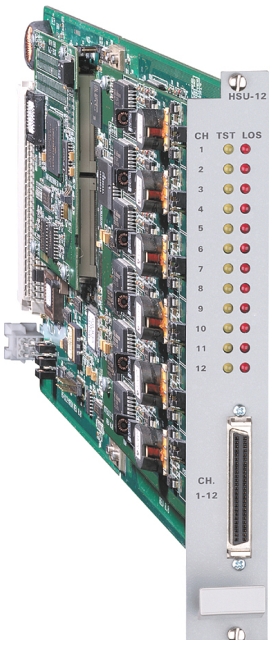
Data Sheet

Megaplex Modules

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

4/6/12-Channel ISDN "U" Interface Data Modules



- 4, 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)

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

The HS-U, HS-U-6 and HS-U-12 modules feature 4, 6 or 12 data channels, 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 all three 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 opposite RAD's ASMi-31 modems or other units with "U" interface.

In addition, modules, 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 data 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).

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When operating in LT mode, 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 operating in NT mode (for "I" mode operation 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.

When configured for "1" mode, the channels serve as an LT for leased lines opposite 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 on the local module's channel (such as data rate) 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. The D channel compression can save up to 128 kbps per module.

The diagnostics include local and remote loopbacks on the individual module channels. The HSU modules can also remotely initiate loopbacks and BERTs on the ASMi-31. In addition, the HSU modules can be configured to run LLB and RLB initiated by commands received from the ASMi-31 modem.

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.*

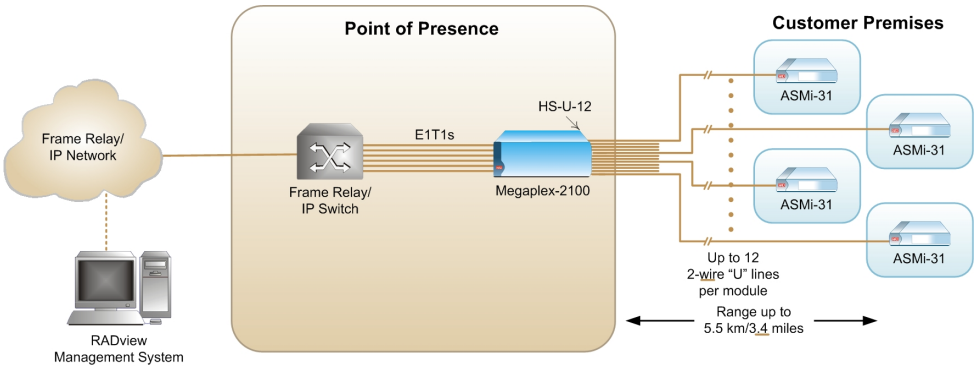

Figure 1. Feeder Mux with Built-in 2-wire Modems Connecting Customer Premises ASMi-31 Modems to a Frame Relay/IP Switch over E1/T1, Including Management and Diagnostic Capabilities

Specifications

"U" INTERFACE

Number of Data Channels
HS-U: 4
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
HS-U: 8-pin RJ-45 (one per channel)
HS-U-6, HS-U-12: Single 50-pin SCSI connector for all 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

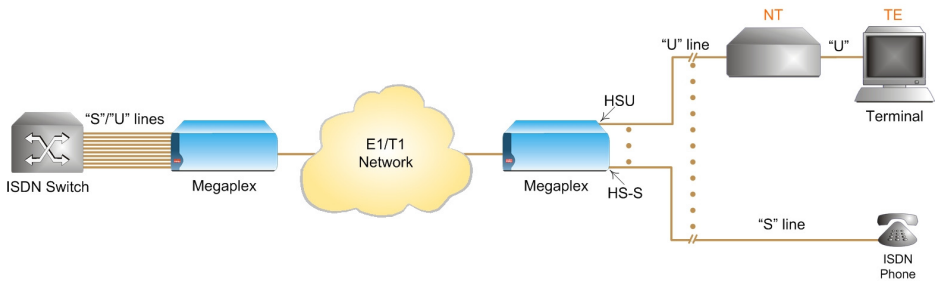

Figure 2. ISDN Extension over non-ISDN Infrastructure ("I" Mode)

Data Sheet

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

4/6/12-Channel ISDN "U" Interface Data Modules

Ordering

MP-2100M-HS-U
4-channel ISDN "U" interface data module for MP-2100/2104

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

Megaplex High Speed Modules

Feature	HS-2	HS-Q/N	HS-6N, HS-12N	HS-U, HS-U-6, HS-U-12	HS-703	HS-S	HSF-1, HSF-2
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	4/6/12	4	4	1/2
Number of Connectors	2	4	2/4	4	4	4	1/2
Data Rate	n x 64 kbps n x 56 kbps	n x 64 kbps n x 56 kbps	n x 64 kbps	128 kbps	64 kbps	128 kbps	up to 10x64 kbps
Supported by MP-4100	-	-	✓	HS-U-6, HS-U-12	✓	✓	HSF-2

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