



Arcom ELAN-IO4NC

QNX Development Kit

Quickstart Manual

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Important Notice

Arcom Control Systems supplies an evaluation copy of QNX 4.25, Photon microGUI and Voyager Browser with our QNX Development Kit product. This is time limited for a minimum of 30 days. After this time you must contact your local QNX sales office to purchase a fully licensed version of QNX Development software. Please also contact the QNX sales office for all enquiries concerning run time license costs.

Anti-Static Handling

This board contains CMOS devices that could be damaged in the event of static electricity discharged through them. At all times, please observe anti-static precautions when handling the board. This includes storing the board in appropriate anti-static packaging and wearing a wrist strap when handling the board.

Packaging

Please ensure that should a board need to be returned to Arcom Control Systems, it is adequately packed, preferably in the original packing material.

Support

Arcom Control Systems has a team of Technical Support Engineers who will be able to provide assistance if you have any problems with using this development kit, please contact support@arcom.co.uk (Europe) or support@arcomcontrols.com (US/Canada)

Acknowledgments

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Preface

The ELAN-104NC is a PC/AT compatible Single Board Computer. It incorporates all the features found in a standard PC/AT system and has extra support for embedded applications, including ethernet, additional serial ports, general purpose I/O, flat panel display interface and silicon disk. The development kit has been produced to help users become familiar with the board very quickly and provide them with the support needed to start developing an application right away.

This manual is intended as a guide to enable users to get the ELAN-104NC configured and running as soon as possible. The board supplied in this development kit contains 8Mbytes of flash memory, which has been pre-configured with Arcoms image of the QNX operating system. Once power is applied to the board it will automatically boot from the on board flash disk and you will be able to start development.

A comprehensive board manual is supplied on the Arcom support CD-ROM. This provides information on the board to enable you to add other peripherals as required, and provides detailed information on all the peripherals incorporated on the board. QNX documentation is supplied on the QNX product suite CD-ROM.

What's in the Kit?

Arcom's ELAN-104NC basic kit for QNX v4.25 comprises of the following items:-

- An ELAN-104NC M16-F8 Single Board Computer loaded with a QNX V4.25 image
- A power supply with US, UK and EURO style plugs, and power connectors for the ELAN-104NC board
- A power supply adapter cable
- A PS/2 mouse
- An RJ45 cross-over network cable
- A PS/2 to AT keyboard adapter
- A VGA adapter cable
- An IDE disk drive cable
- A floppy drive cable
- An ELAN-104NC QNX V4.25 development kit CD-ROM
- A floppy disk containing a set of QNX expiring licenses
- This set of instructions
- QNX 4.25 evaluation development suite

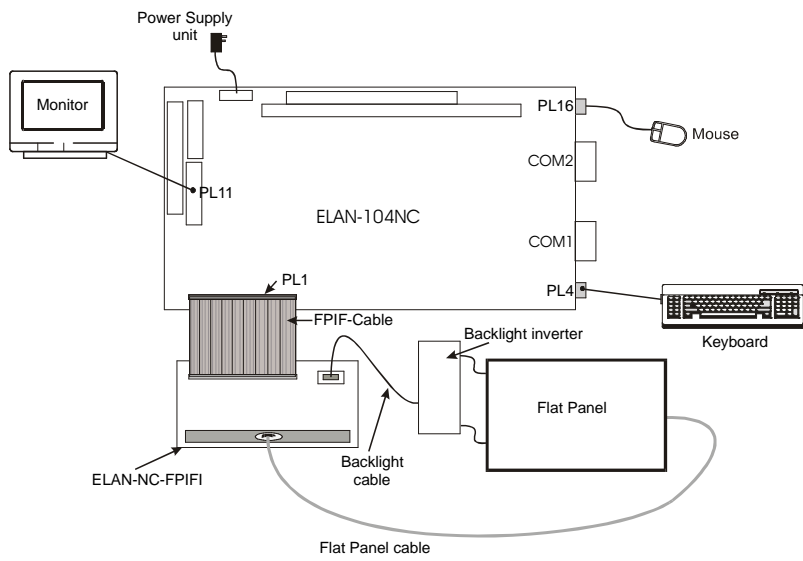
What else do I need?

- PS/2 or AT keyboard
- A VGA monitor (If the kit did not include a flat panel)
- A PC running QNX version 4.XX (for task 2) with 3Gbyte hard drive disk space; 32Mbyte RAM; CD-ROM drive and floppy drive
- A floppy drive

Getting Started

This section guides you through the step-by-step process of connecting up the ELAN-104NC board for the first time and powering the system to display the 'Photon microGUI' on the display. The ELAN-104NC is delivered ready to run and there are no link settings or configuration switches that need adjusting to ensure the board will operate. If you follow the steps detailed in the Quickstart Manual the board will automatically power and load the QNX operating system from flash memory.

Setup Diagram



Task Analysis

The following section include three tasks, which take the user through the process of :-

1. Powering up the ELAN-104NC board
2. Connecting the ELAN-104NC to a QNX network PC
3. Configuring the ELAN-104NC board for TCP/IP

Task I: Powering up the ELAN-104NC

1. Plug the supplied mouse cable into the socket labelled 'PL16 MSE'
2. Plug your keyboard cable into the socket labelled 'PL4 KBD'
3. If using a CRT monitor:
 - Plug the video monitor into the supplied VGA adapter cable, plug the cable into the socket labelled 'CRT PL11'
4. If using a flat panel instead of a CRT monitor:
 - Check the ELAN-104NC board links are in the correct position for the LCD being used. (See the ELAN-104NC Technical Manual, supplied on the support CD-ROM for further information.) For the NEC 6.5" flat panel supplied in the kit, these links should be set as 'LK1 A', 'LK11 B'
 - Plug the interface cable between the ELAN-104NC board socket labelled 'Flat Panel PL1', and the FPIF board socket 'PL1'
 - Plug the interface cable between the flat panel and the FPIF board socket 'PL2'
 - Plug the backlight power cable between the FPIF board 'PL3' and the backlight inverter board

Note:

The default BIOS for the ELAN-104NC sets the output to 'CRT only' mode. If a CRT monitor is detected when the board is switched on. Therefore, to use a flat panel, make sure that a CRT monitor is NOT connected.

5. Fit the appropriate US, UK or Euro plug onto the power supply unit
6. Plug the power supply cable into the socket marked 'PL17 Power'
7. Plug the power supply unit into a 100-240V AC power supply
8. If required, press <F2> to enter the BIOS setup when booting (Refer to the BIOS section in the ELAN-104NC Technical Manual, supplied on the support CD-ROM for further information.)
9. The system will boot to Photon V1.13 and run Voyager V2.00

You have now completed Task I.

Task 2: Establishing a QNX Network

Note:

Consult your Systems Administrator before attempting to connect the ELAN-104NC board to your existing QNX network. This board is configured to boot as node 2 on a network at initial start-up. There is further instruction on editing the build file to configure the board as a different node number included in the help file on the QNX demonstration CD-ROM.

1. Connect ELAN-104NC board and host with network cable(s) - If you are connecting through an Ethernet LAN, you will use an RJ45 straight cable for each machine. If you are connecting directly between the host PC and the ELAN-104NC board, an RJ45 twisted cable has been provided in the development kit
2. On the ELAN-104NC board, Exit Voyager - Left-click the X in the top right hand corner of the Voyager window
3. On the ELAN-104NC board, Exit Photon - Left-click the QNX symbol in the bottom left hand corner of the window. Left-click 'Shutdown'. When the window appears, left-click 'Shutdown'
4. Get the physical ethernet address - The following commands will start the ethernet driver and print out the physical ethernet address for the ELAN-104NC:

Net & <enter>

Net.ether1000 -vvv & <enter>

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5. Edit the host PC's netmap file - On the host PC you will find the netmap file in the '/etc/config' directory. You must enter the node id, the network id and the address of the ethernet card here. It should be configured as follows:

<u>#Logical</u>	<u>LAN</u>	<u>Physical</u>
<i>host_node_#</i>	<i>net_id</i>	<i>Physical_address_host_node</i>
2	<i>net_id</i>	<i>Physical_address_ELAN-104NC</i>

6. Update the hosts network table - After saving and exiting the netmap file type:

netmap -f

Note:

You should be able to establish a connection to the ELAN-104NC board. Type 'ls //2' from your host PC. If you receive any error messages, retrace the first 5 steps.

7. On the ELAN-104NC board, create a backup copy of the '.licenses' file
- cp .licenses .licenses.old**
8. From your host PC, insert the licenses on the host PC and refresh licensing file as follows:

cat //2/licenses >> /.licenses
license -r

9. From your ELAN-104NC board, copy the licensing information from the host PC and refresh licensing file

```
cp //host_node/licenses //2/licenses  
license -r
```

10. Installing old style licenses on the ELAN-104NC board - If there are licenses listed in the '/etc/licenses' directory of your host PC, you must follow these instructions. Otherwise, skip to step 11. Insert license disk into floppy drive on the ELAN-104NC board, then follow these steps

```
Fsys.floppy &  
license  
license -r
```

11. Run nameloc on your host PC - You may use the sin command to check if nameloc is already running

```
nameloc &
```

12. Reboot

```
shutdown
```

You have now completed Task 2.

Task 3: Configuring the ELAN-IO4NC board for TCP/IP

Note:

Your system administrator will be able to tell you which IP address, netmask, and gateway address you can use. Please consult this person before proceeding. You may also edit the /etc/netstart file to configure TCP/IP during the boot process.

1. Exit Voyager and Photon (See steps 2 and 3 of Task 2 above)
2. Enter the IP address - The 'X' is the number of logical QNX LANs running the hardware protocol
ifconfig enX ip_address
3. Enter the netmask - The 'X' is the number of logical QNX LANs running the hardware protocol
ifconfig enX netmask net_mask
4. Enter the default gateway address
route add default gateway_address
5. You may now use the TCP/IP services listed in the '/usr/ucb' directory. If you'd like to use the Voyager Web Browser type
ph

You have now completed Task 3.

Reinstalling the QNX Image

You can reinstall Arcom's QNX Image from a QNX Host Machine by creating a network boot disk for the ELAN-104NC board, or with a bootable floppy and Arcom's CD.

Reinstalling with a bootable floppy and Arcom's CD-ROM

Creating a CD Boot Disk from a Windows Machine:

1. Put Arcom's QNX CD into CD-ROM drive on Windows machine
2. Goto /DOS/DiskImages directory
3. Insert Dos formatted floppy disk into a: drive
4. Double click CD_boot.exe and follow instructions

Creating a CD Boot Disk from a QNX Machine:

1. Put Arcom's QNX CD into CD-ROM drive on QNX machine
2. Insert blank floppy into QNX machine
3. Mount CD-ROM
4. Goto /bin directory on CD
5. type

./cdboot

(This script file will format and check the disk, before copying the image)

Installing Arcom's QNX Image from Arcom's CD:

1. Attach floppy drive to ELAN-104NC board, plug floppy drive cable into socket labelled 'PL9'

2. Attach CD-ROM drive to ELAN-104NC board, plug CD-ROM drive cable into socket labelled 'PL8'
3. Insert floppy into floppy drive, CD into CD-ROM drive and boot ELAN-104NC board. Check that the BIOS is set to boot to a: first
4. Once prompt appears, type:
install
After you are asked if you would like to format the flash drive, installation of the files will take approximately 7 minutes
5. Reboot ELAN-104NC board

Reinstalling using a network boot disk & QNX Host Machine

Note: Check with your Systems Administrator before using this method of installation. The disk created will begin network services for the on board Ethernet. The disk will be configured to boot as node 2 on a QNX network. Also, the files will take up at least 8 Meg of available space on the host QNX machine.

Creating the network boot disk from Windows Machine:

1. Put Arcom's QNX CD into CD-ROM drive on Windows machine
2. Goto /DOS/DiskImages directory
3. Insert Dos formatted disk into a: drive
4. Double click qnx_net_boot.exe
5. Put Arcom's QNX CD into CD_ROM drive on QNX machine
6. Copy the flash image file to your root directory:
cp elannc.img /
7. Edit the /etc/config/netmap file to include node 2 with the Ethernet address of the on board Ethernet and update network mapping by:
netmap -f

Creating the network boot disk from QNX Machine and copying files to Host Machine:

1. Insert floppy disk into QNX host machine
2. Put Arcom's QNX CD into CD-ROM drive on QNX machine
3. Copy the flash image file to your root directory:

cp elan.img /

4. Goto /bin directory on CD
5. Type:

./netboot

(This script file will format and check the disk, before copying the disk image)

6. Edit the /etc/config/netmap file to include node 2 with the Ethernet address of the on board Ethernet and update network mapping:

netmap -f

Reinstalling Arcom's QNX Image:

1. Attach floppy drive to ELAN-104NC board. Plug floppy drive cable into socket labelled 'PL9' and apply power
2. Boot ELAN-104NC board to floppy disk, make sure the BIOS is set to boot to a: drive
3. Make sure you have a connection to your ELAN-104NC board. From your host QNX machine, type:

ls //2

You will receive an error if there is no connection, check with your network administrator that your netmap file in the host machine is set up properly, and you have proper cabling.

4. On the ELAN-104NC board, at the prompt type:

finit

5. From your ELAN-104NC board copy the image to the ELAN-104NC board by typing:

fxwring /dev/rfd0 //host_node/elan.img

(It will take approximately 8 minutes to load the image)

6. Reboot ELAN-104NC board, set BIOS to boot to c: drive

Production Image Loading

When your development is complete, we suggest setting up your boards for production as follows.

1. Configure a hard drive with minimal QNX operating system files (see FAQ on Support CD) and place the following utilities found on the support CD in the /bin directory, to the /bin directory on the hard drive.

Fsys.ElanNC
dinit
fxfmt
fxwring
fxrdimg

2. Connect the hard drive from the development processor board's IDE interface.
3. Boot the development board to the hard drive.
4. Start the Flash Disk Driver:
Fsys.ElanNC &
5. Create an image of the flash on the hard drive:
fxrdimg /dev/rfd0 Image.img
6. Power down the development board and attach the hard drive to the production board's IDE interface.
7. Boot the production board to the hard drive
8. Start the Flash Disk Driver:
Fsys.ElanNC &

9. Format the flash drive:

fxfmt /dev/rfd0

10. Initialise the flash drive:

dinit -h /dev/rfd0

11. Write the flash image to the production board:

fxwring /dev/rfd0 *Image.img*

12. After powering down the board, detach the hard drive and reboot. The board should boot and appear the same as the development board.

Once a hard drive has been properly configured and you are satisfied with your product you can insert steps 8, 9 and 10 to automatically run from the /etc/config/sysinit file on your hard drive.

Reinstalling the expiring licenses

If you are using a network you can install the licenses onto your host node, then copy the file to your ELAN-104NC board across the network as follows:

1. Place the license disk in the floppy drive of the host node.
2. Type license and follow instructions
3. On the host node type:
license -r
4. From the host node, copy the licensing file to the ELAN-104NC board:
cp /.licenses //2/.licenses
5. On the ELAN-104NC board type:
license -r

To install the licenses directly to the ELAN-104NC board:

1. Place the license disk in the floppy drive of the ELAN-104NC board
2. Type:
license
3. Type:
license -r

Using the ELAN-104NC

If you have followed the 'Getting Started' section you will have a working ELAN-104NC system. To start developing and using features of the board you will need to refer to the User Manual, which is supplied on the support CD-ROM. This manual contains information on all aspects of the board and guides you through connecting other peripheral devices such as hard disk, floppy disk, CD-ROM drives, mouse etc.

The User Manual is available as an Adobe Acrobat reader file and is located at:

D:\MANUAL\ELAN104NC.pdf

Where D: is your CD-ROM drive letter. Adobe Acrobat reader is also supplied on the CD-ROM and must be installed prior to using the manual. Refer to the README.HTM file for details on installing Acrobat Reader.

The Support CD-ROM also contains drivers, reference material, and example software.

Note:

The support CD-ROM supplied requires the Internet Explorer 5 browser, or an equivalent, to be installed. You can install IE5 from the CD-ROM to your PC by running 'IE5Setup' from the 'Internet Explorer 5' directory.

Power supply

A mains (100V-240V AC input power) supply rated at 4A, +5V DC is supplied. This is capable of supplying power for the board, keyboard and flat panel display (typically 2A required). If additional devices are also supplied using this adapter, please ensure that the overall current rating is not exceeded.

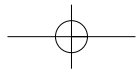
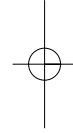
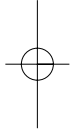
Three mains plug adapters are supplied as part of the kit, one of which should be the correct type for your country. Slot the appropriate plug into the power supply.

The power supply cable is fitted with a 6-way keyed connector. This connects directly to PL17 on the ELAN-104NC. The keyboard and flat panel display source power from the ELAN-104NC board.

Flat Panel Display

The flat panel display supplied in the development kit is a 6.5" NEC colour TFT display (NL6448AC20-06). This display has an 18-bit TFT interface and the ELAN-104NC is configured to drive the correct signals for this display. The CRT monitor is autodetected. If present the CRT will be used and the Flat Panel Interface will be disabled. If no CRT display is found the board will default to the Flat Panel Interface. Refer to ELAN-104NC manual on CD-ROM for more details.

The display has been chosen as an example to demonstrate the capability of the board. The interface can be configured to drive various types of displays, which may be more suitable for your application. Refer to the ELAN-104NC User Manual supplied on the CD-ROM for full details.



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