LAN232

BRIDGING UNIT FOR PROCESS SENSORS

USER'S MANUAL

Model LAN232



Unit information:

Model & Rev:	**-**	**Rev:**
Serial number:		
PCB's:		

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Important warnings are highlighted in this manual with red color.
Recommendations are in blue and important instructions are in brown.

EC Declaration of Conformity

We

Visilab Signal Technologies
Lahdentie 58
FI-04600 MÄNTSÄLÄ
FINLAND

declare that the

LAN232 bridging unit for process sensors

meet the intent of the EMC directive 89/336/EEC. Compliance is based on the following harmonized standards:

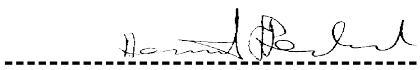
Emissions:

EN 50 081 part 2 (industrial environment):1993 referring to :
EN 55 011 radiated, Class A, Group 1
EN 55 011 conducted, Class A, Group 1

Immunity:

EN 50 082 part 2 (industrial environment):1992 referring to (both radiated and conducted fields):
EN 61000-4
IEC 1000-4
ENV 50140
ENV 50141
ENV 50204

I certify that the apparatus identified above conforms to the requirements of Council Directive 89/336/EEC.



Henrik Stenlund
managing director
5th April 2006

CE

Note for users:
When the apparatus identified above is connected by someone to become a part of an industrial control system, he is also responsible for the EMC compatibility of the resulting system. He is also liable of providing the necessary optical or galvanic isolations for signals and transient absorbers for other lines to conform to the EMC directives. The expansion modules to be attached to the meter electrically and mechanically are designed and implemented in the same fashion and are claimed to be compatible with the EMC directive without individual testing.

The apparatus have been individually tested according to DIN VDE0701 and DIN VDE0702 for electrical safety.

EC Declaration of Conformity

We

Visilab Signal Technologies
Lahdentie 58
FI-04600 MÄNTSÄLÄ
FINLAND

declare that the products which are put on the EU market:

LAN232 bridging unit for process sensors

meet the intent of the RoHS directive 2002/95/EC and the WEEE directive 2002/96/EC. Compliance is based on the following.

The instruments belong to Category 9 "Monitoring and Control Instruments" of the WEEE directive and thus are not required to fulfill the said directives.

I certify that the apparatus identified above conforms to the requirements of Council Directives 2002/95/EC and 2002/96/EC.

Henrik Stenlund
managing director
3rd April 2006

Note:

In spite of the fact that the products are not required to fulfill the directives, we make every effort to comply with the directives in practice. When the Category 9 is moved to be covered the same requirements as other categories do, we are ready to certify that these products comply with the directives.

Specifications of the unit, model LAN232:

Operating -10 to +60 C 20 - 90 %RH noncondensing ambient, max 10 W continuously.

Safety and EMC compliance with UL60950, TÜV EN60950-1, EN55022 (CISPR22) CLASS B, EN61000-3-2,-3, EN61000-4-2,3,4,5,6,8,11, ENV50204, EN55024, LIGHT INDUSTRY LEVEL, CRITERIA A. Tested for electrical safety according to DIN VDE0701 and VDE0702.

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1. Introduction and Taking into Use

The **LAN232** is designed for use with your process sensors made by Visilab, any model. It provides your meter with RS232-based communications for up to eight sensors and 40 m legs maximum. Optionally it offers RS485 communications for a great number of slaves and up to 1200 m network length measured from end-to end. The operating speeds are 9600 bauds (NORMAL) or 38400 bauds (HIGH SPEED). In the following find the proper use of each connector in the box. For any details of use of the sensor itself, refer to the corresponding User's Guide.

LAN232 is taken out of its package carefully and it should be inspected for any damage during shipping. If any damage is visible, contact the manufacturer or the representative from which the unit was bought. The following items should be available:

1. **LAN232** unit
2. User's guide (this)
3. Splitting RS232 cables of 0.5 m in length, 4 pieces
4. Wall supply cable with an IEC320 socket at one end
5. DIN rail mounting kit
6. Other optional items ordered

If something is missing, inform your dealer and he will ship any missing parts. The instrument is ready for use after connecting the cables and power plug.

LAN232 is a self-powered bridging unit connecting any sensor made by Visilab to your PC. You can connect up to eight slaves to it to acquire data from a complex sensor arrangement in your production plant. The default communications is RS232 at 9600 bauds. If you plan to change this, do the corresponding settings in each sensor according to the User's Guides first using your regular RS232 system. Then, configure the LAN232 accordingly as described in the following chapters.

The casing has a number of venting holes for air circulation. The unit is intended for installation into either electrical cabinets or as an office accessory. It has rubber feet for comfortable desktop operation too. It is not watertight in any degree and should not be installed into such conditions where there is a risk of letting water inside. The LAN232 accepts any AC voltage between 85 and 240 Volts of 50/60 Hz. Also DC voltage is acceptable. Check the unit's label for certifications and valid approvals. For wall power inlet, there is an IEC320 connector at one end of the LAN232. A suitable cable with the proper wall plug at the other end is supplied. Minor variations may exist in this respect as conditions vary from country to country and the plugs are often very different. This is described in the following.

Connecting the Cables and Starting the Meter

To preserve the cables and connector for the operating life of the instrument handle them carefully and avoid too much force while fastening and loosening. Refer to Figures 1 to 3 for connector locations and typical cable connections in applications. In practice, there are more legal combinations than the ones shown. Use the standard RS232 cable of your instrument for connecting to LAN232. if you don't have it available, you can use any regular one-to one serial cable with D9 male and female connectors at the ends. The pins 2, 3 and 5 are only used in this direct cable. These are low-cost consumable in PC stores and are varying in length. If possible, choose the one having some sort of shielding in the cable to minimize the risk of EM interference and having a sufficient length.

operation. A twisted-pair cable with shielding is usually sufficient. There are termination resistors available, one inside the meter and another inside the LAN232. Refer to the meter's own User's Guide for details and to Appendix 2 for finding the other resistor and its jumper.

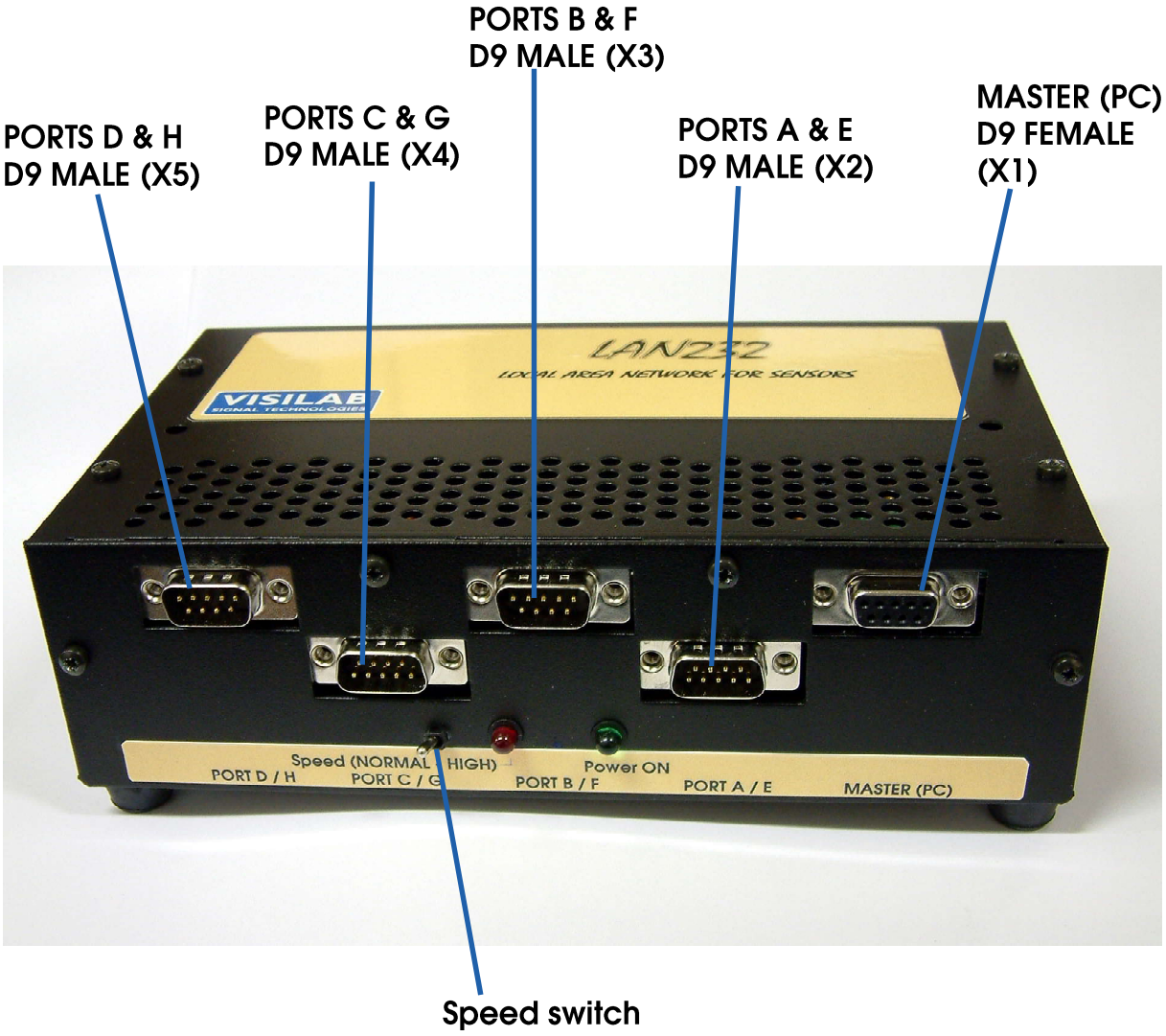


Figure 1. Location of all connectors on the front panel. note that the MASTER port is always reserved for the master alone. No slaves should be connected to it in RS232 mode. In RS485 mode the same connector has some pins available for building the network (refer to appendices).

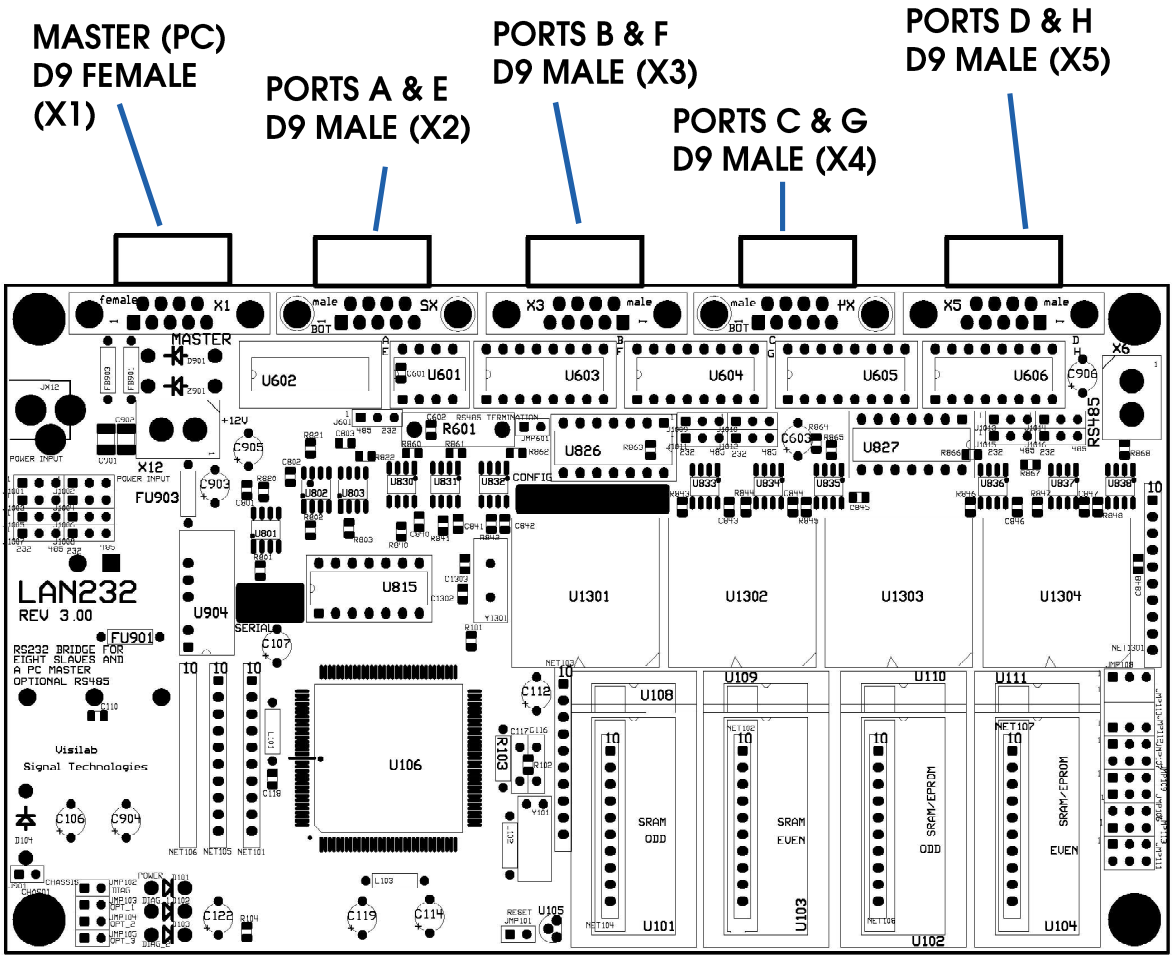


Figure 2. Electrical connectors for model LAN232 with their types indicated.

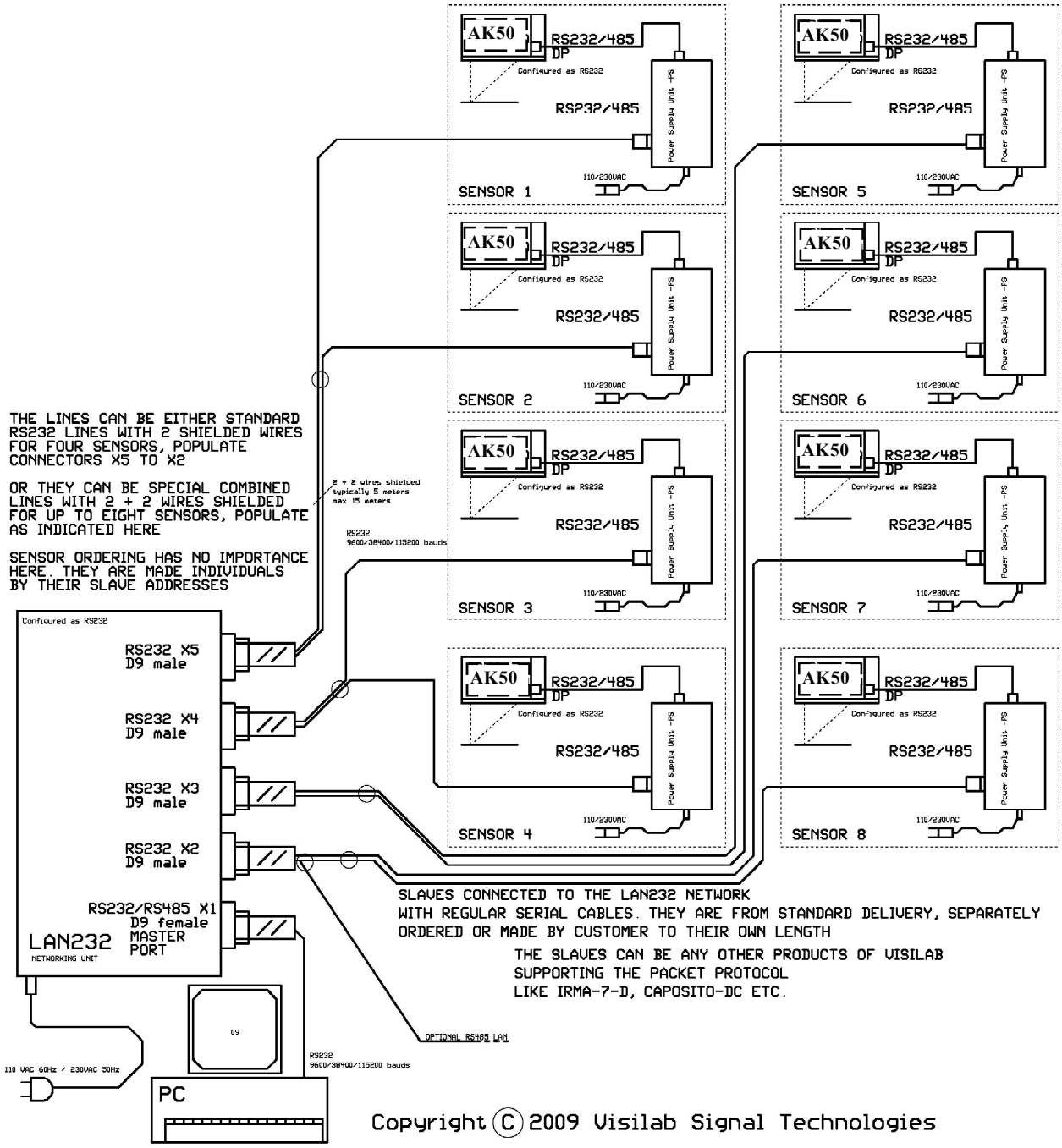


Figure 3. Typical connections in a multi-slave system

2. Basic Features of the LAN232

RS232 Operation

LAN232 can operate as a bridging unit between PC master and a number of instruments working as slaves. The lowest level hardware communications can be RS232 with up to 40 m legs of cables at 9600 bauds (NORMAL SPEED). The maximum recommended leg for the HIGH SPEED setting 38400 bauds is 15 m legs for reliable operation.

The number of slaves is maximum eight, each slave connected to the four D9 standard RS232 ports of the LAN232 unit. Four slaves can be connected directly to the unit and you can use the splitting cables when the number of slaves increases. Detach one slave from LAN232 and install the splitting cable instead. Connect now two slaves to these open ends. The splitting cables are transparent and have no effect on the system. You can use freely any of the available ports reserved for slaves. The one marked for master (PC) is reserved for that purpose and should not be used for the slaves.

The default setting of LAN232 is 9600 bauds and operation in RS232.

Important

Note that each meter's slave address must be made unique before connecting it to the network, either RS232 or RS485 based. Refer to the user's guides of each sensor and perform this as a first task.

Speed Setting

The speed setting of LAN232 is can be changed with the switch as shown in Figure1. When changing the speed, note the following:

- **first, change the speed of the meters, one by one in Keyboard mode and return to packet protocol, select the next slave and repeat. That slave becomes invisible temporarily due to speed difference**
- **second, change the speed of LAN232**
- **third, change the speed of the PC software and now you can talk to the slaves again**

If you do this in an incorrect order, you may invite trouble as you cannot communicate at some point with the slaves. Repeat this set of steps also when changing back the speed.

RS485 Operation

The bridge can be operated as RS485 on the lowest level of hardware with twisted pair cables for longer distances and by using the regular RS232 cables for shorter distances (< 20m). At 9600 baud (NORMAL SPEED) the legs can be up to 1200 m and at 38400 bauds (HIGH SPEED) it can be up to 100 m. You can also have several tens of slaves in the network, possibly up to 100. The current versions of the PC software support data acquisition from up to eight slaves at a time of these. Mill-wide networks in small scale and low cost are thus possible. The cable between the nodes will probably cost more than the LAN232 unit.

To change from the default RS232 to RS485 operation, you need to change first the mode of each meter to operate as RS485, refer to their own User's Guides. Then you need to open the LAN232 unit cover and find a set of jumper plugs. After changing them as indicated in Appendix 3., you can change the corresponding selection in each and every slave to be connected to this two-wire

network. When finished, you are ready to operate this simple network as no changes are required for the software. **Disconnect the power plug before opening the cover! There are dangerous high voltage parts inside the box in the AC-DC converter module.**

You have also the special opportunity of selecting part of the ports for RS232 and the rest of them for RS485. This may be useful if you have slaves which absolutely cannot be working as RS485 or there is some reason you don't want to do it. Port A is reserved always for running the RS485 network when it is activated by selection of jumper J601. The other ports can be used freely as RS232 or RS485 when RS485 has been activated. Else, only RS232 communications is allowed in all ports. There is a line termination resistor which can be taken into use by JMP601. Use it only if required to avoid unnecessary line loading. Use twisted pair wiring for RS485.

The RS485 network is physically connected with the same wires and cables as before, the TX/RX lines being now used by A/B lines of the RS485. These same lines are available in the MASTER connector X1 too (pins 5 - 8). There is also a screw connector inside the box on the circuit board (X6) for building a network with a separate high-quality cable. There is also a rubber plug stopped opening in the box wall just for this purpose. Your mill engineer is capable of getting a cable protector installed to this hole. It would be recommended to use this connector, especially for long distance operation.

When building a network based on RS485, you might encounter a phenomenon where the network runs fine as RS232 but refuses to work completely as RS485. The most common reason for this is that either the master's RS485 wire pair ordering is incorrect or the same problem lies at slaves. Switch the two wires from the screw terminal with eachother and the network should start operating. Make the network operate correctly with one slave at a time and increase the number of slaves until all work. This is recommended to be done before you even install the long cable to the mill, everything being coiled at that time for simplicity.

Indicators

There are two indicator lights on the front panel. The one marked as **POWER** indicates a working power supply of this unit. The second one (**SPEED**) indicates the selected communication speed. If it is lit, you are using the HIGH SPEED (38400 bauds), else you are using the NORMAL speed (9600 bauds). Just toggle the switch near the LED to change the setting and it is accepted in a second.

Appendix 1. Schematic of Electrical Connections for LAN232. **If you open the cover, please, disconnect the power lead first to avoid a shock!**

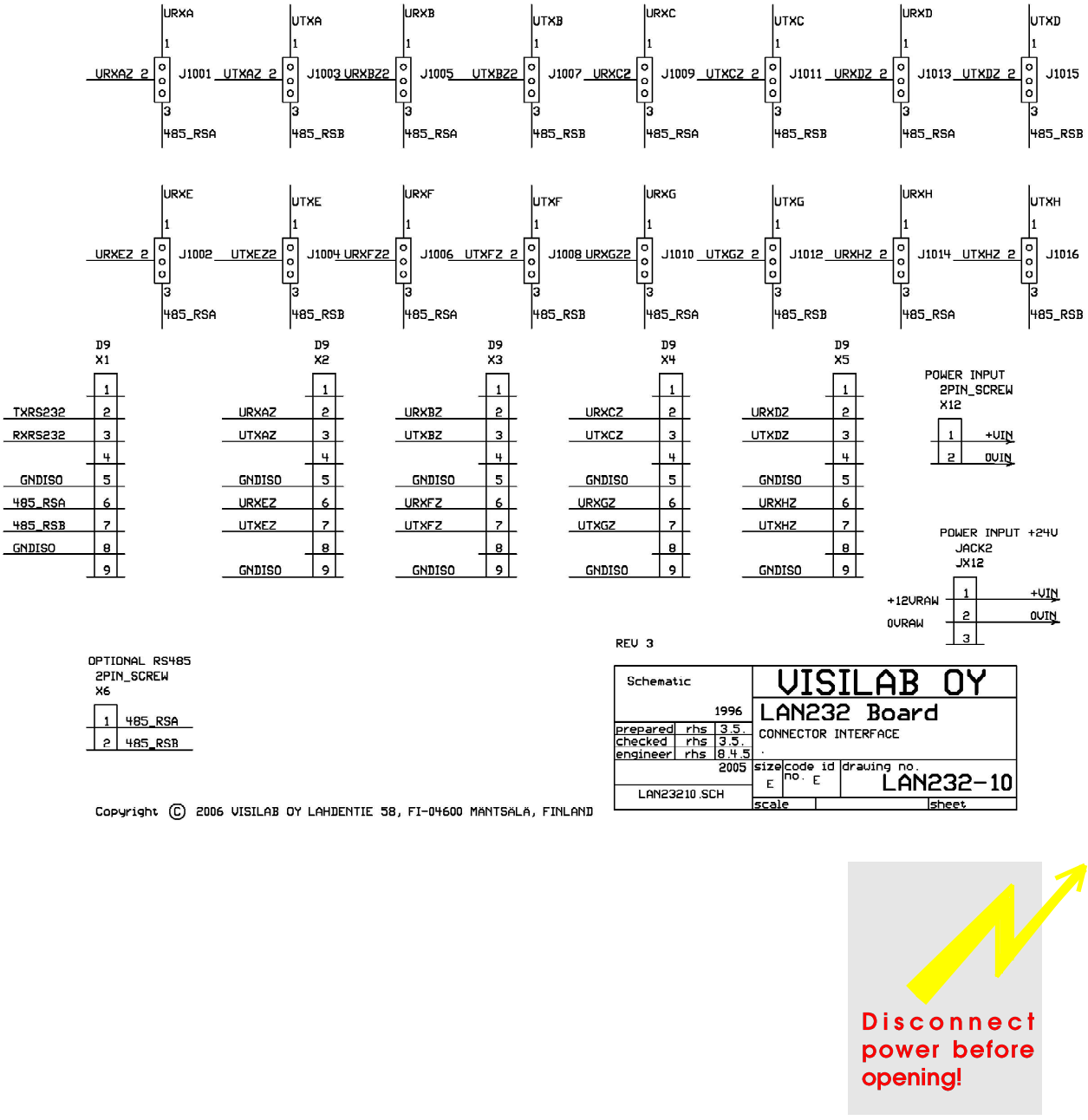


Figure L1. Schematic of the LAN232 connectors and jumper plugs

Appendix 2. The circuit board with locations of all important components.

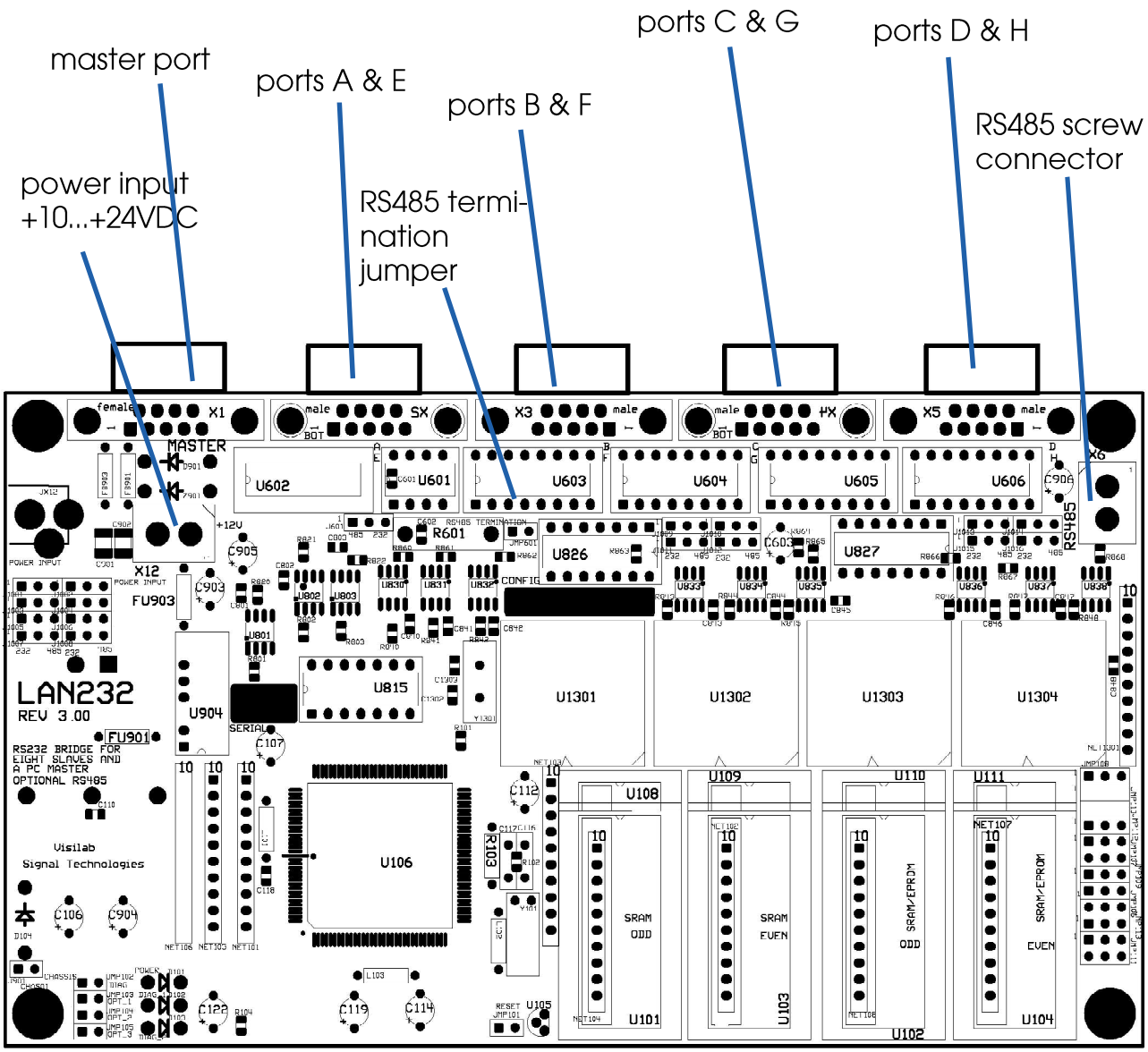


Figure L2 Circuit board for LAN232R3

Appendix 3. The circuit board with locations of all important jumpers, their default and optional positions, RX = receiver line, TX = transmitter line to/from UART. Note that port A is reserved for RS485 communications when activated with J601. Other ports can be left as RS232 if required.

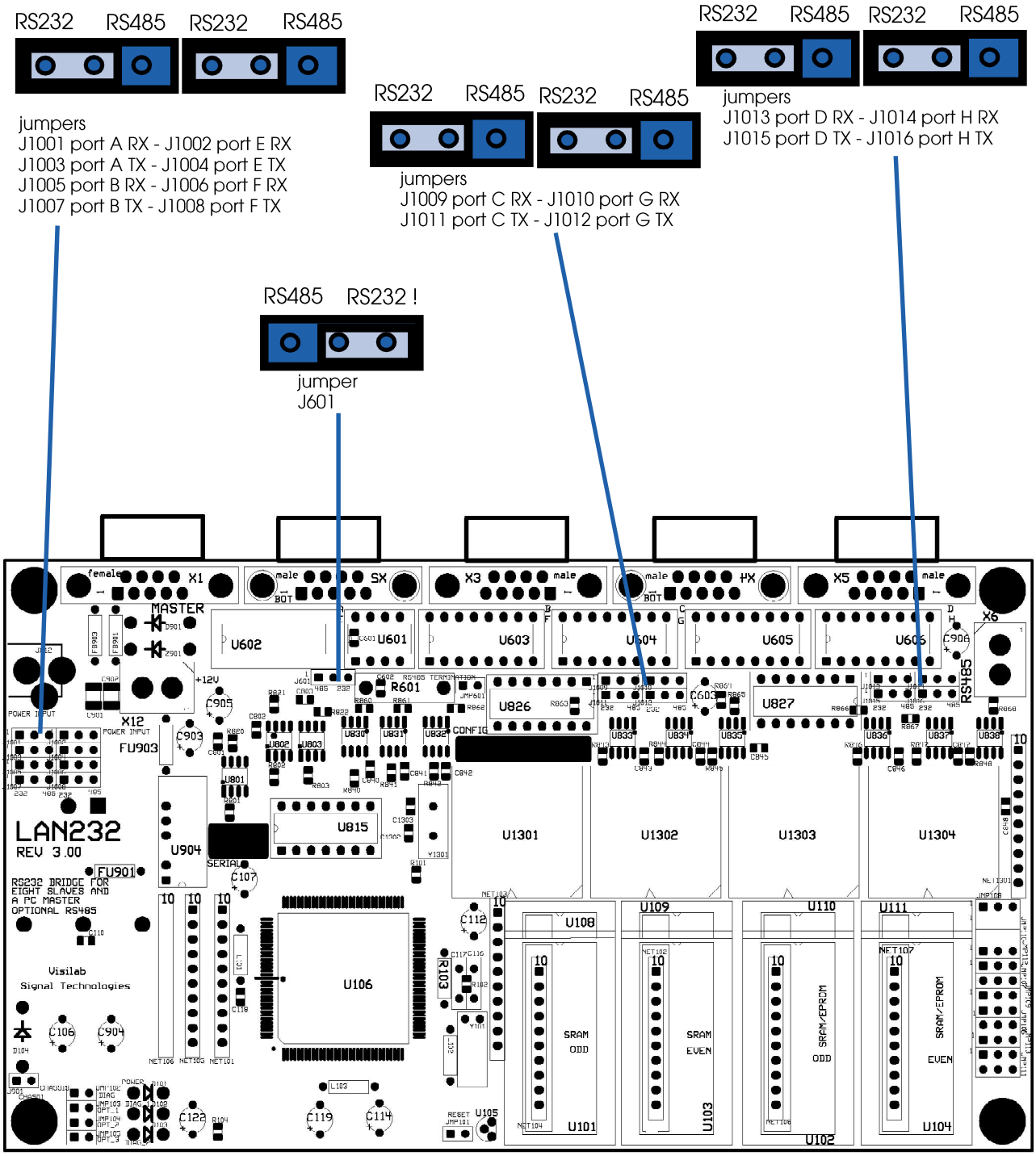


Figure L4-1 Circuit board for LAN232R3 with jumper locations. Do not change other jumpers except the RS485 termination if required.

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