



Microtronix
Access 1000 & 4000
Serial - TCP Converter
Sync – TCP/UDP Server
Quick Start Guide 1.1.2



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1 Overview

The Microtronix **Access Serial/TCP Converter** provides conversion between asynchronous interfaces over TCP/IP sockets, and synchronous interfaces over TCP/IP or UDP/IP sockets.

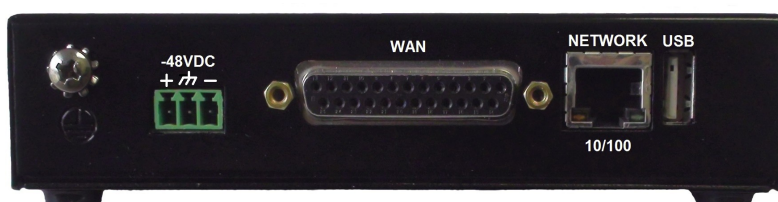
A web interface allows for configuration and monitoring from any Internet browser, and telnet/SSH servers allow for connecting to the command line interface for additional management.

1.1 Access Serial-TCP/IP Converter models

The following table shows the available interfaces and connector type of each Access model.

Model	RJ45 Ethernet	DB25F WAN	USB host port	DB9M Serial ports	Power connector
1000-N00	1	1	1	0	-48VDC
4002-N00	1	2	1	0	-48VDC
4002-N00-RM	1	2	1 (internal)	0	-48VDC
4002-N40-RM	1	2	0	4	-48VDC

The following pictures of the rear plate of each model illustrate the interfaces and connectors.



Model 1000-N00



Model 4002-N00



Model 4002-N40-RM

The model name and serial number are printed on the label located on the bottom of the unit.

The following sections describe the each attributes and function of each interface type.

1.2 WAN interface

WAN interfaces support RS232/V.24 with speeds up to 128 Kbps, and V.35, X.21, RS530, RS449/V.36 interface types with speeds up to 10 Mbps, in a standard DB25F DCE connector. The WAN interface may be used for:

- Synchronous Server
- Terminal Server

The 1000 model has one WAN interface that doubles as the boot console, and the 4002 model has two WAN interfaces with one that doubles as the Console port. See the notes under *Console interface* below.

1.3 Console interface

The Console/WAN port may be used for:

- Synchronous Server
- Terminal Server
- System console port for configuration and monitoring

In addition, the Console port serves as the console for the boot program and operates in RS232 asynchronous mode during boot up. The boot command line interface may be invoked for system management and emergency IP address recovery by entering a password during a 10 second interval after power up.

The 4002 model has a DB25F Console/WAN interface that supports all interface types.

1.4 Network (Ethernet) interface

The RJ45 NETWORK interface is 10/100 Ethernet with full auto-detection, supporting a rich set of standard IP protocols.

1.5 USB interface

The USB 1.1 type A host port supports additional serial interface or storage devices:

- USB serial adapters (FTDI chipset only) for up to 8 additional Terminal Server interfaces
- USB flash drive for storing and moving files

2 Package Check List

Check that the Access model received matches the order by comparing to the model number printed on the label on the bottom of the unit.

Check that the package shipped contains the following items.

- Access unit as above
- AC adapter with AC power cord or - 48VDC power cord
- DB9F-DB25M Console Cable
- RJ45 Ethernet patch cable (blue)
- DB25MF straight through RS232 WAN cable

The following optional items are available through special order, and may be included:

- Additional WAN or serial cable(s) – refer to the Cables section for part numbers
- USB serial adapter unit: 1, 2, 4, or 8 ports
- USB flash drive
- Rack mount kit

3 Quick Start Guide

Configuration of the Access will require a PC or laptop with any standard Internet browser like Internet Explorer or Mozilla Firefox. Optionally, a serial COM port (or USB serial adapter) on the PC with a terminal emulator application may be used to connect to the Console/WAN interface.

3.1 Installation

- 1) The Access may be placed on a shelf in a rack, or mounted using a rack mount kit.
- 2) Connect to the IP network through the RJ45 10/100 Network port.
- 3) Optional: Connect the Console/WAN port to the PC using the Console Cable. Refer to the "Console/WAN Port" section below for instructions.
- 4) Connect DC power adapter and AC power cord, or attach the -48VDC power cord
- 5) Wait 20 seconds for the boot process to complete. The RUN led will start to blink.

3.2 Console/WAN Port

The Console/WAN port offers system control access during the boot-up process. Boot messages will be displayed if a PC COM port is connected using the Console Cable, and a terminal emulator like "putty" or "HyperTerminal" is set for 9600-N-8-1.

3.2.1 U-Boot Command Access

After power up, there is a 10 second delay that allows U-Boot command access:

```
Autoboot in 10 seconds (Enter password to stop)...
```

if the password "foad" is typed while the message is displayed, the U-Boot prompt "A4K:>" will indicate command readiness.

3.2.2 Setting Default IP Parameters

The default IP network parameters may be modified or added here as an alternative to the configuration via the web interface. Enter the following commands to change the default IP address, netmask, default gateway (if needed), and optionally a new system "hostname"

```
set ipaddr 10.1.1.240
set netmask 255.255.255.0
set gatewayip 10.1.1.1
set hostname MYNAME
save
boot
```

These defaults will remain in effect until again changed again in U-Boot, or explicitly changed via the **Ethernet** configuration page in the web interface.

3.2.3 Emergency IP Address Recovery

The u-boot console may be used to recover a forgotten IP address. While in the U-Boot console, the default IP address and other parameters may be displayed:

```
print ipaddr
print netmask
print gatewayip
```

If the default values are not in current effect, they may override the system-defined values temporarily by setting new default values (if desired) and entering the U-Boot commands:

```
set ipaddr 10.1.1.240
set netmask 255.255.255.0
set gatewayip 10.1.1.1
set runlevel 2
save
boot
```

When the system starts up, it will be using the default IP address information, and should be reachable on that network. Browse into the web interface and access the Ethernet page to view the “forgotten” values. Restart the system to get the U-Boot console, and reset run level:

```
set runlevel
save
boot
```

The system will restart with the system-defined values.

3.2.4 System Maintenance

The u-boot console may also be used in conjunction with Microtronix support for applying firmware updates, and emergency IP address recovery.

To apply firmware updates:

- 1) Obtain one or both of the kernel image (ulmage) and filesystem image (jffs2.img) files from Microtronix
- 2) Start a tftpd server on the PC or an available file server
- 3) Place the file(s) in the tftpd default directory on the PC or server
- 4) Enter the PC or server IP address (example 10.1.1.200) using the u-boot commands:

```
set serverip 10.1.1.200
save
```

- 5) Load the new kernel image:

```
run updatekernel
```

- 6) Load the new filesystem image:

```
run updatejffs2
```

- 7) Start the system by re-applying power or typing the “boot” command.

3.3 Configuration Web Interface

The default IP address of the Access is **10.1.1.240**. The PC used to access the web interface must be configured (temporarily) for an address in the same subnet, for example, 10.1.1.200. Connect the PC to the same LAN, or connect directly to the Access.

Open the web browser on the PC, and enter <http://10.1.1.240> in the URL field. When prompted by a popup window, login using default user name: **admin**, and password: **admin**.

The home page will be displayed with the main menu down the left hand side. The Access can now be configured by selecting the main menu items. Each page has a [Help](#) button in the upper right corner for viewing additional information specific to the current page.



3.4 IP Network Configuration

To create or modify the IP network parameters different than the default values defined in U-Boot , obtain the new IP address, network mask, and default gateway values. Follow this procedure only if you don't want the default values to be used in the running system.

From the main menu **System Configuration** section, select **Network** to display the configuration form.

[Help](#)

Network Settings

General Configuration

Hostname:

DNS Servers: . . .

. . .

Search Domain:

Ethernet Interface Configuration

Interface name:

Action: ☒ Update ☐ Delete

IP Assignment: ☒ Static ☐ DHCP

IP address: . . .

Netmask: . . .

Gateway: . . .

Click on **Help** for instructions on VLAN and secondary IP configurations.

Click to apply new settings: Apply

Ethernet Interfaces							
Interface	Configuration	Address	Netmask	Broadcast	Gateway	Status	Select
eth0	default	10.1.1.240	255.255.255.0	10.1.1.255	0.0.0.0	Up	<input type="radio"/>

- 1) Click on the Select button in the Ethernet Interfaces table corresponding to "eth0".
- 2) Enter the new IP address and network mask.
- 3) Enter the new Default Gateway IP address, if needed.
- 4) Click the **Apply** button for the changes to be saved and to take affect.

Connect the Network port to the new network, if not already. Since the IP connection may be lost due to the change, the new address may need to be entered in the browser. The Network configuration page displays the current status of the Ethernet interface.

For more information on additional network configuration, click the [Help](#) button on the page.

3.4.1 Verifying IP Network

Use ping from another station on the IP network to verify the Access is reachable. Sometimes ARP cache tables are obsolete and need refreshing after an IP change.

The LAN led on the front panel or rear RJ45 connector led will blink when there is activity on the Ethernet port.

If the PC used for configuration is still able to reach the Access, use telnet or ssh to connect to the command line interface. If the unit has been pre-configured for console access on the Console port, you may use a terminal emulator to connect a PC COM port to the console using 9600-N-8-1. Login using user name “root” and password “f0adA” (0=zero).

Enter the command “ifconfig eth0” to view the status and statistics of the Ethernet interface.

Use ping to test the connection to the default gateway or another station on the IP network. Enter the command “ping a.b.c.d”, where a.b.c.d is the IP address in dotted notation.

To test the connectivity to a remote IP host that will be connecting to or receiving connections from the Access, use ping to verify reachability.

3.4.2 Monitoring IP Network

Sometimes tracing on the IP interface may be necessary to determine a problem. The standard tcpdump utility is provided for this purpose. To run the tcpdump utility, make a telnet connection from a PC to connect to the Access command line interface. Respond to the login request with the default username “root” and password “f0adA” (0=zero). At the “#” prompt, enter the “tcpdump” command. It can be entered with a number of command line options. Use the “-h” option to see a list of all available options. The normal syntax is:

```
tcpdump -i INTERFACE -w OUTPUT_FILE EXPRESSION
```

To stop tcpdump, type control-C (Ctrl+C). The file can be copied to a PC using FTP or SFTP for display and analysis using Wireshark (Ethereal). File transfer programs like FileZilla or WinSCP may be used to retrieve the file.

For example, to monitor TCP port 102 on the Ethernet interface, and record the output into a file:

```
tcpdump -i eth0 -w /tmp/tcpdump.pcap tcp port 102
```

The other possible interface is the loopback interface sometimes used for internal connections:

```
-i lo
```

For extended monitoring, the output file may also be written to a USB-mounted flash drive (formatted VFAT-32) by using the path:

```
-w /mnt/usb1/tcpdump.pcap
```

When the file is completed, the drive may be removed safely by entering the command:

```
umount /mnt/usb1/
```

Other expressions may be used like a remote IP address:

```
ip host 10.1.1.24
```

Care must be taken to **NOT** use an expression that would monitor the initiating telnet session.

3.5 Synchronous Server Configuration

WAN interfaces may be configured for raw synchronous HDLC operation by configuring it as a Synchronous Server. Ensure that the Terminal server or X.25 Gateway operation is disabled for the selected port by de-selecting the **Enabled** button on the **Serial-TCP** or **HDLC Physical Layer** page.

To configure a port for synchronous service, select **HDLC -TCP/UDP** from the main menu **Synchronous Server** section to display the configuration form.

Help

Synchronous Server Settings

Local interface name: WAN 0 (hdlc0) ▼

Enabled: ☒

Synchronous HDLC Settings

Interface type: RS232/V.24 ▼

Clock source: Internal ▼

Clock rate: 64000 {1200..128000} bits/second

Parity: CRC-16 ▼

Encoding: NRZ ▼

DTR detection: ☒

UI framing: No ▼

Network Settings

Frame data encapsulation: RAW ▼

Protocol: TCP ▼

Port number: 4000

Remote IP address: 0.0.0.0 (Set to 0.0.0.0 to post a listen)

Binding IP address: 0.0.0.0 (Bind the listen port to a local interface)

TCP keepalive: ☐

Start / Restart Synchronous Server ☒

Click to save and/or apply changes: Apply

3.5.1 Synchronous HDLC Settings

- 1) Select the **Local interface name** from the drop-down list.
- 2) Configure the settings to match the attached device.
- 3) If the device asserts a DTR signal, select **DTR detection**. This also controls TCP connectivity.

- 4) Click the **Enabled** checkbox.

3.5.2 Network Settings

- 5) Select the Encapsulation method from the drop-down list. RAW does not preserve frame boundaries across a TCP/IP interface. MBIT and RFC1006 will preserve frame boundaries when transmitting over a TCP/IP interface.
- 6) Select the protocol, TCP or UDP, to create an IP socket.
- 6) Select the port number on which a listen is posted for remote clients, or to which a connection is to be initiated towards a remote server.
- 7) Enter the remote IP address to which the connection will be made, or enter 0.0.0.0 for a TCP listen to be posted.

3.5.3 Update and Start the Server

- 8) Check the **Start / Restart Synchronous Server** box for changes to become active.
- 9) Click the **Apply** button to save changes and (re)start the server if requested.

For additional information, click the [Help](#) button on the page.

3.5.4 Verify Synchronous Server Connection

Click on the **Status** and **Control & Log** items in the **Synchronous Server** main menu section. Refer to the [Help](#) pages for details.

3.5.5 Synchronous Interface Monitor

Sometimes tracing a synchronous interface may be necessary to determine a problem. To run the monitor, make a telnet connection from a PC to connect to the Access command line interface. Respond to the login request with the default username "root" and password "f0adA" (0=zero). At the "#" prompt, enter the command:

```
hdlctrace -a hdlc0
```

Assuming that the correct cable is properly connected, and there is no transmitted data (out), then there must be a configuration problem.

If there is transmitted data but no received data (in), then there is likely a problem with the HDLC clock configuration. Only one side of the interface can be configured to source the clock, and the other side must be configured to receive it. Chances are that the transmitter of the attached device is not receiving a clock signal.

If there is both transmitted and received data but there is still a problem, then the data itself needs to be analyzed.

Analysis beyond this is out of scope for this document. The displayed data may be captured and forwarded to Microtronix Support for analysis.

3.6 Terminal Server Configuration

The WAN interface and USB serial ports may be configured for asynchronous serial operation by configuring them as a terminal server interface. Ensure that Synchronous Server or X.25 Gateway operation is disabled for the selected interface by de-selecting the **Enabled** button on the **HDLC-TCP** or **HDLC Physical Layer** page.

To configure an interface for terminal service, select **Serial-TCP** from the main menu **Terminal Server** section to display the configuration form.

Help

Local interface name: WAN 0 (ttyS0) ▼

Enabled: ☒

Asynchronous Serial Settings

Baud Rate: 9600 ▼

Data Bits: 8 ▼

Parity: None ▼

Input Parity Error: Ignore ▼

Stop Bits: 1 ▼

Flow Control: None ▼

DTR/CD Detection: ☒

Conversion Settings

Conversion Type: RAW ▼

Network Settings

TCP Port: 4000

Remote IP Address: 0.0.0.0 (Set to 0.0.0.0 to post a listen)

Binding IP Address: 0.0.0.0 (Bind the listen port to a local interface)

TCP Keepalive: ☒

Authentication Required: ☒

Start / Restart Terminal Server ☒

Click to apply Terminal Server settings: Apply

3.6.1 Asynchronous Serial Settings

- 1) Select the **Local interface name** from the drop-down list.
- 2) Configure the settings to match the attached device.

- 3) If the device asserts a DTR or CD signal, select **DTR/CD detection**. This also controls TCP connectivity.
- 4) Click the **Enabled** checkbox.

3.6.2 Conversion Settings

- 5) Select the mode of operation from the drop-down list. RAW treats data as a byte stream. LINE does special line handling for data from TCP to the serial interface. IAC-ESC ensures data transparency when connecting to remote Telnet sessions.

3.6.3 Network Settings

- 6) Select the TCP port on which a listen is posted for remote clients, or to which a connection is to be initiated towards a remote server.
- 7) Enter the remote IP address to which the connection will be made, or enter 0.0.0.0 for a listen to be posted.
- 8) Optional: Enter the IP address of the local interface on which the listen TCP port is to be bound. For internal connections, 127.0.0.1.
- 9) Check the **Authentication Required** box if the remote client must login.

3.6.4 Update and Start the Server

- 9) Check the **Start / Restart Terminal Server** box for changes to become active.
- 10) Click the **Apply** button to save changes and (re)start the server if requested.

For additional information, click the [Help](#) button on the page.

3.6.5 Verify Terminal Server Connection

Click on the **Status** and **Control & Log** items in the **Terminal Server** main menu section. Refer to the [Help](#) pages for details.

4 Cables

4.1 Synchronous Cables – WAN interface

When configured for sync, the DB25F WAN ports have an RS530 DCE pin configuration (compatible with ISO 2110). RS232 is a subset of RS530, so a WAN port has a standard RS232 pin assignment when configured for RS232 (V.24).

4.1.1 Connecting to a DCE device

The following cables are used when connecting to DCE device (like a modem) with a female connector that is supplying clocking on the DCE transmit and receive clock pins.

Crossover cable part numbers	
W4025-V24-DTE	DB25M-DB25M RS232 /V.24 crossover cable
W4025-V35-DTE	DB25M-M34M V.35 crossover cable
W4025-X21-DTE	DB25M-DB15M X.21 crossover cable
W4025-RS449-DTE	DB25M-DB37M RS449/V.36 crossover cable
W4025-RS530-DTE	DB25M-DB25M RS530 crossover cable

4.1.2 Connecting to a DTE device

The following cables are used when connecting to DTE device with a male connector that expects to receive clocking on the DCE transmit and receive clock pins. If replacing a modem, avoid any modem handshake issues by configuring the device's interface for "leased line" or "permanent modem" type connection.

Straight through cable part numbers	
811-SC6MF	DB25MF RS232/V.24 straight through cable
W4025-V35-DCE	DB25M-M34F V.35 straight through cable
W4025-X21-DCE	DB25M-DB15F X.21 straight through cable
W4025-RS449-DCE	DB25M-DB37F RS449/V.36 straight through cable
W4025-RS530-DCE	DB25M-DB25F RS530 straight through cable

4.2 Async Cables – WAN interface

When configured for asynchronous serial, the DB25F WAN interface has a standard RS232 DCE pin configuration.

4.2.1 Connecting to a DCE device

Standard null modem cables are used when connecting to a serial DCE device (like a modem) that has a DB25 or DB9 female connector.

Null modem cable part numbers	
W4025-V24-DTE	DB25MM - WAN interface to DB25F
W4009-V24-DTE-S	DB25M-DB9M - WAN interface to DB9F

4.2.2 Connecting to a DTE device

Standard straight-through cables are used when connecting to a serial DTE device (like a PC COM port) that has a DB25 or DB9 male connector. If replacing a modem, avoid any modem handshake issues by configuring the device's interface for “leased line” or “permanent modem” type connection.

Straight through cable part numbers	
811-SC6MF	DB25MF - WAN interface to DB25M
[284-MC1MF	DB9F-DB25M - WAN interface to DB9M

4.3 Async Cables – Serial USB ports

When a USB serial adapter is connected, the connector has a standard DB9M RS232 DTE pin configuration.

4.3.1 Connecting to a DTE device

Standard null modem cables are used when connecting to a serial DTE device (like a PC COM port) that has a DB25 or DB9 male connector.

Null modem cable part numbers	
	DB9M-DB25M - Serial port to DB25M
	DB9MM - Serial port to DB9M

4.3.2 Connecting to a DCE device

Standard straight through cables are used when connecting to a serial DCE device (like a modem) that has a DB25 or DB9 female connector. If replacing a modem, avoid any modem handshake issues by configuring the device's interface for "leased line" or "permanent modem" type connection.

Straight through cable part numbers	
	DB25MF - Serial port to DB25F
	DB9F-DB25M - Serial port to DB9F

5 Encapsulation Message Formats

The following are the formats of the messages used to encapsulate frame data over TCP connections. The TCP/IP host is expected to implement one of these methods if message preservation is required.

Count (length) fields are in network byte order (big endian) with most significant byte first, least significant byte last.

5.1 MBIT (2-byte count field)

Simple encapsulation of data using a 2-byte length field. Used to encapsulate and demarcate frame data. Each MBIT message contains the data from an individual frame. The purpose is to preserve the boundaries of application messages.

Count = x	Payload (x bytes)
-----------	-------------------

Error detection is not performed on the header, and any error will cause data loss and/or stalling.

5.2 RFC1006 (ISO TP)

Encapsulation method to provide ISO Transport Service for bridging between X.25 and TCP hosts. Preserves application message boundaries similar to MBIT above, and can be used as an alternative to MBIT. The header is 4 bytes.

03	00	Count = 4+x	Payload (x bytes)
----	----	-------------	-------------------

Error detection is performed on the header, and any errors will cause the connection to be terminated.

6 Contact Microtronix

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