

IMX-2



ISDN Inverse Multiplexer and Backup Unit



FEATURES

- ISDN inverse multiplexer, operating over a combination of a single ISDN line (two B channels) and a single leased line
- Supports ISDN backup of leased lines or Dynamic Bandwidth Allocation
- Integrated terminal adapter supports Euro-ISDN, 5ESS, National ISDN (NI1), DMS-100 and NTT
- Offers "S" or "U" ISDN BRI interfaces
- Supports 50 leased line
- Provides Bandwidth On Demand (smart terminal adapter)
- Supports BONDING 1, 2 and 3 protocol specifications
- Tolerates a differential delay of up to 512 msec
- Setup and control via front panel or supervisory port
- SNMP support using SLIP protocol
- Software download via Xmodem protocol
- Resilient operation with failure recovery

DESCRIPTION

- IMX-2 is an inverse multiplexer that splits a data channel between a leased line and an ISDN switched circuit connection, according to mode of operation, line availability and traffic load.
- Typical applications for IMX-2 include high speed leased line backup, dynamic bandwidth allocation and bandwidth on demand.

DYNAMIC BANDWIDTH ALLOCATION

- Dynamic bandwidth allocation can be performed on the basis of traffic sensing, time of day or by manual intervention. In traffic sensing mode, IMX-2 senses the bandwidth requirement of an application and automatically adds or drops ISDN B channels during the transmission. Typical applications include bridge/router internetworking links. Dynamic bandwidth allocation is available only for a leased line of 64 kbps, enabling a data port bandwidth of between 64 to 192 kbps (see *Figure 1*).

LEASED LINE BACKUP

- IMX-2 can backup one leased line, operating at data rates from 64 kbps to 256 kbps, over two B channels (in backup mode the maximum data rate possible is 128 kbps). When the leased line returns to proper operation, IMX-2 automatically reverts to the leased line (see *Figure 2*).

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BANDWIDTH ON DEMAND (SMART TERMINAL ADAPTER)

- For applications such as video-conferencing that require switched connections, IMX-2 can act as a smart terminal adapter and call up one or two B channels to provide up to 128 kbps aggregate bandwidth (see Figure 3).

OPERATION

- During the initial handshaking process, the unit measures the delay of each network channel. This enables the two units to reconstruct the data after it has been spread across the three separate networks channels to ensure that the data is delivered in the proper order.
- IMX-2 offers a large choice of interfaces on the network side as well as the data ports. It connects to basic rate ISDN (BRI) switched digital service. It also supports one dedicated circuit (leased line) with a wide range of interfaces (see *Ordering*).
- Using the BONDING 1, 2 and 3 protocol specifications for inverse multiplexing, IMX-2 can operate with other vendor products, or with RAD's IMX-64 (see Figure 5).
- The differential delay tolerance of 512 msec is enough to support two satellite hops.
- Dialing can be performed either manually or by dialing protocols through the DTE leads.
- Command driven software offers complete control of configuration, call setup, diagnostics, alarms, etc.
- SNMP over SLIP support is available for most monitoring and configuration functions.
- The software download function, performed using Xmodem protocol, facilitates product upgrades.
- IMX-2 is a compact 1U-high standalone unit. It can be mounted in a 19" rack using the optional rack-mount hardware (see *Ordering*).

APPLICATIONS

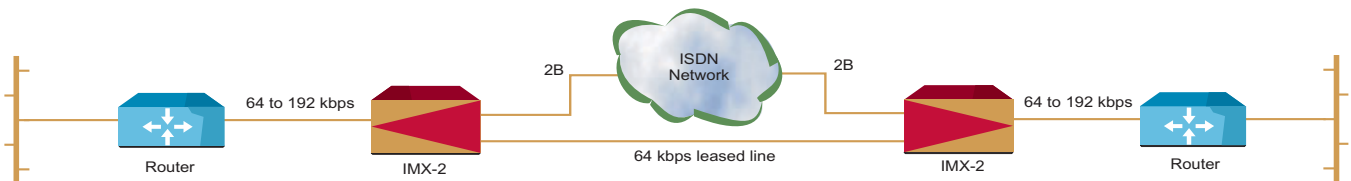


Figure 1. Dynamic Bandwidth Allocation

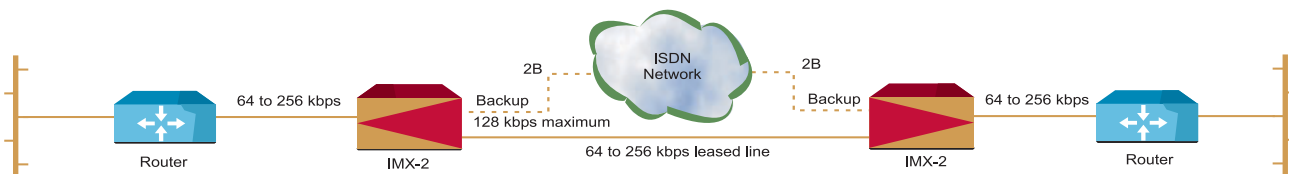


Figure 2. High Speed Leased Line Backup

ISDN Inverse Multiplexer and Backup Unit

SPECIFICATIONS

NETWORK PORTS

IMX-2 provides one leased line and one ISDN interface (see *Ordering*).

LEASED LINE PORT

- **Number of Ports**
1
- **Data Rate**
 - 64 kbps for DBA or when using BONDING
 - $n \times 64$ kbps for transparent call/leased line backup ($n = 1$ to 4)
- **Transmit Timing**
 - Internal: accuracy 32 ppm
 - DTE transmit timing (looped back from the network)

- **Interfaces**
V.35, V.36/RS-449, RS-530, RS-530A, or X.21 (see *Ordering*)
- **Connectors**
26-pin high density D-type, female + appropriate conversion cable (see *Ordering*)

ISDN BASIC RATE INTERFACE

(IMX-2 is considered a TE – Terminal Equipment)

- **Number of "S" or "U" Interfaces (2B+D)**
1
- **Line Termination**
100Ω ±5%
- **Transmit Timing**
Looped back from the network
- **Connector**
RJ-45, 8-pin

DATA PORT

- **Number of Ports**
1
- **Data Rate**
Up to 256 kbps
- **Transmit Timing**
 - Internal: accuracy 32 ppm
 - Locked to network transmit timing
- **Interfaces**
V.35, V.36/RS-449, RS-530, RS-530A or X.21 (see *Ordering*)
- **Connector**
26-pin high density D-type, female + appropriate conversion cable (see *Ordering*)



Figure 3. Bandwidth on Demand

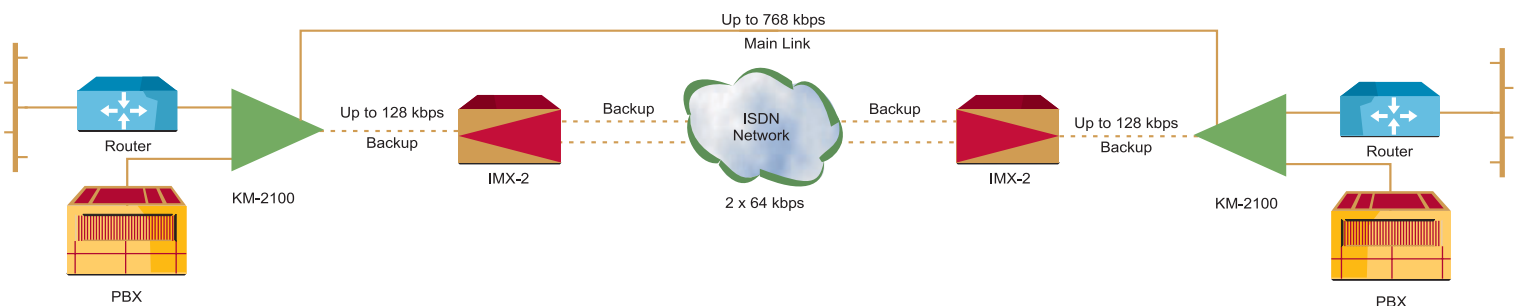


Figure 4. High Speed Backup over ISDN

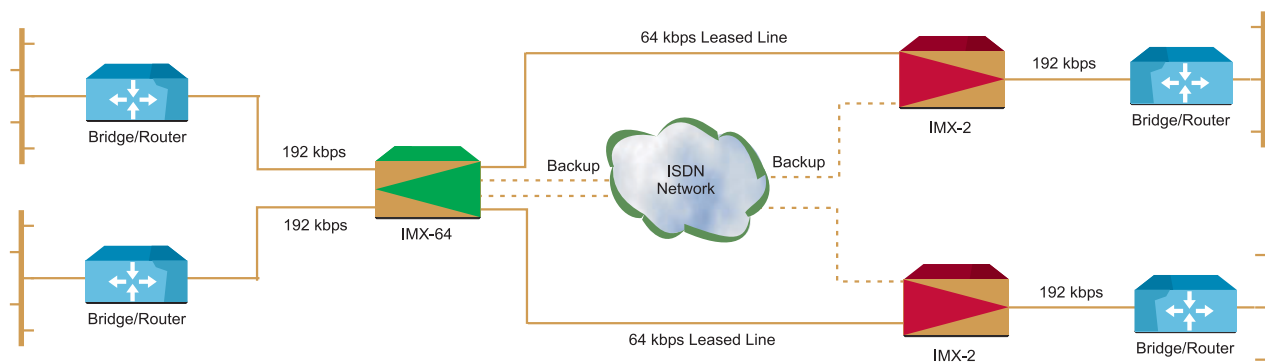


Figure 5. ISDN Backup using Bonding Standards across from an IMX-64 Inverse Multiplexer

IMX-2

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OPERATION MODES

- **Dialing Modes**
 - V.25 bis direct dialing
 - V.25 bis addressed dialing
 - Manual (via front panel or control port)
- **Call Types**
Transparent mode
BONDING 1, 2, 3

CONTROL (SUPERVISORY) PORT

- **Interface**
V.24/RS-232
- **Configuration**
DCE
- **Connector**
9-pin D-type, female
- **Baud Rate**
1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6 kbps, autobaud option
- **Character**
 - 8 bit, no parity
 - 7, 8 bit; odd, even parity

GENERAL

- **Indicators**
CH. ACT – channel activity per B1, B2, DTE
CALL SYNC – lights steadily when a call is connected to data port
TST – test is activated
ALM – alarm is present
- **Delay Equalization**
512 msec
- **ISDN Protocol Compliance**
EURO-ISDN, AT&T (5ESS), DMS-100, National ISDN (NI1), NTT
- **Compliance**
I.430, Q.921, Q.931
- **Front Panel Controls**
Cursor, Scroll, Enter
- **Physical**
Height: 4.3 cm / 1.7 in (1U)
Width: 21.5 cm / 8.5 in
Depth: 24.3 cm / 9.5 in
Weight: 1.5 kg / 3.5 lb
- **Power**
100-240 VAC, 35W
- **Environment**
Temperature: 0-50°C / 32-122°F
Humidity: Up to 90%, non-condensing

ORDERING

IMX-2/@/#/\$

Inverse Multiplexer with one data port, one ISDN BRI interface and one leased line channel

@ Specify data port interface:

V35 for V.35
V36 for V.36/RS-449
530 for RS-530
530A for RS-530A
X21 for X.21

Specify leased line interface:

V35 for V.35
V36 for V.36/RS-449
530 for RS-530
530A for RS-530A
X21 for X.21

\$ Specify ISDN interface standard:

IBE for ISDN-BRI "S" interface
IBU for ISDN-BRI "U" interface

CABLES

All data and network port interfaces terminate in 26-pin high-density D-type, female connectors. Conversion cables are supplied automatically, in accordance with the interface ordered. The cables for the V.35, V.36/RS-449, RS-530, or X.21 physical interfaces have a female connector on the user side. If a male connector is required on the user side, it should be specified in the Ordering notes. The RS-530A version has only a male connector option.

To order an additional conversion cable, specify:

CBL-SCS26/a/b

a Specify physical interface:
V35 for V.35, 34-pin
V36 for V.36/RS-449, 37-pin
530 for RS-530, 25-pin
SCS26 for RS-530A, 26-pin
X21 for X.21, 15-pin

b Specify connector on the user side:
M for male connector
F for female connector

RM-17

Hardware for mounting one or two standalone units in a 19" rack

data communications

www.rad.com

- **International Headquarters**
24 Raoul Wallenberg Street
Tel Aviv 69719, Israel
Tel: (972) 3-6458181
Fax: (972) 3-6498250, 6474436
Email: rad@rad.com

- **U.S. Headquarters**
900 Corporate Drive
Mahwah, NJ 07430
Tel: (201) 529-1100
Toll free: 1-800-444-7234
Fax: (201) 529-5777
Email: market@radusa.com

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