# Hardware Documentation for

# CAN PCI

## User Manual

AUTOMATA
a cannon company

ideas industrially applied

## IDENTIFICATION OF MANUFACTURER

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### ENGINEERING AND MAINTENANCE SERVICE

AUTOMATA is always willing to offer technical and/or methodological support for problems that the customer's staff are not able to solve on their own.

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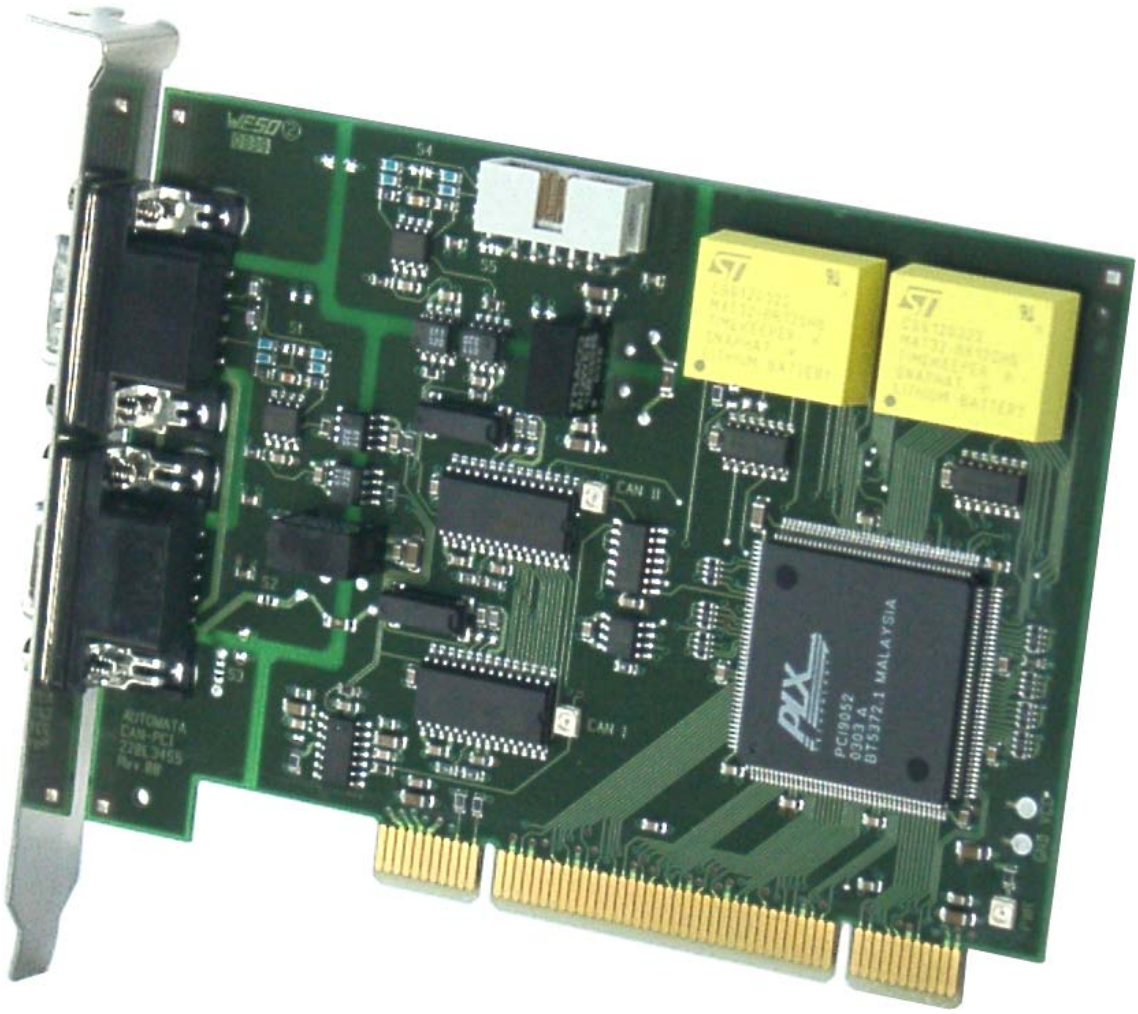
# OVERVIEW




picture: 70062800 - CAN PCI 2NNV

The picture above, shows the CAN card with two CAN interfaces and 32kWord non volatile RAM. Not shown is the Front-Panel of the second interface.

Both, the Front-Panel of the card and the panel of the second CAN are assembled with a male/female D-SUB connector for incoming and outgoing bus. This feature enables the installation of the CAN bus with low cost 'point to point' standard cables.

The galvanic isolation in conjunction with a CAN transceiver, especially developed for rugged industrial environment, makes the card to the best choice for any application.

A special feature of the AUTOMATA CAN card is the non volatile on board RAM (64kByte). This kind of memory can be used to store cyclically machine parameters. In the case of an unintentionally shut down the data of the last store operation is still available. For fast access to the memory it is arranged in 'word order' and linear address space.

# FEATURES

Due to the fact, that not every application has the need for non volatile RAM or a second CAN, we are offering the boards in different variants.

| name | CAN PCI 1N | CAN PCI 2N | CAN PCI 2NNV |
|---|---|---|---|
| part number (for order) | 70034500 | 70062810 | 70062800 |
| number of CAN interfaces | 1 | 2 | 2 |
| Non Volatile RAM (NV-RAM) | no | no | yes |

table: available CAN PCI boards

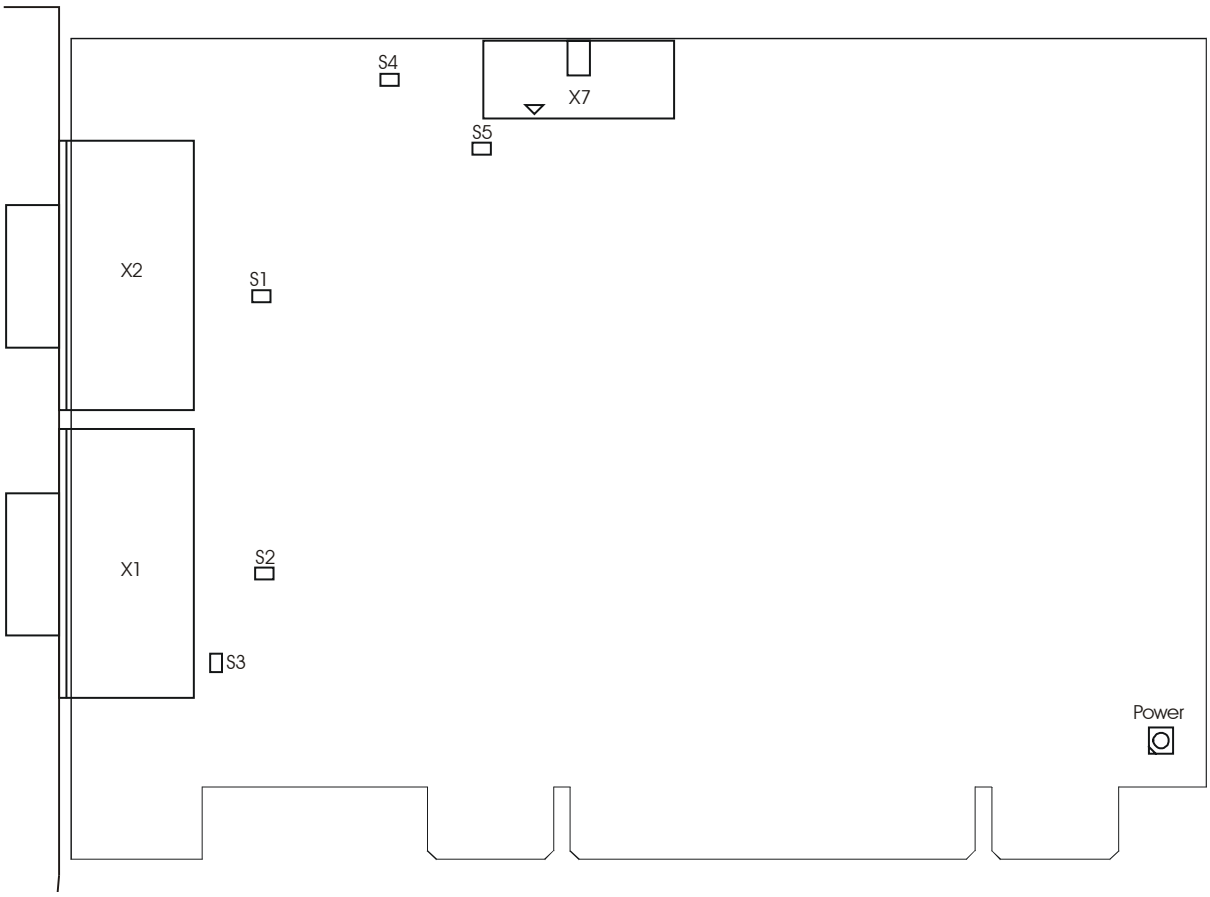
Common features:

- galvanic decoupled high speed CAN access (ISO 11898-2)
- CAN connector pin assignment according to CiA/DS-102 (CiA/DRP-303-1 prepared)
- two connectors for each CAN interface (male, female) for simple wiring
- plug and play BIOS detects base address and interrupt
- on board termination is possible

Non Volatile RAM (NV-RAM) features (only 70062800):

- 32kWord NV-RAM
- battery guarantees more than 10 years data retention
- exchangeable battery extends board life
- word arrangement of RAM leads to fast access

# OPERATING ELEMENTS




picture: 70062800 - CAN PCI 2NNV operating elements

## FRONT PANEL

The connectors X1 and X2 of the Front Panel are used for connecting the CAN bus cable to the CAN PCI card. The CAN bus is connected through from X1 (female) to X2 (male). The pin assignment can be seen in the following table and meets the CiA/DS-102.

| pin | signal |
|---|---|
| 1 | - |
| 2 | CAN low |
| 3 | GND |
| 4 | - |
| 5 | Earth[1] |
| 6 | GND[1] |
| 7 | CAN high |
| 8 | - |
| 9 | - |

table: pin assignment X1, X2

[1] If solder bridge is closed

## CONNECTION FOR SECOND INTERFACE

The second interface uses for the connection to the CAN bus, the same connectors as are used for the first. They are mounted to a extra Front Panel. As a matter of course, the pin assignment of the second interface connectors is the same as for the first. The extra Panel is connected to the CAN PCI board via a flat ribbon cable which fits into X7.

# SOLDER BRIDGE

The CAN PCI cards are delivered with additional features, which are accessible via solder bridges. On delivery, all solder bridges are opened.

| bridge | function |
|---|---|
| S1 | on board termination CAN I [1] |
| S2 | connects board ground CAN I to D-SUB connectors X1 and X2 pin 6 |
| S3 | connects board earth to D-SUB X1 and X2 pin 5 |
| S4 | on board termination CAN II [1] |
| S5 | connects board ground CAN II to D-SUB connectors on extension slot |

table: solder bridge

[1] The CAN bus line has to be terminated at each end with a resistor to suppress reflections (ISO 11898-2). The usage of S2, S3 should be avoided because the bus line loose termination if the CAN PCI cards are moved or removed.

# TECHNICAL SPECIFICATION

## BOARD CHARACTERISTICS

| | CAN PCI 1N<br>70034500 | CAN PCI 2N<br>70062810 | CAN PCI 2NNV<br>70062800 | Units |
|---|---|---|---|---|
| slot count | 1 | 2[1] | 2[1] | - |
| dimension length x height (board) | 130 x 94 | | | mm |
| number of CAN interfaces | 1 | 2 | 2 | - |
| galvanic isolation | yes | | | - |
| Non Volatile RAM (NV-RAM) | - | - | 32760[2] | word |
| data retention of NV-RAM | - | - | >10 | year |
| max. CAN baudrate | 1000 | | | Kbit/s |
| on board CAN termination | possible[3] | | | - |
| operating temperature | 0...50 | | | °C |
| power supply | 5V DC +/- 5% | | | - |
| weight | approx. 100 | | | g |

[1] Additional slot is only used by front panel for second CAN

[2] Last eight words are reserved and can't be used by customer

[3] Solder bridges S1/S4 can be used to terminate the bus line (nom. 120 Ohm)

# ON BOARD ASSIGNMENTS

The used PCI bridge supports four user 'address spaces'. These are used to access the CAN interfaces and the memory. The base address to access the **'local configuration registers'** (LCR) and the base addresses for the address spaces can be read from the registers 0x10...0x24 of the **'PCI configuration registers'** (see PCI specification).

| bridge signal | access via | address range | bus width | function |
|---|---|---|---|---|
| CS0_ | address-space 0 | 0xFF | 8 | register CAN-Controller interface 1 |
| CS1_ | - | - | - | not used |
| CS2_ | address-space 2 | 0xFF | 8 | register CAN-Controller interface 2 |
| CS3_ | address-space 3 | 0xFFF8 | 16 | NV-RAM |
| U0/WAIT0_ | LCR 0x50 | Bit 2 | - | Low => reset CAN-Controller 1 |
| U1/LLOCK0_ | LCR 0x50 | Bit 5 | - | Low => reset CAN-Controller 2 |