AIM104-386EX Development Kit

Quickstart Manual

(Or read this manual first)

Product Information

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Revision History

Manual	PCB	Comments	
Iss A	V1 Iss1	241198	First Release
Iss B	V1 Iss1	120499	[ECO 2810] Minor Edits
Iss C	V1 Iss1	220799	[ECO 2829] Revised BIOS

Preface

The Manual

This manual is intended as a guide for quick set-up and operation of the AIM104-386EX module using the Arcom Development Kit. This manual should be read first, before reading the Technical Manual.

Contents - Packing List

In your AIM104-386EX Development Kit you should have:

- An AIM104-386EX board, attached to
- A Development Kit Baseboard (AIM104-386DB) all in a sealed anti-static bag
- A mains voltage to +5V DC power supply and cable
- 2 null-modem RS232 cables
- A CD-ROM titled 'AIM104-386EX Development Kit CD-ROM'
- A document titled 'AIM104-386EX Quickstart Manual' (this document)
- A document titled 'AIM104-386EX Technical Manual'

Anti-Static Handling

The AIM104-386EX board contains CMOS devices that could be damaged in the event of static electricity being discharged through them. At all times, please observe anti-static precautions when handling the board and always unpack and install it in an anti-static working area.

Packaging

Please ensure that should any of the boards or equipment need to be returned to Arcom, they are adequately packed. Use an anti-static bag for the board and use a box, not bag, to physically protect the board. Please use the original packaging if possible.

Introduction

The AIM104-386EX Technical Manual details the features and technical specification of the AIM104-386EX board. This document explains the use of the Development Kit and should be read FIRST.

The AIM104-386DB Development Kit baseboard is intended to provide an easy development environment for users of the AIM104-386EX module. All cables and connector breakouts are provided.

The Development Kit

The Development Kit Baseboard

The Development Kit baseboard (AIM104-386DB) and the AIM104-386EX processor board should be shipped to you connected together as shown:

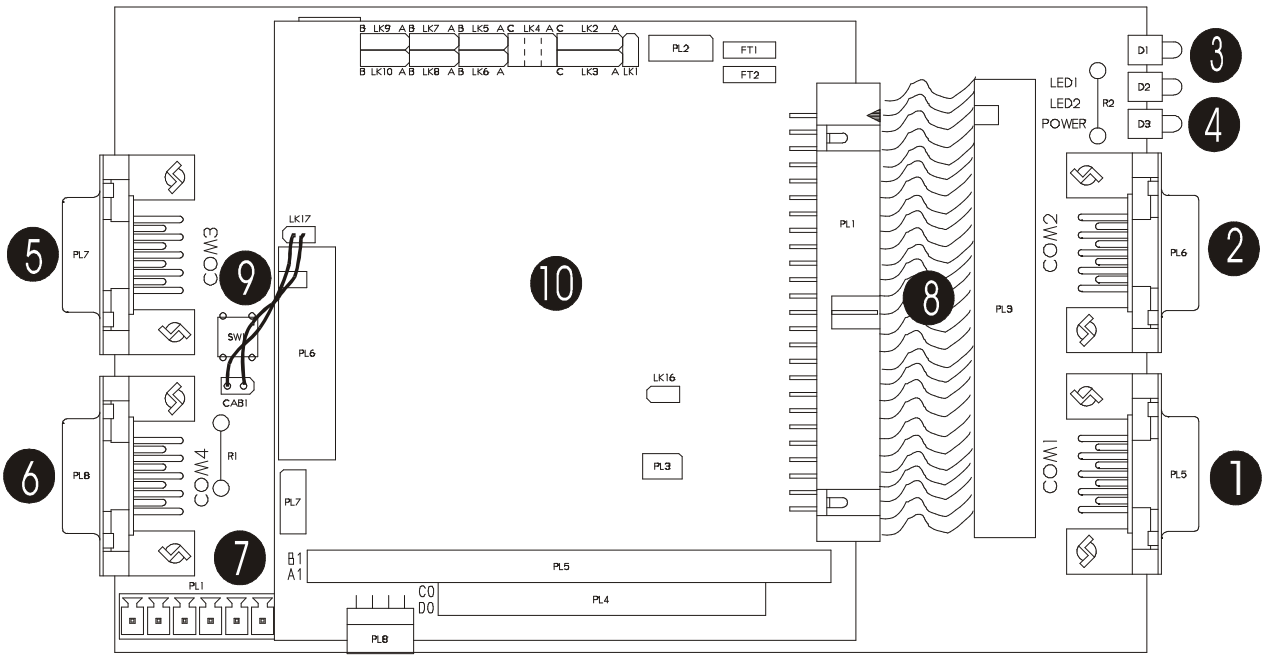


Figure 1.

(1) COM1 connector

(2) COM2 connector

(3) User LED's 1 and 2

(4) Power (+5V) LED

(5) COM3 (console) connector

(6) COM4 (RS485) connector

(7) Power input connector, PL1 (for +5V and optional battery, +12V and -12V connections)

(8) 50 way to 50 way IDC ribbon cable

(9) Reset button and cable

(10) AIM104-386EX module

RS232 Null-modem cables

Two RS232 null-modem cables are provided. At least one of the cables must be connected between the host PC that is being used for development and the AIM104-386EX module.

Either of the host PC's COM ports (COM1 or COM2) may be used and should be connected to COM3 of the Development Kit baseboard. COM3 is the "console" communications port, allowing control of the AIM104-386EX from the host PC acting as a terminal emulator.

The second cable may be connected between the host PC (if a second COM port is available) and COM1 of the Development Kit baseboard. This connection can be used to transfer files between the host PC and the AIM104-386EX flash disk.

If the host PC does not have a second spare serial COM port (e.g. a serial mouse is being used) then file transfer can be done using the console (COM3) link, but this configuration is slightly more awkward to use. Both methods are detailed later in this manual.

Power Supply

A mains (100V - 240V AC input) power supply rated at 2A, +5V DC is supplied. This is capable of supplying power to the AIM104-386EX module (typically 600mA required) as well as one or two more PC/104 add-on cards (if required). Please do not connect additional cards to the AIM104-386EX module until you have followed all the set-up instructions in this manual.

Three different mains plugs are supplied are with the Development Kit, one of which should be the correct type for your country. Slot the appropriate plug into the power supply.

At the other end of the power supply cable is a 6-way screw terminal plug, which connects to PL1 of the Development Kit baseboard.

Note: when adding additional cards to the PC/104 stack please check that the total required current consumption is well below 2A. If more power is required, please use an alternative power supply.

The AIM104-386EX Development Kit CD-ROM

The CD-ROM contains the following software:

- Auto-installation program (setup.exe)
- File transfer utilities (TRANSFER, RSZ and REMSERVE)
- AIM104-386EX Target Library (Borland V4.52)
- Electronic copies of this manual and the Technical Manual
- Datasheets for the Intel 386EX embedded microprocessor, the DS1302 Real Time Clock chip and the IC Works 48C55A clock generator chip
- Binary image of the flash program pre-installed on your AIM104-386EX
- Various help files for the above utilities and libraries
- Paradigm Remote Debugger configuration and helper files

The installation program located in the root directory of the CD-ROM (CD:\setup.exe) aids easy installation of the software that you wish to install.

Your PC must be running Microsoft Windows 95 or above (Windows 98, Windows NT) in order for the installation program to run. Step by step instructions are given when running the installation program.

Getting Started

The remainder of this document is divided into two sections. Section 1 deals with setting the module up for development as a Single Board Computer running ROM-DOS. Section 2 is for users wishing to develop target code to run on the AIM104-386EX without using the ROM-DOS environment. It is strongly recommended that users develop their application in the ROM-DOS environment, which aids fast and effective development of code for the AIM104-386EX.

Important: The AIM104-386EX contains CMOS devices that could be damaged in the event of static electricity being discharged through them. Development with the AIM104-386EX should only be carried out in an anti-static working area and anti-static precautions should be observed at all times.

If you intend to develop your application to run in a ROM-DOS environment (as recommended) read **ONLY** section 1. Ignore section 2.

Section 1- Using the AIM104-386EX as a Single Board Computer with ROM-DOS V6.22

Software Installation

Install the software supplied on the CD-ROM before setting up the Development Kit hardware.

Your PC must be running Microsoft Windows 95 or above (Windows 98, Windows NT) in order for the installation program to run. You must also have a terminal emulator program installed on your PC, e.g. HyperTerminal (part of the standard Windows 95 'Accessories' package), Procomm Plus, or any other equivalent. If you do not have any terminal emulator software, you can use the TCOM utility (supplied on the CD-ROM). See Appendix B for details.

1) Insert the CD-ROM into the CD drive of the host PC. The *install* program will start running automatically.

2) If it does not, click on the start button and then select “Run...”. Type CD:\setup.exe (change "CD" to the drive letter of your CD drive) and click on "OK".

3) Follow the on-screen instructions to install the Development Kit software. You have several installation options. Primarily:

- Typical
- Compact
- Custom

Full details are given during the installation. Please carefully read the information given in the ‘information’ part of the install process before continuing.

There are other files on the CD that are not installed on your PC as part of the installation procedure. Many of these (e.g. the binary flash image) are only required if you encounter a problem during your development (e.g. you accidentally erase part of the BIOS program from the flash memory). There are several help files on the CD-ROM that explain the purpose and use of many of these files.

Hardware Set-up

Ensure that you have all the Development Kit hardware as listed in the 'Packing List' at the start of this manual. Check that all links are set to the factory default settings shown below.

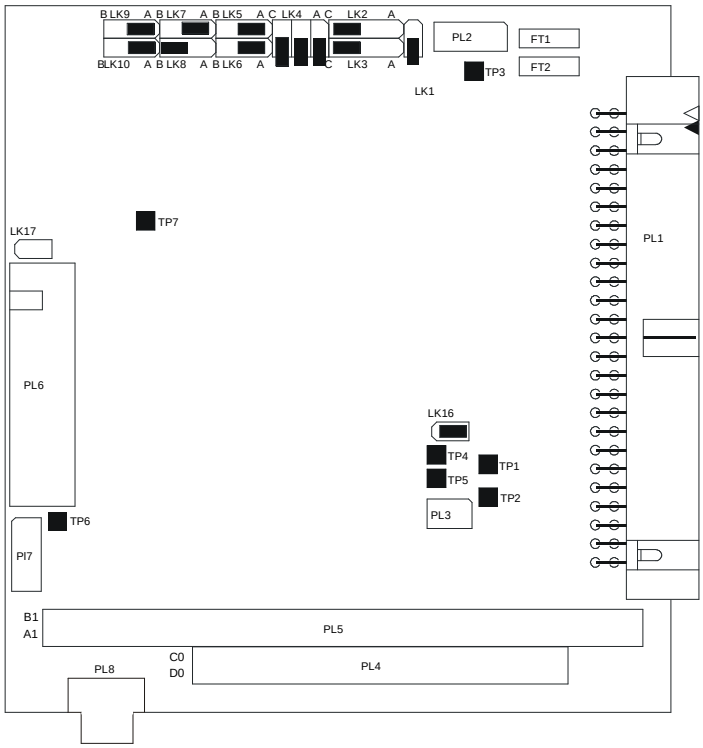


Figure 2. Default link settings

If you have two free serial COM ports on your host PC then follow the instructions given in **SET-UP (A)**. If you only have one free COM port on your PC then follow the instructions given in **SET-UP (B)**.

Set-up (A) - Using two COM ports

Connect the equipment together as shown in the diagram below:

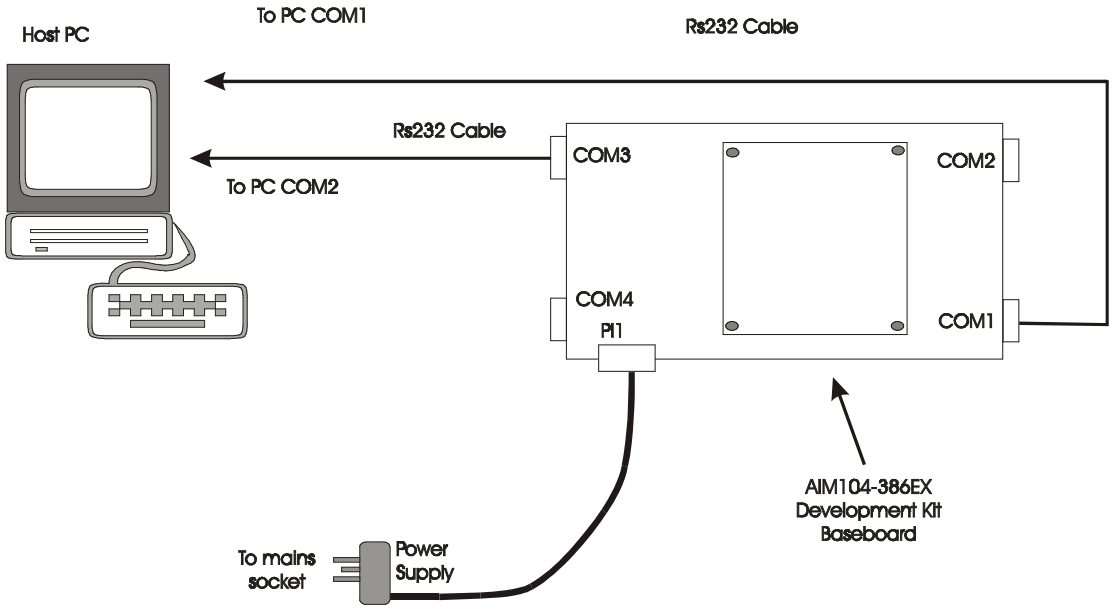


Figure 3

- Ensure that the AIM104-386EX module is correctly plugged into the Development Kit baseboard as shown in figure 1, in the introduction section of this manual.
- Connect COM2 of your PC to COM3 of the Development Kit baseboard using one of the RS232 cables provided.
- Connect COM1 of your PC to COM1 of the Development Kit baseboard using the second RS232 cable provided.
- Plug the 6-way screw terminal connector of the power supply cable into PL1 of the Development Kit baseboard.
- Set the terminal emulator program (e.g. HyperTerminal) running on the host PC. Set the terminal emulator COM port connection setting to COM2. Set the port settings as follows:

Bits per second (baud rate):	19200
Data bits:	8
Parity:	None
Stop bits:	1
Flow Control:	None

- Plug the power supply into a mains outlet socket (100V - 240V AC).

You should now see something like this in the terminal emulator window:

```
Datalight BIOS v1.03
For the AIM104-386
Build 229 Date 07/21/99
Copyright (c) 1997-1998 Datalight Inc.

Tested RAM 00640k

Press F2 or `<` to enter setup

Datalight FlashFX
V4.02.229 386 DOS
Copyright (c) 93-99
Patent US#5860082
V1i02-P{ortions Copyright Arcom Control Systems Ltd 1999

4 Serial Ports, COM1 at 03F8H

Starting ROM-DOS...

C:\>
```

In the terminal emulator window, at the C:\> prompt type: DIR <return>

You should now see a list of the files on the flash disk (drive C:) of the AIM104-386EX. It should look something like this:

```
C:\>

 Volume in drive C is NO NAME
 Volume Serial Number is D888-6FE0
 Directory of C:\

CONFIG      COM      31,533   06-04-1999   6:22a
FXFMT       EXE      19,006   03-31-1999  11:28a
RSZ         EXE      32,340   01-28-1999   7:29p
AUTOEXEC    BAT           9   01-01-1980  12:58a
R           BAT         140   01-01-1980  12:58a
            5 file(s)       83,028 bytes
                           704,512 bytes free

C:\>
```

[**Note:** actual files on flash disk may differ from those shown above]

Transferring Files

To transfer files between the host PC and the AIM104-386EX flash disk, open up a DOS window. Files can be transferred to the AIM104-386EX using one of three utilities provided, which are TRANSFER, RSZ, and REMSERVE. If you already have REMSERVE installed and working on your PC then you may use it. (You will need to download remserve.exe to the AIM104-386EX first) However, we recommend that you use either TRANSFER (to transfer one file at a time) or RSZ (to transfer multiple files at a time).

Step-by-step instructions on transferring a file from the host PC to the AIM104-386EX using TRANSFER are given below. Further details on the use of TRANSFER and RSZ are given in the Technical Manual and on the CD-ROM.

Transferring Files to the AIM104-386EX Flash Disk

There are 2 utilities provided that can be used to transfer files from the host PC to the AIM104-386EX flash disk. These are TRANSFER and RSZ.

RSZ File Transfer

In the terminal emulator type:

```
RSZ /p1 /b115200 /r
```

Open up a DOS window and then type:

```
RSZ /p1 /b115200 /s [filename]
```

TRANSFER File Transfer

In the terminal emulator window type:

```
TRANSFER /R /B115200 /COM1 [filename]
```

Open a DOS window on the host PC and type:

```
TRANSFER /S /B115200 /COM1 [filename]
```

During the transfer you should see lots of 'T's on the host and lots of 'R's on the target.

Set-up (B) - Using one COM port

Connect the equipment together as shown in the diagram below:

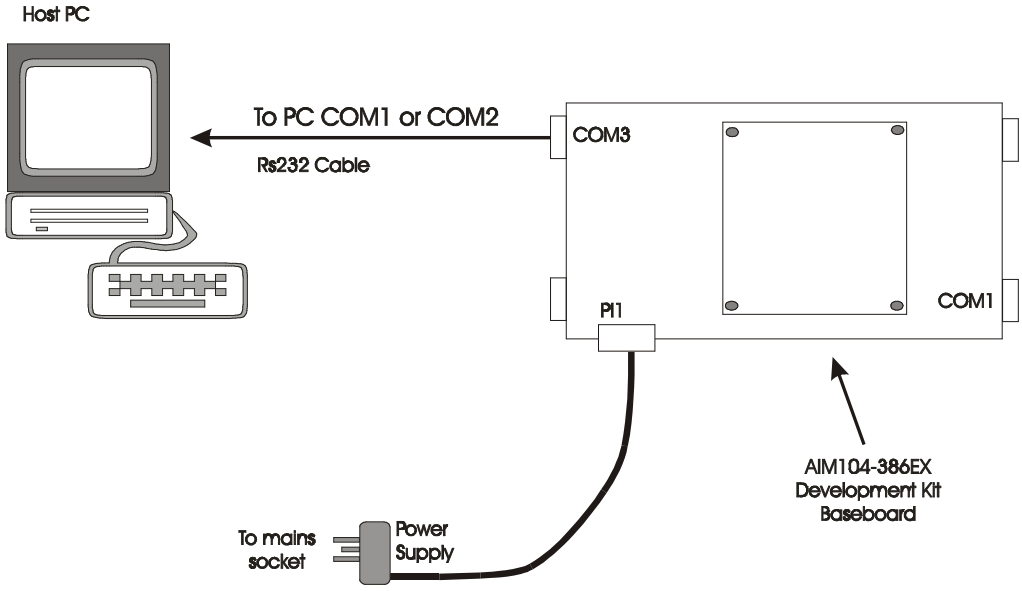


Figure 4

- Ensure that the AIM104-386EX module is correctly plugged into the Development Kit baseboard as shown in figure 1, in the introduction section of this manual.
- Connect the spare COM port (COM1 or COM2) of your PC to COM3 of the Development Kit baseboard using one of the RS232 cables provided.
- Plug the 6-way screw terminal connector of the power supply cable into PL1 of the Development Kit baseboard.
- Set the terminal emulator program (e.g. HyperTerminal) running on the host PC. Set the terminal emulator COM port connection setting to COM1 or COM2 (whichever you have plugged the RS232 cable into). Set the port settings as follows:

Bits per second (baud rate):	19200
Data bits:	8
Parity:	None
Stop bits:	1
Flow Control:	None

- Plug the power supply into a mains outlet socket (100V - 240V AC).

You should now see something like the following in the terminal emulator window:

```
Datalight BIOS v1.03
For the AIM104-386
Build 229 Date 07/21/99
Copyright (c) 1997-1998 Datalight Inc.

Tested RAM 00640k

Press F2 or `<` to enter setup

Datalight FlashFX
V4.02.229 386 DOS
Copyright (c) 93-99
Patent US#5860082
V1i02-P{ortions Copyright Arcom Control Systems Ltd 1999

4 Serial Ports, COM1 at 03F8H

Starting ROM-DOS...

C:\>
```

In the terminal emulator window type: DIR <return>

You should now see a list of the files on the flash disk (drive C:) of the AIM104-386EX. It should look something like this:

```
C:\>

 Volume in drive C is NO NAME
 Volume Serial Number is D888-6FE0
 Directory of C:\

CONFIG      COM      31,533   06-04-1999   6:22a
FXFMT       EXE      19,006   03-31-1999  11:28a
RSZ         EXE      32,340   01-28-1999   7:29p
AUTOEXEC    BAT           9   01-01-1980  12:58a
R           BAT         140   01-01-1980  12:58a
            5 file(s)      83,028 bytes
                          704,512 bytes free

C:\>
```

[**Note**: actual files on the flash disk may differ from those shown above]

Transferring Files to the AIM104-386EX Flash Disk

There are 3 utilities provided that can be used to transfer files from the host PC to the AIM104-386EX flash disk. These are TRANSFER, RSZ and REMSERVE. However, only RSZ can be used to transfer files between the host PC and the AIM104-386EX using the serial console link.

Step-by-step instructions on transferring files using RSZ are given below. If TRANSFER or REMSERVE is used, you would need to either use two cables, or swap over the connection from COM3 to one of the other COMs ports at the time of file transfer.

RSZ File Transfer

In the terminal emulator type:

```
RSZ /p3 /b115200 /i1 /r
```

Alternatively type ‘R’ and return to run R.BAT on the flash disk.

Now set the terminal emulator baud rate to 115200 baud. Most terminal emulators will allow you to transfer a file using a 'file transfer' utility.

Remember that RSZ uses the ZMODEM protocol.

Once the transfer is complete, reset the terminal emulator back to 19200 baud. You should now be back to the C:\ prompt of the AIM104-386EX flash disk. IF you are using hyperterminal, you must disconnect and then reconnect the comms link whenever changing the baud rate (use the toolbar buttons).

If you cannot transfer a file within your terminal emulator then you must first shut it down after entering the above command. Open up a DOS window and then type:

```
RSZ /p1 /b115200 /s [filename]
```

(Replace /p1 with /p2 if using COM2 instead of COM1)

You can of course transfer files at 19200 baud, which will save you the trouble of changing the baud rate. However, the file transfer time will be exceedingly slow for any but the smallest of files.

Additionally you may change the BIOS setup to run the serial console at 115200 baud. You will then not need to set Hyperterminal to run at 19200 baud after downloading. See the Technical Manual for details.

Borland C Turbo Debug Remote

The Borland C Turbo Debug Remote facility is the most appropriate for developing code. It requires that the AIM104-386EX be loaded with the file TDREMOTE.EXE. After this the application code can be loaded and run on the AIM104-386EX within the familiar Turbo Debug environment.

The run in remote mode requires an RS-232 cable connected between the host PC and COM1 or COM2 of the AIM104-386EX. If you are using 2 PC COM ports, then you can simply type in the terminal emulator:

```
TDREMOTE -rpX -rsN
```

Where X is 1 or 2 (the COM port to be used), N is the baud rate to be used. This is specified as:

```
-rs1        9600 baud
-rs2        19,200 baud
-rs3        38,400 baud
-rs4        115,200 baud
```

If you are only using one serial link between the PC and the host, it will be most convenient to add the above TDREMOTE command into the autoexec.bat file, reconnect the RS-232 cable to COM1 (or 2) of the AIM104-386EX and then reboot it.

The AIM104-386EX is now ready to receive the application. Next, we set up the host PC. Type the following at the DOS prompt:

```
TD -rpX -rsN AppName
```

Where X is the COM port and N the baud rate as before. Note that the link speed set here must be the same as that set up on the AIM104-386EX.

AppName refers to the application name (the .EXE file). When you have done this you will see the TURBO DEBUGGER screen. *Full details of Remote Debugging can be found in the BORLAND ON-LINE HELP files or in BORLAND manuals.*

If the TDREMOTE command is added to the AUTOEXEC.BAT file and you have difficulty exiting from the utility (with ctrl-C) you can bypass AUTOEXEC.BAT commands (line by line) by pressing shift-B when ROM-DOS starts. See Appendix C (Start-up Options) for more details.

Section 2 - Using the AIM104-386EX as a Target Processor Board

Software Installation

Install the software supplied on the CD-ROM before setting up the Development Kit hardware.

Your PC must be running Microsoft Windows 95 or above (Windows 98, Windows NT) in order for the installation program to run. You must also have a terminal emulator program installed on your PC, e.g. HyperTerminal (part of the standard Windows 95 'Accessories' package), Procomm Plus, or any other equivalent.

4) Insert the CD-ROM into the CD drive of the host PC. Click on the Start button and then select "Run…".

5) Type CD:\setup.exe (change "CD" to the drive letter of your CD drive) and click on "OK".

6) Follow the on-screen instructions to install the Development Kit software. You have several installation options. Primarily:

- Development Kit Utilities (always select this option, if first installation)
- AIM104-386EX Target Library
- Documents (AIM104-386EX manuals and datasheets in PDF format and other help text files)

There are other files on the CD that are not installed on your PC as part of the installation procedure. Many of these (e.g. the binary flash image) are only required if you encounter a problem during your development (e.g. you accidentally erase part of the BIOS program from the flash memory). There are help files on the CD-ROM that explain the use of many of these files.

Hardware set-up

Ensure that you have all the Development Kit hardware as listed in the 'Packing List' at the start of this manual. Check that the links are as shown in the link settings diagram below. All links settings are as the factory default settings except link 4C, which must be fitted.

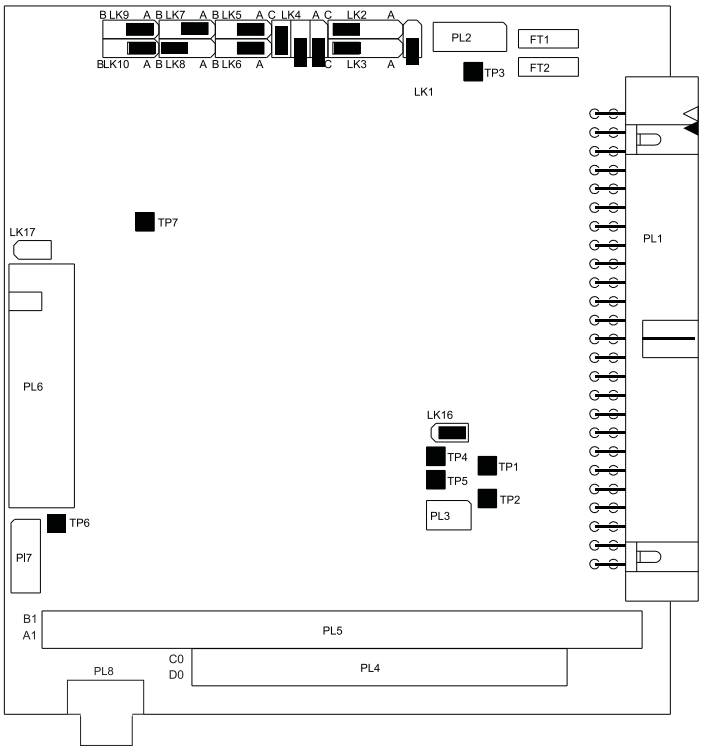


Figure 5. Link settings for Target Board development

•· Ensure that the AIM104-386EX module is correctly plugged into the Development Kit baseboard (as shown in figure 1, in the introduction section of this manual).

• Connect COM1 or COM2 of your host PC to COM3 of the Development Kit baseboard using one of the two RS232 cables provided.

• Plug the 6-way screw terminal connector of the power supply cable into PL1 of the Development Kit baseboard.

• Plug the power supply into a mains outlet socket (100V - 240V AC).

The equipment should look something like this:

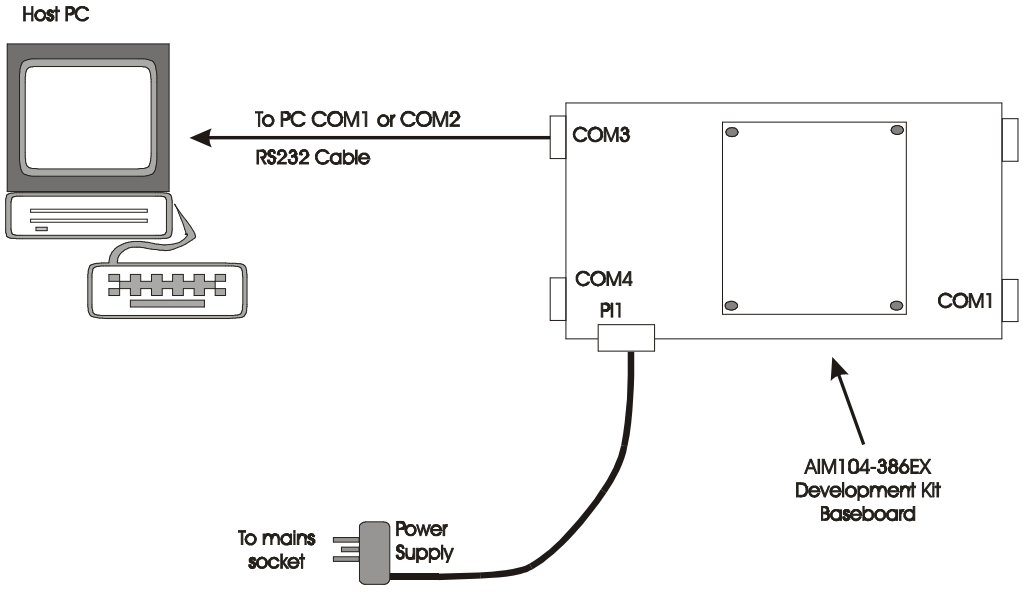


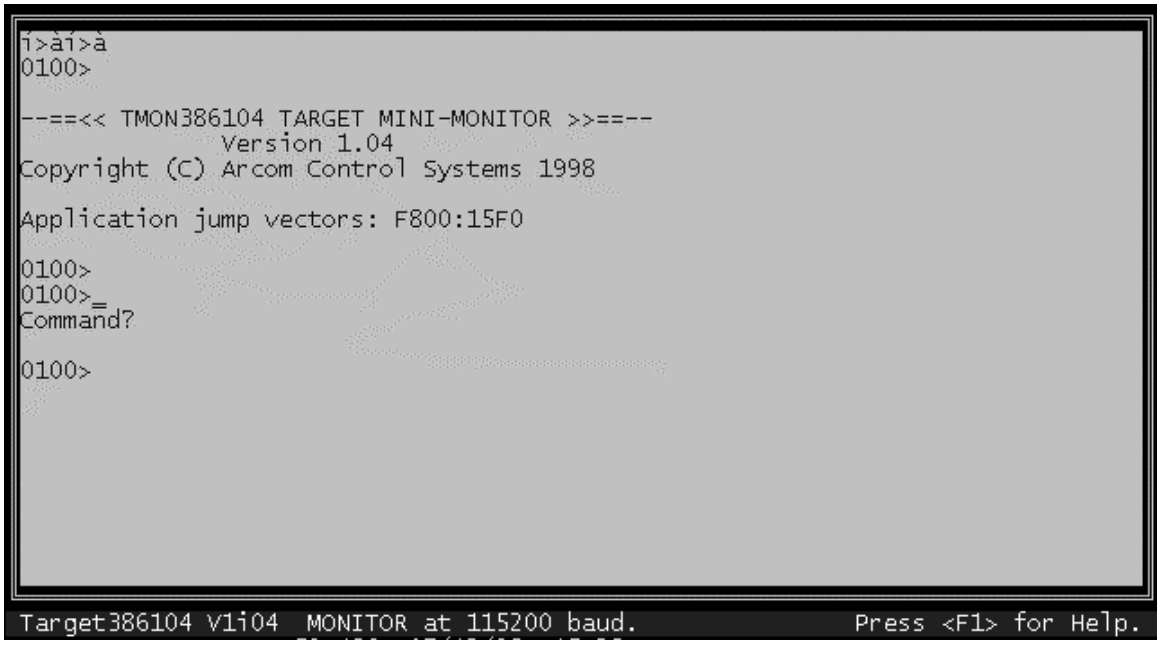
Figure 6.

During the CD-ROM software installation, a utility called TCOM should have been installed on your PC. If you installed everything in their default directories you will find the utility in C:\386104\TCOM. It is also in the Software\Arcom\TCOM2.1 directory on the CD-ROM. There are three files, TCOM.EXE, TCOM.INI and a README.TXT file.

The TCOM.EXE utility uses COM2 of the host PC. If you are connected to the AIM104-386EX via COM1 of your PC you will need to edit the TCOM.INI file. The README.TXT file explains how to edit the TCOM.INI file so that the TCOM utility uses the COM1 port of the PC.If necessary, edit the TCOM.INI file to use the correct COM port.

- Open up a DOS window on the host PC. Run TCOM.EXE. Pressing F1 brings up a help window listing the TCOM options.
- Press F7. This causes TCOM to scan the COM port for the target board.

You should now see something like this:



TCOM is a DOS utility which acts as a terminal emulator, but can communicate with the TMON application running on the AIM104-386EX board. The AIM104-386EX BIOS checks the status of link 4C. If it is not present, the BIOS jumps to ROM-DOS. If the link is present, the BIOS jumps to the TMON application.

The TCOM function keys, when pressed, run macros which execute TMON commands. TMON 'command line' commands can be typed directly at the TCOM command prompt. The prompt displays the current data segment, e.g. "0100>". For further details on the TMON utility, see Appendix C. Press F1 to display the list of TCOM options.

For further details on monitor commands press ‘H’ (for help) at the “0100 >” prompt.

Debugging Target Code Using Paradigm

Development of code running in the ROM-DOS environment can be debugged using TDRemote, supplied with BorlandC v4.52. Debugging code running in a target environment is more difficult. It is recommended that developers use Paradigm for debugging target code running on the AIM104-386EX. Paradigm is a software development tool for debugging embedded system code. Further details about the software can be found on Paradigm Systems, website: www.devtools.com .

The Paradigm remote portion required to run on the AIM104-386EX module when using Paradigm has already been loaded into the flash as standard, and can be activated through the BIOS settings, see the Technical Manual, appendix C.

When the Paradigm startup check is enabled in the BIOS there is a 5 second delay (approx.) on startup whilst a Paradigm connection is checked for on COM2. If no connection is made, the AIM104-386 continues booting.

The Development Kit CD-ROM contains support files for Paradigm. An explanation of these files and how they are used to set-up and run Paradigm is given below. It is assumed in this section of the manual that the user has installed both Paradigm and Borland C to their default directories (C:\PD, C:\LOCATE and C:\BC45).

Installation of Arcom support files

Install both the Arcom Target Libraries and the Arcom Paradigm Support files using the auto-install program on the Development Kit CD-ROM. Both Borland C v4.52 and Paradigm must already be installed in their default directories for this installation to work.

Arcom Target Libraries install to:

```
C:\BC45\386104
```

Start-up Code installs to:

```
C:\LOCATE\BCPP45\386104
```

Helpers install to:

```
C:\LOCATE\BCPP45\HELPERS
```

Include files, Libraries and Demonstration code installs to:

```
C:\BC45\PD386104\INCLUDE
C:\BC45\PD386104\LIB
C:\LOCATE\BCPP45\DEMO
```

The start-up and support files are specific to the AIM104-386EX module. They are included into Paradigm applications at link time.

Start-up Code

The start-up code filenames are:

```
BCCx.yyy    where x = {s,m,c,l,h}      The memory model
            And yyy = {rtm,dbg}        Release or Debug
```

Runtime Debug Kernel Customisation:

```
KERx.yyy
```

Heap management for BC++:

```
DMMx.yyy
```

Helper Support Files (C:\LOCATE\BCPP45\HELPERS)

```
CONx.yyy              Console I/O Driver
EMUx.yyy              DOS Emulation Support
RTLx.yyy              Runtime Library Support functions
SIOx.yyy              Stream I/O Support
```

Include Files (C:\BC45\386104\INCLUDE)

These include files are needed to build the demonstration code.

```
ArTypes.h             Generic Type Definitions
ArSystem.h            Generic System Definitions
ArComm.h              Generic Communications Definitions
Ar386104.h            Platform Specific Definitions
ArTmr.h               Generic Timer Definitions
ArUart.h
INS8250.h
```

Library Files (C:\BC45\386104\LIB)

The Arcom Target Libraries for the 386104 board. See the Targetlib.pdf file (on the Development Kit CD-ROM) for more details.

```
3861040x.yyy          where x = {s,m,c,l,h}
                      And yyy = {lib,dbg}
```

Demo Files (C:\LOCATE\BCPP45\DEMO)

The Demo source code and build configuration files. The demo program only uses a small subset of the available Target library functionality.

```
Makefile              MAKE utility configuration file
386104.rt             Paradigm Locate Configuration for debugging
386104.rm             Paradigm Locate Configuration for binary image
Devpath.mkf           Path definition file
Paradigm.mkf          Paradigm environment definition file
Fardata.cfg           Paradigm environment definition file
Flashled.c            Demo source
```

`Flashled` is a very simple demonstration program that flashes the two LEDs (on the Development Kit baseboard) in a simple sequence. The purpose of the program is to demonstrate the processes involved in using Paradigm to debug an application and then generate a rommable image for programming into the Flash on the AIM104-386EX Target.

Building the Application

To build the program type MAKE. This will build the program for the AIM104-386EX board, small memory model for debugging. (Ensure that your paths are set to contain the PDRT186 and LOCATE programs).

Debugging the Application

To debug the application type: `PDRT186 FLASHLED`

(Ensure that the PD\PDRT186.INI file is set for the communications port and baud rate that you wish to use. The remote portion of Paradigm runs on the AIM104-386EX at a baud rate of 115200 baud, COM2.)

The application will download to the target and run. DO NOT single step over the first few lines of code because interrupts are disabled here. If you do, the communications link will timeout.

The green and red LEDs should be flashing on and off when the application is running. If they are not, check that links 5 and 6 are in the A position.

Generating Rommable Code

Edit `MAKEFILE` and change the value of `DEBUG` to 0. Re-BUILD the application using `MAKE -B`. This generates a file `FLASHLED.HEX`

The locate information for this demonstration program creates a .HEX file for a binary image, 64KB in size. This is because the default runtime start-up code sets up a memory map with 0x0000:0000 - 0xE000:0000 set for SRAM access and 0xE000:0000 - 0xFFFF:000F set for flash access. TMON and PDREMOTE are stored in the region 0xF000:0000 - 0xFFFF:000F. This leaves the 64KB segment at 0xE000:0000 available for code.

This does not impose a great restriction on application code size, as application code at 0xE000:0000 may be used as a 'Bootloader' to shadow code from the rest of the 1MB flash part to SRAM. Alternatively, the start of the flash window (0xE0000) may be lowered to, say, 0x80000 giving a memory map similar to that used by the Arcom Target386EX board.

Downloading HEX Code to the AIM104-386EX

Use the supplied Arcom Utility 'TCOM' to download the Intel Hex file and blow it into flash memory, as follows:

- Insert LK4C on the AIM104-386EX and reset the board and reset the board. This will start TMOM.

- Run TCOM on the host PC, ensuring that the TCOM.INI file is set for your COM port. After TCOM finishes detecting the version of TMON running, enter the P command and download the file FLASHLED.HEX.

- To download the program into flash memory from its load location to the flash bootstrap location, type:

  C 1000 E000 1000

Setting the Application Jump Vector

The application jump vector is where TMON will start running your code if link 4C is not inserted. NOTE down the current settings (displayed when TMON starts) as these will be required when you wish to return to the original configuration - e.g. to run Paradigm or ROM-DOS).

Use the TCOM option 'F2' to alter the application jump vector settings. When prompted, enter the new jump vector, which for this example is: E000:0000

Allow TCOM to set up this new jump vector (TCOM will alter the TMON mini-monitor code and then restart TMON).

Ensure link 4C is not fitted and then reset the board. The application will run automatically, and the green and red LEDs should flash on and off.

NOTES on BCPP45.ASM startup code

(which compiles to become BCCx.yyy)

If the RUNTIME version of BCPP45.ASM (BCCx.RTM) is used, the following settings are applied to the CSU amd ICU:

(The DEBUG version does none of this)

i. CS0 is enabled for the entire 1MB range of SRAM

ii. CS1 is disabled within startup code (PC/104 Memory Access)

iii. UCS is set to the E000:0 to FFFF:F range (top 128KB)

iv. PC/104 I/O is enabled for 0-0x3ff

v. COM3 is enabled for 0x3e8-0x3ef

vi. COM4 is enabled for 0x2e8-0x2ef

vii. Parallel I/O (Matrix Keypad / Flash Paging / RTC - There is no Printer Port) is enabled for 0xEC00 - 0xEC0F

viii. CS5 is enabled

ix. CS2 set to 8 w.s. (for SVIF)

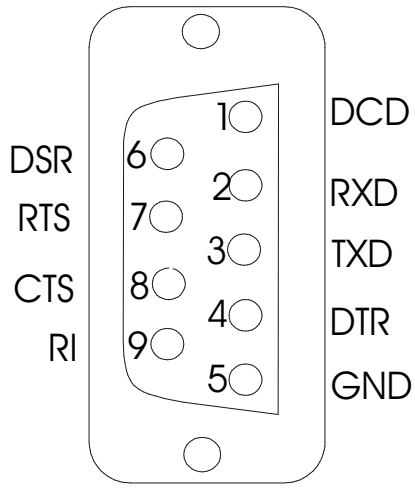
x. Watchdog counter is disabled

xi. Interrupts are masked off.

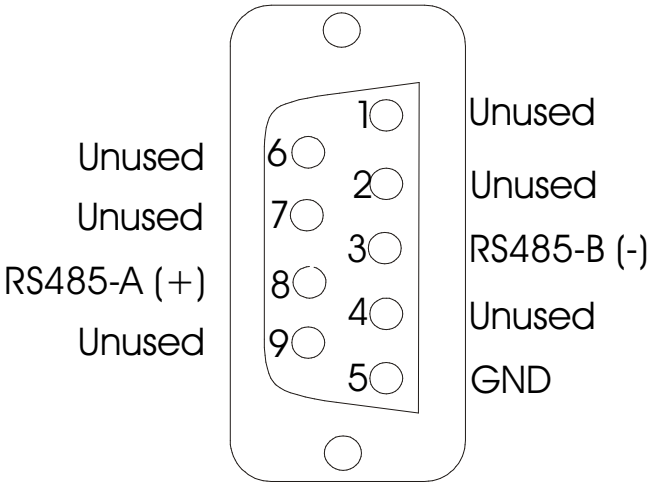
Therefore it is important to note that code stored in flash will NOT BE VISIBLE in the memory range 0x80000-0xE0000. If code is to execute from this memory range, the code in flash must first be shadowed to SRAM using a routine stored within the flash range 0xE0000-0xF0000.

Appendix A - Baseboard Connections

COM1, COM2 and COM3

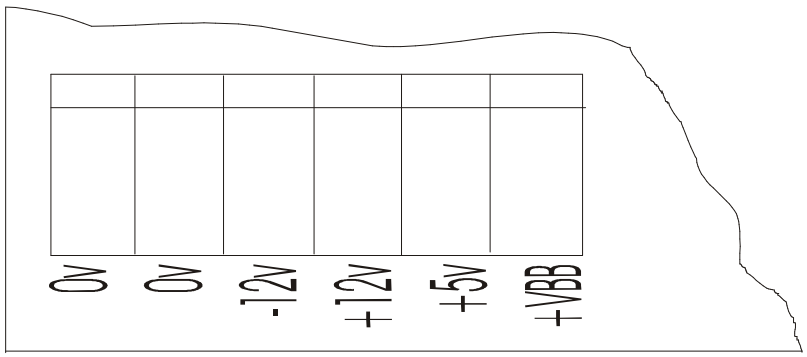


COM4



PL1 - Power Input

Bottom leftside view of circuit board.

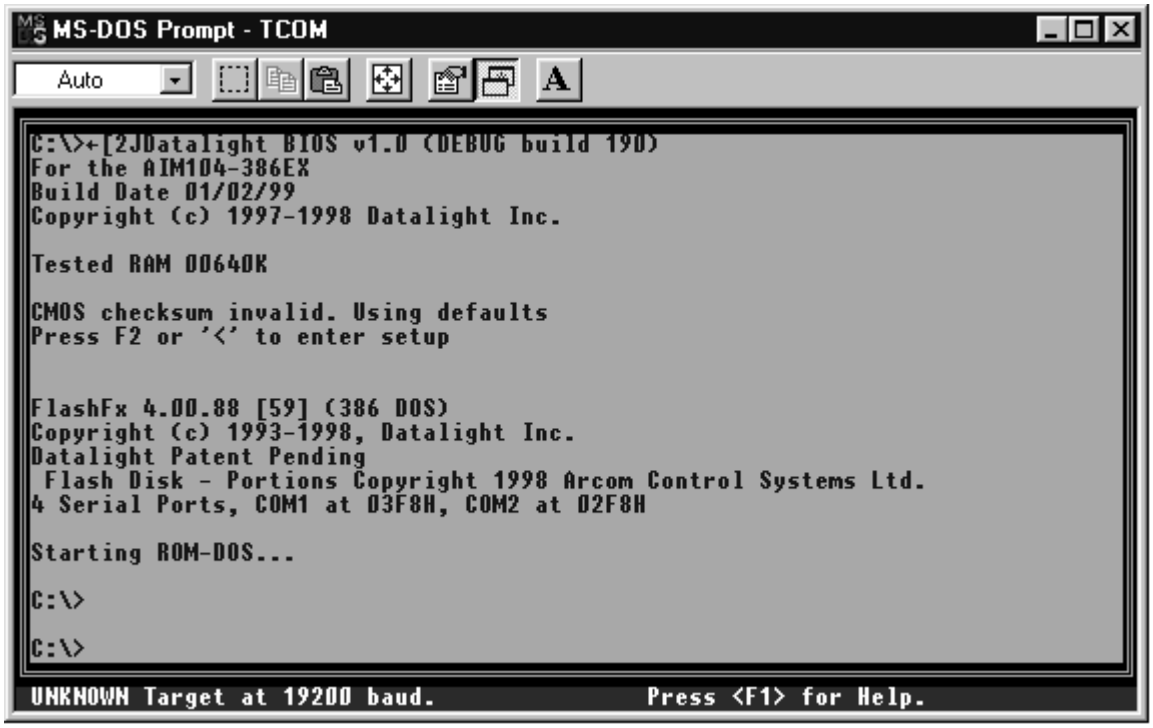


Appendix B - Using TCOM as a Terminal Emulator for ROM-DOS development

TCOM can be used as a basic terminal emulator. If you have another terminal emulator such as HyperTerminal or Procomm Plus it is suggested that you use that instead as it will have greater flexibility.

The hardware should be set-up as explained in section 1 of the manual, using either one or two serial links between the host PC and the AIM104-386EX module. Power up the AIM104-386EX, to boot-up in to ROM-DOS.

Run TCOM.EXE. It will briefly scan for a 'target' board, looking to see if TMON is running. You can prevent the auto-scanning when TCOM starts up by editing the TCOM.INI file. To do this, change the SCAN=Y; to SCAN=N;. After a couple of seconds it will default to terminal emulator mode, running at 19200 baud, 8, n, 1 on COM2. If you are using COM1 to connect to the AIM104-386EX COM3, you will need to change the COM port settings in the TCOM.INI file, and then re-start TCOM. You should now see something like this:



You can now use TCOM as a standard terminal emulator. Pressing ‘F1’ brings up a list of function key commands. Most of these are specifically for using, TCOM in a target environment and should be ignored. ‘F8’ changes the COM port settings and ‘F10’ exits TCOM.

Appendix C - Baseboard (AIM104-386DB) Circuit Diagram