Black Box® France

SHORT HAUL,
ASYNCHRONOUS 4 WIRE
MODEM FOR PRIVATE LINES
1,2 à 19,2 Kbps

SHM 15

USER'S GUIDE

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BLACK BOX FRANCE

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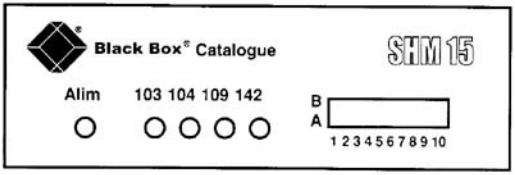
I - EC MARKING

The product guarantees compliance with the following directives:

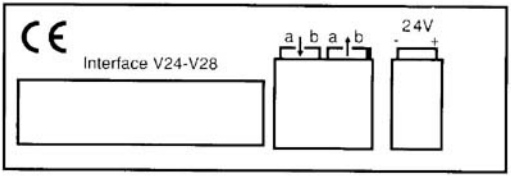
- EMC Directive 89/336/CEE.

- Electrical Safety Directive 73/23/CEE.

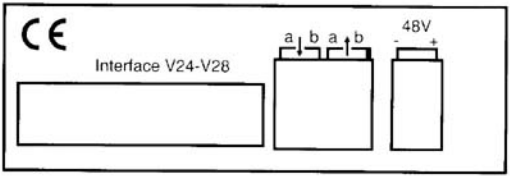
Front panel



Rear panel : 24V



Rear panel : 48V



II - CONNECTIONS

1. Power supply :

Connect all secondary supply wires before plugging the VAC transformer

Standalone version : connect to the marked "24V" screw terminals :

- the output wires of the VAC transformer, or
- a 24 Vrms : 50-60 Hz AC supply or
- a 24 V DC supply : 135 mA max. on 24V supply.

Standalone 48V version : connect the 48V supply to the 48V screw terminals with respect to the polarities + and -.

Rack-mount version : Connect the AC power card. Push on the power supply switch.
In the case of internal voltage failure :

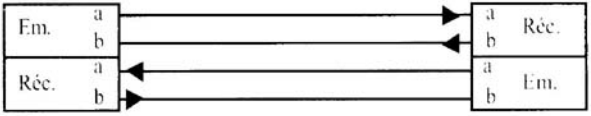
- check the fuse on the front panel of the power supply card if all the "Pwr" lights are OFF.
- check the fises F1 and F2 on the modem card (T 160 mA) if only one modem is concerned.

2. Point to point link :

The transmit line is connected to the terminals :

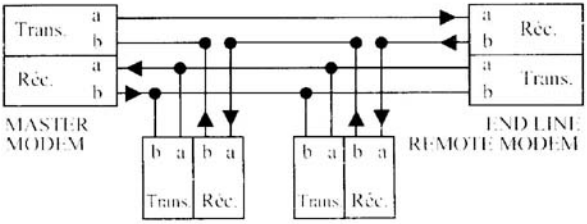
The receive line is connected to the terminals :

CAUTION :
The wires "a" and "b" at the transmit end must be connected, respectively to the terminals "a" and "b" at the receive end.
The connecting is correct if the display RD which is behind the modem is lighted when 104 is set in the binary 0 condition at the far end, and reciprocally.



3. Multipoint link

Note the connecting indications according to the figure below. The transmitters are connected in parallel mode on the RECEIVE line at the Centre station. The receivers are connected in serial mode on the TRANSMIT line from the Centre.



III - INTERFACE

EIA : RS 232-C
CCITT : V24 + V28
ISO : 2110

Circuit		PIN	MEANING	NAME	Signal Source
UITT	EIA				
102	AB	7	Signal Ground	GND	
103	BA	2	Transmitted data	TD	→
104	BB	3	Received data	RD	←
105	CA	4	Request to send	RTS	→
106	CB	5	Clear to send	CTS	←
107	CC	6	Data set ready	DSR	←
108	CD	20	Data terminal ready	DTR	→
109	CF	8	Data carrier detect	DCD	←
140	RL	21	Remote loop back	RLB2	→
141	LL	18	Local loop back	LLB3	→
142	TM	25	Test indicator	TI	←

DSR is ON when DTR is ON except when the modem is in loop 2.
→ Terminal Signal Source
← Modem Signal Source

IV - DISPLAYS AND TEST FACILITY

1. Display

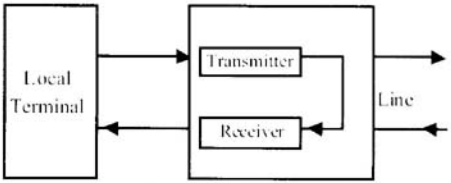
Display "Alim" lights up when the modem supply is on.
Display "109" lights up when received signal detector is on.
Display "104" lights up when received data is 0.
Display "103" lights up when transmited data is 0.
Display "142" lights up when a local or remote loop back is in process.

2. Loop facility

Two loops types are available

A - Local Loop 3 (LLB3)

Controled by micro switch S9 or CT141

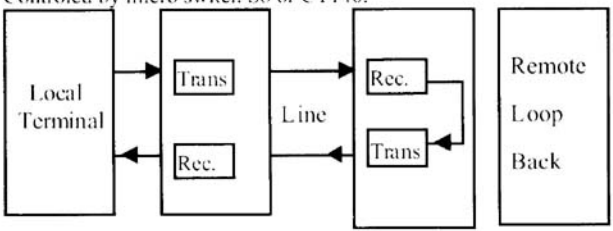


Local Loop back Type 3

Local modem is disconnected from the line. Transmit line is looped to receive line on local modem. Data transmitted by the terminal are sending back by the local modem. This loop back permits to test only the local modem.

B - Remote loop back (RLB2)

Controled by micro switch S8 or CT140.



Remote loop back type 2

Strap Z on position 2-1 inhibits loop back. On position 2-3 strap Z admits of loop back, CT140 controled.
The remote modem is looped. Data transmitted by local terminal, via the local modem, are send to and returned from the remote loop back modem. This test can verify the integrity of the local modem, the communication link and the remote modem.

Strap Z has no influence on S8 command.

C - Remote loop back inhibition controled by front panel S10

S10 switch allows the user to forbid the remote modem to loop back its one modem.

A position : loop back allowed
B position : loop back inhibited

WARNING :
When the modem is in loop 2 mode, all signals provided to the interface are OFF except the "Test" signal which is ON.

V - PROGRAMMING THE MODEM

1. Transmission control

Data transmission is controled by CT105 (RTS) and terminal must wait until CT106 (CTS) to start transmit data.

CT105 can be :

- controled by terminal (S7 on position A) (necessary in a multipoint link's peripherical station).
- forced by the modem (in order to obtain a permanent transmit mode) (S7 on position B). In this case, the modem doesn't take care of the terminal's CT105.

Delay time 105/106 is controled by S6 micro switch.

- Position B : 30ms delay
- Position A : 100 ms delay

VI - RANGE

The distance indicated below correspond to a guaranteed minimum range for twisted pairs of Ø 4mm (AWG 26).
For other diameters multiply roughly by 1.3 for Ø 0,5 mm ; 1,5 for Ø 0,6 mm ; 2,0 for Ø 0,8 mm

Rate (bps)	point to point	Multipoint 2 stations	Multipoint 4 stations	Multipoint 8 stations
1.200	7 km/ 4.40 mi			
2.400	6 km/ 3.75 mi		4.5km/ 2.81mi	2.5km/ 1.56mi
4.800	4 km/ 2.50 mi		3 km/ 1.87 mi	
9.600	2.7 km/ 1.69 mi	2.2km/ 1.3 mi	1.6km/ 1.00mi	
19.200	1.6 km/ 1.00 mi	1km / .63mi		

VII - MICRO SWITCH POSITION SUMMARY

* Factory settings

S 1	S 2	S 3	Data rate (bits/s)
A	A	A	19.200
B	A	A	9.600
A	B	A	4.800
B	B	A	2.400*
A	A	B	1.200

S 4	S 5	Transmission clock
		Don't care

S 6	Delay time CT 106 / CT 105
B	Delay time = 30 ms*
A	Delay time = 100 ms

S 7	Transmission control
A	By CT 105*
B	Permanent

S 8	S 9	Loop back
B	A	Loop back 2
A	B	Loop back 3
A	A	NONE*

S 10	Remote loop back
B	Loop back 2 allowed
A	Loop back 2 inhibited