



BLACK BOX Catalogue Ltd
The Source for Connectivity



MicroMux SP-8/34
MTU9834

MicroMux SP-8/34 E3 to HSSI Converter



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Contents

Contents.....4

Installation.....6

 G.703 75-ohm Cable Schedule.....6

 Setting up the MicroMux 8/34 using the switch setting options7

 G.703 Cable Equalisation7

 Clock master / clock slave settings7

 G.703 Data Loop-back.....8

 G.703 Data Inversion.....8

 Internal data routing control8

 X.21 RxD Clocking Inversion8

 G.703 Jitter Attenuation9

 X.21 Terminal Timing.....9

 X.21 TxD Clocking Inversion.....9

 HSSI.....9

Specifications:.....10

 Environmental.....10



Introduction

The Black Box MicroMux SP-8/34 is a follow-on member of the highly successful MicroMux range of E1 interface systems. The MicroMux SP-8/34 supports the next two levels up in the PDH system of European network interfaces, E2, running at 8448kbit/s, and E3, running at 34368kbit/s.

The MicroMux SP-8/34 is designed to enable the connection of data communication systems to carrier services, or private services, such as microwave links, that are presented as G.703 at either E2 or E3 speeds.

The MicroMux SP-8/34 offers a choice of an HSSI or an X.21 DTE interface at the E2 speed. Only the HSSI interface is usable at the E3 data rate, as standard X.21 DTE ports cannot keep pace with data above 10Mbit/s.

The SP-8/34 can also function as an X.21 to HSSI converter at E2 data rates.

The SP-8/34 is shipped configured for 34 Mbps. Contact Black Box if you require 8 Mbps operation.



Installation

On unpacking the MicroMux SP-8/34 you should find the unit and this manual. All units have an integral power supply. Mains powered units have an IEC connector and are delivered with a mains lead.

DC powered units are available as an option. If there you have a requirement for a DC powered units please call Black Box Technical Support.

Connection to a 75-ohm un-balanced G.703 / E2 or E3 network

The unit is designed for connection to a 75-ohm un-balanced service. It should be connected using the two B.N.C. connectors on the rear panel of the MicroMux SP-8/34. These are labelled as "Rx" and "Tx". Your G.703 carrier service equipment may be labelled with transmit and receive. The MicroMux SP-8/34 "RX" port should be connected to the receive side of the carrier equipment. The MicroMux SP-8/34 "TX" port transmits carrier and this should be connected to the out-bound port of the carrier service. E3 is the factory default speed. Selection of E2 speed may be specified at the time of ordering. The data-rate can be changed in the field, but only by suitably trained service personnel equipped with the necessary anti-static tools.

G.703 75-ohm Cable Schedule

Connections should be made using 75-ohm co-axial cables with B.N.C. connectors. The coax cables required are two off, 75-ohm coax cables of 5mm diameter, which must be terminated in male BNC connectors. The maximum cable attenuation must be 6db at 1024kHz. The attenuation characteristics should follow the "root f" law. Cable type RG59, or 2002, or equivalent, should meet this specification.

Status Indicators

There are thirteen LED status indicators on the front panel of the MicroMux SP-8/34. Looking at the unit from the front, and starting on the left, the function of the LEDs are as follows:

Green L.E.D.	Power status.
Amber L.E.D.	Jitter attenuation enabled.
Amber L.E.D.	Internal clock master enabled.
Amber L.E.D.	DTE loop back enabled.
Amber L.E.D.	Line loop back enabled.
Amber L.E.D.	G.703 port selected.
Amber L.E.D.	Reserved for future applications.
Amber L.E.D.	HSSI port selected.
Amber L.E.D.	X.21 port selected.



Amber L.E.D.	E3 data rate selected.
Amber L.E.D.	E2 data rate selected.
Green L.E.D.	Network / carrier line status.
Amber L.E.D.	G.703 signal quality status.

Setting up the MicroMux 8/34 using the switch setting options

The base unit is equipped with two, 8-way switches. The default setting for all switches is Up / Off.

The function of the switches of switch bank one is as follows:

1	Clock Slave Up/Off	Clock Master Down/On
2	G.703 Cable Equalisation Bit 0	See below
3	G.703 Cable Equalisation Bit 1	See below
4	G.703 Data Normal Up/Off	G.703 Data Loop-back Down/On
5	G.703 Data Normal Up/Off	G.703 Data Inversion Down/On
6,7,8	Reserved for future applications	

G.703 Cable Equalisation

The Line Interface Unit (LIU) compensates for equalisation for various lengths of cable. This function is controlled by switch 2 and switch 3 of switch bank one.

The settings for E2 are as follows:

0 dB < Cable < 4.1 dB	Switch 2 Up / Off	Switch 3 Up /Off
2.5 dB < Cable < 6.5 dB	Switch 2 Down / On	Switch 3 Up /Off

The settings for E3 are as follows:

0 dB < Cable < 3.5 dB	Switch 2 Up / Off	Switch 3 Up /Off
2.6 dB < Cable < 8 dB	Switch 2 Down / On	Switch 3 Up /Off
6 dB < Cable < 9.9 dB	Switch 2 Down / On	Switch 3 Down /On
8.6 dB < Cable < 13.2 dB	Switch 2 Up / Off	Switch 3 Down /On

Clock master / clock slave settings

When installing a MicroMux - SP-8/34 system, and connecting it to a directly connected public carrier E2 or E3 circuit, the MicroMux SP-8/34 can be set as a clock master or a clock slave. If two MicroMux SP-8/34 systems are being used, one at each end of the circuit, then both can be set to clock master. In some cases, the E2 or E3 circuit may be provisioned using private network equipment, such as a higher order multiplexor, which may be providing a clock master on the E2 / E3 interface. If the circuit does have a local clock master within the private network equipment, then the MicroMux SP-8/34 should be set as a clock slave.



G.703 Data Loop-back

When data loop-back is enabled (On / Down) the G.703 network data is looped-back (line loop-back). Note that when the G.703 interface is in data loop-back mode it still incorporates the jitter attenuator in the data path (if jitter attenuation enabled).

G.703 Data Inversion

When data inversion is enabled (Down / On) data is inverted in both directions between the two selected interfaces.

The function of the switches of switch bank two is as follows:

- | | | |
|---|--|--|
| 1 | Reserved for future applications | |
| 2 | X.21 RxD Clocking Normal Up / Off | X.21 RxD Clocking Inversion Down / On |
| 3 | Internal data routing control bit 0 | See below |
| 4 | Internal data routing control bit 1 | See below |
| 5 | Internal data routing control bit 2 | See below |
| 6 | Jitter Attenuation Enabled Up / Off | Jitter Attenuation Disabled Down / On |
| 7 | X.21 Terminal Timing Disabled Up / Off | X.21 Terminal Timing Enabled Down / On |
| 8 | X.21 TxD Clocking Normal Up / Off | X.21 TxD Clocking Inversion Down / On |

Internal data routing control

The MicroMux SP-8/34 has several modes of operation. These are controlled by the internal data routing switches.

G.703 E2 to X.21	3=On	4=Off	5=Off
G.703 E2 to HSSI	3=Off	4=Off	5=Off
G.703 E3 to HSSI	3=Off	4=Off	5=Off
X.21 to HSSI	3=Off	4=On	5=On (see note 1)

Note 1: The X.21 to HSSI mode can only operate at E2 data rates in clock master mode.

X.21 RxD Clocking Inversion

When X.21 RxData Clocking is inverted (Down / On) receive data (data from SP-8/34 DCE toward the DTE) is re-timed 180 degrees out of phase with respect to the data timing signalling. This can overcome timing issues caused by DTE interfaces that are not strictly X.21 compatible.



G.703 Jitter Attenuation

When the G.703 jitter attenuation is enabled (Up / Off) the recovered clock is applied to the Line Interface. The re-timed clock is then used to clock the DCE interface. Note that jitter attenuation is not applied in clock master mode.

X.21 Terminal Timing

When X.21 terminal timing is enabled (Down / On) the X.21 transmit data input (TxD) is clocked in (to a buffer within the SP-8/34) using the terminal timing input signalling (TTC). When disabled (Up / Off) data is clocked in using the data timing signalling (CLK).

X.21 TxD Clocking Inversion

When X.21 TxData Clocking is inverted (Down / On) transmit data (data from the DTE toward the SP-8/34 DCE) is clocked in 180 degrees out of phase with respect to the selected timing signalling (which could be the Terminal Timing signal if enable or the SP-8/34 system clock if Terminal Timing is not enabled).

HSSI

The HSSI on the MicroMux SP-8/34 is configured as a DCE. It provides Receive Data and Receive Timing, using the clock frequency recovered from the E2/E3 transmission line. It provides Send Timing, which, when the unit is in clock master mode, is at the master clock frequency. The MicroMux SP-8/34 expects to receive Terminal/Transmit Timing and Transmit Data back from the attached DTE interface. The interface supports the control signals CA, LA, LB.



Specifications:

Speed:	8/34Mbps
Interfaces:	E3, E2, HSSI and X.21
Connectors:	(2) BNC coax 75-ohm; HSSI 50-Way micro DF, DB15F
Indicators:	(4) LEDs: Power, Network, Clock Master and Loopback
Power:	230VAC, 50Hz, Internal via IEC320 Connector.
Size:	4.6 (H) x 17 (H) x 25.2 (D) cm
Weight:	1.5 kg

Environmental

The MicroMux - SP-8/34 is designed to operate under the following conditions.

- Ambient temperature in the range of 5 to 45 degrees Celsius.
- Relative humidity of 10 to 90 percent (non-condensing).
- Atmospheric pressure 86kPa to 106kPa.
- Power requirement: 230V 50Hz, 100mA, fuse 250mA A/S

