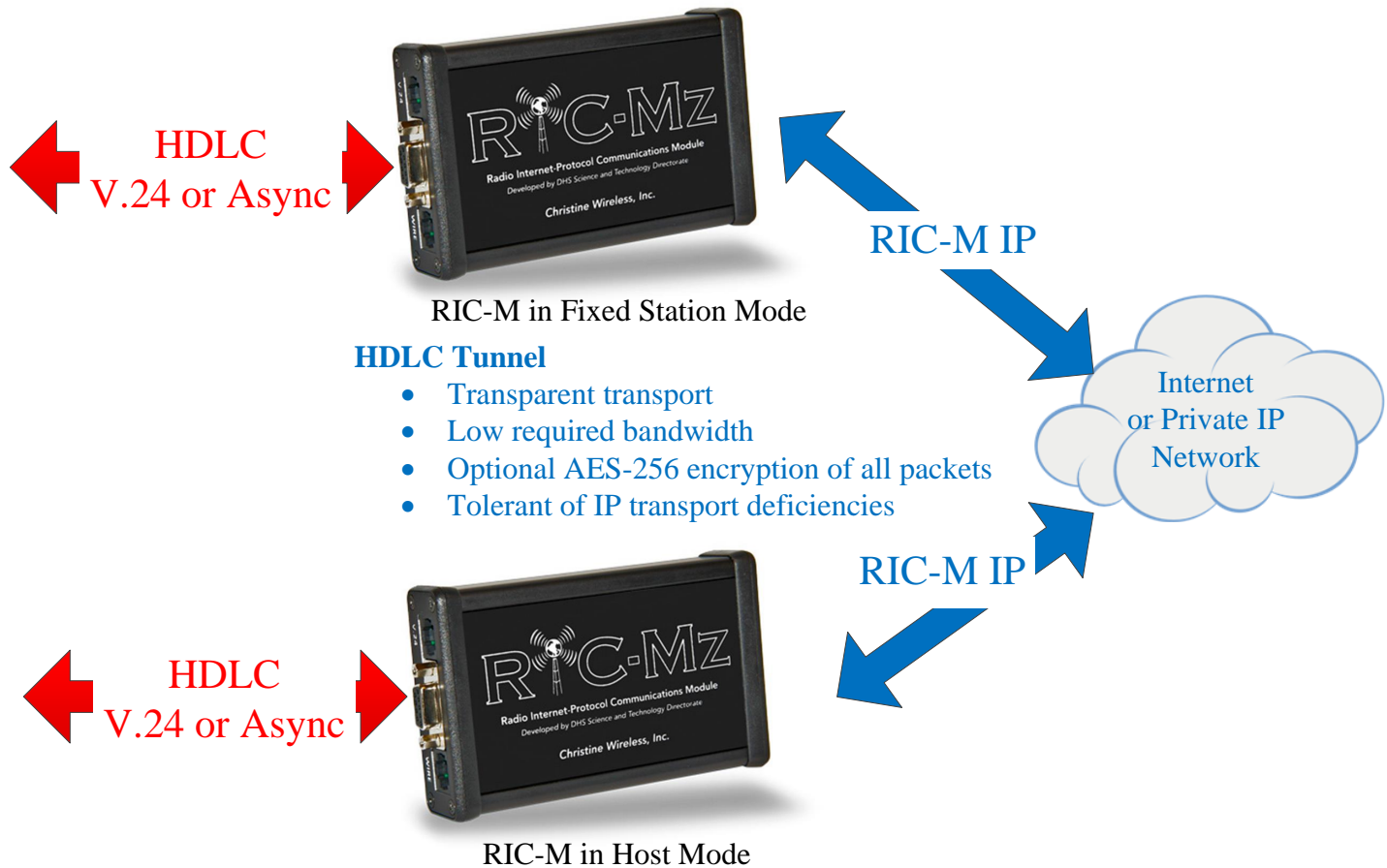


DFSI IP



Internet
or Private IP
Network

HDLC ↔ RIC-M IP



RIC-M Addresses IP Transport Issues

While active with voice traffic, connected HDLC equipment produces a traffic message once every 20 milliseconds. In a real world IP network, the output from the IP network can be very different (especially with Cellular LTE data service).

- IP packets may arrive out-of-order or may be missing entirely.
- The relative arrival time of packets can vary widely especially if the network is loaded with traffic.
- Packets may arrive in groups with long periods of no-arrivals between groups-23 voice packets arriving at once was observed on one national LTE network (460 milliseconds of voice).
- Connected equipment is typically not tolerant of the above and will produce a broken or unintelligible voice output.

RIC-M addresses these issues directly:

- *Received IP packets are read into memory, up to 30 at a time, to avoid losing packets that arrive in groups.*
- *Packets can be sent multiple times (4 or 8 times on a time-spaced, interleaved basis) to be able to tolerate even high-packet-loss IP networks without compromising voice performance.*
- *Packets are assigned serial numbers at transmission and are put back into the intended order on reception. Duplicate packets are discarded.*
- *Packets are checked for correctness (CRC) and only correct packets are sent to the connected equipment.*
- *Stored packets are retimed to provide a uniform 20 millisecond rate even with extreme variations in the IP network packet arrival time. The latency of the voice is a user-defined parameter.*

RIC-M Package Options



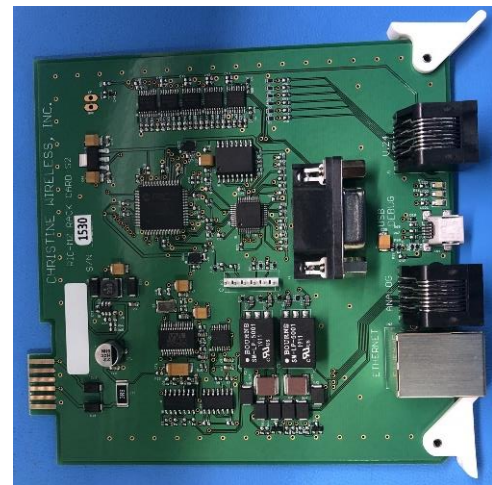
Stand-Alone RIC-M



Stand-Alone RIC-M with Optional Ribbon Cable for connection to an ATAC-3000™, PDR-3500™ or Quantar™ without a V.24 Board



Card Cage for up to 21 RIC-Ms with redundant power supplies



RIC-M Card Cage Card



RIC-M Wireline Card



RIC-M Wireline Card
installed on a Quantar™ Wireline
Board that lacks a V.24 board

More Information/Purchase

RIC-M is available on Purchase/Credit Card or
Federal Contracts (including GSA) from:

ACG Systems, Inc.

133 Defense Highway

Annapolis Maryland 21401

(410) 224-0224

<https://www.acgsys.com>