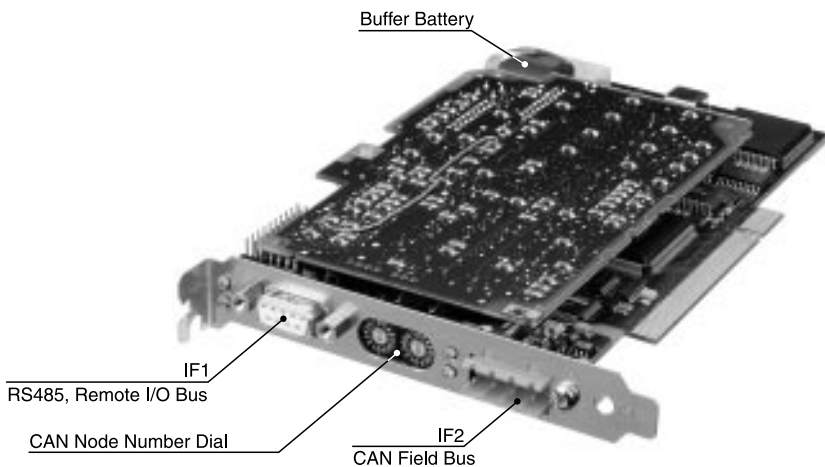


1 Technical Data

Module ID	LS251
General Information	
Model Number	5LS251.60-1
Type	Standard PCI Half Size Card, Plug & Play
Output Power without LS071 with LS071	max. 7.75 W max. 8.5 W
Operating Temperature	0 - 55 °C
Humidity	0 - 95 % (not condensing)
Controller	
Processor Architecture	32 Bit
Typical Command Cycle Time	0.13 µsec
Data and Program code Cache	2 x 256 Byte
Standard Memory Construction Operating Memory System RAM User RAM System PROM User PROM	2 MByte DRAM 174 KByte SRAM 850 KByte SRAM 512 KByte FlashPROM 512 KByte FlashPROM
Real Time Resolution	Non-volatile 1 sec
Data Buffering Buffer Battery Battery Monitoring Buffer Life	Lithium battery 3 V / 950 mAh Yes min. 4 years
Standard Communication Interface	
User Interface 1 Connection Type Electrical Isolation Baudrate 100 kBit/sec 181 kBit/sec 500 kBit/sec 1000 kBit/sec 2000 kBit/sec	RS485 interface (for remote I/O) 9 Pin D Type connector (F) Yes Expansion Distance max. 1200 m max. 1000 m max. 400 m max. 200 m max. 100 m
User Interface 2 Connection Type Electrical Isolation Max. Baudrate	CAN interface 4 Pin connector block Yes 500 kBit/sec (see chapter 1 "General Information", section "CAN Field Bus")

Module ID	LS251
Controller	
Remote I/O bus	
Access Procedure	Master/Slave principle
Number of Slaves	max. 31 (without repeater)
Intelligent Slaves with CPU possible ?	Yes
Protocol Handling	through own processor
Transfer Time	897 µsec for 64 digital I/O and 16 analog I/O
Topology	physical bus
Coupling to Bus	direct
Transfer Method	twisted pair cable
Terminating Resistance	external
CAN Field Bus	
Multi master capable	Yes
Number of stations	max. 64 (without repeater)
Controller	Controller 82527
Priority	through object identifier
Protocol	from CiA/CAL
Transfer method	4 wire twisted pair cable
Terminating resistance	optional external cable
Interface Expansion	with expansion card LS071 in neighboring slot 1 x CAN 1 x RS232

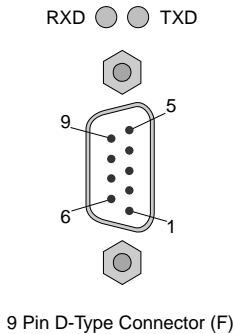
2 Overview of the Components



3 Description of the Components

3.1 RS485, Remote I/O Bus

The cabling of remote I/O networks is explained in chapter 1 "General Information" section "Remote I/O Bus".



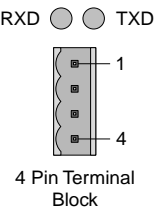
Pin	RS485 Interface, 9 Pin D Type Connector (F)	
1	Shield	Shield connection (casing)
2	-	Reserved
3	DATA	Data
4	CNTRL	Transmit Enable (control wire)
5	GND	Isolated Supply
6	+5 V / 50 mA	Isolated supply (e.g. for Bus connection)
7	-	Reserved
8	DATA\	Data\
9	CNTRL\	Transmit enable\

3.2 CAN Field Bus

A 4 pin terminal block and a 120 Ω bus terminating resistor are included with every delivery.

The resistor must be attached between pins 1 and 3.

The cabling of a CAN field bus is explained in chapter 1 "General Information" section "Can Field Bus".



Connector	CAN Field Bus, 4 Pin Terminal block	
1	CAN_H	CAN High
2	CAN_GND	CAN Ground
3	CAN_L	CAN Low
4	CAN_SHLD	Shield

3.4.3 Changing the Battery

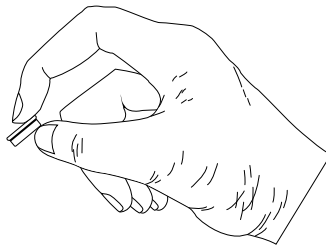
The product design allows the battery to be changed when the PC is turned off (Logic Scanner LS251 is at zero volts) and also when the PC is turned on. Changing the battery under operating voltage is, however, not allowed in many countries.



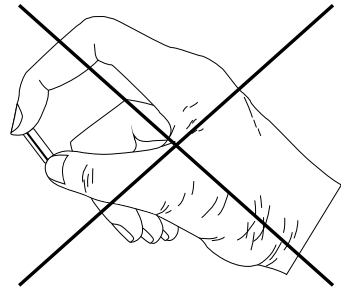
Data stored in the RAM will be lost if the battery is changed while the PC is switched off!

- 1) Touch the mounting rail or ground connection (not the power supply!) in order to discharge any static charge from your body.
- 2) Remove the battery from the holder by pulling the removal strip (don't use uninsulated tools-> risk of short circuit). The battery should not be held by its edges. **Insulated** tweezers may be used for removing the battery.

Right:



Wrong:



- 3) New batteries are to be inserted with proper polarity. The **removal strip ①** should be pulled straight, and the battery inserted with the "+" side facing down ②. The removal strip **must** be left protruding from the upper side of the battery so that it can be changed in the future.

①



②



- 4) Now push the excess part of the removal strip under the battery so that it does not hang loose.



Lithium batteries are considered hazardous waste and should be disposed of accordingly!

4 Memory

The LS251 is equipped with 512 KByte User FlashPROM and 850 KByte User RAM. System modules are provided with 256 KByte FlashPROM. If the FlashPROM memory for the user program is not sufficient for the user program, it can be transferred to the LS251 from the hard disk using the DL tools.

The complete SRAM can be addressed via the PCI Bus.

5 Online Connection

The online connection is made via the PCI bus and the SRAM of the LS251.

A suitable driver is included with PG2000 version >V 2.35. Otherwise, the online connection must be made using the RS232 interface on the LS071 expansion circuit board.

The LS251 can be programmed via CAN like every other B&R CPU. Programming through a CAN network is possible when PG2000 is coupled to a processor using CAN interface. This processor routes to the LS251 via CAN.

6 Operating System

The Logic Scanner LS251 comes with a pre-installed operating system. The operating system can be updated using the PCI bus and the programming system PG2000 >V 2.35.

If the Expansion Card LS071 is being used, upgrades can be made using the RS232 interface together with the older versions of PG2000.

Upgrading the operating system must be carried out in the following way:

- 1) Turn off the power supply to the PC
- 2) Switch both node number dials on the LS251 to position 0
- 3) Turn the power back on
- 4) Establish online connection with the PC
- 5) PG2000 start (no connection will be show in the message window)
- 6) Choose menu point "SYSTEM" - "SERVICE" - "PCCSW UPDATE" (starting with PG-Version 2.30)
- 7) The window **System Download** will be opened
- 8) Set desired baudrate and connection in this window
- 9) Press **"OK"** to start system download



User Flash will be deleted!

Download progress is shown in the status bar.

- 10) When download is 100 % complete, the node number dials must be switched to a position other than 00 and FF
- 11) Turn PC off/on

It is possible that connection to LS251 is not created immediately during operating system download, in which case a red message window may appear.

It is then necessary to repeat the download.

7 Visualization

7.1 DOS Visualization

With DOS visualization, the LS251 Logic Scanner can be accessed through the PCI bus with a NET2000 driver. The NET2000 driver must be programmed separately on the LS251 in the System FlashPROM or in the User FlashPROM.

A NET2000 PCI driver must also be loaded on the visualization device. B&R can provide NET2000 DDK (Driver Development Kit) to create the driver.

Visualization can be coupled to the expansion card using the CAN interface or the RS232 interface. This module can be used with all standard PCC drivers.

7.2 Windows® Visualization

32 Bit operating systems such as Windows® 95 or Windows NT™ offer the possibility to couple the visualization using the new B&R process imaging PVI (Process Visualization Interface). Using the PVI, every visualization device is able to read/write data (internal variables, inputs/outputs or extra modules) from the LS251.

A driver is provided for the PVI that can serve the LS251 over a PCI bus. The driver will be available for delivery from the start of the second quarter of 1998. At present, a PVI can be coupled with a DLL interface (C, C++) or using a DDE interface (e.g. Visual Basic).

Coupling with applications using an OLE interface (Active X) is planned for subsequent expansions.

8. PC Resources

8.1 PCI Bus

The Logic Scanner LS251 is supplied as a PCI bus card. The PCI bus has the following advantages:

- Fast data transfer
- 33 MHz transfer frequency
- 32 Bit data bus size
- Plug & Play

8.2 Plug & Play

Plug & Play technology has made the operation of plug-in cards far easier.

The BIOS identifies the PCI module during the booting procedure and assigns it an address. If a module is added or taken away, the user does not have to make any setting changes.

8.3 Interrupt

The LS251 Logic Scanner reserves an interrupt. It is automatically assigned during the boot procedure by the Plug and Play technology.

8.4 Memory

Logic Scanner LS251 uses the following memory areas:

Memory Size	Memory Area
1 x 16 Byte	Memory area <1 MByte
1 x 4 KByte	Memory area <1 MByte
1 x 1 MByte	Extended Memory (>1 MByte)
1 x 2 MByte	Extended Memory (>1 MByte)

Memory is automatically assigned during the boot procedure.

9 Installation in the PC

9.1 Protection against Electrostatic Discharge

Static discharges can damage the electronics of the Logic Scanner LS251. Please pay attention to the following points to prevent accidental damage:

- Leave the LS251 Logic Scanner in the antistatic packing until you are ready to install it.
- Any static charge must be discharged before you touch the LS251. Before moving the LS251, touch a grounded metal surface e.g. the PC housing.
- Only hold the LS251 by its edges. Do not touch any connectors or components.
- Do not place the LS251 on any metal surfaces.
- Move the LS251 as little as possible to prevent new electrostatic charge from clothes, carpets or furniture.

9.2 Installation of the LS251

- 1) Before beginning installation you must first discharge any electrostatic charge. Before installing the LS251, touch a grounded metal surface such as the PC housing.
- 2) Turn off the computer and all peripheral devices (monitor, printer etc.). Disconnect all connections to peripheral devices including the power supplies.
- 3) Take out the screws and remove the PC housing. This procedure is fully described in the computer manual.
- 4) Locate a free PCI bus expansion slot and remove the slot cover. Screws are necessary to fasten the LS251.
Keep the expansion slot cover safe so it can be replaced if the LS251 is removed. The cover must be in place for the cooling and spark protection of the system to function properly.
- 5) Hold the LS251 by the top edge and push it into the expansion slot.
- 6) Adjust the slots on the mounted side panels to line up with the screw holes on the side panels of the PC. Screw the LS251 in place with the screws removed from the expansion cover.
This step is important because it grounds the LS251.
- 7) Replace all the cables in the PC and stow them away so that they will not be damaged when removing the PC housing cover.
- 8) Replace the PC housing cover and screw it down securely.
- 9) Reconnect all power cables and connections to the periphery devices.