Manual

SOHARD
EMBEDDED SYSTEMS

SH ARC-66
ISA ARCNET card with COM90C66

CE

Version 03.00

Inhaltsverzeichnis

1. Introduction

The SH ARC-66 is a 16 bit ARCNET card for computers with an ISA bus. The card is conceived for the use in computers for office communications as well as in industrial computers. Both alternatively available interfaces, coax and TWP, ensure a maximum of flexibility.

By means of the attached software drivers, the card can be integrated into your application fast and at moderate costs.

For the implementation in office communication systems, the standard ARCNET driver of the corresponding operating system can be used.

2. Compatibility

The card is software-compatible to 8 bit ARCNET cards (with COM 90xx). Thus the SH ARC-66 can easily be used as a substitute for an older ARCNET card. Having connected the card, it behaves like its 8 bit predecessor. The card can only be switched into the 16 bit modus (see [1]) by setting a further bit specifically – usually, this is already effected by the 16 bit driver.

By activating the internal termination, the SH ARC-66 behaves like a "star card" (low-impedance bus interface).

3. Ports and Displays

node ID swith

coax port
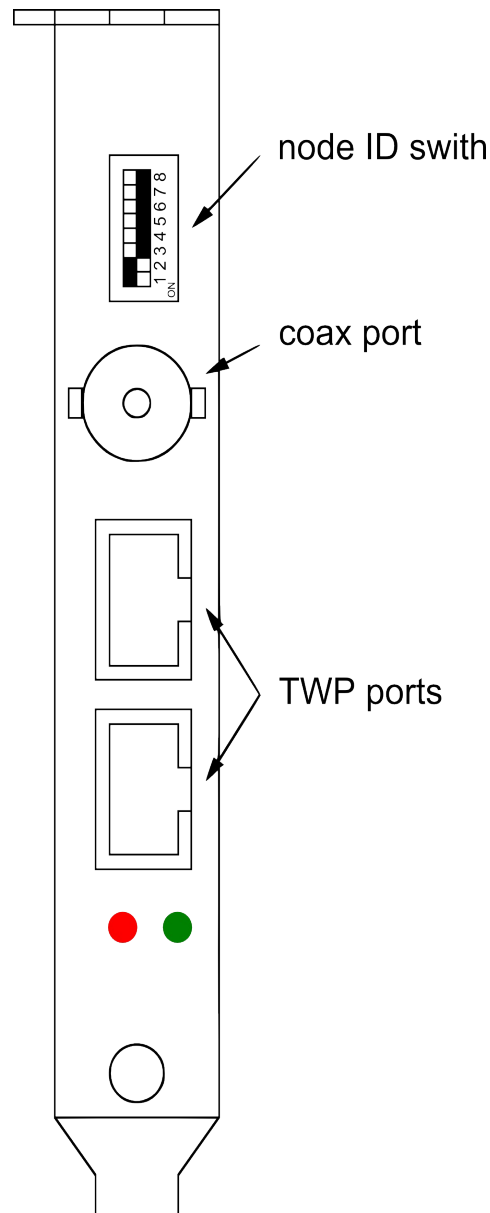
TWP ports

3.1 Coax

Situated at the mounting bracket of the card, the coaxial port is provided by a BNC-socket.

3.2 Twisted Pair

Two RJ45 sockets at the mounting bracket of the card represent it's TWP ports. Both sockets are completely equal. If the card is operated as a bus card, the incoming line must be put into one of the RJ45 sockets and the outgoing line into the other RJ45 socket. Only a RJ45 socket is used in the star operation. The free socket remains free and the card is terminated internally or an external termination (bus termination) is put onto the free socket.

Pin	Bezeichnung
1	n.c.
2	n.c.
3	n.c.
4	Pulse 1
5	Pulse 2
6	n.c.
7	n.c.
8	n.c.

```
 1 2 3 4 5 6 7 8

      RJ45
```
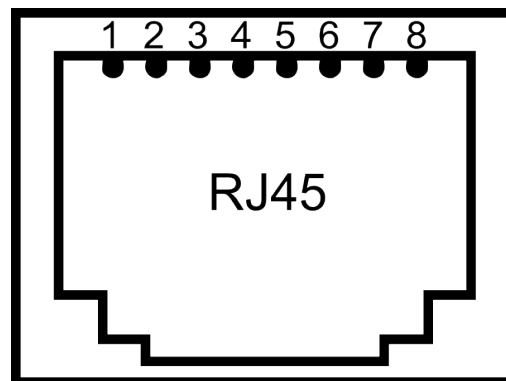
3.3 Node ID

Every ARCNET node within the network needs a 'Node ID', which is assigned once – also called node number or station address. This is adjusted by means of a DIP switch at the mounting bracket of the card.

The Node ID arises (see table) in accordance with the binary coding, being apparent by the position of the eight switches included in the DIP switch S1 (ON=0 / OFF=1).

Node ID	1	2	3	4	5	6	7	8
1	OFF	ON	ON	ON	ON	ON	ON	ON
2	ON	OFF	ON	ON	ON	ON	ON	ON
3	OFF	OFF	ON	ON	ON	ON	ON	ON
4	ON	ON	OFF	ON	ON	ON	ON	ON
5	OFF	ON	OFF	ON	ON	ON	ON	ON
6	ON	OFF	OFF	ON	ON	ON	ON	ON
7	OFF	OFF	OFF	ON	ON	ON	ON	ON
8	ON	ON	ON	OFF	ON	ON	ON	ON
9	OFF	ON	ON	OFF	ON	ON	ON	ON
10	ON	OFF	ON	OFF	ON	ON	ON	ON
11	OFF	OFF	ON	OFF	ON	ON	ON	ON
12	ON	ON	OFF	OFF	ON	ON	ON	ON
13	OFF	ON	OFF	OFF	ON	ON	ON	ON
14	ON	OFF	OFF	OFF	ON	ON	ON	ON
15	OFF	OFF	OFF	OFF	ON	ON	ON	ON
16	ON	ON	ON	ON	OFF	ON	ON	ON
...								
254	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
255	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

The Node ID = 0, which is not permitted, has an additional feature. If all the DIP switches are set to "ON", the Node ID can be adjusted by the software. Therefore, the card does not become active on part of the network unless an initialization was carried out by the software.

3.4 Selection of Interfaces

There are two interfaces on the card which cannot be used simultaneously so that a selection by means of jumpers is necessary. The coax port is selected by setting the jumpers like the ones in the left picture. The TWP port is selected by setting the jumpers like the ones in the right picture.
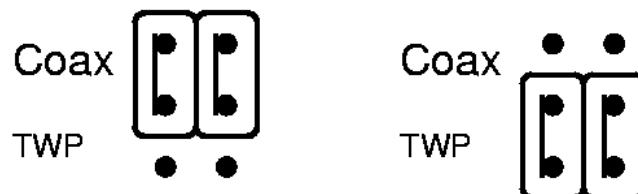
Please also note the various terminations in the following chapter.

3.5 Bus Termination

Every network line must be terminated. If the SH ARC-66 forms the end of a line, it has to be terminated there.

There are two ways of termination:
- externally: here the line termination is attached externally (as BNC terminators).
- Internally: The card offers the possibility of internal termination. The corresponding jumper on the card has to be set as shown below.

We recommend the external termination. In both cases termination has to be carried out according to the characteristic impedance of the cable used (e.g. RG62=93 ohm)

The internal jumper for the termination offers the possibility of terminating with 93 ohm (left picture above) or with 120 ohm (right picture above).

Type of cable	Wellenwiderstand
coax	93 ohm
twisted pair	e.g. 120 ohm

3.6 Red LED

The red LED will be active if the SH ARC-66 is accessed by the ISA bus. These accesses become visible by prolonging the impulse lenght.

Status of the LED	Description
Active	Access to SH ARC-66
Dark	There is no access (chip select) to the SH ARC-66

3.7 Green LED

The green LED indicates activities on the ARCNET bus.

Status of the LED	Description
Active	Network OK (Token revolves)
Flashing (short "blinding out" 1sec)	Network tries to re-configure itself (reconfiguration). However, no other node is found.
Dark	Card does not have any supply voltage or Node ID = 0 and card is not initialized

3.8 I/O Base Address

The I/O base address of the ARCNET controller is set by means of a DIP switch (S2) on the card. Switch position "ON" represents a low level and switch position "OFF" represents a high level on the signal line.

The I/O base address must be still unused in the system.

I/O Base Address	IOS0	IOS1	IOS2
0x260-0x26F	ON	ON	ON
0x290-0x29F	OFF	ON	ON
0x2E0-0x2EF	ON	OFF	ON
0x2F0-0x2FF	OFF	OFF	ON
0x300-0x30F	ON	ON	OFF
0x350-0x35F	OFF	ON	OFF
0x380-0x38F	ON	OFF	OFF
0x3E0-0x3EF	OFF	OFF	OFF

3.9 Memory Address

The Memory address of the ARCNET controller (Dual Ported RAM) is set by means of a DIP switch (S2) on the card. Switch position ON represents a low level and switch position OFF represents a high level on the signal line.

The switch position also defines which memory area the boot ROM superimposes..

The memory areas must be still unused in the system.

MS0	MS1	MS2	MS3	MS4	ARCNET RAM	BOOT ROM
ON	ON	ON	ON	ON	C:0000-C:07FF	C:2000-C:3FFF
OFF	ON	ON	ON	ON	C:0800-C:0FFF	C:2000-C:3FFF
ON	OFF	ON	ON	ON	C:1000:-C:17FF	C:2000-C:3FFF
OFF	OFF	ON	ON	ON	C:1800-C:1FFF	C:2000-C:3FFF
ON	ON	OFF	ON	ON	C:4000-C:47FF	C:6000-C:7FFF
OFF	ON	OFF	ON	ON	C:4800-C:4FFF	C:6000-C:7FFF
ON	OFF	OFF	ON	ON	C:5000-C:57FF	C:6000-C:7FFF
OFF	OFF	OFF	ON	ON	C:5800-C:5FFF	C:6000-C:7FFF
ON	ON	ON	OFF	ON	C:C000-C:C7FF	C:E000-C:FFFF
OFF	ON	ON	OFF	ON	C:C800-C:CFFF	C:E000-C:FFFF
ON	OFF	ON	OFF	ON	C:D000-C:D7FF	C:E000-C:FFFF
OFF	OFF	ON	OFF	ON	C:D800-C:DFFF	C:E000-C:FFFF
ON	ON	OFF	OFF	ON	D:0000-D:07FF	D:2000-D:3FFF
OFF	ON	OFF	OFF	ON	D:0800-D:0FFF	D:2000-D:3FFF
ON	OFF	OFF	OFF	ON	D:1000-D:17FF	D:2000-D:3FFF
OFF	OFF	OFF	OFF	ON	D:1800-D:1FFF	D:2000-D:3FFF
ON	ON	ON	ON	OFF	D:4000-D:47FF	D:6000-D:7FFF
OFF	ON	ON	ON	OFF	D:4800-D:4FFF	D:6000-D:7FFF
ON	OFF	ON	ON	OFF	D:5000-D:5700	D:6000-D:7FFF
OFF	OFF	ON	ON	OFF	D:5800-D:5FFF	D:6000-D:7FFF
ON	ON	OFF	ON	OFF	D:8000-D:87FF	D:A000-D:BFFF
OFF	ON	OFF	ON	OFF	D:8800-D:8FFF	D:A000-D:BFFF
ON	OFF	OFF	ON	OFF	D:9000-D:9700	D:A000-D:BFFF
OFF	OFF	OFF	ON	OFF	D:9800-D:9FFF	D:A000-D:BFFF
ON	ON	ON	OFF	OFF	D:C000-D:C7FF	D:E000-D:FFFF
OFF	ON	ON	OFF	OFF	D:C800-D:CFFF	D:E000-D:FFFF
ON	OFF	ON	OFF	OFF	D:D000-D:D7FF	D:E000-D:FFFF
OFF	OFF	ON	OFF	OFF	D:D800-D:DFFF	D:E000-D:FFFF
ON	ON	OFF	OFF	OFF	E:0000-E:07FF	E:2000-E:3FFF
OFF	ON	OFF	OFF	OFF	E:0800-E:0FFF	E:2000-E:3FFF
ON	OFF	OFF	OFF	OFF	E:1000-E:17FF	E:2000-E:3FFF
OFF	OFF	OFF	OFF	OFF	E:1800-E:1FFF	E:2000-E:3FFF

3.10 Interrupt

The interrupt, which shall be triggered by the card, can be selected with the jumper panels JP1 and JP2.

The selected interrupt must not be occupied within the system and must be assigned to the ISA bus by the motherboard BIOS.

3.11 Boot ROM

The card can be equipped with a boot ROM (socket IC4). Therefore it is possible to boot the computer via the network.

The jumper "ENROM" has to be plugged in. However, we recommend to plug in the jumper even if no boot ROM is used.

The selected memory area of the boot ROM can be taken from the table of chapter 3.8 "memory address."

4. Memory address space

The ARCNET controller superimposes at 16 addresses in the I/O area and occupies 2 kilobytes of the main memory (Memory) (see [1]).

IO-base address +	Read register	Write register
0	STATUS	INTERRUPT MASK
1	DIAG. Status	COMMAND
2	CONFIGURATION	CONFIGURATION
3	I/O SELECT	RESERVED
4	MEMORY SELECT	RESERVED
5	NODE ID	NODE ID
6	RESERVED	RESERVED
7	RESERVED	EXTERNAL REGISTER
8	RESET	RESET
9	RESET	RESET
A	RESET	RESET
B	RESET	RESET
C	DATA LOW	DATA LOW
D	DATA HIGH	DATA HIGH
E	ADDRESS PTR LOW	ADDRESS PTR LOW
F	ADDRESS PTR HIGH	ADDRESS PTR HIGH

5. Factory Settings

The SH ARC-66 is delivered with the following configuration.

Interface	Coax
Internal Termination	Not connected (OFF)
Node ID	3
I/O base address	0x2E0
Memory area	D:0000-D:07FF
Interrupt	10
ENROM	Connected (ON)

6. Technical Data

6.1 General

Compatibility: ANSI/ATA 878.1
Power consumption: < 4W
Operating temperature range: 0°C bis +55°C
Storage temperature range: -20°C bis +85°C
Dimensions without connectors: width 121 mm, height 21 mm,
                                  depth 129 mm
Weight: max. 0.5 kg packed for shipping

6.2 Coax Interface

Datenrate: 2.5Mbps
Input impedance: ≥ 10 kΩ (at f = 5 MHz)
Output voltage: min. 16 Vss with 93Ω termination
Form of output impulse: sine dipulse 200 ns acc. to ANSI/ATA 878.1
Cabling: RG62 with Z=93Ω is recommended
Connection: isolated BNC socket

6.3 TWP Interface

Datenrate: 2.5Mbps
Input impedance: ≥ 10 kΩ (at f = 5 MHz)
Output voltage: min. 16 Vss with 120Ω termination
Form of output impulse: sine dipulse 200 ns acc. to ANSI/ATA 878.1
Cabling: CAT5-Kabel with Z=93Ω is recommended
Connection: RJ45 socket

7. CE Declaration of Conformity

EC Declaration of Conformity

$C \mskip-8mu \in$

EC Declaration of Conformity
in accordance with Annex IV of Directive 2004/108/EC

Name of Supplier: **SOHARD**
                             Embedded Systems GmbH

Address of Supplier: **Wuerzburger Str. 197**
                             D-90766 Fuerth
                             Germany

declares that the present product named

Product name: **SH ARC-66**

meets the requirements of Directive 2004/108/EG of the European
Parliament and of the Council as specified in Annex I of the said
Directive. In accordance with Article 6 of the said Directive this
Declaration is based on the following harmonized Standards

Safety: **EN60950: 1992**
                             + A1: 1993 + A2: 1993
                             + A3: 1995 + A4: 1997

EMC: **EN 55022:1998 + A1:2000 + A2:2003**
                             EN 55024:1998 + A1:2001 + A2:2003
                             EN 61000-6-2:2001

Fuerth, 2009-02-11   _____
                            (Sebastian Schnitzenbaumer, Managing Director)

8. Restriction of Hazardous Substances Directive (RoHS)

The controller COM90C66 is not (as of 2009) available as a ROHS conforming part. SOHARD Embedded Systems assures that all other components, the board and all other materials applied for the production of the SH ARC-66 are ROHS compliant. Thus the COM90C66 has to be disposed of separately.

9. Support

In case of problems when operating the device please be sure to have read the manual before contacting us.

9.1 Contacts

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                        - 566 (Technical support)
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eMail: arcnet@sohard.de

Latest manuals and technical information for this product available at: http://www.sohard.de.

10. Literature

Referenz	Dokument
[1]	Datasheet COM90C66, SMSC (http://www.smsc.com)
[2]	ARCNET Hardware Manual, ARCNET User Group e.V. (http://www.arcnet.de)

11. Warranty

Warranty is granted by SOHARD Embedded Systems according to our General Terms and Conditions.