

# APPLICATION NOTE

## HSSI Line Driving Over 10 Metres— With ASI Modems, and an HSSI Router Interface

Satellite Division 

### Application Summary

There are thresholds in any network, whether it is terrestrial or satellite. Most of these thresholds are bandwidth based, but one of the more practical problems that occur is Line Driving.

This isn't so much of a problem where a Satellite Modem uses either COAX or Fibre, but it is when the Modem has a HSSI Interface.

The HSSI interface is commonly used in Satellite networks especially for ISP Backbone connections. One reason is that it supports asymmetric rates, another is that it can operate at speeds between 64k and 51.84Mbps.

So on the Router it is useful, but the higher the speed the shorter the cable distance can be. So the higher the distance the closer the Router needs to be to the Satellite Modem.

This can present a problem where you cannot have IP Routers in the same rack as Satellite Modems, or where the IP Routers are some distance from the Satellite Modems.



## About the HSSI Extender (HE1000)

The Line Driving distance of HSSI is not great, and the majority of HSSI cables are no greater than 3metres (the Cisco HSSI Specifications states a maximum of 10metres). A requirement existed for a product to interface between Modems and Routers at speeds up to 51.84Mbps, but to Line Drive this speed to at least 150metres. This is the function of the HE1000.

The Metrodata HE1000 HSSI Extender provides a simple "plug and play" point to point HSSI extension service. The HE1000 operates as a HSSI DCE providing the transmit timing to the attached router. A simple bit switch selection enables operation at either N x 1M, or standard network frequencies for example 34.368Mbps.

## ASI Modem – HSSI Router

The HE1000 utilises a standards compliant asynchronous serial interface (ASI ) as the transmission medium. ASI runs over standard coaxial cable, terminated with BNC connectors and as such provides a much more flexible, and rugged interconnect than HSSI.

The ASI interface, compliant with EN-50083-9, operates at a fixed 270Mbps and transports the data stream in byte mode, with special fill characters inserted. The ASI interface utilises an adaptive equaliser stage in the receive interface and as such can operate over 150M of good quality coaxial cable.

The HE1000 ASI interface is fully compatible with the ASI interface presented on Satellite Modems. Therefore, the HE1000 may be used as a simple interface converter performing the conversion from HSSI to ASI thereby allowing an operator to standardise on ASI modems, remove the cable length restrictions inherent with the HSSI interface, yet still operate with flexible bandwidth. The HE1000 fully supports asymmetric operation utilising differing receive and transmit data rates.

## Application

A primary goal in the design of the HE1000 HSSI Extender was ease of use, and to this end the HE1000 is virtually configuration free realising a truly "plug and play" solution.

In this application, the HE1000 is used to convert from HSSI to ASI, thereby allowing the Router to connect to the Modem. In this case, due to space restrictions within the earth station, it is not possible to locate the Router close to the Modem, and the required asymmetric data rates of 8/34 must be supported. The HE1000 offers the solution.

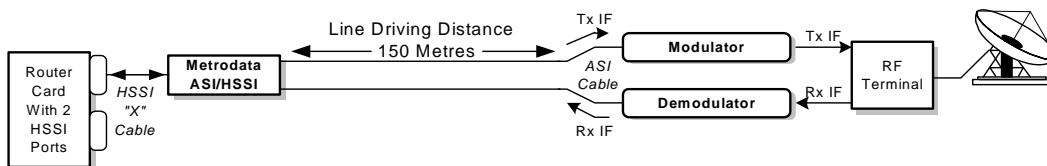


Figure 1: Connecting the Router to the Modem



## Network Topology

As can be seen in Figure 1 above, the physical configuration of the network is relatively simple.

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## Ordering Information

| Router Interface                      | 100 – 250 VAC | -48V DC                       |
|---------------------------------------|---------------|-------------------------------|
| HSSI Interface                        | 80-05-500     | <i>Contact Us For Details</i> |
|                                       |               |                               |
| HE1000 1U Rack Mount Kit For 2 Units  | 80-05-252     | <i>Contact Us For Details</i> |
| HE1000 6U Rack Mount Kit For 18 Units | 80-05-250     | <i>Contact Us For Details</i> |

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## HE1000 Specifications

| Parameter             | Definition   |
|-----------------------|--|
| ASI Modem Interface   | BNC, 75Ohm   |
| Data Rate             | To 51.84Mbps   |
| Line Coding           | 8B/10B   |
| Jitter Tolerance      | Per EN-50083-9   |
| Framing               | Unframed   |
| Transport Clock       | 270Mbps +/- 15ppm Tolerance  |
| ASI Mode              | Distributed  |
| Cable Length          | 150m (Belden 8281 or similar)  |
| Voltage Level         | 800mV +/- 10%  |
|                       |  |
| HSSI Router Interface | HSSI, 50way AMP connector  |
| Data Rate             | Bitswitch selectable N x 1Mbps or 1.544, 2.048, 6.312, 8.192, 8.448, 16.384, 32.768, 34.368, 44.736, 51.84Mbps |
| Presentation          | DCE  |
| Controls              | TA, CA   |
| General               | Definition   |
| Power supply          | 100-250 VAC 50-400 Hz or -48V DC   |
| Conformance           | EN60950, EN55022, EN50082, EN50083-9   |
| Dimensions            | 1U Height: 260 x 215 x 47 mm (w x d x h)   |
| Environmental         | Range  |
| Ambient Temperature:  | 0°C to +40°C   |
| Storage Temperature:  | -20°C to +70°C   |
| Relative Humidity:    | 0% - 95% non condensing  |
| Barometric Pressure   | 86 KPa - 106 KPa   |
|                       |  |



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