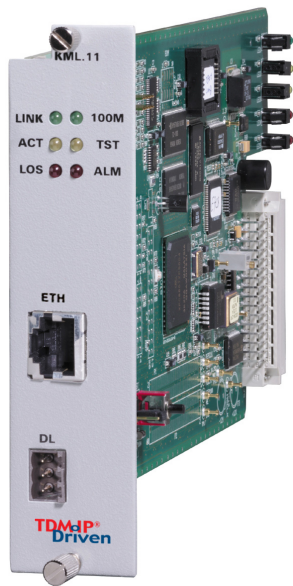




## IP Main Link Module



- Enhanced diagnostics: LAN statistics, local loopback, remote loopback
- Compatible with RAD's IPmux TDMoIP gateways

## FEATURES

- TDMoIP main link for Kilomux-2100/2104
- Enables synchronous communication between Kilomux devices over IP and Ethernet networks
- Network packet delay variation is absorbed using a configurable jitter buffer
- QoS support:
  - Labeling IP level priority (ToS)
  - VLAN tagging and priority labeling according to IEEE 802.1p&Q

## DESCRIPTION

- The KML.11 main link module connects Kilomux directly to an IP/Ethernet-based backbone. KML.11 converts the TDM bit stream into IP packets, effectively providing a cost-effective, versatile and modular TDMoIP solution for supporting TDM applications over IP networks.
- KML.11 is a standard IP device, supporting ICMP (ping), ARP, next hop and default gateway capabilities.

## PERFORMANCE

- The IP packet size is configurable. Greater packet length results in greater processing delay, yet smaller bandwidth overhead.
- An enhanced buffering mechanism compensates for packet delay variation (jitter) of up to 300 msec in the network.

## QoS SUPPORT

- KML.11 supports VLAN tagging and priority labeling according to 802.1p&Q.
- The user can configure the ToS (Type of Service) of the outgoing IP frames. This allows an en-route Layer-3 router or switch, which supports ToS (or Diffserv), to assign higher priority to TDMoIP traffic for delay-sensitive applications.
- Assigned, IANA registered, UDP socket number for TDMoIP simplifies flow classification through switches and routers.

# KML.11

## IP Main Link Module

### TIMING

- KML.11 maintains synchronization between TDM devices using advanced clock distribution mechanisms. The clocking options are:
  - **Internal** – master clock source for the TDM circuit is provided by the Kilomux internal clock oscillator
  - **Adaptive** – clock is recovered from the Ethernet network interface
  - **External** – Kilomux external clock port offers the option to synchronize the device to an external clock source

### ETHERNET PORT

The Ethernet port has a standard UTP half/full duplex 10/100BaseT copper interface with auto-negotiation support. If auto-negotiation is disabled, KML.11 can be set to operate in one of the following modes:

- 100BaseT – full duplex
- 100BaseT – half duplex
- 10BaseT – full duplex
- 10BaseT – half duplex

### DIAGNOSTICS & MANAGEMENT

- The following diagnostic tools facilitate monitoring and problem solving capabilities:
  - Remote loop over the Ethernet link interfaces, and internally, toward the I/O modules
  - LAN performance monitoring and statistics
  - ICMP (ping)
- KML.11 utilizes a management channel designated for remote inband management over the IP network. The communication bus between KML.11 and KCL.2 (common logic module) carries all management information. The management channel is IP-encapsulated together with the Kilomux frame payload.

- LAN performance monitoring and statistics (as per RFC 2665) are available for frames received and sent to the IP network, collisions, deferred transmission carrier sense errors, etc.

## APPLICATIONS



Figure 1. Compressed Voice System over IP

## IP Main Link Module

### SPECIFICATIONS

#### ETHERNET PORT

- **Interface**  
10/100BaseT half/full duplex over UTP
- **Range**  
Up to 100m/330 ft over UTP cat. 5 cable
- **Payload**  
56 kbps to 1536 kbps
- **Standards Compliance**  
IEEE 802.3, 802.3u, Ethernet, 802.1p&Q
- **Connector**  
RJ-45
- **Statistics**  
According to RFC 2665:
  - Received Frames: Correct Frames, Correct Octets, Alignment Errors, FCS Errors
  - Transmitted Frames: Correct Frames, Correct Octets, Single Collision, Multiple Collision, Deferred Transmission, Late Collision, Carrier Sense Error
- **Packet Delay Variation (Jitter) Tolerance**  
±300 msec

#### GENERAL

- **Diagnostics**  
LAN statistics  
WAN diagnostics:
  - Remote loopback toward Ethernet network
  - Local loopback (internal only) toward I/O modules
- **LED Indicators**
  - LINK (green) – On when Ethernet line is OK
  - 100M (green) – On when uplink is operating at 100 Mbps rate
  - ACT (yellow) – blinks when packets are received on the Ethernet line
  - TST (yellow) – On when uplink is under test
  - LOS (red) – On if sync loss is detected on uplink
  - ALM (red) – On when alarm occurs

- **Power Consumption**  
3.5W derived from +5V
- **DL Connector**  
3-pin connector for downloading software upgrades

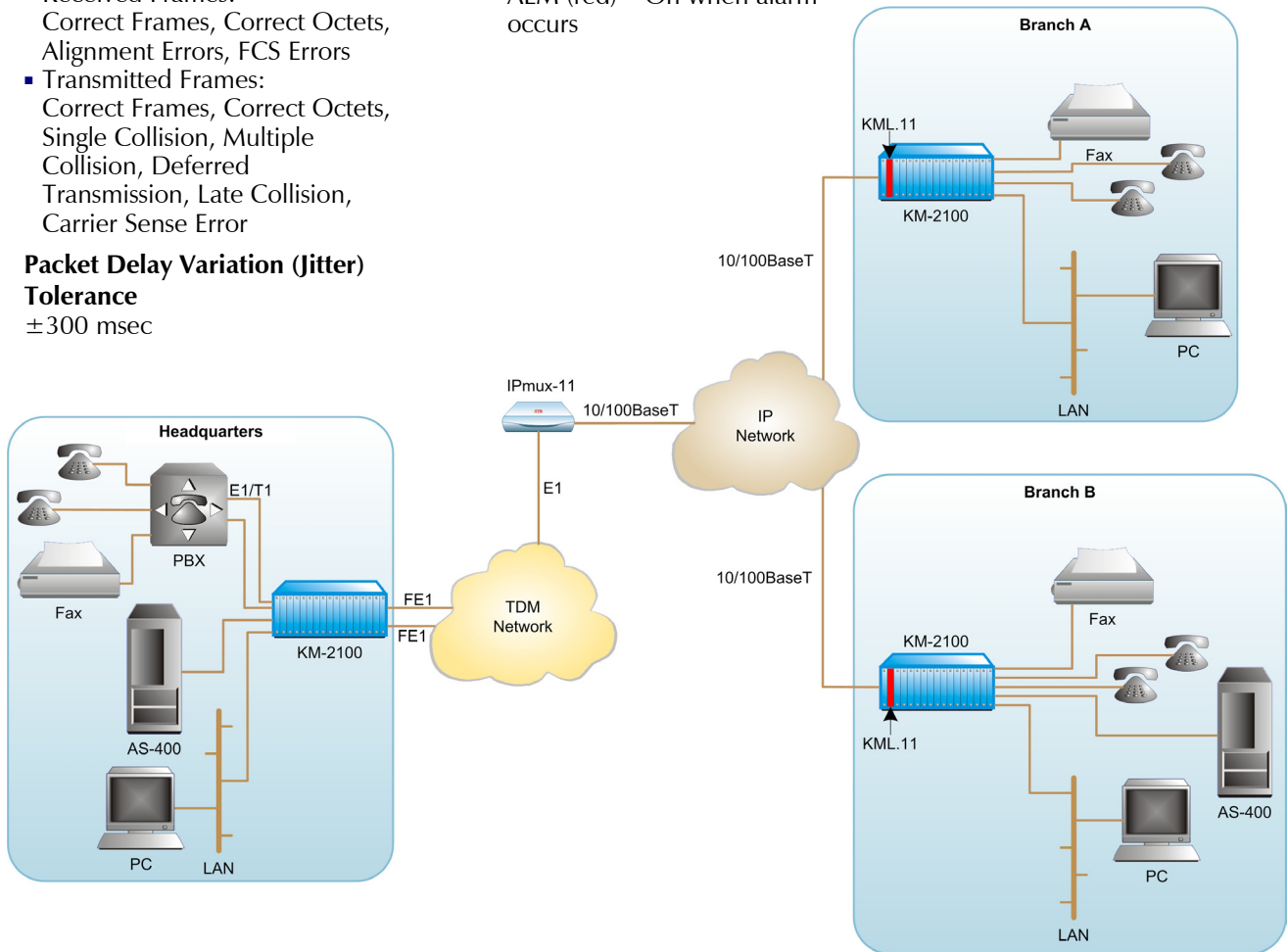


Figure 2. IPmux-11 and Kilomux Units in Multiservice and CVS over IP Point-to-Multipoint Application



# KML.11

## IP Main Link Module

### ORDERING

---

#### **KM-2100M-KML.11**

IP main link module for  
KM-2100/2104

#### SUPPLIED ACCESSORIES

#### **CBL-KVF6/8-DL**

Cable, with an RS-232 DB-9  
connector for downloading software  
upgrades from a PC to KML.11 using  
the 3-pin DL connector



**data communications**

[www.rad.com](http://www.rad.com)

- **International Headquarters**  
24 Raoul Wallenberg Street  
Tel Aviv 69719, Israel  
Tel: 972-3-6458181  
Fax: 972-3-6498250  
Email: [market@rad.com](mailto:market@rad.com)
- **North America Headquarters**  
900 Corporate Drive  
Mahwah, NJ 07430, USA  
Tel: (201) 529-1100  
Toll free: 1-800 444-7234  
Fax: (201) 529-5777

425-111-03/06