

Megaplex-4100/2100/2104  
**HS-U-6, HS-U-12**  
 6/12-Channel ISDN "U" Interface Data Modules



Integrated ISDN "U" interface enables data transmission to a remote network over a 2-wire unconditional line

- 6 or 12 sync/async data channels
- Programmable channel data rates from 1.2 to 128 kbps (sync) or 115.2 kbps (async)
- Integrated LT per channel, providing 2-wire, 2B1Q, "U" interface with range of up to 5.5 km (3.4 miles)
- LT or NT ("I" mode) operation per channel
- ISDN BRI repeater over ISDN facilities ("I" mode)



# HS-U-6, HS-U-12

## 6/12-Channel ISDN "U" Interface Data Modules

The HS-U-6 and HS-U-12 modules feature 6 and 12 data channels, respectively, with each channel operating at rates of up to 128 kbps. Each channel incorporates an integrated "U" interface Line Termination (LT), enabling data transmission to a remote Network Termination (NT) over a 2-wire unconditioned line.

**Note:** Unless otherwise specified, the term HSU denotes both modules.

HSU modules can be configured to operate in either of two modes:

- "I" mode for extension of ISDN lines over non-ISDN infrastructure. The module can be configured to operate as NT or LT;
- "1" mode, serving as an LT. Utilizes built-in modems to work with RAD's ASMi-31 modems or other units with "U" interface.

In addition, each HS-U-6 and HS-U-12 data channel can be independently configured to operate in either of these two modes.

The data channels can be independently configured to transmit at rates of 1.2 to 128 kbps in sync mode, and 1.2 to 115.2 kbps in async transfer mode. The multiplexing and rate adaptation technique is according to ITU-T I.460.

The integrated LTs employ 2B1Q line coding and advanced adaptive echo cancellation techniques, to transmit data in full-duplex mode over 2-wire twisted-pair lines at distances of up to 5.5 km (3.4 miles).

When HSU operates as LT, the remote NT can be provided by ASMi-31 short range modems. The HSU channel supplies the clock to the remote NT, which should operate in slave (loopback timing) mode.

When HSU operates as NT (for "I" mode only), the HSU channel timing is taken from the remote LT equipment. This channel can become the external clock source for the Megaplex system.

"I" mode channel configuration enables the Megaplex system to transfer ISDN Basic Rate (2B+D) lines transparently over a network, to third party IDSL modems.

In "1" mode, the channels serve as an LT for leased lines, working with RAD's ASMi-31 modems. In this mode, the data channels also provide configuration download capability compatible with the ASMi-31 modem. This enables configuration changes (such as data rate) on a local channel to be automatically updated on the ASMi-31 connected to that channel.

The HS-U-6 and HS-U-12 modules have 6, respectively 12 internal ports for D channel compression. These ports are used to "compress" the signaling information carried by D channels, before being sent to a main link. The routing of the D channels to compression ports is user-configurable: any D channel can be routed to any compression port on the same module. D channel compression can save up to 128 kbps per module.

Diagnostics include local and remote loopbacks on individual channels. The HSU modules can also remotely initiate loopbacks and BERTs on connected ASMi-31 units. In addition, the HSU modules can be configured to run LLB and RLB initiated by ASMi-31 modems.

The modules' phantom feeding powers remote equipment. HS-U-6/12 can provide various phantom feeding voltages, ranging up to 120 VDC. The DC power source for the HSU modules can be a Ringer power supply module or unit. See separate *Ringers data sheet* for more information.

**Note:** for -48 VDC phantom feeding only, a -48 VDC powered Megaplex chassis will not require a Ringer.

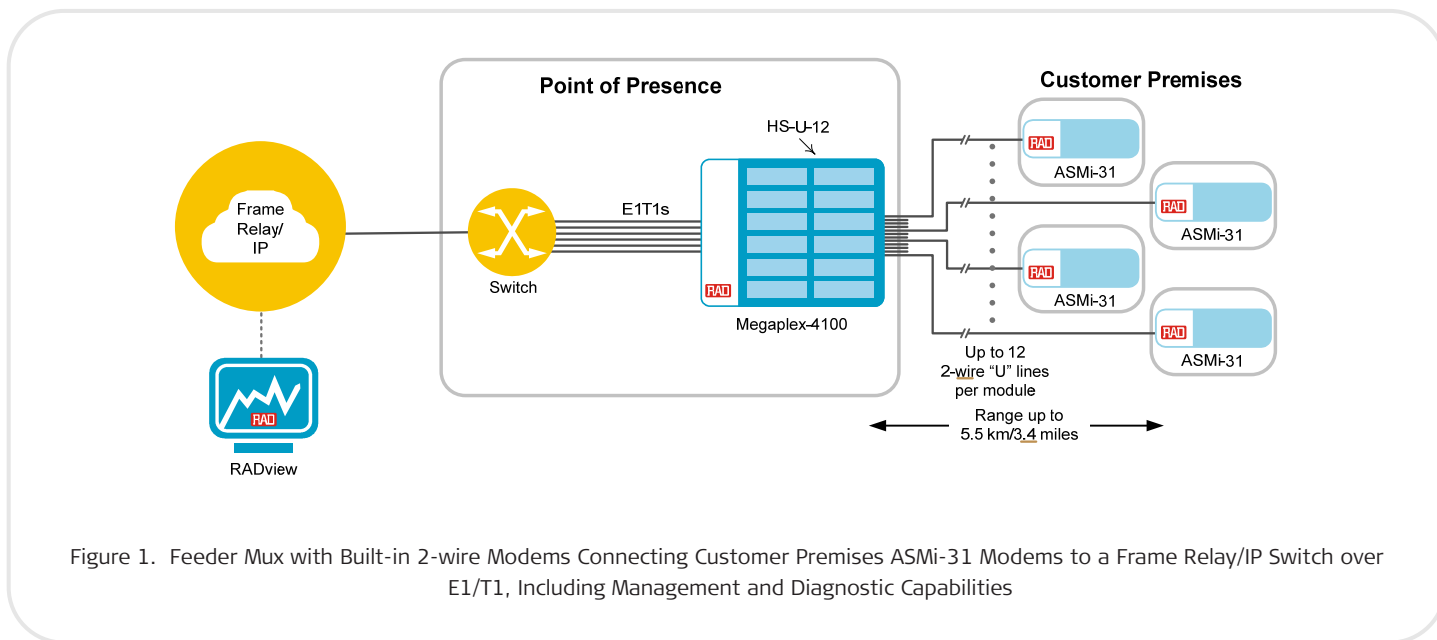


Figure 1. Feeder Mux with Built-in 2-wire Modems Connecting Customer Premises ASMi-31 Modems to a Frame Relay/IP Switch over E1/T1, Including Management and Diagnostic Capabilities

## Specifications

### “U” INTERFACE

#### Number of Data Channels

HS-U-6: 6  
HS-U-12: 12

#### Signal Format

Full duplex, 2B1Q per ANSI T1.601, ETSI DTR/TM3002

#### Framing

2B+D

#### Line Type

Unloaded twisted pair cable

#### Impedance

135Ω

#### Range

5.5 km (3.4 miles) over 26 AWG (0.4 mm)

#### Data Rates (per channel)

Sync: 1.2, 2.4, 4.8, 9.6, 16, 19.2, 32, 38.4, 48, 64 and 128 kbps

Async: 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6 and 115.2 kbps

#### Connectors

Single 50-pin SCSI connector for all (6 or 12) channels

### TRUNK INTERFACE

#### Bit Mapping

According to data rate:

1.2 to 16 kbps: 2 bits  
19.2 to 32 kbps: 4 bits  
38.4 to 64 kbps: 8 bits  
115.2 or 128 kbps: 16 bits (over 2 TSs)

#### B-Channel Timeslot Allocation

4 x (1.2 to 16 kbps) in one TS  
2 x (19.2 to 32 kbps) in one TS  
1 x (38.4 to 64 kbps) in one TS  
1 x (115.2 or 128 kbps) in two TSs

#### D-Channel Timeslot Allocation

4 x D-channels (16 kbps) in one TS, or each D-channel in a different TS

### GENERAL

#### Timing

NT mode: HSU is linked to the incoming clock from the remote LT (e.g. ISDN switch)

LT mode: Transmit timing of the HSU interface is locked to the system nodal timing clock and passed to the remote NT unit (e.g. ASMi-31). Receive timing is recovered from the remote NT unit

### Indicators per Channel

LOS (red) - loss of sync  
TST (yellow) - in test mode

### Diagnostics (per channel)

Local digital loopback  
Remote digital loopback (not in NT mode)  
Remote loopback on external unit  
Externally initiated loc loopback  
LLB on external unit  
BERT on external unit  
LLB + BERT on external unit  
Local loopback + BERT on external unit

### Configuration

Programmable via the Megaplex management system

### Environment

Operating temperature: 0°C to 45°C  
(32°F to 113°F)  
Storage temperature: -20°C to +70°C  
(-4°F to +160°F)  
Humidity: up to 95%, non-condensing

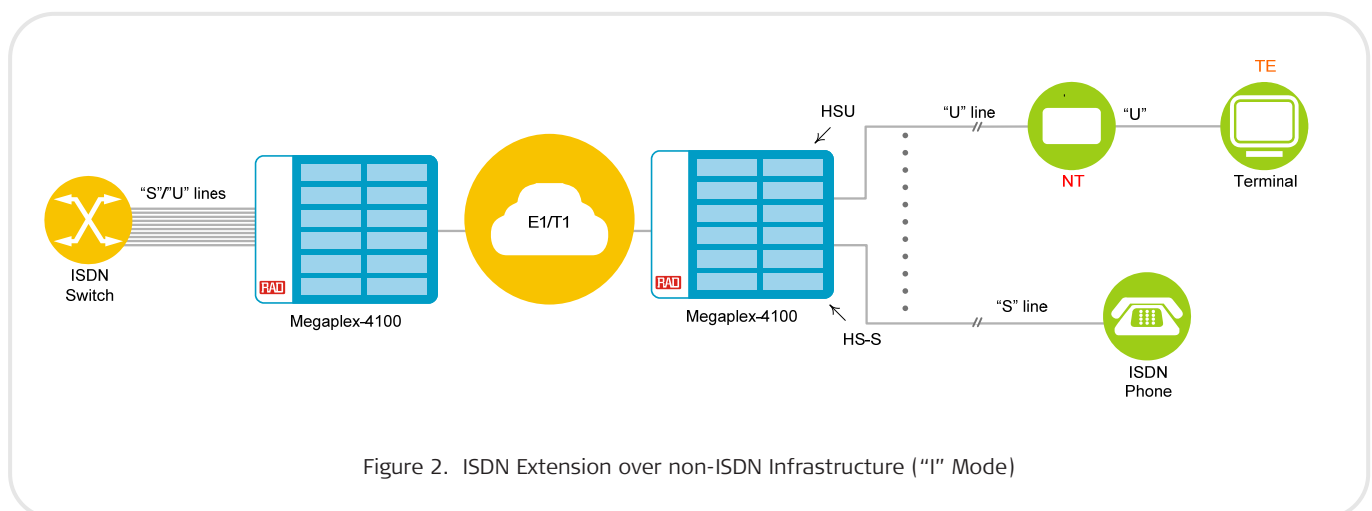


Figure 2. ISDN Extension over non-ISDN Infrastructure ("I" Mode)

# HS-U-6, HS-U-12

## 6/12-Channel ISDN "U" Interface Data Modules

### Ordering

#### MP-2100M-HS-U-6

6-channel ISDN "U" interface data module for MP-2100/2104 and MP-4100

#### MP-2100M-HS-U-12

12-channel ISDN "U" interface data module for MP-2100/2104 and MP-4100

### OPTIONAL ACCESSORIES

#### CBL-HSU6

Octopus cable for splitting the 50-pin SCSI connector of HS-U-6 into 6 x RJ-45 connectors, for direct connection to user equipment. Cable length is 2m (6 ft).








#### CBL-HSU12

Octopus cable for splitting the 50-pin SCSI connector of HS-U-12 into 12 x RJ-45 connectors, for direct connection to user equipment. Cable length is 2m (6 ft).

#### CBL-HSU12/OPEN/12M

Octopus cable for splitting the 50-pin SCSI connector of HS-U-12, open-ended, 12m (40 ft) long

Megaplex High-Speed Modules

|                       | HS-2                                                                                | HS-Q/N                                                                              | HS-6N/12N                                                                           | HS-U-6/HS-U-12                                                                      | HS-703                                                                                | HS-S                                                                                  | HSF-1/HSF-2                                                                           |
|-----------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Feature</b>        |  |  |  |  |  |  |  |
| Interface Type        | V.24/RS-232, V.35, X.21 or V.11/RS-422                                              | V.24/RS-232, V.35, X.21 or V.11/RS-422                                              | V.24/RS-232, V.35, X.21 or V.11/RS-422                                              | ISDN "U"                                                                            | G.703                                                                                 | ISDN "S"                                                                              | IEEE C37.94 Fiber optic                                                               |
| Number of Channels    | 2                                                                                   | 4                                                                                   | 6/12                                                                                | 6/12                                                                                | 4                                                                                     | 4                                                                                     | 1/2                                                                                   |
| Number of Connectors  | 2                                                                                   | 4                                                                                   | 2/4                                                                                 | 1                                                                                   | 4                                                                                     | 4                                                                                     | 1/2                                                                                   |
| Data Rate             | n x 64 kbps<br>n x 56 kbps                                                          | n x 64 kbps<br>n x 56 kbps                                                          | n x 64 kbps                                                                         | 128 kbps                                                                            | 64 kbps                                                                               | 128 kbps                                                                              | up to 10x64 kbps                                                                      |
| Chassis compatibility | MP-210x                                                                             | MP-210x                                                                             | MP-4100                                                                             | MP-4100                                                                             | MP-4100                                                                               | MP-4100                                                                               | MP-210x (MP-4100 - HSF-2 only)                                                        |

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