

AMIGA MULTIFACE – ZORRO II/III EXPANSION BOARD

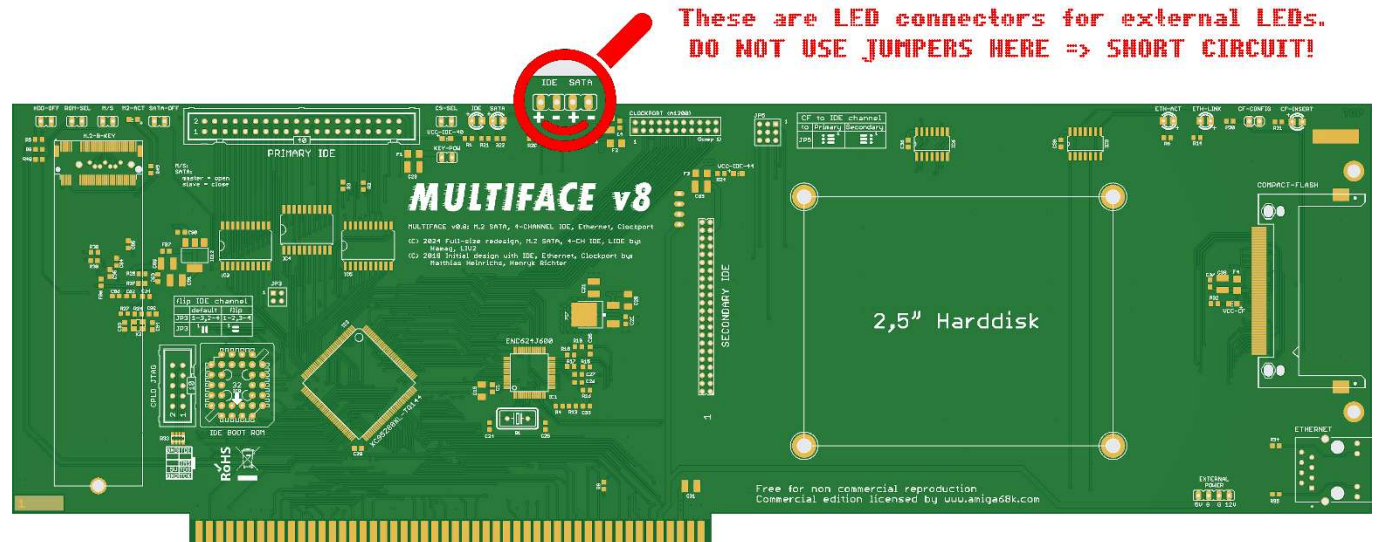
The Multiface expansion card combines various functions and is compatible with all Amiga models that provide Zorro II or III slots. The IDE interface runs on all Amigas in Zorro II mode. The Ethernet interface switches to Zorro III mode on the A3000(T) and A4000(T) and, depending on CPU performance, ensures very high data transfer rates.

Key Features

- 2-channel IDE interface (Primary and Secondary IDE), up to 4 IDE/ATAPI-compatible devices simultaneously
- Optionally, one SATA SSD or M.2 B-Key storage medium can also be operated (not both at the same time)
- Clock port interface for A1200-compatible clock port extensions (USB interface, 16-bit sound card)
- Ethernet/LAN interface (Zorro III mode in A3000(T) and A4000(T))

Layout

A detailed configuration description of the jumper can be found in the “Configuration” section.



IMPORTANT NOTE:

The two pin headers labeled “IDE” and “SATA” (located approximately in the middle of the upper edge, to the right of the two LEDs ‘IDE’ and “SATA”) are only intended for connecting external LEDs, i.e., LEDs that lead to the housing, for example. Do not insert a jumper there under any circumstances!

Information about IDE/ATAPI

The IDE (Integrated Drive Electronics) interface is a standard for connecting storage devices such as hard disks and CD drives to computers. The ATAPI protocol (ATA Packet Interface) extends IDE with the ability to address not only hard disks but also removable media such as CD-ROMs. ATAPI enables this by packaging SCSI commands into the simpler ATA protocol. Together, they form the basis for data exchange with many old and new storage devices.

The master/slave concept allows two devices to be operated on each IDE channel. Older IDE/ATAPI-compatible devices have jumpers that can be used to configure the drive as “master” or “slave.” The master takes primary control of the data channel, while the slave waits to be addressed.

IDE/SATA Interfaces

The Multiface card uses the open source LIDE driver to operate the IDE interface (more on this in the “Acknowledgements” section). The driver is stored in the ROM chip on the expansion card and is integrated into the system when AmigaOS starts up. The boot ROM with the device driver can be updated using Amiga (see section “Driver Update”).

A total of up to 4 IDE/ATAPI-compatible devices can be operated, 2 devices on the “PRIMARY” IDE” and 2 devices on the “SECONDARY” IDE” port, which must then be configured as “master” or “slave” respectively. The usual data transfer speeds range between 1.6 MB/s and 2.6 MB/s.

Here the factory default configuration which leads to the following logical assignment:

M/S (closed), JP3 (default), JP5 (all on the right), all other jumpers open

```
PRIMARY IDE
├─ IDE-40 (Master)
└─ Compact-Flash (Slave)

SECONDARY IDE
├─ IDE-44 (Master)
└─ SATA/M.2 (Slave)
```

See section “Configuration” for detailed information about the options.

Storage Media and Drives

IDE-40: This is the conventional dual-row 40-pin connector at the top of the expansion card. You can connect hard drives and optical drives (CD-ROM, CD-RW, DVD-ROM, DVD-RW, etc.) here. If you set the Compact-Flash interface to the SECONDARY IDE channel using JP5, you can also connect two devices to one cable here.

IDE-44: This is the slightly newer IDE 44-pin connector in the middle of the expansion card. The additional four pins are used for the integrated power supply, especially for 2.5-inch hard drives from laptops and Compact-Flash adapters, eliminating the need for a separate power cable.

Compact-Flash: The Compact-Flash connector is located on the right edge of the card and can be operated from the outside when installed. Please note, however, that the Compact-Flash card must not be removed while the Amiga is running (no hot swapping!). Always switch off the Amiga before removing or inserting the Compact-Flash card.

SATA/M.2 B-Key: On the left front side, it has a socket for an M.2 SSD. On the back, there is a conventional SATA socket at the top of the expansion card. The JM20330 chip on the back is used for translation between parallel and serial ATA communication.

IMPORTANT NOTE:

Only the SATA connection on the back or the M.2 SSD connection on the front of the expansion card may be used. Never connect two devices to both connections at the same time!

If you decide to purchase an M.2 SSD, please note the following features:

- SSD-Type: M.2 SSD (NVMe are **not** supported)
- Interface: SATA-III
- Protocol: AHCI (SATA)
- Form factor: M.2 2280
- Pin-Layout: M-key and B-key must be present (the ones with M-key only are NVMe)



Configuration

Below is a brief description of the jumpers along the top edge of the expansion card:

HDD-OFF: Turns both IDE channels completely on or off:

- Open: Both IDE channels switched on
- Closed: Both IDE channels switched off

ROM-SEL: The LIDE driver has a size of 32kB. However, the built-in EPROM 39SF010A has a higher capacity (128kB). Theoretically, it would therefore be possible to pack several ROM files onto the EPROM and then select an alternative driver with "ROM-SEL" plugged in.

M/S: Defines whether the SATA/M.2 SSD is "master" or "slave":

- Open: SATA/M.2 SSD = Master and IDE-44 = Slave
- Closed: SATA/M.2 SSD = Slave and IDE-44 = Master

SATA-OFF: Disables the SATA/M.2 SSD interface. This allows, for example, the Compact-Flash interface to be connected to the SECONDARY IDE via JP5, enabling two additional devices to be connected to the PRIMARY IDE.

CS-SEL: Certain drives, such as slim CD/DVD drives, do not have their own jumper to configure the device as "master" or "slave." Using this jumper, such drives can be switched to "master/slave" from the outside.

KEY-POW: Activates a +5V power supply on pin 20 of the classic IDE-40 interface. This can be useful, for example, to supply power to certain Compact-Flash cards without having to provide an extra power cable.

CF-CONFIG: This allows the Compact-Flash interface to be defined as "master" or "slave":

- Open: Compact-Flash = Slave
- Closed: Compact-Flash = Master

JP3: This makes the PRIMARY IDE channel the SECONDARY IDE channel and vice versa.

JP5: Defines whether the Compact-Flash interface should be assigned to PRIMARY IDE or SECONDARY IDE:

- All 3 jumpers on the right Compact-Flash interface belongs to the PRIMARY IDE channel
- All 3 jumpers on the left Compact-Flash interface belongs to the SECONDARY IDE channel

The factory default configuration (see section "IDE/SATA Interfaces"):

M/S (closed), JP3 (default), JP5 (all on the right), all other jumpers open

Device Setup

Once the desired drives are connected and the jumpers are configured accordingly, you can begin defining and partitioning the drives. For handling large storage capacities, we strongly recommend the new Amiga OS 3.2 or higher.

Start your Amiga and navigate to the "Tools" folder. Now select the "HDToolbox" icon and right-click to select 'Information' from the menu. Make sure that the LIDE device driver is defined in the "Tooltypes" section:

```
SCSI_DEVICE_NAME=lide.device
```

Save the setting and start "HDToolbox." To define and partition the connected IDE/ATAPI devices, we recommend searching online. CD/DVD drives can be integrated via CD0, CD1: devices in SYS:Devs/ (Unit=0 is Primary/Master, Unit=1 is Primary/Slave, Unit=2 is Secondary/Master, and Unit=3 is Secondary/Slave).

Ethernet Interface

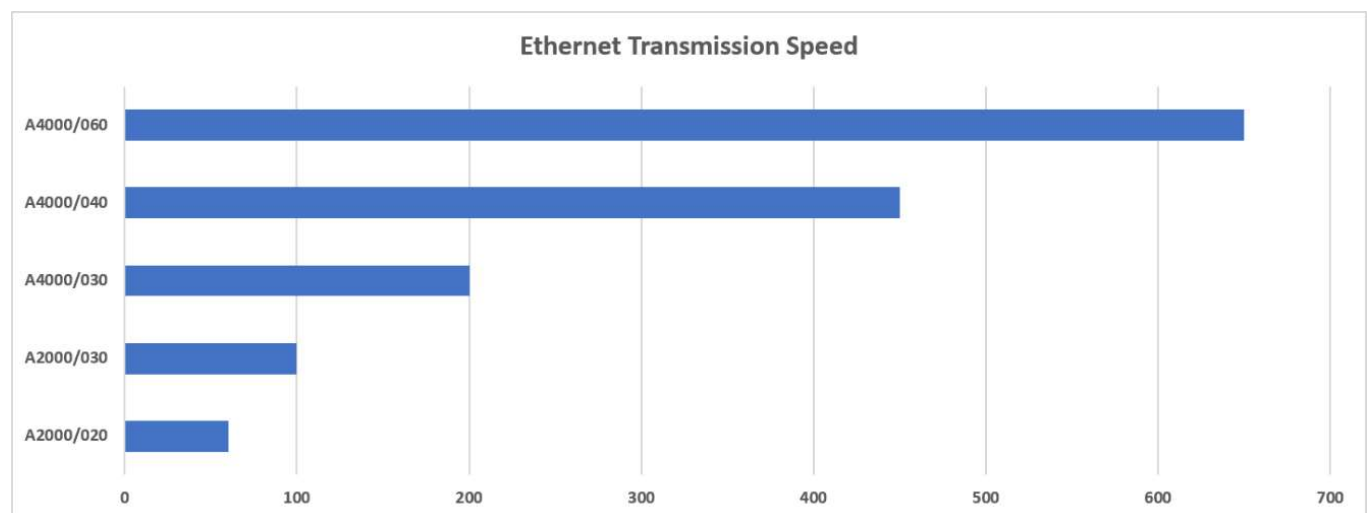
The Multiface card also features a very fast Ethernet interface that allows you to connect your Amiga to a network. Some examples of applications:

- Access to the Local Area Network (LAN) and data exchange with other computers in the network (Linux, Windows, MacOS), e.g. via Server Message Block (SMB) or File Transfer Protocol (FTP) network protocols
- Access the Internet via a browser. To do this, you need TCP/IP stack software (RoadShow, AmiTCP, MiamiDX, Genesis, etc.) and a web browser (iBrowse 2.4 + AmiSSL, Voyager, AWeb, etc.).
- Email client via SimpleMail or YAM
- Remote access via Telnet or SSH

The network driver is located on the supplied floppy disk or can alternatively be downloaded as an ADF file from the web shop. For Amigas with a 68020+ CPU, copy the file "enc629j6net.device" to SYS:Devs/Networks and then install the TCP/IP stack and the desired browser.

If you are running an Amiga with the original 68000 CPU, copy the file "enc629j6net.device_68000" to SYS:Devs/Networks and rename it to "enc629j6net.device". For 68000 CPUs, we recommend RoadShow as the TCP/IP stack.

Processing network data within the TCP/IP stack is a very CPU-intensive task. Therefore, the Ethernet data transfer speeds achieved vary considerably depending on the processor model. With an Amiga 2000 and a 68020 processor, for example, up to 100 kB/s can be expected. An Amiga 4000 with a 68060 processor, on the other hand, can easily achieve over 600 kB/s. When taking measurements, make sure that the server you are downloading from provides the required bandwidth.



Driver Update

The LIDE driver on the EPROM can be updated from the Amiga. No EPROM programmer is required. To do this, download the ADF file of the latest release from <https://github.com/LIV2/lide.device/releases> (e.g., lide-update-40.10.adf) and write the ADF to a floppy disk (e.g., using ADFer from aminet.net) or start the ADF from a Gotek drive. The floppy disk will then automatically boot into the update process.

Acknowledgements

Many thanks to everyone involved and for their tremendous efforts:

- Initial Design (2019): IDE, Ethernet, Clockport: Matthias (matze@alk.org) and Henryk (buggs@alk.org)
- Extended Design (2024): Full-length Zorro Board Re-Design, SATA/M.2 SSD, 2-Kanal IDE, Compact-Flash: Sven (hamag@alk.org)
- LIDE Driver Development: LIV2 on Github -> <https://github.com/LIV2/lide.device>

Troubleshooting

A.) If only devices from the PRIMARY/ or SECONDARY/ channel appear on the Workbench

- Did you configure all devices correctly? Each IDE channel can take 1x Master and 1x SLAVE IDE device.
- Did you set "Automount" in HDToolbox for all devices?
- Try to swap the channels by setting the two jumpers JP3 (from vertical to horizontal or vice versa).

B.) Compact-Flash Card does not show up in Workbench or second device on the same channel makes troubles

- Please remember to always use the following properties for Compact-Flash cards in HDToolbox:

Mask: 0x7FFFFFFE
Max-Transfer: 0x1FE00

C.) Check the +5V rail on the board with a multimeter. Is the +5V below 4.85V, attach a floppy power cable from the PSU to one of the floppy power connectors on the Multiface board to raise the voltage externally.