

Odin TeleSystems Inc.



Installation Guide for BALDER-8, Rev. 1.1

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2. Introduction

Balder-8 is an Integrated Services Digital Network (ISDN) interface card for IBM PC compatible computers. A PC equipped with one or more Balder-8 boards can be connected to ISDN Basic Rate S/T-interfaces. The Balder-8 board contains eight, full duplex, ISDN 2B+D transceivers which comply with the ITU-T ISDN Layer 1 specifications (I.430). It also contains a full implementation of an ISDN digital phone.

The intended usage of the Balder-8 board is in advanced ISDN traffic generator and protocol analyzer applications. It can operate either as a generator on eight ISDN Basic Rate Accesses or as a monitor on four accesses. The switching between the generator and monitor modes can be performed with software. It is recommended that Balder-8 is used in a PC with at least an 80386 processor for single board configurations or an 80486 or faster processor for multiple board configurations.

This document describes how to install the Balder-8 board into a PC, how to connect it to the ISDN S/T interface, and how to connect accessories to the Balder-8 board.

3. How to Contact Us

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4. PC Requirements

It is recommended that Balder-8 is used in a PC which satisfies the following requirements:

- Industry Standard Architecture (ISA) Bus with at least one free 16-bit slot.
- An Intel 80386 processor. A 486, Pentium or Pentium Pro processor is recommended.
- 1 Free IRQ (3 - 15)
- At least 32 Free I/O -addresses

5. Configuring Balder-8

5.1 Handling Instructions

The Balder-8 board has been packaged in a sealed anti-static bag for protection during shipping and handling. Follow precautions regarding handling of electrical equipment while configuring the board and while installing it into a PC expansion slot. ***Be aware of the possibility of damage to the sensitive electrical devices on Balder-8 from static electricity discharge. Please wear anti-static protection devices such as a ground strap connected to a grounded equipment frame while handling the Balder-8 board.*** To configure the board, remove it from the anti-static bag and place it on to a flat and properly grounded anti-static mat.



5.2 General

The Balder-8 board is configured by setting jumpers (JP) and switches (SW) on the board. The locations and names of the jumpers and switches can be found from Figure 1.

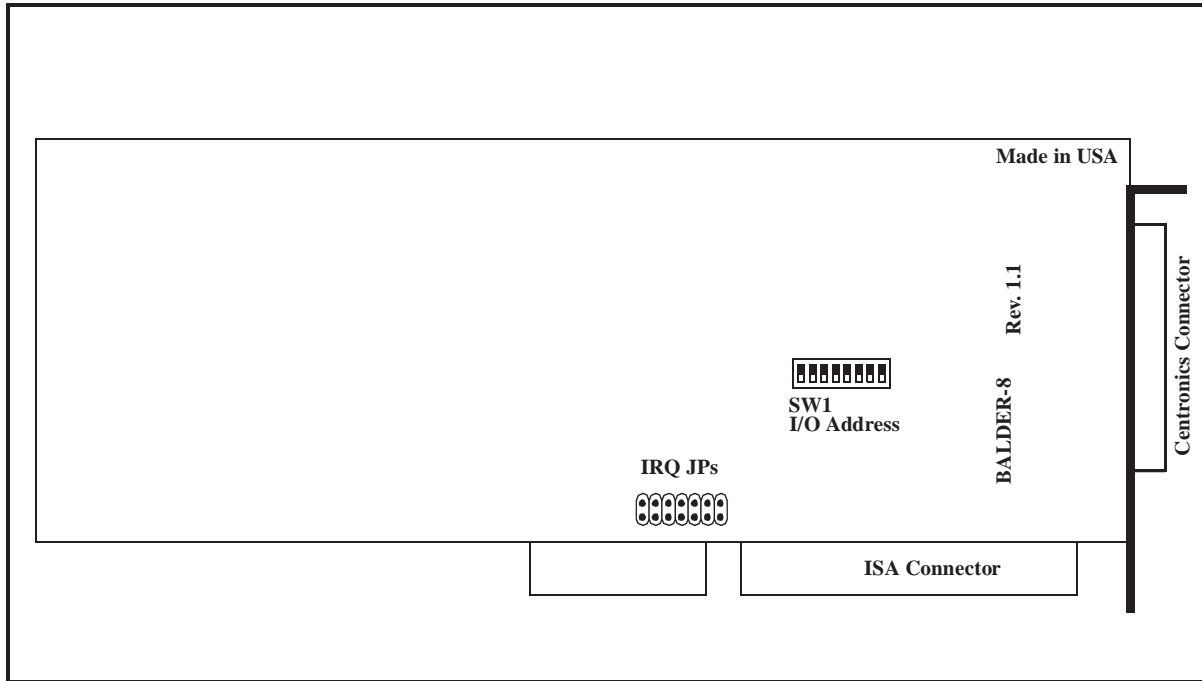


Figure 1. Balder-8 Switches and Jumpers

5.3 Setting the Board Number

More than one Balder-8 boards can be installed in one PC. Each board has to be assigned a unique board number. The board number is set with switches S5-S7 in dip-switch SW1. The possible different board number settings are listed in Table 1.

TABLE 1. Board number settings

Board #	S7	S6	S5
0	On	On	On
1	On	On	Off
2	On	Off	On
3	On	Off	Off

The boards should be numbered sequentially, starting from 0; i.e. if 2 board are used they should be numbered 0 and 1. Three boards should be numbered 0, 1 and 2, and so on.



5.4 Setting the I/O Base Address

Balder-8 requires access to a 32 byte long I/O address space the base address of which can be set to any even 32 byte boundary within the range 0200h - 03FFh. Since different PCs are equipped with different hardware, the address space that should be selected is PC specific. The factory default for the Balder-8 board is I/O base address 0280h; i.e., Balder-8 will use I/O ports 0280h through 029Fh (32 bytes). This needs to be changed if the PC already contains hardware (e.g. LAN adapters, drive controllers, or serial port boards) which use this address area. Consult the documentation for the corresponding hardware to determine what I/O addresses are free for use by the Balder-8 board (see also Table 2, "IO base address settings.," on page 7)

If more than one Balder-8 is installed in one PC, the different boards should be set to the same I/O address. The board number then determines in which 1024 (400h) byte segment the board places its I/O address space. For example, if a board is set to number 3 and I/O address 280h the board will occupy I/O address $(3 * 400h + 280h)$ to $(3 * 400h + 280h + 32)$. There is normally no need to worry about these calculation unless the PC is equipped with boards that use I/O addresses beyond 400h, which is uncommon. In virtually all cases it's sufficient to choose an I/O address that does not conflict with any other boards I/O address and then set each board to have unique board number (Section 5.3 on page 6).

The I/O base address is set with switches S1-S4 in dip-switch SW1, as listed in Table 2.

TABLE 2. IO base address settings.

IO Base Address	S4	S3	S2	S1	Comment
0200H	On	On	On	On	Not recommended ¹
0220H	On	On	On	Off	
0240H	On	On	Off	On	
0260H	On	On	Off	Off	Not recommended ²
0280H	On	Off	On	On	Balder-8 default
02A0H	On	Off	On	Off	
02C0H	On	Off	Off	On	
02E0H	On	Off	Off	Off	Not recommended ³
0300H	Off	On	On	On	Default for most other boards
0320H	Off	On	On	Off	
0340H	Off	On	Off	On	
0360H	Off	On	Off	Off	Not recommended ⁴
0380H	Off	Off	On	On	
03A0H	Off	Off	On	Off	Not recommended ⁵



TABLE 2. IO base address settings.

IO Base Address	S4	S3	S2	S1	Comment
03C0H	Off	Off	Off	On	Not recommended ⁶
03E0H	Off	Off	Off	Off	Not recommended ⁷

1. 02001H: Game control adapter
2. 0278H-02F7H: Second printer port (LPT2)
3. 02F8H-02FFH: Second serial port (COM2)
4. 0378H-037FH: First serial port (COM1)
5. 03B0H-03B7H: Monochrome and printer adapter
6. 03D0H-03DFH: Color/Graphics adapter
7. 03F0H-03F7H: Floppy disk drive adapter card
 03f8H-03FFH: Serial port adapter card.

The footnotes for Table 2 describe some commonly used PC hardware and their I/O port addresses. ***Do not use any of these I/O ports for Balder-8 if you have any of this hardware installed.*** Note that this list is not complete, and your particular PC manufacturer may have used other I/O ports than those mentioned here. Also, note that different boards use different number of I/O address following the base address. The I/O addresses above only indicate the start address of a range of addresses used (e.g. the Balder-8 board uses 32 bytes following the I/O base address). Make sure there are no overlaps, or erratic operation may result.

5.5 Setting IRQ

Balder-8 requires a separate IRQ per board. ***The Balder-8 cannot share IRQs with any other hardware installed in the PC.*** If more than one Balder-8 board is installed in one PC, each board must be configured with a unique IRQ number.

The IRQ is set with jumper JP1. The possible IRQs for Balder-8 are listed in Table 3.:

TABLE 3. IRQs supported by Balder-8.

IRQ	Comment
3	Normally used by COM2 (if installed)
4	Normally used by COM1 (if installed)
5	Normally used by LPT2 (if installed)
6	Normally used by the diskette controller (if installed)
7	Normally used by LPT1 (if installed)
9 (2)	Normally free. Sometimes used by LAN adapters (if installed)
10	Normally free. Balder-8 factory default
11	Normally free



TABLE 3. IRQs supported by Balder-8.

IRQ	Comment
12	Normally free
14	Normally used by the fixed disk controller (if installed)
15	Normally free



6. Connecting Balder-8 to the S/T-Interface

The back panel of Balder-8 contains a connector with 50 contacts. Balder-8 is delivered with a telco-type connector cable and two Harmonica connectors with 12 RJ-11 connectors each. One of the Harmonicas is intended to be used with generator applications and the other with monitor applications.

6.1 RJ-11 Connector

The Balder-8 board is connected to the S/T interface using a RJ-11 connector. The RJ-11 pin-outs for the S/T line interfaces is shown in Figure 2.

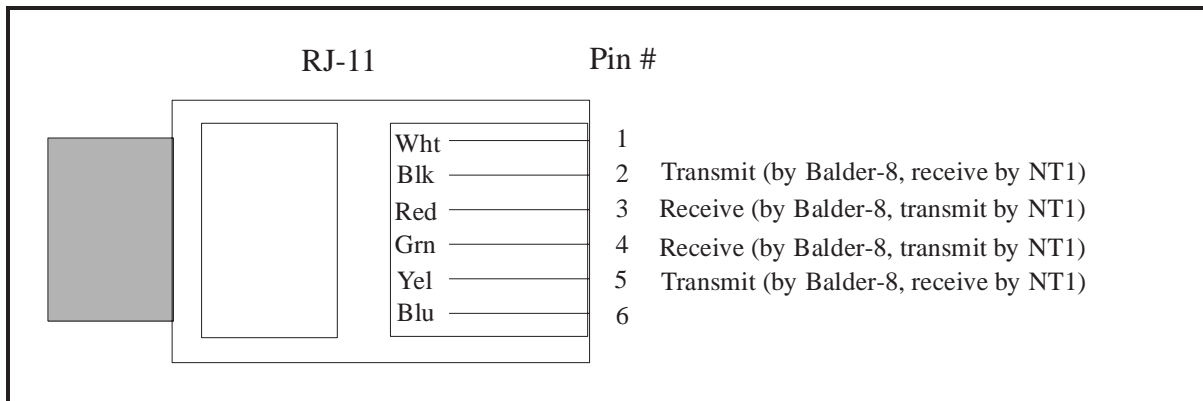


Figure 2. RJ-11 Connector for the ISDN BRI S/T Interface



6.2 Generator Application

When used as a generator, Balder-8 can be used to generate ISDN traffic on 8 separate S/T interfaces. A connection diagram is illustrated in Figure 3.

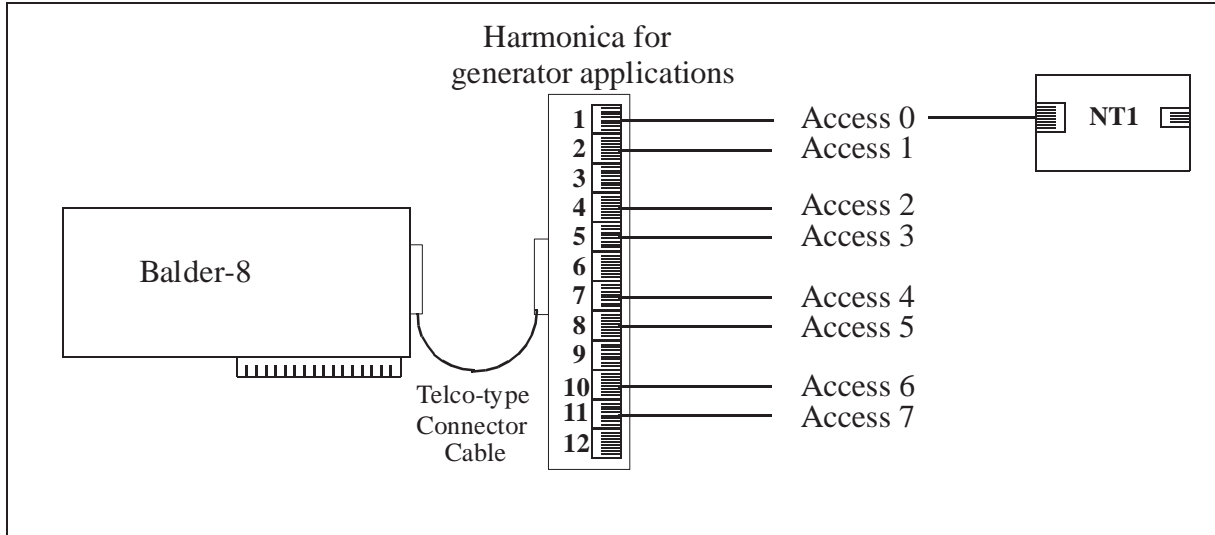


Figure 3. Using Balder-8 in with Generator Applications

The Harmonicas are clearly labeled. The labeling of the generator Harmonica is shown in Figure 4.

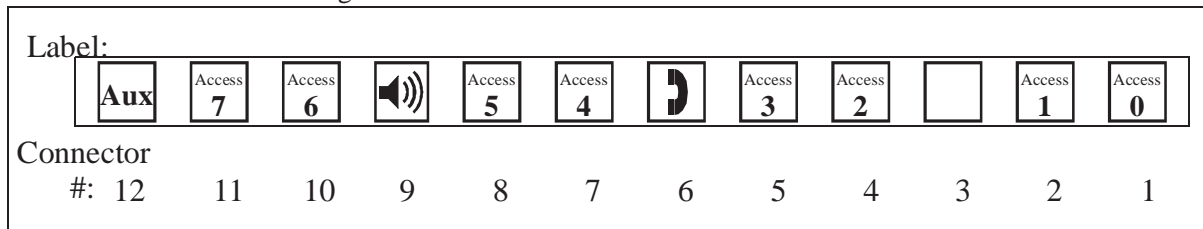


Figure 4. Labeling of the Generator Harmonica

6.3 Monitor Application

When used as a monitor, Balder-8 can be used to monitor ISDN Basic Rate traffic on 4 S/T interfaces. In the Harmonica for monitoring, two adjacent connectors form a T-connector that can be used to gain access to a line. An external T-connector can be used as well. Figure 5 illustrates the two possible ways of connecting Balder-8 when used for monitoring.

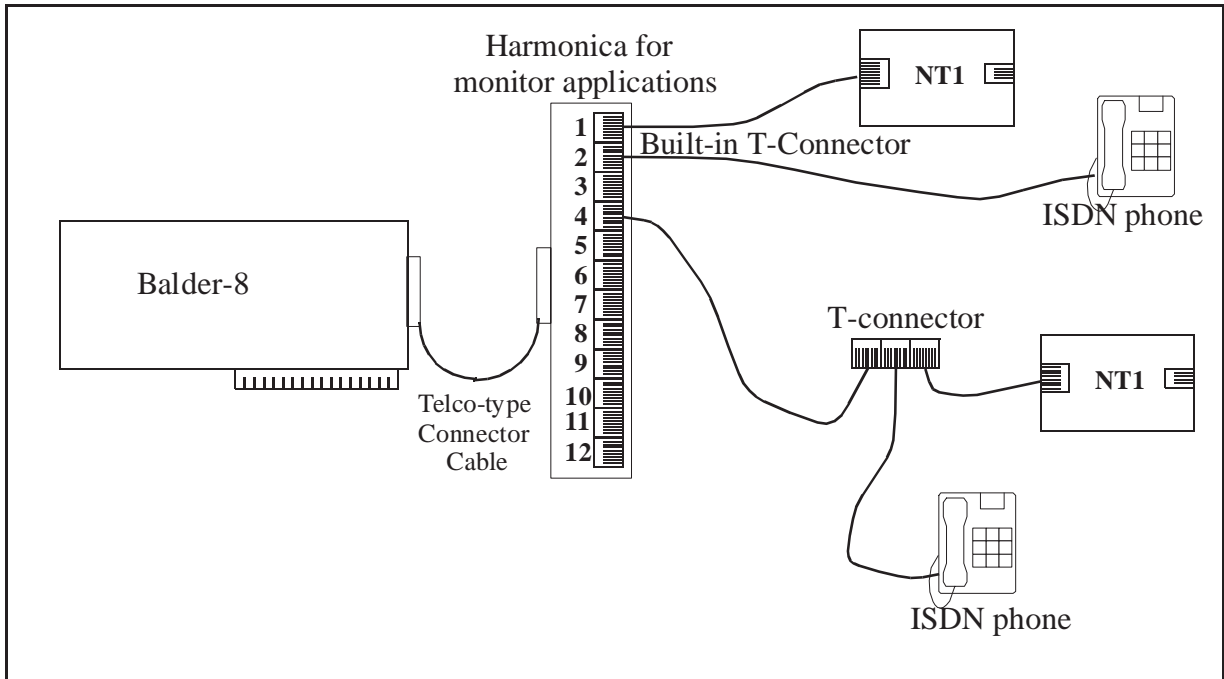


Figure 5. Using Balder-8 with Monitor Applications

The labeling of the generator Harmonica is shown in Figure 6.

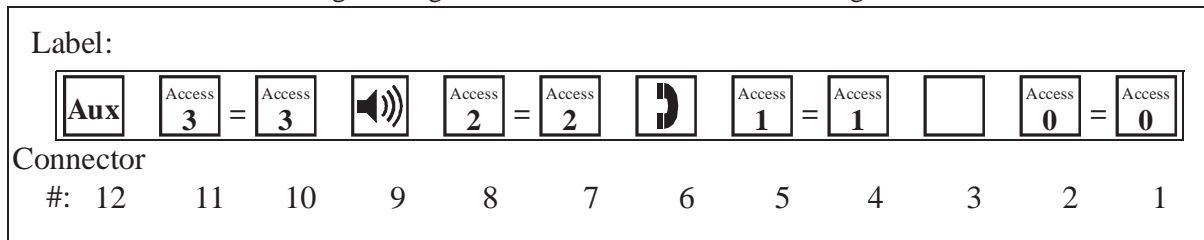


Figure 6. Labels on the Monitor Harmonica



7. Connecting Accessories to Balder-8

Balder-8 provides a full implementation of a digital ISDN phone. The Harmonicas provide needed connectors for the accessories as illustrated in Figure 7.

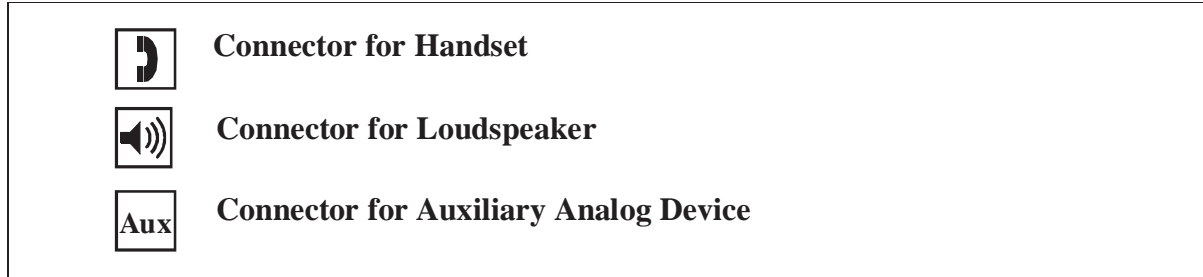


Figure 7. Connectors for Accessories

7.1 Phone Handset

A phone handset can be connected to the connector number 6 in the Harmonica. The handset can then be switched to any B-channel with software. Please note that the handset cable must be equipped with an RJ-11 connector to fit the Harmonica. The connection of telephone handset to the RJ-11 connector is shown in Figure 8.

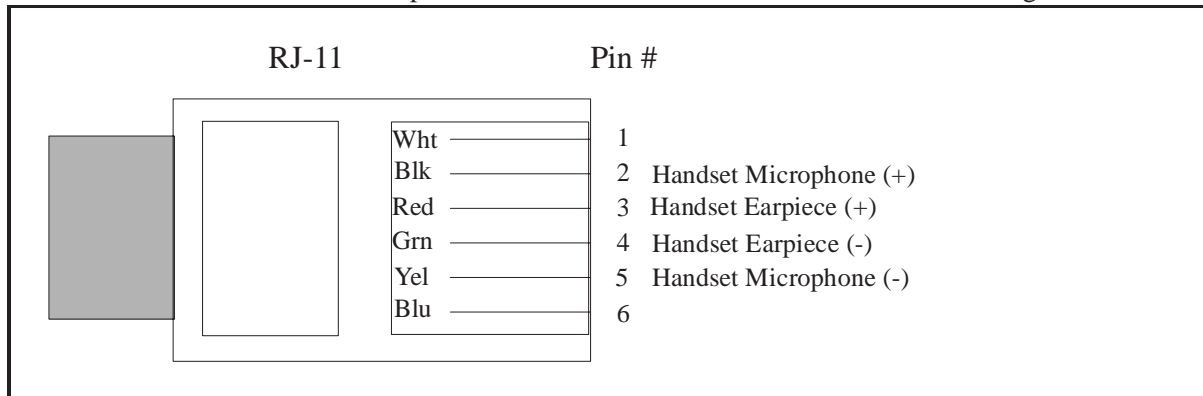


Figure 8. Connection of a handset to RJ-11

A handset accessory package consisting of a handset and a handset cable is available from Odin TeleSystems.

7.2 Speaker

A loudspeaker can be connected to the connector number 9 in the Harmonica. The speaker can then be switched with software to listen to any B-channel. It should be noted that the speaker must be a 200 ohm speaker, and not an often used 8 ohm



speaker. As with the handset, the speaker must be equipped with a RJ-11 connector. The connection of a speaker to a RJ-11 connector is shown in Figure 9.

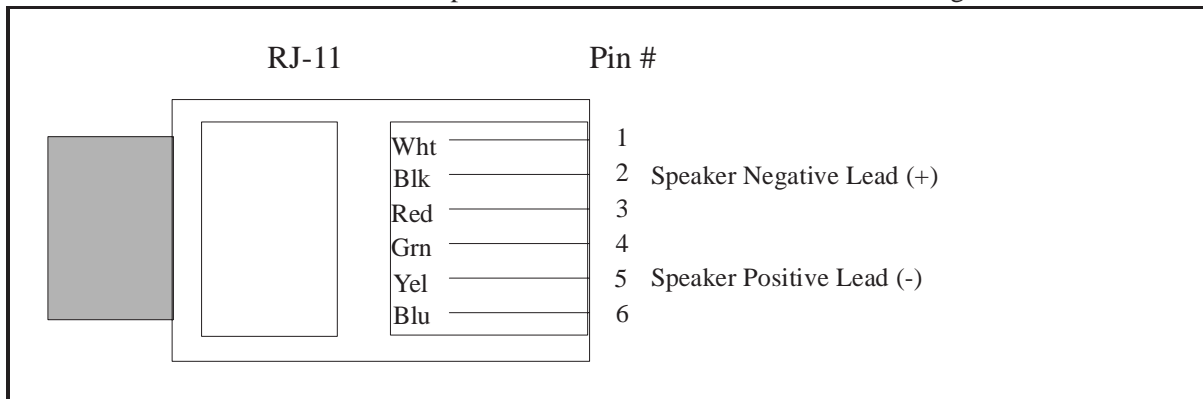


Figure 9. Connection of a speaker to RJ-11

A speaker accessory package consisting of a speaker and a speaker cable is available from Odin TeleSystems.

7.3 Aux

The supported auxiliary device is a piezo-ringer. The piezo-ringer can be connected to the connector number 12 in the Harmonica.

7.4 Terminating Resistors

The Balder-8 board is supplied without terminating resistors installed. The board can, however, be configured to use terminating resistors for the accesses by installing four resistor networks into the empty sockets to the right hand side of the board (labeled



AS1 - AS4 in Figure 10). The resistor networks to be used are supplied with the board.

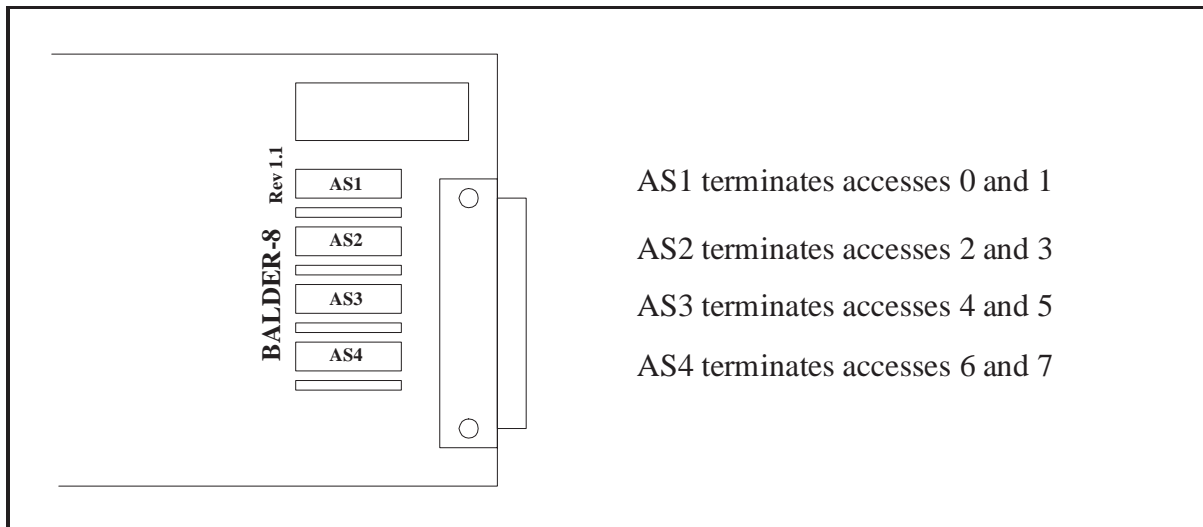


Figure 10. Terminating Resistors on Balder-8

If the Balder-8 board is to be connected to network terminals (NTs) which do *not* use Phantom Power, the sockets can also be equipped with analog switches, which allows switching the terminating resistors on and off with software. The analog switch upgrade package is available from Odin TeleSystems.

Doc. No. 1512-1-HAA-1003-1

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