

AMPLIFIER & C-BUS/RS232 CONVERTOR

C ← BUS

RS 232

PCB 432 Eng.



- **Converts C-BUS to RS232 and vice versa**
- **Amplifies the C-Bus line**
- **Bus speed up to 9,600 baud**
- **Possible connections**
 - COSTER devices with C-Bus Master
 - COSTER devices with C-Bus Slave
 - COSTER and non-COSTER devices with RS 232 Bus
 - RS 232 serial port for PC
 - RS 232 serial port for modem
 - Local portable PC with ACX 232 test plug-in
- **Supplied with serial cable with DB9 connector for connecting to computer**
- **230 V AC power supply (or 240 V AC for UK market); installation on DIN 4 rail**

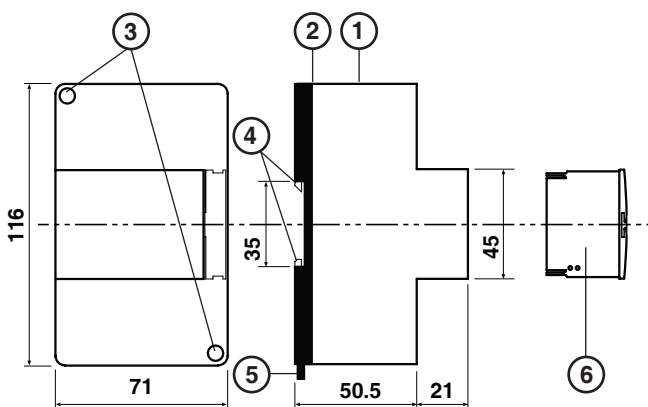
1. APPLICATION

- For amplifying and connecting the C-BUS data transmission network for:
- COSTER devices provided with Slave C-BUS port;;
 - COSTER devices provided with Master C-BUS port;
 - amplifying C-BUS line for networks kilometres long;
 - COSTER and NON-COSTER devices provided with RS 232 Bus;
 - MODEM provided with C-BUS and/or RS 232;
 - PC provided with RS232 or USB inputs (using RS 232/USB convertor cable)
 - extending C-BUS line by a further 5000 meters;
 - local connection of a portable PC by means of ACX 232 test Plug-in;

2. INSTALLATION

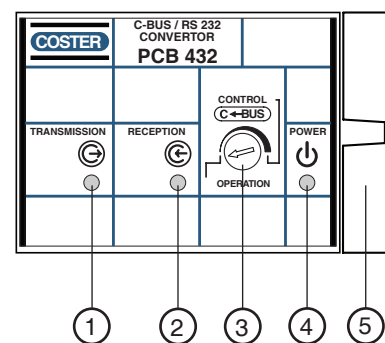
PCB 432 must be located in a dry space which meets the ambient conditions given under 5. TECHNICAL DATA. If sited in a location classified as "Hazardous" it must be installed in a cabinet for electrical equipment constructed in accordance with the regulations in force for the class of danger concerned. The device can be mounted on a DIN rail and housed in a standard DIN enclosure.

3. OVERALL DIMENSIONS



- 1 – Protective cover for electronic components
- 2 – Base with transformer and terminal block
- 3 – Screws for securing base and cover
- 4 – DIN rail securing elements
- 5 – DIN rail release lever
- 6 – Plug for slot for ACX 232 test Plug-in

4. FACIA



- 1 - Transmitting data LED
- 2 - Receiving data LED
- 3 - Potentiometer for tracing fault in line:
This potentiometer should normally be left in the operating position
- 4 - Network LED
- 5 - Plug for the slot for ACX 232 test Plug-in

5. TECHNICAL DATA

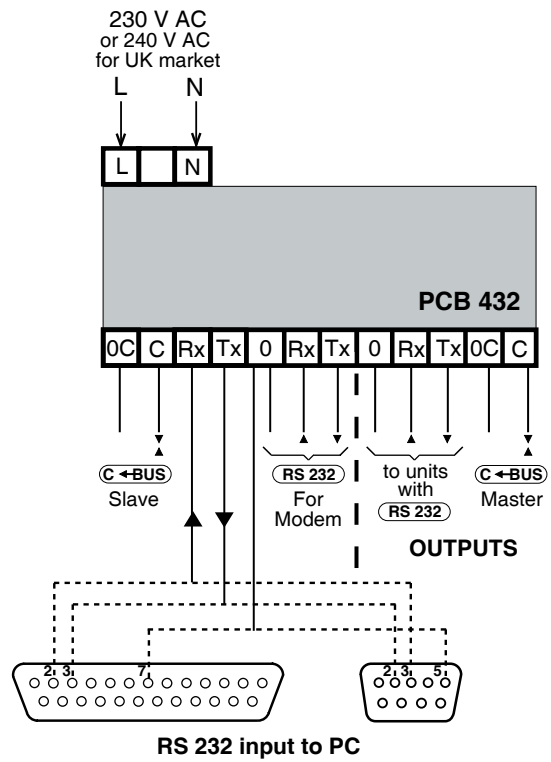
Power supply	230 V AC ± 10% or 240 V AC for UK market
Frequency	50 to 60 Hz
Consumption	5 VA
Protection	IP40
Radio disturbances	VDE0875/0871
Vibration test	with 2g (DIN 40 046)
Construction standards	Italian Electrotech. Committee (CEI)
Enclosure	DIN 4E module
Installation	on DIN 35 rail
Weight	0.27 kg
•Materials:	
Base	NYLON
Cover	ABS
•Ambient temperature:	
Operation	0 ... 45 °C
Storage	- 25 ... + 60 °C
Ambient humidity	Class F DIN 40040
•Data transmission:	
Transmission speed (Baud rate)	max 9600 bit/s
Serial port RS232 to or from device	1
Serial port RS 232 towards modem or PC	2
Parallel port C-BUS "Master"	1
Parallel port C-BUS "Slave"	1

L – 230 V AC (or 240 V AC for UK market)
N – Neutral

INPUTS :

- C-Bus Slave** –Input C-Bus Slave for use PCB 432 as C-Bus line amplifier
- RS 232 for PC** – RS 232 Line for PC
- RS 232 Modem** – RS 232 for Modem

6. WIRING DIAGRAMS



OUTPUTS:

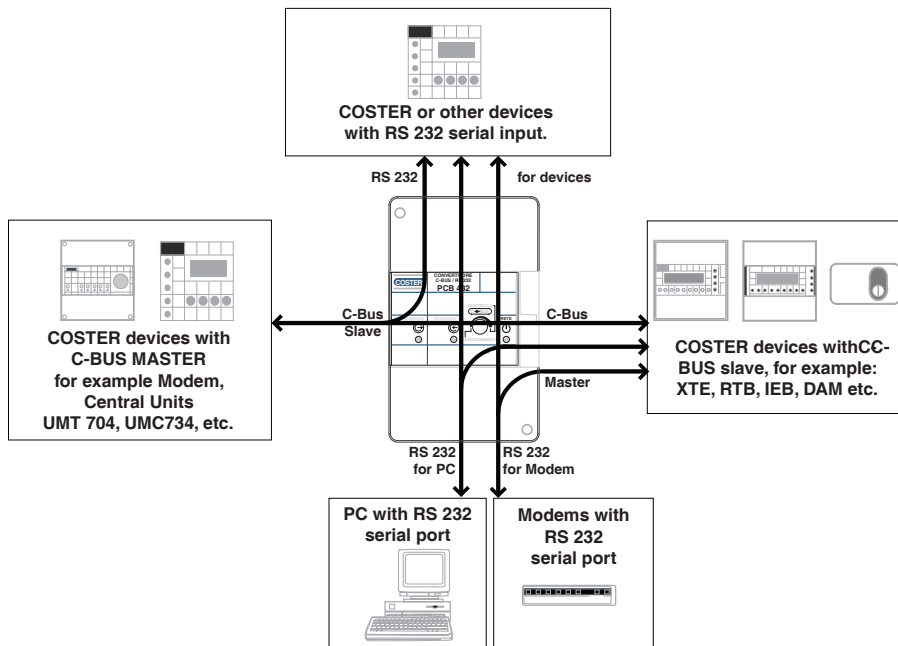
- RS 232 for devices** – Output RS 232 line for COSTER or NON COSTER units provided with this Bus
- C-Bus Master** –C-BUS Master output which represents the amplified C-Bus network

7. ELECTRICAL CONNECTIONS

Proceed as follows :

- Separate base and cover after having removed the securing screws (2.3)
 - Mount the base on the DIN rail and check that the securing elements (3.4) anchor it securely
 - Make the electrical connections strictly according to the diagram and in respect of the safety regulations in force using the following cables :
 - 1.5 mm² for power supply.
 - 1 to 1.5 mm² for C-Bus.
 - 0.75 mm² (approximately) for RS 232. Maximum length: 15 meters.
 - Switch on power (230 V AC; or 240 V AC for UK market) and check its presence at terminals L and N.
 - Switch off power, replace the cover on the base/terminal block and secure it with the four screws supplied (3.3)
- It is advisable not to insert more than two cables in a single terminal of the device and if necessary to use external terminals.**

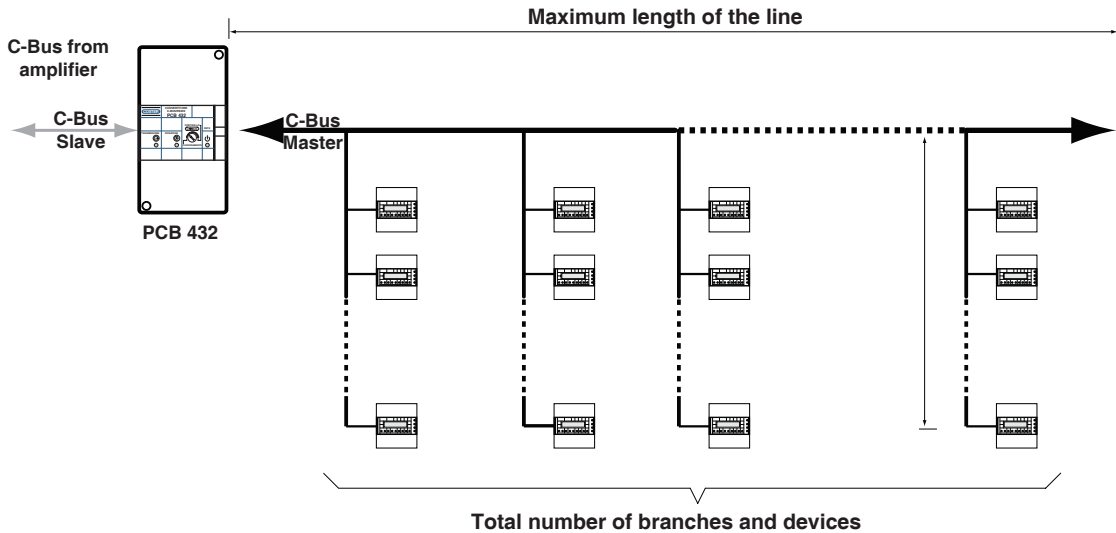
8. DIAGRAM SHOWING MAIN DATA ROUTES



9. AMPLIFIER OF C-BUS SIGNAL AND TRANSMISSION SPEED

PCB 432, besides being a "DISTRIBUTOR" of C-BUS and RS 232, also functions as a line amplifier for the C-Bus signal when the line is very long and connects with a large number of units..

The maximum transmission speed is 9600 baud; all the technical specifications of the line relate to this speed.



THE C-BUS CABLES MUST BE LAID IN DEDICATED TUBING.

TABLE VALID FOR 1200 BAUD

Max TRUNK cross section cable	Max BRANCH cross section	Max BRANCHES	Max UNITS per BRANCH	max TOTAL UNITS
11,000m 1.5 mm ²	500m 1 mm ²	8	25	150
7,500m 2.5 mm ²	500m 1.5 mm ²	10	25	239

TABLE VALID FOR 2400 BAUD

Max TRUNK cross section cable	Max BRANCH cross section	Max BRANCHES	Max UNITS per BRANCH	Max TOTAL UNITS
8,000m 1.5 mm ²	500m 1 mm ²	8	25	150
6,500m 2.5 mm ²	500m 1.5 mm ²	10	25	239

TABLE VALID FOR 4800 BAUD

Max TRUNK cross section cable	Max BRANCH cross section	Max BRANCHES	Max UNITS per BRANCH	Max TOTAL UNITS
6,500m 1.5 mm ²	500m 1 mm ²	8	20	150
5,500m 2.5 mm ²	500m 1.5 mm ²	10	25	239

TABLE VALID FOR 9600 BAUD

max TRONCO cross section cable	Max BRANCH cross section	Max BRANCHES	Max UNITS per BRANCH	Max TOTAL UNITS
3,000m 1.5 mm ²	500m 1 mm ²	8	20	150
2,400m 2.5 mm ²	500m 1.5 mm ²	10	25	239

WARNING: If the trunk is too short you can lengthen the branches or insert more of them. If the branches are fewer or shorter you can lengthen the trunk.

Essentially, the important figure is the total of the lengths of all the cables of the trunk and the branches

10. LENGTHS OF LARGER BUS OR COMPLEX NETWORKS

If longer bus than those shown in the above table are necessary, or if more complex networks with intermediate taps are required, it is possible to use several PCB 432 connected in series or in parallel.

To increase the distances and the outputs in respect of those indicated in the table it is possible to use screened cables having a lower parasitic capacity.

The features of PCB 432 permit the construction of any type of network.

Under these circumstances a detailed technical examination is required in order to optimise the number of PCB 432 necessary and the type of cables for the connections.

The maximum number of units to be used in the same network is always 239 on account of the addresses.

If there were to be more than 239 units it would be necessary to create a second network; this would certainly be advisable to ensure operational reliability.

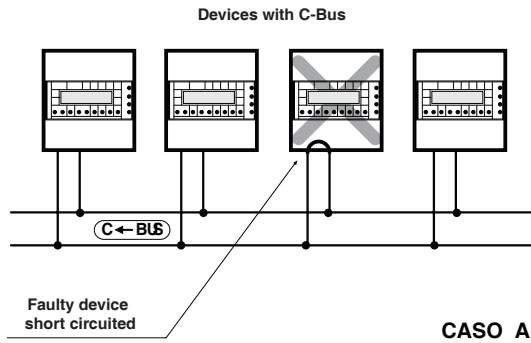
11. NETWORK DIAGNOSTICS

PCB 432 incorporates a potentiometer accessible on the facia: CONTROL C-BUS.
 By means of this potentiometer you can adjust the level of the line signal response detector.
 It is possible to detect if some unit is faulty or if there are line losses due to inadequate insulation.

11.1 Faulty unit

- When the unit develops a fault it may:
- Never respond: in this event it does not create problems on the line
 - Always responds anonymously, even if not interrogated: in this event it obviously creates a disturbance on the line.

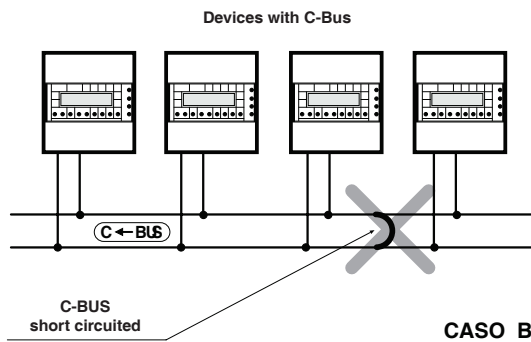
• **Device which always responds or which occupies the line with an incongruent signal**



SYMPTOM : iThe reception LED (2 in section 4) is always lit or lights intermittently in an irregular manner.

ACTION: Rotate the CONTROL C-BUS potentiometer from the normal operating position until the receiving LED goes out. Normally this potentiometer is left in the **operating** position. To know which is the faulty unit simply interrogate all of them and see which does not respond. This operation can be carried out using the SWC 701 program which has a specific rapid mode.

• **Short circuit on bus line**



SYMPTOM : The reception LED (2 in section 4) is always lit

ACTION: if, rotating the CONTROL C-BUS potentiometer from the normal operating position, you cannot switch off the receiving LED, this means that the fault is not due to one or more devices being faulty but to a short circuit in the line. In this event it is necessary to divide the line into sections, starting from the most distant unit, in order to identify the short circuit.

• **Current loss on the line owing to poor insulation**

Corresponds to an incomplete short circuit which causes a certain spurious current to flow in the circuit.

If this current does not exceed unsupportable levels it is possible to compensate with an appropriate setting of the control potentiometer; this operation can serve to obtain an immediate functioning of the system, but it must not be forgotten that sooner or later the cause will have to be eliminated by examining the insulation of the line.

SYMPTON: the reception LED (2 in section 4) is always lit.

ACTION: by rotating the CONTROL C-BUS potentiometer from its normal operating position you can switch off the reception LED.

By checking the various devices you can see if they all respond: in this event it is not a fault in a device which causes this symptom, but a loss of current in the line.

The potentiometer must be left in the position in which it is found in order to ensure a temporary operation.

Everything functions until the loss of current in the line remains constant or varies only slightly, otherwise it is necessary to re-adjust the control potentiometer in order to compensate for the new value of current loss. You are advised to look for, identify and eliminate this defect in the line.

Amendments to Data Sheet

Data	Revision No.	Page	Section	Amendment description	Firmware version	Software version
17.09.08 AM	01	2	6. WIRING DIAGRAM	Updated wiring diagram		
06.10.08 DZ	02	1	MAIN FEATURES	Added point for serial cable supplied		



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