

TELEFRANG AB



RS232-SIOX Converter

K32

General Description

The K32 module interfaces an asynchronous RS232C serial port to the SIOX two wire serial communication bus. Most standard computers can thus be used as SIOX bus controllers.

Up to 60 SIOX stations can be connected to the converter which is powered by an external 15 V - 35 V, 120 mA DC supply. The RS232C end is optoisolated from the SIOX bus. The entire converter is housed in a 25-pole Dsub case.



Block Diagram

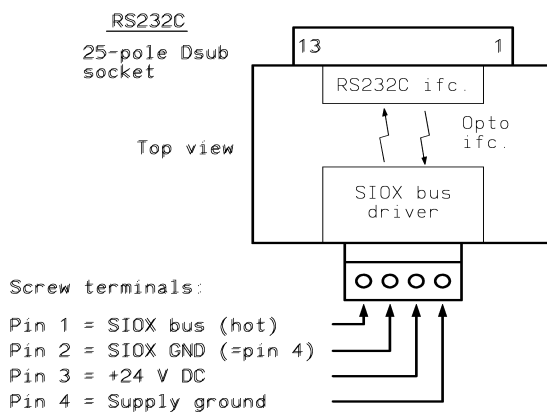




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Installation

A pluggable screw connector provides the power and SIOX connection. The supply voltage can be anywhere between 15 V and 35 V DC, higher voltages providing better margins in environments with high noise levels. The supply must be able to carry the maximum bus short-circuit current of approximately 100 mA, plus an extra 20 mA.

If very long bus wires are used (high resistance), the current generator may need adjustment. This is accomplished with the jumpers J1 and J2. Please refer to 'SIOX Bus Current' on page 6 for details. However, the total number of SIOX stations connected must be decreased proportionally. At 100 mA current limit, and depending on station types, up to 60 stations can be connected.

The negative supply terminal is internally connected to one of the two SIOX bus terminals. It is possible to use the bus supply to power remote SIOX stations, but you are recommended to avoid 3-wire connections where the same return wire is used for both the SIOX bus and the remote station supply. The additional voltage drop in the common return wire may disturb the bus communications, especially in the case of long wires.

RS232C Interface

The converter is equipped with a female 25-pole Dsub socket which can be connected directly to many computers, e.g. the IBM PC and IBM PC XT or other equipment connecting as DTE.

A shielded cable with a maximum length of 3 m should be used between the K32 unit and the other equipment. When using the 25-pole Dsub, the easiest way to connect the module is to use the transmit, receive and ground lead. In addition, a supply of +8 - +15 V DC must be connected to any of pin 4, 5, 6, 8 or 20. This may be taken from the RS232C interface itself, if the current requirement is met. It is the input impedance in the computer's own receive port that determines the current requirement. Worst case will be a 3 k Ω input impedance (as defined in the RS232C standard). To obtain the required swing of $\nabla 5$ V on the receiver input, the current requirement will be approximately 2 mA. At least one of the pins 4, 5, 6, 8 or 20 usually has a suitable positive supply for this purpose.

Note that pins 4 and 20 (7 and 4 on a 9-pole D-sub) are low on many PCs until a communication program has initiated the port. No SIOX bus current is then generated. To test the bus voltage without starting the PC, just pull out the K32 and the current will appear on the bus.



Internally, the K32 module connects pins 4, 5 and 6 together which, when interfacing to a DTE (Data Terminal Equipment), assures proper connection of the RTS, CTS and DSR signals. However, when interfacing to a DCE (Data Communication Equipment), it is recommended that pin 6 is left open on the DCE connector, otherwise CTS and DSR, which both are outputs, will be unintentionally connected with each other. Further, pins 8 and 20 are internally connected (DCD from DCE-end to DTR), which is often required if these signal lines are used by the equipment. If in doubt, check the technical manual describing the RS232C implementation.

Consequently, the easiest way to connect the unit will be as shown below:

<u>Dsub pin</u>	<u>Function</u>
2	Receive data (to K32 module)
3	Transmit data (from K32 module)
7	Signal ground
4	Positive supply (pins 5, 6, 8 or 20 may also be used)

The full pinout with internal connections for the Dsub is shown below:

<u>Dsub Pin</u>	<u>RS232C Name / Function</u>	
1	Protective ground, not used	
2	TD = Receive data to K32 module	
3	RD = Transmit data from K32 module	
4	RTS connected to CTS and DSR below	
5		CTS
6		DSR
7	Signal ground	
8	DCD connected to DTR below	
20		DTR



Typical connections in interface cables:

<u>IBM AT</u> <u>9-pole</u> <u>cable socket</u>	<u>IBM PC 25-pole</u>	<u>K32 25-pole</u> <u>cable socket</u>	<u>Function</u> <u>cable plug</u>
5	7	7	GND
3	2	2	TD (=K32 Rx)
2	3	3	RD (=K32 Tx)
4, 1	20, 8	20	DTR (+DCD)
7, 8, 6	4, 5, 6	4	RTS (+CTS/DSR)

Please observe that the K32 module can be plugged directly into a 25-pole IBM PC compatible port.

Local Echo

The K32 converter echoes data received at pin 2 of the Dsub connector back to pin 3, since all data transmitted over the SIOX bus is automatically returned. This feature provides transmission checking and works well for the SIOX protocol.

In a few special cases, e.g. when using non-standard protocol software on a slow computer system, this echo may unnecessarily burden the system and therefore may require the no-echo feature to be enabled. In this case, install the jumper at position J3 in order to inhibit the echo. Note that the protocol software must be designed to operate either with or without echo.

We recommend the use of standard echo-enabled mode for new protocol software.

As shipped, local echo is enabled (J3 open).

SIOX Connection

The SIOX modules should be interconnected through a two-wire, low capacitance twisted pair. Shielded cables may be used but unless a correct strategy for shield grounding is adopted, it may prove to be of little benefit. Instead, the capacitance between the shield and the bus wires will add to the total capacitive load on the SIOX bus and decrease the maximum distance over which communication can be carried out for a given bit rate.



SIOX Bus Current

J1 and J2 controls the SIOX bus short-circuit current.

<u>Installed jumpers</u>		<u>SIOX bus current</u>
J1	J2	105 mA, factory setting
J1	-	70 mA
-	J2	35 mA
-	-	0 mA, special use

Note: '-' denotes uninstalled jumper.

In cases where the bus cable resistance is high, it may be necessary to lower the SIOX bus current in order to obtain communication. Cable resistance should be measured at the K32 connection point with a short-circuit installed across the SIOX bus at the most remote module position.

Assuming that a supply voltage of at least 24 V DC is used, special attention should be paid to the SIOX bus current if the resistance is higher than 100 Ω (2 x 50 Ω). At lower supply voltages, the acceptable cable resistance is further decreased. However, lowering the current in order to cope with high cable resistances will result in slower rise times due to the cable capacitances. In this case, baudrate reduction may be necessary. Alternatively, using a high current (75 or 105 mA) to keep the rise times short and increase the supply voltage to 35 V DC to lessen the effect of cable resistance can be the solution.

The SIOX module R30, which is a bus expander, may also be used to increase SIOX bus lengths.

A PTC resistor is installed in series with the outgoing 'hot' SIOX bus line for protection purposes. Normally, the device has a resistance of a few ohms, but under an overload condition such as a shorted bus, the device will enter a high impedance state which will reduce the current to a safe level. The transfer from low to high impedance is not immediate but will take a few minutes until the temperature rise due to the power dissipated in the module is high enough.

If the unit does not recover automatically when the fault is corrected, remove power for a few seconds. Recover can also be obtained by sending a few seconds of 'break' from the computer to the K32 unit.

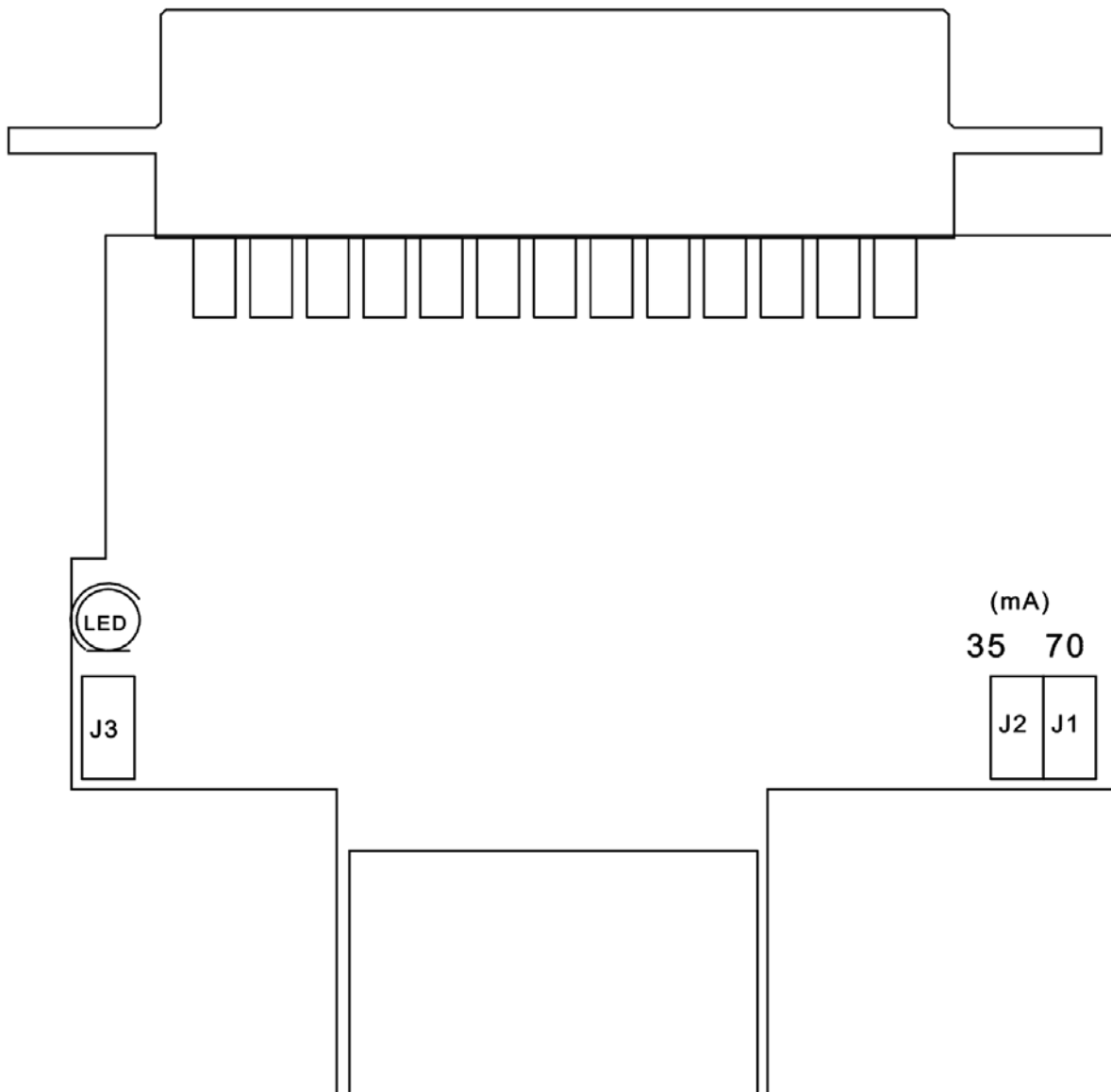


Indicator LED

A green indicator LED (Light Emitting Diode) is located inside the opening on the side of the casing. It is intended for diagnostic purposes under installation or service. If the LED is activated, it informs that the module's current generator supplies current to the SIOX bus (a 'mark' condition received from the computer). It will flicker during normal operation while communications are carried out.

Jumper Locations

Below is shown the internal jumper locations.





Electrical Specifications (T_{amb} = 20 °C)				
	Min	Typ	Max	Unit
SIOX Bus Supply Voltage	15	24	35	VDC
SIOX Bus Short Circuit Current (selectable)	35		105	mA
RS232C positive Supply Current		3		mA
RS232C Pin 2 (Tx) Voltage	∇5		∇16	V
Communication Speed	300		1920 0	bps

Environmental Specifications				
	Min	Typ	Max	Unit
Operating Temperature Range	0		+55	°C
Storage Temperature Range	-20		+85	°C

Mechanical Specifications		
Dimensions	57 x 51 x 20	mm
Weight	50	g