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SC-1000/SC-1000A Installation Guide for ARM®-Architecture Processors

American Arium

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About the SC-1000/SC-1000A

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WARRANTY INFORMATION

Standard Warranty

Each emulator comes with a one-year warranty and includes the following:

- **Technical support**. Access to our technical support engineers. They are experts on American Arium tools and applications and have broad experience with problems seen in the industry.
- **SourcePoint upgrades**. Usually, a minimum of two major software releases annually, with feature-rich upgrades to support the latest ARM processors. You will be notified when new releases are available.
- **Training**. On-site classes are available to train new users and update experienced users with hands-on knowledge of SourcePoint's advanced feature set.
- **Repairs**. Parts, labor, and return shipping costs are paid for by American Arium in the event of equipment failure. Hardware is upgraded, fixed, tested, and returned in an expedient manner.
- **Loaner equipment**. Under time pressure and your emulator just broke? If so, and if equipment is available, we will loan you tools while your equipment is being repaired.

STAR 1 Warranty

An annual extended warranty may be purchased, either at the time you buy your emulator or at a later date (assuming American Arium still supports the product). This plan, called STAR 1, covers everything included in the standard warranty for a period of 1 year.

For your convenience, one month prior to the end of either your standard or STAR 1 warranty period, American Arium will send you a quotation for continued service.

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TRADEMARK INFORMATION

Trademarks

SourcePoint is a trademark of American Arium.

ARM and Thumb are registered trademarks of ARM Limited. "ARM" is used to represent any or all of ARM Holdings plc); its operating company ARM Limited; and the regional subsidiaries ARM INC.; ARM KK; and ARM Korea Ltd.

FLEXlm is a registered trademark of Macrovision Corp.

Microsoft and Windows are registered trademarks of Microsoft Corporation.

Note

The zlib compression library © 1995-1998, Jean-Loup Gailly and Mark Adler, is used in this product.

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CONTACTING AMERICAN ARIUM

CONTACTING ARIUM OFFICES

Address:

Headquarters: 14811 Myford Road, Tustin, CA 92780

East Coast Office: 8601 Six Forks Road, Suite 104-213, Raleigh, NC 27615

Browse:

www.arium.com

Phone:

Headquarters: 877-508-3970 (toll free in the US) or 714-731-1661 (outside the US)

East Coast Sales Office: 866-700-9144 (US toll free) or 919-870-1792

Fax:

Headquarters: 714-731-6344

East Coast Office: 919-870-5092

E-Mail:

Sales: info@arium.com
Support: support@arium.com

CONTACTING TECHNICAL SUPPORT

Before contacting technical support, please have the following information available:

- Serial number and model number of your emulator.
- SourcePoint version number. You can find this by selecting the **About** command from the **Help** menu on the SourcePoint menu bar.
- Emulator switch settings.
- Firmware revision. You can find this by selecting the **Diagnostics** command from the **Options** menu on the SourcePoint menu bar and looking under the **Run Control** tab. The **Revision** field is the second field.
- Components seen in the JTAG scan chain. You can find this by selecting the **Diagnostics** command from the **Options** menu on the SourcePoint menu bar, and looking under **JTAG Devices**.

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- Emulator configuration. You can find this by selecting the **Emulator Configuration** command from the **Options** menu found on the SourcePoint menu bar. You will see a number of check boxes; note which are selected and which are not selected.

To contact us:

Web

www.arium.com/support.html

Here you will find file downloads, application notes, and sample command macros.

Email

support@arium.com

Please attach the results of the **aadump()** command along with a description of your problem.

Phone

877-508-3970 (US toll free) or 714-731-1661 - Western US, Mon-Fri, 8:00 am - 5:00 pm PT
866-700-9144 (US toll free) or 919-484-1001 - Eastern US, Mon-Fri, 8:30 am - 5:30 pm ET

International support

For a list of distributors and their contact information, go to:

www.arium.com/contact/distributors.html

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THE SC-1000/SC1000A AT A GLANCE

OVERVIEW

The SC-1000 and SC-1000A represent American Arium's latest integrated debug solutions for ASICs and ASSPs with ARM®-architecture cores. These emulators, which support the ARM ETM and Intel® XScale™ processor trace, feature first-of-its-kind trace compression technology that increases trace depth substantially. With compression disabled, the trace buffer holds up to 2 M samples (4M with the SC-1000A and SourcePoint™ 6.0 or later); when enabled, it holds up to 30 M virtual samples, depending on your application. In addition, the emulators support up to 300 MHz trace capture, support all ETM trace configurations and ETM triggering capabilities, handle trace stoppage without stopping the processor, and offer selectable timestamp resolution down to 10 ns. They handle up to and including eight ARM cores on one JTAG chain. The SC-1000/SC-1000A support full ARM and Thumb® instruction sets and are designed for use with today's most popular compilers.

PROCESSORS SUPPORTED

The SC-1000/SC-1000A support the following ARM architecture processors:

- ARM7™/ARM9™-based processors
- Intel® XScale™ processors
- TI OMAP™ processors

For the latest detailed list, visit the American Arium Web site at www.arium.com.

Note: Apart from the fact that the SC-1000A has greater trace depth (and then only if used with SourcePoint 6.0 or later), the two units operate identically from a user's point of view. Since this is a *Getting Started* guide, and since the SC-1000A is currently shipping, references in this manual from hereon in will be to the SC-1000A. However, the information applies the SC-1000, as well, unless otherwise stated.

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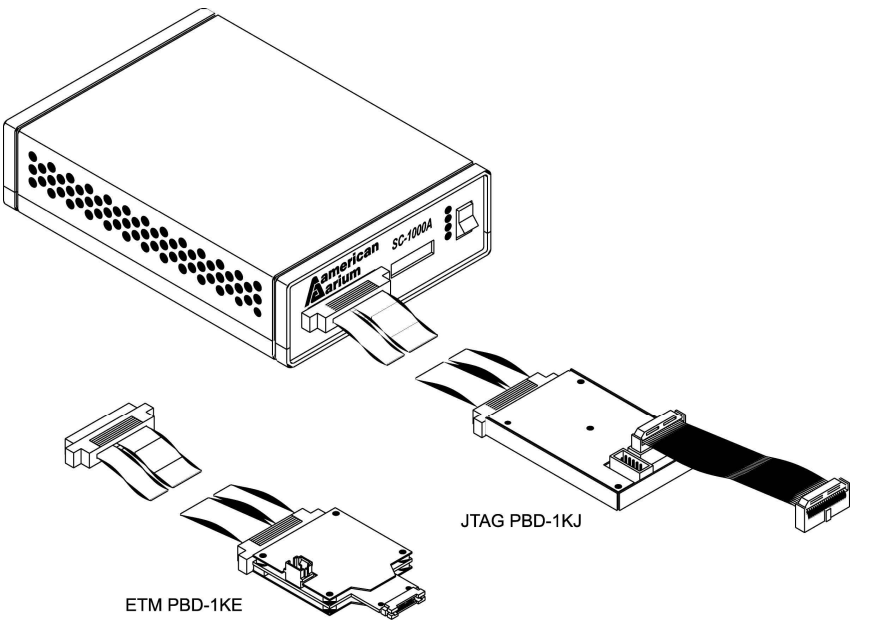
WHAT SHIPPED WITH YOUR UNIT

Item	Description
SC-1000A	Emulator base unit
One of two PBDs: PBD-1KE PBD-1KJ	 38-pin ETM Mictor connector 20-pin JTAG debug connector
SourcePoint CD	Interface software
Direct crossover cable (orange)	For direct TCP/IP connection
Ethernet patch cable (blue)	For network TCP/IP connection
USB cable (beige)	For USB connection
Documentation	Manuals, addenda, etc.

You may also have purchased a DPA-2014, which is a 20-to-14-pin JTAG adapter.

PHYSICAL DESCRIPTION

The drawing below illustrates the emulator (base unit) and both PBD connections.

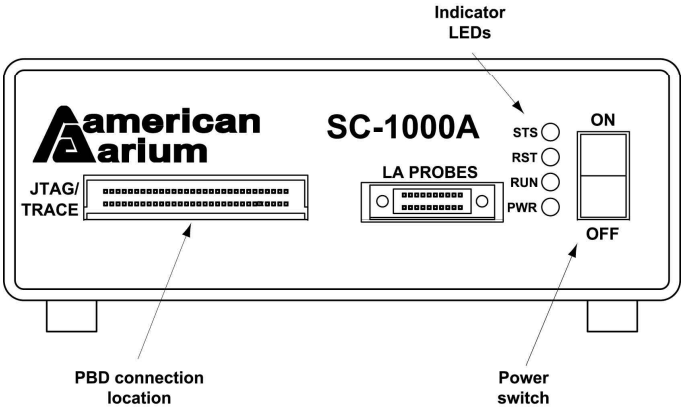


SC-1000A

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FRONT PANEL

The front panel includes the power switch, LEDs, and a connection port for the personality module (referred to also as the PBD). There is also a connection port for a probe, which currently is not available.



SC-1000A front panel

STATUS INDICATOR LIGHTS (LEDS)

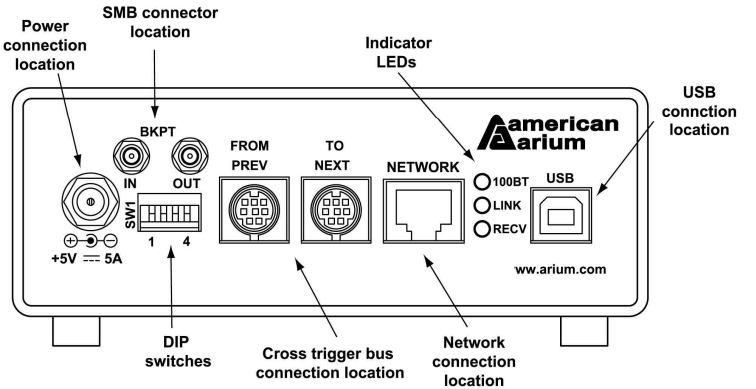
The status indicator lights on the front panel of the SC-1000A indicate the following (from top to bottom):

- STS – lights up briefly, along with the other LEDs, after the SC-1000A has performed boot level hardware initialization and prior to loading the flash image. Also, the upper and lower amber LEDs flash in an alternating pattern if the flash file fails to load.
- Rst – When lit, the emulator is in reset mode.
- Run – when lit, the emulator is running.
- Pwr – when lit, the power is on.

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BACK PANEL

The back panel includes the connection ports for the power cord, network TCP/IP connection and USB connection cables, SMB connection ports, cross trigger bus connection port, and DIP switches. In addition, there are three LEDs designed to let you know when network communication is active.



SC-1000A back panel

STATUS INDICATOR LIGHTS (LEDS)

The status indicator lights on the back panel indicate the following (top to bottom):

- 100BT – When lit, indicates signals are being transmitted at 100 MB/sec.
- Link – When lit, indicates ethernet is connected and is in receive, transmit, or idle state.
- Recv – When lit, indicates the ethernet connection is receiving data.

DIP SWITCHES

The use of each switch is described briefly below (left to right):

- Switch 1 – Forces the emulator to use the alternate flash image
- Switch 2 – Currently, no designated functionality.
- Switch 3 – Currently, no designated functionality.
- Switch 4 – Used to perform initial IP address assignment.

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CROSS TRIGGER BUS PORT CONNECTIONS

Used to synchronize multiple SC-1000As when in cross trigger mode.

SMB CONNECTION PORTS

- **Breakpoint In.** The Breakpoint In connection port allows the SC-1000A to stop emulation by assertion of DBGRQ.
- **Breakpoint Out.** The Breakpoint Out connection port is used to synchronize or arm another piece of test equipment (e.g., logic analyzer). This signal indicates that target DBGRQ has been deasserted.

HOST SYSTEM REQUIREMENTS

The following system features are required at a minimum to run SourcePoint:

- Intel® Pentium® or AMD processor or better computer
- Microsoft® Windows® NT 4.0 with SP4 (or later)/2000/XP
- 128 MB RAM
- 60 MB hard disk space
- CD-ROM drive
- 10Base-T/100Base-T LAN connection (for ethernet connections)
- USB port (for USB connections)

Note: If your operating system is Microsoft Windows 2000 or XP, you may need to contact your Systems Administrator to gain administrator privileges.

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HARDWARE CONNECTIONS

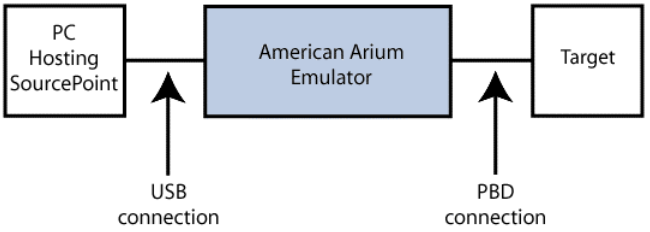
BASIC CONFIGURATIONS

Begin by determining the type of system connection you want.

- A direct TCP/IP or USB connection is the simplest way to connect the host computer and the emulator. Only a single host PC can use the SC-1000A with this type of connection.
- An ethernet TCP/IP connection may be your best choice if you already have a network in place. It will allow users from different locations to make use of the debugger if your network security allows such access.

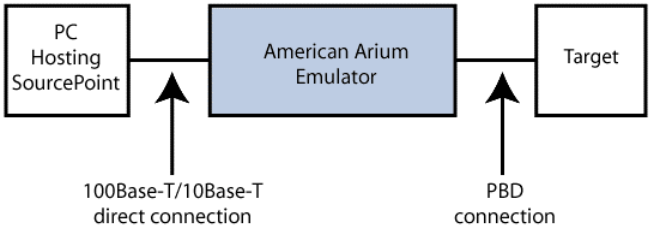
The illustrations below provide visual representations of the configuration options.

USB CONNECTION



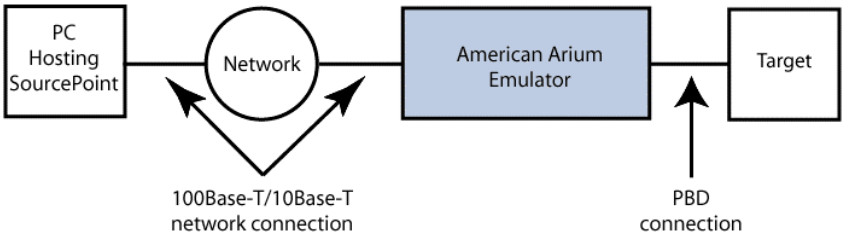
USB connection

TCP/IP CONNECTIONS



10Base-T/100 Base-T direct connection

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10Base-T/100Base-T network connection

CONNECTING THE EMULATOR TO THE HOST COMPUTER

Each physical configuration requires a different connection cable. Specifics are provided below.

USB CONNECTION

1. Locate the beige USB cable that shipped with your unit.
2. Connect one end to the emulator at the connector port on the emulator labeled USB.
3. Connect the other end to the host computer's USB port.

DIRECT TCP/IP CONNECTION

1. Locate the orange direct crossover cable that shipped with your unit.
2. Connect one end to the emulator at the connector port on the emulator labeled NETWORK.
3. Connect the other end to the host computer at the 10/100Base-T network socket.

NETWORK TCP/IP CONNECTION

1. Locate the blue ethernet patch cable that shipped with your unit.
2. Connect one end to the emulator at the connector port on the emulator labeled NETWORK.
3. Connect the other end to your network hub.

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CONNECTING THE PERSONALITY MODULE (PBD)

CONNECTING THE PBD-1KE TO THE TARGET

To connect the PBD-1KE (ETM Mictor connector) to the target:

1. Connect the PBD from the target's debug trace port directly to the 38-pin Mictor connector.
2. Connect the PBD to the emulator at the connector on the front of the unit labeled JTAG/Trace, using the longer 52-pin cable.

CONNECTING THE PBD-1KJ TO THE TARGET

To connect the PBD-1KJ (JTAG connector) to the target:

1. Connect the PBD to the target's deug trace port, using the shorter 20-pin cable.
2. Connect the PBD to the emulator at the connector on the front of the unit labeled JTAG/Trace, using the longer 52-pin cable.

COMPLETING HARDWARE CONNECTIONS

1. Connect the power supply to your power source and the back of the emulator at the port (the connector on the far left of the panel).
2. Connect the other end to your power source.
3. Turn on the emulator by flipping the switch on the front of the emulator to the "On" position. If emulator power is on, the bottom status indicator light on the front panel, labeled PWR, is lit.
4. Turn on the power to the target.

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SOFTWARE INSTALLATION AND SYSTEM CONFIGURATION

INSTALLING THE SOFTWARE

Note: If you have set up the hardware for a USB connection, you are first asked to load the USB driver. See “USB Connection and Configuration” below for further instructions.

Directions on installing American Arium’s interface software are provided below.

1. Insert the SourcePoint CD-ROM into the CD-ROM (if you have not already done so).
2. Run the setup program.
3. Insert the license file diskette when prompted.

   During setup, you are asked for the SourcePoint license file. This file resides on a floppy disk that shipped with your unit.

Note: SourcePoint requires that a license file be present in the SourcePoint directory to run SourcePoint, so you will want to copy the file to the SourcePoint working directory.

4. Select **Run SourcePoint** from the last screen of the installation GUI.

NOTES ON MACROVISION FLEXLM® LICENSE FILES

License files act as a key, enabling use with specific emulator model/serial numbers and activating optional features within SourcePoint. SourcePoint requires a license file for successful installation. These files use a digital signature to ensure integrity. Each emulator is shipped with a separate disk that contains a license file corresponding to that emulator’s serial number. If optional features or software upgrades are ordered at a later time, a new license file is generated by American Arium and made available to you.

License files serve two purposes:

1. Indicate which SourcePoint optional features are activated.
2. Indicate the licensed SourcePoint version for the specified emulator serial number(s).

If the emulator serial number is not found in any license file, an error message is generated. Press the **OK** button to exit SourcePoint. If the license file is lost or corrupt, contact American Arium technical support for a replacement.

Note: SourcePoint does not function without a FLEXlm license file.

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Note: You need to copy the aa*xxx*.lic (xxx=serial number of unit) file to the SourcePoint root directory; it is not recognized from a sub-directory.

When SourcePoint is executed, the emulator serial number is read, the corresponding license file is located, and activated feature information is verified. FLEXlm license files must be stored in the same directory as the SourcePoint executable (default path = \Program Files\American Arium\SourcePoint) utilizing a "lic" extension.

USB CONNECTION AND CONFIGURATION

If you have set up the hardware for a USB connection, you must install the Arium USB driver prior to setting up the connection.

INSTALLING THE USB DRIVER

1. At the time that you power up the host computer, you are notified via a standard Microsoft Windows dialog box that you need to load a USB driver.
2. Insert the SourcePoint CD into your CD-ROM drive.
3. Follow the instructions on your screen. The driver file you need to load is “AriumUsb.inf” located in the root directory of SourcePoint.

Note: If your operating system is Microsoft Windows 2000 or XP, you may need to contact your Systems Administrator to gain administrator privileges.

INSTALLING SOURCEPOINT

See “Installing the Software,” at the beginning of the chapter for specifics.

CONFIGURING THE SYSTEM

USB is a “plug and play” connection. When you open SourcePoint for the first time, you are presented with an empty screen and an active toolbar. Your system is ready to use.

TCP/IP CONNECTION AND CONFIGURATION

After you have set up your hardware for a TCP/IP connection, install SourcePoint. After installation, configure your system.

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INSTALLING SOURCEPOINT

See “Installing the Software,” at the beginning of the chapter for specifics.

CONFIGURING THE SYSTEM

You will need to know the serial number of your emulator. It can be found on the bottom of the unit.

Depending on the type of TCP/IP connection you have chosen, you also may need to know some or all of the values listed below before you can complete initial configuration. It is recommended that you have these values before you begin the configuration process.

Gather Connection Information

You will need some or all of the values listed below in order to connect the emulator with the debugger, depending on your connection type. In some instances you can use the default values. In others, you may need to contact your Systems Administrator for this information.

	Direct TCP/IP Connection	**Network TCP/IP Connection**
Host PC TCP/IP Address*	Use 192.168.000.002	N/A
Emulator Base Unit TCP/IP Address	Use 192.168.000.001	Contact your administrator
Emulator Base Unit Network Mask	Use 255.255.255.000	Not needed
Emulator Base Unit Network Gateway	Use 192.168.000.002	Contact your administrator

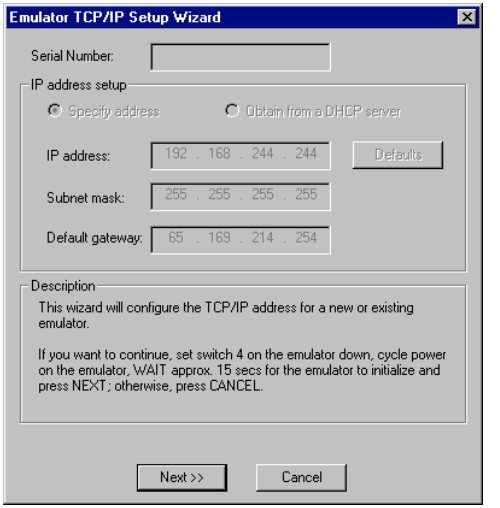
*This value is set on the network card of your host computer.

Note: Arium recommends you write down and save your static TCP/IP address (if you are using one) and the serial number of your emulator. That way, if you are configuring a new host and the emulator has been moved to a remote location, you will have the information you need to connect to it. SOURCEPOINT DOES NOT REMEMBER THIS INFORMATION FOR YOU.

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EMULATOR TCP/IP SETUP WIZARD

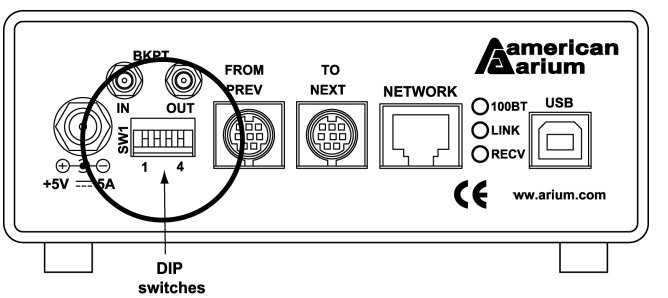
The first time you run SourcePoint, the **Emulator TCP/IP Setup Wizard** opens.



*Initial screen of **Emulator TCP/IP Setup Wizard***

To configure the system:

1. Find the DIP switches on the back panel of your emulator. Set Switch 4 down.



SC-1000A back panel showing position of DIP switches

2. Turn the On/Off power switch on the front of the emulator off and then on.
3. Wait approximately 15 seconds for the emulator to initialize.

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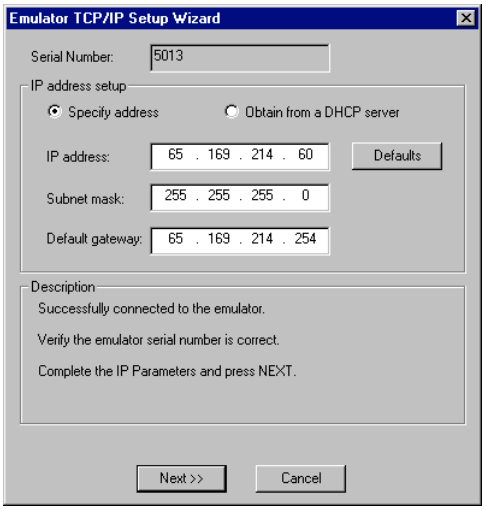
4. On the wizard, click on the **Next** button.

   The second screen of the wizard displays with the **IP address setup** section now activated. The factory-assigned IP address settings of the connected emulator are displayed (assuming this is a unit fresh out of the box).

5. Verify that the emulator serial number found in the text box at the top of the dialog box is correct.

6. Type in the correct values based on the list found earlier in this section.

Caution: American Arium does not recommend that you set up a dynamic IP address on initial installation.



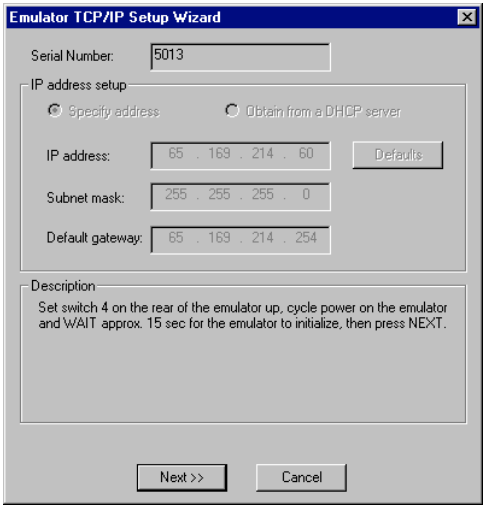
***Emulator TCP/IP Setup Wizard**, Screen 2 with sample values inserted*

7. Click the **Next** button.

   A third **Emulator TCP/IP Setup Wizard** dialog box displays.

Note: An intermediate dialog box may display if the connection time is not virtually instantaneous. The dialog box contains a progress bar that times out after two sweeps. Time out indicates network connectivity problems or a bad cable.

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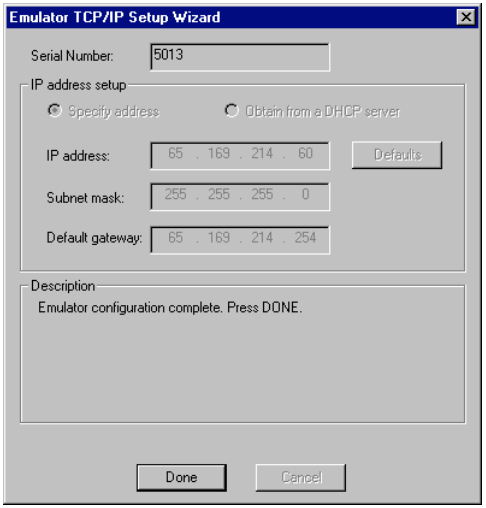


***Emulator TCP/IP Setup Wizard**, Screen 3*

8. Go to the DIP switches on the back panel of your emulator. Set Switch 4 to the up position.
9. Flip the power switch on the emulator off and then on.
10. Wait approximately 15 seconds for the emulator to initialize.
11. Press the **Next** button.

    This takes you to the final **Emulator TCP/IP Setup Wizard** dialog box. The box displays the correct emulator serial number and address values.

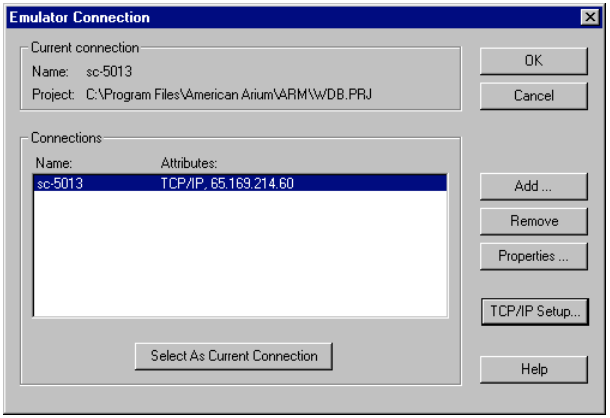
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***Emulator TCP/IP Setup Wizard**, Screen 4*

12. Click the **Done** button.

    The wizard closes, and the **Emulator Connection** dialog box displays with the new TCP/IP address highlighted in the **Connections** text field.



***Emulator Connection** dialog box*

13. Click the **Select As Current Connection** button or double-click on the highlighted TCP/IP address.
14. Click the **OK** button.

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TROUBLESHOOTING YOUR EMULATOR

FAQs

Question: What can I do if my emulator does not power up?

Answer: Check the power cord to confirm that it is snugly plugged into the back of the emulator and plugged into a power source. Make sure the On/Off switch on the front of the emulator is at the “On” position. Note whether the PWR status indicator light is lit.

Question: Where do I find the values I need to enter into the installation wizard to set up a TCP/IP configuration?

Answer: Contact your Systems Administrator for these values. If your Administrator wants you to use a dynamic IP address, be sure he or she knows the following:

- Your network can have no more than a single DHCP server with no DHCP relays.
- Only a Windows 2000 Server is qualified for use with the SC-1000A. Other servers may work, but American Arium has not qualified them.
- Make sure that an adequate number of IP addresses exists in the DHCP free pool.
- If no addresses are available either at SC-1000A boot time or at lease renewal time, the emulator will wait until it is either powered down or an IP address from the DHCP server becomes available. While the emulator is waiting for a DHCP IP address, it will be addressable only via the USB port.
- If the SC-1000A appears to wait because of a depleted DHCP address pool, it may take up to 5 minutes to acquire an address *after* the time one becomes available.

Note: Arium does not recommend you set up a dynamic IP address on initial installation.

Question: What should I do if the installation wizard does not complete?

Answer: There are a number of reasons the wizard may not have completed.

- Review the procedure you used when running the wizard. Determine whether you set DIP switch #4 down and up and cycled power at the appropriate times.
- Check to ensure that the **Specify address** option was enabled.
- Check that you have a valid IP address.

If the wizard does not complete, cancel it, go to the **Emulator Connection** dialog box that opened with the wizard, and click the **TCP/IP Setup** button to open the wizard and try again.

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Question: The default values listed in the installation wizard are grayed out. I cannot change them. Why?

Answer: You must flip DIP switch #4 and cycle power to the unit at a prescribed time to activate that area of the GUI. Go to the chapter entitled, "Software Installation and Configuration" earlier in this *Getting Started* guide or carefully follow the instructions on each screen of the setup wizard for details.

Question: How can I verify SC-1000A connections?

Answer: There are a number of steps you can take to verify emulator connections.

- Verify that the proper cable is connected. Check the status indicator lights on the back panel of the unit.
- Ping the computer by opening a DOS box. Enter the word "ping" (without the quotation marks) at the prompt followed by the emulator's IP address.
- If you do not get a reply and you have configured a TCP/IP connection, run American Arium's USB utility. (For details, see "Using Command Line Utilities to Solve Problems" below.)
- If you have configured a USB connection, run a TELNET utility. (For details, see "Using Command Line Utilities to Solve Problems" below.) At the prompt, enter the "enetstat type" (without the quotation marks) and press the Enter key.

Question: I need to determine whether my personality module is functioning.

Answer: Follow these instructions to determine the functionality of the PBD:

1. Open a telnet or USB utility session. (For details, see "Using Command Line Utilities to Solve Problems" below.)
2. At the prompt, enter the command "stalljtag" (without the quotation marks) and press the Enter key.
3. At the prompt, enter the phrase "jtagtest loops rate" (without the quotation marks), placing the desired loops (test iterations) and rate (number representing TCK rates) after the jtagtest command. (See table below.) Press the Enter key. This command tests the functionality of the personality board and cable.

Loops	Rate
0	48.0 MHz
1	40.0 MHz
2	32.0 MHz
3	28.0 MHz
4	24.0 MHz
5	20.0 MHz
6	16.0 MHz
7	14.0 MHz
8	12.0 MHz
9	10.0 MHz
10	8.0 MHz

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11	6.0 MHz
12	4.0 MHz
13	2.0 MHz
14	1.0 MHz
15	500.0 kHz
16	200.0 kHz
17	100.0 kHz
18	50.0 kHz
19	20.0 kHz
20	10.0 kHz
21	5.0 kHz
22	2.0 kHz

4. After running the jtagtest command, again enter the command “stalljtag” (without the quotation marks) and press the Enter key.

USING COMMAND LINE UTILITIES TO SOLVE PROBLEMS

American Arium offers two command line utilities for troubleshooting your system, our USB utility, and a telnet program. Both allow you to talk directly to the emulator without going through SourcePoint. They also provide some information that is not available through SourcePoint. If you are having trouble establishing a USB connection, use telnet (since you can’t use the USB utility if you cannot establish a USB connection). If, on the other hand, you are having trouble establishing a TCP/IP connection, use the USB utility to establish communication with the host system.

ACCESSING AMERICAN ARIUM’S USB UTILITY

American Arium’s USB utility can be accessed in your SourcePoint working directory. The file name is SBU.exe.

1. Locate the file.
2. Double-click on it to execute it.

ACCESSING TELNET

A TELNET utility can be accessed as follows:

Note: To access these commands, you will need to know the IP address of the emulator.

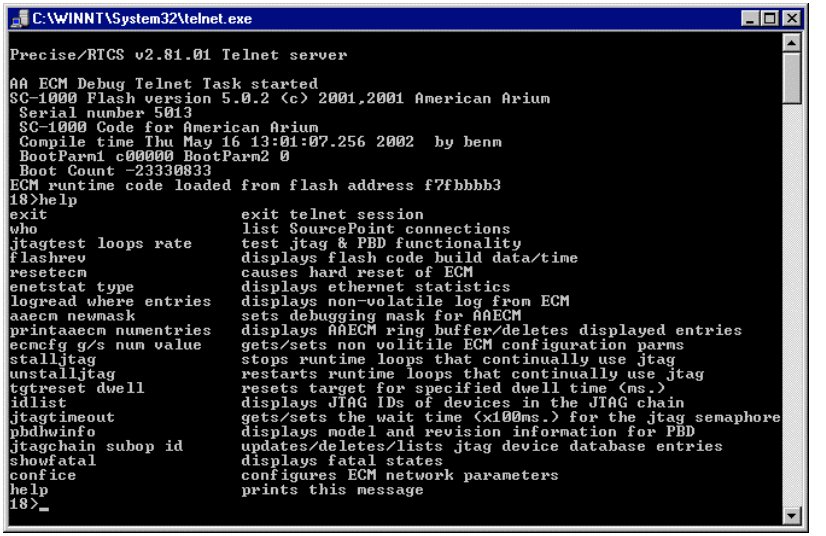
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1. Go to **Start|Run** on your desktop.
2. Type in “telnet 192.168.000.001” (without the quotation marks and assuming the emulator is fresh out of the box).

   A telnet window opens.
3. At the command prompt, type in “h” or “help” (without the quotation marks). The list of commands appears.

COMMAND LINE UTILITY INFORMATION

Below is an illustration of a text box containing a list of telnet commands. The same commands come up via the USB utility.



Sample telnet text box

The session opens with several valuable pieces of information, depending on the emulator to which you are attached. In the sample above, the session describes the current flash version, the serial number of the emulator, and some boot information.

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The available commands are then listed. While some of the commands are self-explanatory, others are not. Brief descriptions of those that may not be entirely clear are provided below.

Command	Comment
who	With this command you get a list of people connected to SourcePoint
jtagtest loops rate	This command tests the JTAG/ETM and PBD functionality. It is especially valuable when used to validate whether the JTAG/ETM works. If not, that may be the reason SourcePoint won't run. Before and after running jtagtest, run the command stalljtag (see below).
flashrev	This command displays flash code data. The emulator saves the current and previous version of flash. If, for some reason, you want to run SourcePoint with the previous version of the flash (if, for example, you find it more compatible), you can access it here.
resetecm	This command causes a hard reset of the emulator.
enetstat type	This command displays ethernet statistics. If you find you're having multiple, seemingly unrelated communications problems and need detailed information about how the ethernet connection is working, using this command will give you a significant amount of data.
logread where entries	This command displays the non-volatile log from emulator. It is used for emulator failure analysis.
aaecm newmask	This command sets the debugging mask for the emulator.
printaaecm numentries	This command displays the emulator's circular log and deletes displayed entries.
ecmfg g/s num value	This command gets/sets non-volatile emulator configuration parameters. While most of these can be set in SourcePoint, there are additional parameters that are not available there.
stalljtag	This command stops runtime loops that continually use the JTAG chain. Initiating the command prevents normal JTAG/ETM operations by the emulator so the user can run other commands.
unstalljtag	This command restarts runtime loops that continually use the JTAG chain. Initiating the command frees the JTAG/ETM chain for use by the emulator for normal JTAG operations.
tgtreset dwell	This command resets the target for the specified dwell time.
Idlist	This command causes a display of JTAG/ETM devices and lists their JTAG/ETM IDs in the JTAG/ETM chain. It tells you how many devices are on it, whether or not the devices are CPUs, the stepping value of each device, and the unique chip ID.
jtagtimeout	This command sets the maximum amount of time (x1000 ms) allowed for a target jtag operation to complete. If no value is listed after the command, it shows you what the current timeout value is. If you add a value following the command, the timeout rate will be set to that time (e.g., jtagtimeout 10 ms to 1 second). If the operation does not complete within the specified time, the target is marked "unavailable" and must be reset. This prevents indefinite hangs when the target is not operating properly.
pbdhwinfo	This command displays model and revision information for the personality module.
confice	This program allows you to set a number of network parameters.

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PRODUCT SPECIFICATIONS AND OTHER TECHNICAL INFORMATION

SPECIFICATIONS

JTAG Probe Input Characteristics	
Target Connection	38-pin Mictor connector contains both JTAG and trace status port signals.
JTAG Configuration	Per IEEE 1149.1 specification or ARM-specified adaptive TCK mode
JTAG Clock Frequency	2 kHz – 40 MHz, 2 kHz - 16 MHz in adaptive TCK mode
Download Speed	Varies per JTAG clock frequency limit of target
JTAG Input Characteristics	
TDO, DBGACK, and RTCK	15 pF
TDO Sampling with Respect to TCK	Selectable: falling or rising TCK Minimum required setup and hold window = 5.3 ns T_{su} = 5.3 ns, t_h = 0 ns
VT_{ref}(1)	Voh/loh = 47 kO pull down to ground 0.1µF capacitance to ground
nSRST(2)	Voh/loh (inactive) = 640 kO to 2.4 V paralleled with 47 k to VT_{ref} Voh/lol (active) = 57 O pull down to ground
JTAG Output Characteristics	
Low Drive TDI, TMS	Voh/loh = 49 O to VT_{ref} Vol/lol = 48 O to 0 V
High Drive TDI, TMS	Voh/loh = 18 O to VT_{ref} Vol/lol = <9 O to 0 V
DBGRQ	Voh/loh = 53 O to V_{ref} Vol/lol = 51 O to 0 V
TCK	Adjustable from 110 O to <12 O in 8 steps
nTRST(2)	Voh/loh = 640 kO to 2.4 V paralleled with 10 K or 56 O to Vt_{ref} (jumper selectable) Vol/lol = 51 O to 0 V
Delay	TDI and TMS delay from TCK falling edge to TDI and TMS valid: min –3 ns, max 3 ns
Trace Port Input Chraracteristics	
Max Clock Frequency	Up to 300 MHz full clock mode, 150 MHz half clock
Data Setup/Hold Times	1.5 ns setup, 1.0 ns hold
Clocking	Single or double edge, single on dual ETM clocks
Data Port Width	4, 8, or 16 bits

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Trace Depth (3)	2 M max with 11-bit timestamp (4 M with SourcePoint 6.0 or later), 1 M with 23-bit timestamp (2 M with SourcePoint 6.0 or later), 512K with 31-bit timestamp (1 M with SourcePoint 6.0 or later)
Timestamp	Variable resolution: 10 ns, 100 ns, 1000 ns (1 µsec) 10 µs, 100 µs, 1000 µs (1 Msec)
Input Impedance	5 pf, > 100 kO
Multi-Core Support	Yes, with daisy chained SC-1000As
Target Power Supply	1.0 V – 5.5 V
Communications	
Ethernet	RJ-45 connector IEEE 802.3 auto-sensing 10/100Base-T ethernet Max download speed = 1 MB/sec
Trigger Out	SMB (m) >2 V into 50 O load or 0.8 V into 50 O (jumperable polarity)
Trigger In	SMB (m) 50 O terminator to 2 V or 0.8 V (jumperable polarity) Max input = 3.6 V
USB	V1.1
Power	
Power	5 V DC at 5A
Power supply	External, 100 V – 250 V, 47 Hz to 63 Hz IEC 320 input
Dimensions	
Width	5.45 in/13.98 cm
Length	7.56 in/19.38 cm
Height	1.98 in/5.08 cm
Environmental	
Operating Temperature	32° F/0° C to 104° F/40° C

(1) VT_{ref} is used to determine the target power status and the reference for input threshold and output voltage swings. The emulator does not draw power from the target system.
(2) Open collector output.
(3) Depths listed are actual trace memory depths. Compression algorithm can extend effective depth well beyond these limits.

SMB CONNECTION PORTS

Breakpoint In

The Breakpoint In connection port allows the SC-1000A to stop emulation by assertion of DBGRQ. Termination level and active level are jumper selectable inside the SC-1000A.

J11, JP14	
1-2, 2-3	Low = break, 75 O to 2.2 V
2-3, 1-2	High = break, 75 O to 0.8 V

Gray row = default

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Breakpoint Out

The Breakpoint Out connection port is used to synchronize or arm another piece of test equipment (e.g., logic analyzer). This signal indicates that target DBGRQ has been deasserted. Active level is jumper selectable inside the SC-1000A.

JP13	
2-3	Low volts = arm
1-2	High volts = arm

Gray row = default

PBD CONNECTION INFORMATION

Single Processor ETM Connector Pin-Out

Pin 1	No Connect	Pin 2	No Connect
Pin 3	No Connect	Pin 4	No Connect
Pin 5	GND	Pin 6	TRACECLK
Pin 7	DBGRQ	Pin 8	DBGACK
Pin 9	nSRST	Pin 10	EXTTRIG
Pin 11	TDO	Pin 12	VTref
Pin 13	RTCK	Pin 14	VSupply
Pin 15	TCK	Pin 16	TRACEPKT7
Pin 17	TMS	Pin 18	TRACEPKT6
Pin 19	TDI	Pin 20	TRACEPKT5
Pin 21	nTRST	Pin 22	TRACEPKT4
Pin 23	TRACEPKT15	Pin 24	TRACEPKT3
Pin 25	TRACEPKT14	Pin 26	TRACEPKT2
Pin 27	TRACEPKT13	Pin 28	TRACEPKT1
Pin 29	TRACEPKT12	Pin 30	TRACEPKT0
Pin 31	TRACEPKT11	Pin 32	TRACESYNC
Pin 33	TRACEPKT10	Pin 34	PIPESTAT2
Pin 35	TRACEPKT9	Pin 36	PIPESTAT1
Pin 37	TRACEPKT8	Pin 38	PIPESTAT0

Note: Pins 1, 2, 3, and 4 must be true no connects. For designs with less than 16 trace data pins, Pin 5 and any unused TRACEPKT pins must be connected to ground.

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Multiple Processor ETM Connector Pin-Out

Pin 1	No Connect	Pin 2	No Connect
Pin 3	No Connect	Pin 4	No Connect
Pin 5	TRACECLK_B	Pin 6	TRACECLK_A
Pin 7	DBGRQ	Pin 8	DBGACK
Pin 9	nSRST	Pin 10	EXTTRIG
Pin 11	TDO	Pin 12	VTref
Pin 13	RTCK	Pin 14	VSupply
Pin 15	TCK	Pin 16	TRACEPKT_A7
Pin 17	TMS	Pin 18	TRACEPKT_A6
Pin 19	TDI	Pin 20	TRACEPKT_A5
Pin 21	nTRST	Pin 22	TRACEPKT_A4
Pin 23	TRACEPKT_B3	Pin 24	TRACEPKT_A3
Pin 25	TRACEPKT_B2	Pin 26	TRACEPKT_A2
Pin 27	TRACEPKT_B1	Pin 28	TRACEPKT_A1
Pin 29	TRACEPKT_B0	Pin 30	TRACEPKT_A0
Pin 31	TRACESYNC_B	Pin 32	TRACESYNC_A
Pin 33	PIPESTAT_B2	Pin 34	PIPESTAT_A2
Pin 35	PIPESTAT_B1	Pin 36	PIPESTAT_A1
Pin 37	PIPESTAT_B0	Pin 38	PIPESTAT_A0

Note: Pins 1, 2, 3, and 4 must be true no connects. For designs with less than 16 trace data pins, unused TRACEPKT pins must be connected to ground.

JTAG Interface Connections

Pin 1	VT_{ref}	Pin 2	V_{supply}
Pin 3	nTRST	Pin 4	GND
Pin 5	TDI	Pin 6	GND
Pin 7	TMS	Pin 8	GND
Pin 9	TCK	Pin 10	GND
Pin 11	RTCK	Pin 12	GND
Pin 13	TDO	Pin 14	GND
Pin 15	nSRST	Pin 16	GND
Pin 17	DBGRQ	Pin 18	GND
Pin 19	DBGACK	Pin 20	GND

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CARE AND MAINTENANCE OF THE EMULATOR

GENERAL CARE AND MAINTENANCE

The SC-1000A emulator base unit requires only normal care.

- Keep it in an open area so it will not overheat.
- Keep it dry.
- Dust it and the area around it periodically. Do not let dust collect around the vent holes.
- If you need to clean the unit more thoroughly, first disconnect the power source and all the cables. Clean the unit using a soft cloth that has been dampened in soap and water. Make sure the unit is completely dry before using it.

Caution**: **Failure to disconnect the unit prior to cleaning it may result in electric shock should the unit actually get wet. Always disconnect the SC-1000A from its power source prior to getting it near water or other liquids.

- Do not drop the unit.
- Take care not to bend or break any DIP switches or damage any connection areas.

Personality modules:

- Take care not to bend or damage the pins.
- Do not bend the cables.
- Do not set anything on cables, connectors, or personality board.

MAINTENANCE FROM AMERICAN ARIUM

If you need to return the emulator or any part of the system for repair or replacement, you must call first to get an RMA number. The number must be posted plainly on the outside of the package for delivery to be accepted.

Within the US. To get an RMA number, call American Arium toll free at 877-508-3970 within the US or 714-731-1661 within North America.

Outside North America. To get an RMA number, contact your distributor. A list of distributors can be found on our Web site at www.arium.com.

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