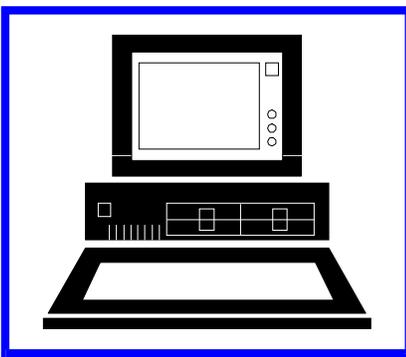
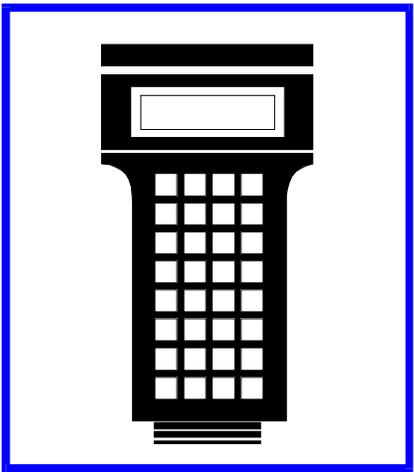
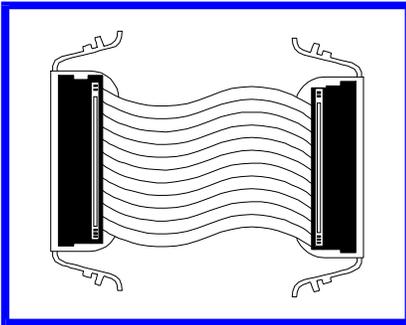
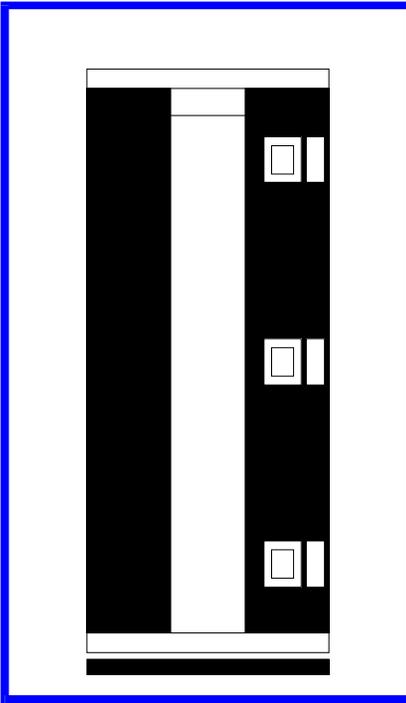
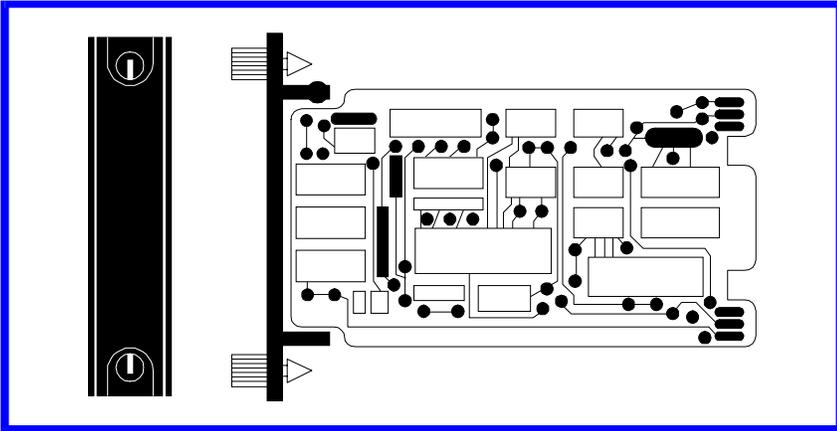
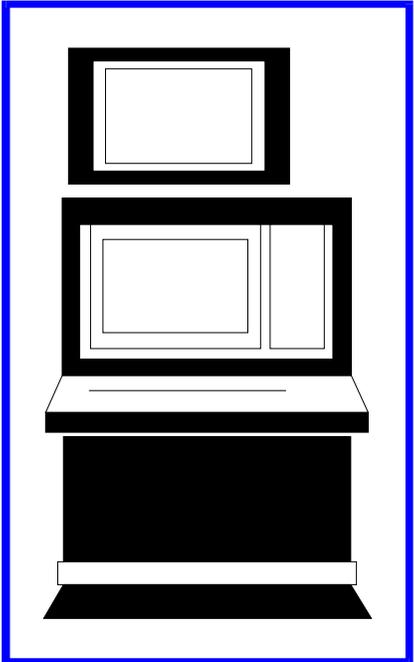


E97-811-1

Instruction

LAN-90[®] Process Control View (PCV[®]) Installation (Software Release 5.2)



WARNING notices as used in this instruction apply to hazards or unsafe practices that could result in personal injury or death.

CAUTION notices apply to hazards or unsafe practices that could result in property damage.

NOTES highlight procedures and contain information that assists the operator in understanding the information contained in this instruction.

WARNING

INSTRUCTION MANUALS

DO NOT INSTALL, MAINTAIN, OR OPERATE THIS EQUIPMENT WITHOUT READING, UNDERSTANDING, AND FOLLOWING THE PROPER **Elsag Bailey (Canada) Inc.** INSTRUCTIONS AND MANUALS; OTHERWISE, INJURY OR DAMAGE MAY RESULT.

RADIO FREQUENCY INTERFERENCE

MOST ELECTRONIC EQUIPMENT IS INFLUENCED BY RADIO FREQUENCY INTERFERENCE (RFI). CAUTION SHOULD BE EXERCISED WITH REGARD TO THE USE OF PORTABLE COMMUNICATIONS EQUIPMENT IN THE AREA AROUND SUCH EQUIPMENT. PRUDENT PRACTICE DICTATES THAT SIGNS SHOULD BE POSTED IN THE VICINITY OF THE EQUIPMENT CAUTIONING AGAINST THE USE OF PORTABLE COMMUNICATIONS EQUIPMENT.

POSSIBLE PROCESS UPSETS

MAINTENANCE MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL AND ONLY AFTER SECURING EQUIPMENT CONTROLLED BY THIS PRODUCT. ADJUSTING OR REMOVING THIS PRODUCT WHILE IT IS IN THE SYSTEM MAY UPSET THE PROCESS BEING CONTROLLED. SOME PROCESS UPSETS MAY CAUSE INJURY OR DAMAGE.

AVERTISSEMENT

MANUELS D'OPÉRATION

NE PAS METTRE EN PLACE, RÉPARER OU FAIRE FONCTIONNER L'ÉQUIPEMENT SANS AVOIR LU, COMPRIS ET SUIVI LES INSTRUCTIONS RÉGLEMENTAIRES DE **Elsag Bailey (Canada) Inc.** TOUTE NÉGLIGENCE À CET ÉGARD POURRAIT ÊTRE UNE CAUSE D'ACCIDENT OU DE DÉFAILLANCE DU MATÉRIEL.

PERTURBATIONS PAR FRÉQUENCE RADIO

LA PLUPART DES ÉQUIPEMENTS ÉLECTRONIQUES SONT SENSIBLES AUX PERTURBATIONS PAR FRÉQUENCE RADIO. DES PRÉCAUTIONS DEVRONT ÊTRE PRISES LORS DE L'UTILISATION DU MATÉRIEL DE COMMUNICATION PORTATIF. LA PRUDENCE EXIGE QUE LES PRÉCAUTIONS À PRENDRE DANS CE CAS SOIENT SIGNALÉES AUX ENDROITS VOULUS DANS VOTRE USINE.

PERTURBATIONS DU PROCÉDÉ

L'ENTRETIEN DOIT ÊTRE ASSURÉ PAR UNE PERSONNE QUALIFIÉE EN CONSIDÉRANT L'ASPECT SÉCURITAIRE DES ÉQUIPEMENTS CONTRÔLÉS PAR CE PRODUIT. L'AJUSTEMENT ET/OU L'EXTRACTION DE CE PRODUIT PEUT OCCASIONNER DES À-COUPS AU PROCÉDÉ CONTRÔLE LORSQU'IL EST INSÉRÉ DANS UNE SYSTÈME ACTIF. CES À-COUPS PEUVENT ÉGALEMENT OCCASIONNER DES BLESSURES OU DES DOMMAGES MATÉRIELS.

NOTICE

The information contained in this document is subject to change without notice.

Elsag Bailey (Canada) Inc., its affiliates, employees, and agents, and the authors and contributors to this publication specifically disclaim all liabilities and warranties, express and implied (including warranties of merchantability and fitness for a particular purpose), for the accuracy, currency, completeness, and/or reliability of the information contained herein and/or for the fitness for any particular use and/or for the performance of any material and/or equipment selected in whole or part with the user of/or in reliance upon information contained herein. Selection of materials and/or equipment is at the sole risk of the user of this publication.

This document contains proprietary information of **Elsag Bailey (Canada) Inc.**, and is issued in strict confidence. Its use, or reproduction for use, for the reverse engineering, development or manufacture of hardware or software described herein is prohibited. No part of this document may be photocopied or reproduced without the prior written consent of **Elsag Bailey (Canada) Inc.**

Preface

This manual applies to the LAN-90 PCV® Software Release 5.2 Installation procedure. It provides general information and specific instructions on installing the LAN-90 PCV base system software.

This manual, together with the Operation and Configuration manuals provide a complete description of the LAN-90 Process Control View (PCV) base system software package.

This manual can be used as:

- a reference guide for system engineers and technicians responsible for installing the hardware and software required to run LAN-90 PCV on a personal computer or a network of personal computers.

This manual assumes the reader has a general knowledge of CRT-based process control systems.

The following trademarks belong to the companies listed:

- Bailey®, LAN-90®, PCV®, INFI 90®, Network 90®, HARMONY 90™ - Elsag Bailey Process Automation
- QNX®, QNX Windows™ - QNX Software Systems
- MS-DOS®, MS Windows®, MS Windows for Workgroups®, Windows-NT® - Microsoft Corporation
- RIPCAM® - Elsid Software Systems Ltd.
- DIF® - Software Arts Products Corp.
- WATCOM® - WATCOM International Corp.
- PostScript® - Adobe Systems, Inc.
- IBM®, IBM PC/AT® - International Business Machines Corp.
- Graphics Ultra+™, Ultra Pro™, Ultra™ - ATI Technologies Inc.
- Intellicon® - Connect Tech Inc.

The use of these and any other trademarked names, registered or otherwise, is for editorial purposes only, with no intention of infringement of the trademark.

List of Effective Pages

Total number of pages in this instruction is 113, consisting of the following:

Page No.	Change Date
Preface	Original
List of Effective Pages	Original
iii through ix	Original
1-1 through 1-8	Original
2-1 through 2-16	Original
3-1 through 3-7	Original
4-1 through 4-6	Original
5-1 through 5-7	Original
6-1 through 6-2	Original
7-1 through 7-16	Original
8-1 through 8-17	Original
9-1 through 9-1	Original
10-1 through 10-4	Original
11-1 through 11-8	Original
A-1 through A-4	Original
B-1 through B-1	Original
C-1 through C-3	Original
D-1 through D-1	Original
Index-1 through Index-3	Original

When an update is received, insert the latest changed pages and dispose of the superseded pages.

NOTE: On an update page, the changed text or table is indicated by a vertical bar in the outer margin of the page adjacent to the changed area. A changed figure is indicated by a vertical bar in the outer margin next to the figure caption. The date the update was prepared will appear beside the page number.

Table of Contents

	<i>Page</i>
SECTION 1 - INTRODUCTION	1-1
LAN-90 PCV	1-1
Key Features of LAN-90 PCV	1-1
LAN-90 PCV Optional Software Package	1-3
New Features in Software Release 5.2	1-4
New Features in Software Release 5.1	1-5
New Features in Software Release 5.0A	1-5
REQUIREMENTS	1-5
Hardware	1-5
Software	1-6
CONVENTIONS USED IN THIS MANUAL	1-6
RELATED DOCUMENTS	1-7
SECTION 2 - INSTALLING ADAPTER CARDS	2-1
INTRODUCTION	2-1
PC HARDWARE INSTALLATION CONSIDERATIONS	2-1
HARDWARE SETTINGS	2-1
Memory Address Locations	2-2
I/O Ports	2-3
Interrupts	2-4
DMA Channels	2-5
VIDEO ADAPTER CARDS	2-5
Super VGA and VGA Cards	2-5
SERIAL AND PARALLEL PORTS	2-6
CTI Intellicon Serial Card	2-6
NETWORK CARDS	2-7
Ethernet Network Card	2-7
HP On-Board Ethernet	2-7
WinStar-16	2-8
ALTA EtherCombo-16 T/C	2-9
Arcnet Network Card	2-10
ADAPTEC 1540B/1542B SCSI HOST ADAPTER CARD	2-11
ADAPTEC SCSI HOST ADAPTER CARD: MODEL 1540C/1542C/1542CF	2-12
Dipswitch Settings	2-12
Software Set-up	2-13
MKM/EMKI KEYBOARD SWITCHING	2-16
SECTION 3 - CONNECTING PERIPHERAL DEVICES	3-1
OVERVIEW	3-1
MONITORS	3-1
Second Monitor	3-1
POINTING DEVICES	3-1
OPERATOR KEYBOARDS	3-2
MKI Connections	3-2
EMKI Connections	3-3
Keyboard Identification	3-4
Software Configuration	3-4
ADP	3-4
PRINTERS	3-5
INSTALLATION OF SECURITY KEY	3-5
OPTICAL DISK	3-6
Backup Usage	3-7

Table of Contents (continued)

	<i>Page</i>
SECTION 4 - LAN-90 PCV NETWORKING	4-1
SETTING UP THE NETWORK	4-1
ETHERNET SETUP	4-1
10Base2 Network	4-1
10BaseT Network	4-2
ARCNET SETUP	4-3
Cables	4-3
Hubs	4-3
CONNECTING THE COMPUTER TO THE NETWORK	4-4
Configuring the ARCnet Network Card	4-4
SECTION 5 - CONNECTING TO THE ICI OR CIU	5-1
OVERVIEW	5-1
ICI/CIU SWITCH AND STRAP SETTINGS	5-1
ICT/SSM/LSM Switch Settings	5-1
NIS/LIS Switch Settings	5-2
LIM Switch Settings	5-4
BTM Switch Settings	5-4
Termination Unit Strapping	5-5
CONNECTING THE ICI OR CIU	5-6
SOFTWARE CONFIGURATION	5-7
SECTION 6 - INSTALLING DOS	6-1
CONSIDERATIONS WHEN INSTALLING DOS	6-1
Loading Both DOS and QNX	6-1
Accessing DOS Partition from QNX	6-1
ADAPTER CARD UTILITIES	6-2
SECTION 7 - INSTALLING QNX	7-1
OVERVIEW	7-1
INSTALLING QNX	7-1
Assumptions	7-1
Identifying Ethernet Addresses	7-2
INSTALLATION	7-2
QNX Background Information	7-7
THE SYSTEM INITIALIZATION FILE	7-7
What Happens When You Boot	7-7
USING THE SYSTEM INITIALIZATION FILE	7-9
Base-Level Services	7-9
Optional Services	7-11
Supporting Non-USA Keyboards	7-12
TIME ZONES AND THE REAL-TIME CLOCK	7-12
Establishing The Time Zone	7-13
Getting The Date And Time From The Realtime Clock	7-13
LICENSING	7-14
Operating System Licensing	7-14
Application Licensing	7-15
Expanding Your License	7-15
SECTION 8 - INSTALLING LAN-90 PCV SOFTWARE	8-1
INTRODUCTION	8-1
OVERVIEW	8-1
Client Vs Server	8-1

Table of Contents (continued)

	<i>Page</i>
<hr/>	
SECTION 8 - INSTALLING LAN-90 PCV SOFTWARE (continued)	
UPGRADING	8-1
Saving Historical Data Files.....	8-1
Saving Configuration & Data Files	8-3
Assumptions.....	8-3
INSTALLATION.....	8-4
ADDING A NEW CONSOLE.....	8-9
Changing a Standalone Console to a Networked Console	8-10
Changing the Ethernet Card in Your Console	8-11
Connecting Two LAN-90 PCV5.x Networks Together	8-13
Power Down Option	8-14
Physically Switch Networks Option	8-15
Operational Option	8-15
Error Recovery.....	8-16
<hr/>	
SECTION 9 - INITIAL CONFIGURATION.....	9-1
OVERVIEW	9-1
<hr/>	
SECTION 10 - OPTIONAL LOGGING INSTALLATION.....	10-1
OVERVIEW	10-1
INSTALLING LOGGING ON AN EXISTING SYSTEM	10-1
Start the Installation Program	10-1
Load Logging Option	10-1
<hr/>	
SECTION 11 - INSTALLING A HARMONY 90 PROTOCOL SPECIFIC DRIVER	11-1
INSTALL DISKS.....	11-1
EDIT STARTUP FILE	11-1
To Edit the Startup File:	11-2
ACTIVATING HARMONY 90	11-3
REBOOT THE COMPUTER	11-5
DRIVER CONFIGURATION	11-5
Setting Driver Parameters	11-6
DEVICE DEFINITION	11-6
CONFIRM COMMUNICATION	11-7
<hr/>	
APPENDIX A - INSTALLING DOS.....	A-1
INSTALLING DOS.....	A-1
How to Start the MS-DOS FDISK Program	A-1
Remove Current Partition.....	A-2
Create a Primary DOS Partition	A-2
Create DOS Bootable Disk.....	A-4
<hr/>	
APPENDIX B - NETWORK PLANNING FORM.....	B-1
<hr/>	
APPENDIX C - SWITCH SETTINGS	C-1
<hr/>	
APPENDIX D - TIME ZONE RULES.....	D-1
TIME ZONE RULES AVAILABLE IN QNX/PCV 5.2.....	D-1

List of Figures

<i>No.</i>	<i>Title</i>	<i>Page</i>
2-1.	CTI Intellicon Serial Card Switch Settings	2-7
2-2.	Alta Ethernet Network Card Settings	2-9
2-3.	QNX Arcnet Network Card Settings	2-11
2-4.	Adaptec SCSI Host Adapter Card	2-12
2-5.	Adaptec 1540C/1542C SCSI Host Adapter Card	2-13
2-6.	Adaptec 1540C/1542C SCSI Host Adapter Card Port Address Menu	2-14
2-7.	Adaptec 1540C/1542C SCSI Host Adapter Card Configure/View Host Adapter Settings Menu	2-14
2-8.	Adaptec 1540C/1542C SCSI Host Adapter Card SCSI Device Configuration Menu.....	2-15
2-9.	Adaptec 1540C/1542C SCSI Host Adapter Card Advanced Configuration Options Menu.....	2-16
3-1.	IIMKM01 Keyboard Interface Board	3-2
3-2.	EMKI Keyboard Jumper Settings	3-3
3-3.	Optical Drive Address Setting	3-6
4-1.	Sample 10Base2 Network	4-2
4-2.	Sample 10BaseT Network	4-3
5-1.	ICT, SSM, or LSM Settings	5-2
5-2.	NIS or LIS Settings	5-3
5-3.	INICT03 Switch Settings	5-3
5-4.	LIM Settings	5-4
5-5.	BTM Settings.....	5-4
5-6.	NTMF01 Dipshunt Strapping.....	5-5
5-7.	NIMP01 Jumpering.....	5-5
5-8.	ICI/CIU Cable Connections.....	5-6
5-9.	Termination Unit Serial Cable.....	5-6
8-1.	LAN-90 Introduction Screen	8-4
8-2.	Network Card Query	8-5
8-3.	1st Node Query.....	8-5
8-4.	Hardware Configuration	8-5
8-5.	Adding a Node to the Network	8-7
8-6.	Copying Volumes	8-7
10-1.	Console Configuration Application Menu	10-2
10-2.	Console List Menu	10-3
10-3.	Server Client Options Menu	10-3
10-4.	Main Menu	10-4
11-1.	Install Options.....	11-1
11-2.	Starting a QNX Wterm Window	11-2
11-3.	Edit the Startup File Screen.....	11-3
11-4.	Console Configuration Menu Selection.....	11-4
11-5.	Hardware Options Menu.....	11-4
11-6.	HARMONY 90 Configuration Menu	11-5
11-7.	HARMONY 90 Driver Configuration Menu	11-6
11-8.	HARMONY 90 Device Definition Menu	11-7
A-1.	Fdisk Disk Options Menu	A-1
A-2.	Fdisk's Create DOS Partition or Logical DOS Drive Menu	A-2
A-3.	Fdisk's Create Primary DOS Partition Menu	A-2
A-4.	Fdisk's Create Primary DOS Partition Menu	A-3
A-5.	Fdisk's Set Active Partition Menu	A-3

List of Figures (continued)

<i>No.</i>	<i>Title</i>	<i>Page</i>
C-1.	Switch Settings for HP VECTRA XU Series or XM4	C-1
C-2.	Switch Settings for HP VECTRA VL2	C-2
C-3.	Switch Settings for DEC VENTURIS.....	C-2
C-4.	Switch Settings for DEC CELEBRIS/VENTURIS 590.....	C-3

List of Tables

<i>No.</i>	<i>Title</i>	<i>Page</i>
1-1.	LAN-90 PCV Hardware Nomenclature	1-5
2-1.	ROM Addresses.....	2-3
2-2.	Typical I/O Ports.....	2-3
2-3.	Other I/O Ports.....	2-3
2-4.	I/O Port Addresses.....	2-4
2-5.	Common IRQ assignments	2-4
2-6.	Interrupts	2-5
2-7.	DMA Channels.....	2-5
2-8.	WinStar-16 Configuration	2-9
2-9.	ALTA EtherCombo-16 T/C Configuration	2-10
4-1.	Network Card Menu Settings.....	4-5
4-2.	Arcnet Network Card Settings	4-5
5-1.	ICI/CIU Baud Rate Settings	5-2
5-2.	Mandatory Switch Settings for INICT03	5-3
5-3.	ICI/CIU to Serial Port Connections	5-7
8-1.	Standard LAN-90 PCV Volumes.....	8-8
8-2.	Optional LAN-90 PCV Volumes.....	8-8
B-1.	Network Planning Form.....	B-1
D-1.	Time Zone Rules	D-1

Safety Summary

SPECIFIC WARNINGS

Always turn off power to the computer and disconnect the power cord when inserting adapter cards in your computer. (p. 2-1)

If you forget to power down even one node you will experience problems. (p. 8-15)

SPECIFIC CAUTIONS

Always wear a conductive groundstrap when handling adapter cards to prevent damage to components by electrostatic discharge. (p. 2-1)

Do not attach the pointing device with the power on the PC. (p. 3-1)

Do not attach the keyboards with the power on. (p. 3-2)

Make sure power to the MKM or EMKI keyboard interface is OFF before connecting the ADP. Failure to disconnect the power from the keyboard interface may result in blown fuses or damage to the ADP or keyboard. (p. 3-4)

Before installing the security key ensure that the computer power is off and proper static safety precautions are followed. (p. 3-5)

Before connecting a printer to the security key ensure the power to the printer is turned off. (p. 3-6)

Bailey recommends that you use isolating modems at each end of the serial cable connecting the computer and the ICI/CIU, to avoid groundloops between the two. Without isolating modems, it is possible for a potential difference to form along the serial cable that could damage the computer or the ICI/CIU.

NOTE: The INICT03 cannot power on isolating modem. An externally powered isolating modem must be used with the INICT03. (p. 5-6)

If you are upgrading your LAN-90 PCV system, you must back up your configuration and data before you begin. If you have stored any other files, you should also back them up. LAN-90 PCV will only back up its own files. Refer to the subsection "Upgrading" in **Section 8 – Installing LAN-90 PCV Software**. (p. 7-1)

QNX must be installed on each computer on the network that has its own hard disk. (p. 7-1)

Ensure that the same time zone is used on all computers. (p. 7-4)

Safety Summary (continued)

You **MUST** choose to make every node a “Network Boot Server” in order for the installation program to properly configure the network. (p. 7-5)

Never use the 'vedit' editor to modify system files. Use of this editor can result in system corruption. Instead, use 'qed'. (p. 7-8)

Do not press <Esc> unless you want to abort the installation. After aborting you will need to re-install QNX and LAN-90 PCV software so that the software is correctly installed. (p. 8-4)

SECTION 1 - INTRODUCTION

LAN-90 PCV

LAN-90 Process Control View (PCV) is a control package that runs on a network of standard IBM-compatible personal computers. With it you can monitor, manipulate, collect, and analyze realtime process data from the Elsag Bailey INFI 90 OPEN and Network 90 Distributed Control Systems (DCS).

Key Features of LAN-90 PCV

LAN-90 PCV supports a wide range of standard hardware in a variety of configurations:

- Connects to the INFI 90 OPEN DCS via a standard serial port or a high-speed intelligent serial card.
- Connects to stand-alone process control units.
- Runs on stand-alone computers or on networked systems.
- Networked systems can have redundant connections to the INFI 90 OPEN system.
- Stores data on a variety of media: hard disks, floppy disks, and rewritable optical disks.
- Accepts command and text input from regular keyboards, Elsag Bailey operator keyboards, and Elsag Bailey annunciator/display panels.
- Installable support for PLCs.

Using LAN-90 PCV is easy and secure:

- Functions are grouped together logically in menus and organized in a tree-structured hierarchy that branches out from a single Main Menu.
- Context-sensitive help screens are provided at every menu.
- Access to different functions is restricted by assigning users to various permit groups, each group containing up to 20 different access levels.

A comprehensive set of console configuration functions are available on-line:

- The tag database, which defines the INFI 90 OPEN points to be monitored or controlled, can be defined on-line.

- Trends (tag values collected on a regular basis and written to disk) are defined on-line.
- All configurable text (e.g., engineering units) can be edited on-line, and substitutes for some standard LAN-90 PCV text (such as alarm codes) can be added.
- Alarm tones, alarm inhibiting and broadcasting alarm acknowledgments to other consoles on the INFI 90 OPEN system are configured on-line.
- Graphic displays can be configured on-line to include display and control faceplates for any tag type as well as trend charts.

Compatibility with other Eltag Bailey consoles allows you to use some of the functions of the Eltag Bailey Engineering Workstations (EWS) to configure the LAN-90 PCV system off-line:

- Graphic displays, trend and tag databases can be created off-line, then loaded into the LAN-90 PCV system.

A complete set of process monitoring and control functions make LAN-90 PCV a powerful operator console:

- Color graphic displays allow you to monitor process values as numbers and symbols and take control actions.
- Process alarms are easily managed with the advanced alarm capabilities of LAN-90 PCV: alarm groups, alarm priorities, alarm indicators, alarm summaries, operator alarm inhibiting and general and individual alarm acknowledgment.
- System status displays allow you to diagnose and troubleshoot your INFI 90 OPEN system.
- System Event logs collect and print information about alarms, process events, and operator actions.
- Tuning and block details displays allow you to modify INFI 90 OPEN modules to optimize your process performance. Access to these displays is restricted to users through permit groups.

Utilities provide file, data and system support functions:

- Tag summaries let you query the database for configuration and live value information.
- File and disk utilities let you copy files to and from all supported media (hard disks, floppy disks, and rewritable optical disks). With the file/disk utilities you can format the

different media, back up and restore files between media, and translate LAN-90 PCV data files to common file formats such as ASCII text and DIF.

- System diagnostic screens report the status of CIU communication, redundancy failover, trend collection, system activity and system messages.
- Printer utilities allows you to turn the alarm printer on and off and cancel or hold printouts sent to any printer.

LAN-90 PCV Optional Software Package

Optional applications can be added to your LAN-90 PCV system to further enhance its power:

- The Logging package collects historical information in report form for printing and saving on disk. There are six types of log:
 - Periodic logs collect tag information on a regular basis (hourly, daily, weekly, etc.).
 - Trigger logs collect tag information between process events.
 - Trend logs print out collected trend data.
 - Trip logs collect tag information before and after a process event.
 - Expanded System Events Log Functions: Archiving, Retrieval and Backup.
 - Sequence of Events Logs - 1 millisecond resolution event recording.

Periodic and Trigger logs are configured using a spreadsheet which gives you complete control over the appearance of the log, and allows you to use formulas to calculate new information not available directly from process tags (e.g., costs). The other log types have a relatively fixed format and only report the information collected.

- The Quality Analysis & Control (QAC) package provides both Statistical Process Control (SPC) charts and Time Series Analysis (TSA) charts. SPC charts (Shewhart, CUSUM, or EWMA) monitor the historical and current trended values for a tag. When the tag value is out of spec, the chart is highlighted and alarms can be generated. Variation in tag values can be minimized by using TSA charts to analyze trend data to pinpoint interrelationships between variables and sources of variation.

- The Lab Data Entry packages allows you to include manually gathered data in your LAN-90 PCV system and send these values out to the INFI 90 OPEN system.
- The Custom Applications Toolkit (CAT) gives you a library of C programming routines for accessing tag information from LAN-90 PCV. You can program your own applications for collecting, displaying, or manipulating LAN-90 PCV tag values.
- The classCONNECT/DDE and TCP Link package provides network connectivity between the LAN-90 PCV consoles and the DOS world using TCP/IP protocol communication. The classCONNECT/DDE package includes the necessary software for both the LAN-90 PCV console and the DOS based computer to communicate over the ethernet using TCP/IP protocol.

New Features in Software Release 5.2

- ***HARMONY 90™***
HARMONY 90 provides additional external device interface capabilities for LAN-90 PCV. Traditional LAN-90 PCV communicates with the INFI 90 OPEN and Network 90 process control modules. HARMONY 90 provides communication paths to other process controllers. Drivers are available for a range of protocols to support most PLC makes. LAN-90 PCV is released with two new option packages. These are Protocol Specific Drivers allowing HARMONY 90 to connect to Modbus protocol devices and the Bailey-Fisher & Porter Micro-DCI controller family. Other protocols can be supported as Engineered solutions.
- ***Module Time Stamping***
Exception reports available from the INFI 90 OPEN process control modules are accurate to the millisecond. LAN-90 PCV now supports millisecond time stamping directly from the process control modules. This feature is selectable as a system option.
- ***Distributed Sequence of Events Support***
The LAN-90 PCV SOE Logging package now provides full support for the Elsas Bailey Distributed Sequence of Events modules and function codes. This new system is functionally equivalent to that of previous systems based on Function Codes 99 and 210. The DSOE system requires a Sequence of Events Master (SEM) module.
- ***Support for NE-2100 Ethernet Connections***
Ethernet support now includes WD-8003, NE-2000 and NE-2100. The LAN-90 PCV supported computer list includes the HP XU which has a NE-2100 ethernet connection on board.

New Features in Software Release 5.1

- Enhanced Data Collection System allows filtering and aging of system events.
- Text String Tag Support.
- Sequence of Events Logs.
- Simplified network design with on-line configurability.
- Improved installation and set-up.

New Features in Software Release 5.0A

- Red Tag Support.
- X-Y Plots.
- Operating parameters display.
- Enhanced SPC to support auto grade changes.
- Allows LAN-90 PCV consoles to share databases, trends, graphics with each other.

REQUIREMENTS

Hardware

In the world of personal computers, the hardware is constantly evolving. Please contact your local Elsag Bailey office for the most current version of the LAN-90 PCV Equipment Requirements drawing (# AL780448). This drawing provides the most up-to-date summary of the equipment that can be used with LAN-90 PCV. The summary of equipment includes PC's, Monitors, Printers, Ethernet cards, Graphic cards, SCSI cards, Optical Disk drives and other miscellaneous hardware items.

Table 1-1 summarizes the types of LAN-90 PCV hardware that can be included with the LAN-90 PCV console.

Table 1-1. LAN-90 PCV Hardware Nomenclature

Component	Description	LAN-90 PCV Nomenclature
Loop Interface	Network 90 or INFI 90 to Computer Interface Unit. There are a number of different interfaces depending on the system configuration.	INICT01 or INICT03 NCIU02, NCIU03, NCIU04
Trackball	Optional Trackball with a PS/2 connector instead of mouse for use as the pointing device.	IIATB04
MKM or EMKI Keyboard	A mylar style keyboard, which include standard QWERTY keys and special keys for use in controlling processes.	LCKEY1
ADS/ADP Panel	A 32 button/LED panel to call up displays and annunciate alarms.	IIADP02

Software

To run LAN-90 PCV, your computer must be running Elsasg Bailey's QNX operating system.

You are sent the following software:

- Elsasg Bailey OEM QNX Operating System
- QNX Windows Interface
- Installation and Program disks
- Software Release Option disks (dependent on the package you have purchased)

(If you are upgrading your existing system, the QNX Operating System disks may or may not be included).

The software is supplied on 3.5", 1.44Mb floppy disks.

CONVENTIONS USED IN THIS MANUAL

You will find the following conventions used throughout this manual.

NOTE: Used to highlight important or additional information.

CAUTION Used to highlight information that, if ignored, could result in property or information damage.

WARNING Used to highlight information that, if ignored, could result in personal injury.

bold Used for anything you must type exactly as shown. For example, you could be told to press **y** or type **ls /dev/hd0t77** (QNX4 example).

italic Used for information you must provide. For example, if you are told to enter a filename, you type the actual name of the file instead of the italicized word. Also used to show information displayed by the computer.

Initial Capitals Used for menu and screen titles.

small text Used to show the contents of text files.

<Key> Used for the names of special keys (non-alphabetic, non-numeric, non-punctuational) that can be found on the regular QWERTY keyboard or can be found on both the operator and regular keyboards. Some of the key names used are:

<Enter> The enter key

<Num+>	The plus key on the numeric keypad
<Space>	The space bar
<PgUp>	The page up key
<Left>	The left cursor key
{Key}	Used for the names of keys found only on the operator keyboards. Some of the operator keyboard key names are Silence and DoubleUp.
<Key Key>	When two or more keys are to be pressed together, the key names appear together within the brackets or braces. For example, to reboot the computer, you can press <Ctrl Alt Shift Del>; that is, press the Ctrl, Alt, Shift, and Del keys in that order without releasing any one until you have pressed them all.
“name”	Used for filenames, directory names, and device names.

RELATED DOCUMENTS

This manual describes how to install the base system. For information not covered in this manual, refer to one of the following manuals:

- LAN-90 PCV Configuration Manual, **I-E97-811-2.1** (describes how to configure the LAN-90 computer)
- LAN-90 PCV Operations Manual, **I-E97-811-2.2** (describes how to use monitor and control a process and how to configure and use the optional Logging package)
- LAN-90 PCV Quality Analysis & Control, **I-E97-811-4** (describes how to configure and use SPC and TSA charts with the optional Quality Analysis & Control package)
- LAN-90 PCV Lab Data Entry Manual, **I-E97-811-5** (describes how to use the optional Lab Data Entry package to enter manually-gathered data into)
- LAN-90 PCV classCONNECT/DDE and TCP-Link Software User's Guide **I-E97-811-18** (describes how to install and configure the optional classCONNECT/DDE and TCP-Link software)

Other Elsag Bailey manuals that can be useful are:

- INFI-NET Communications Modules manual (Product Instruction **I-E96-601**)

- Computer Interface Unit Product Instruction (Product Instruction **I-E93-905-2**)
- Engineering Work Station CAD/TXT Software Product Instruction (Product Instruction **I-E96-701**)
- Function Code Application Manual (Product Instruction **I-E96-200**)
- Management Command System Operation/Configuration Manual (Product Instruction **I-E93-901-21**)
- Operator Interface Station (IIOIS12) Hardware Manual (Product Instruction **I-E96-107-2**)
- Software Logging Database Graphics (SLDG) Product Instruction (Product Instruction **I-E96-716**)

Third-party software manuals you should have:

- QNX Operating System Manual set (6 books)
- QWindows System Manual set (2 books)
- RIPCAM2 User Guide (if you have the Logging option)
- DOS Operating System Manual (if DOS is or will be installed)

You should also have the computer hardware and setup manuals for your computer and the hardware manuals for any peripheral equipment you have (e.g Optical disks, printers).

SECTION 2 - INSTALLING ADAPTER CARDS

INTRODUCTION

WARNING

Always turn off power to the computer and disconnect the power cord when inserting adapter cards in your computer.

CAUTION

Always wear a conductive groundstrap when handling adapter cards to prevent damage to components by electrostatic discharge.

NOTE: The instructions in this section apply to AT-type computers ONLY. AT-type computers are 80286, 80386, 80486 and Pentium based IBM PC/AT-compatible computers.

PC HARDWARE INSTALLATION CONSIDERATIONS

Every time you use a PC and install utility cards in the slots provided, you run the risk of conflicts with the hardware.

NOTE: It is critical that you understand your hardware. We recommend you to have a list of the interface cards and other devices as well as the interrupts and memory locations used by each. This information is needed during Startup as you are configuring each node.

HARDWARE SETTINGS

Many of the cards you insert in your computer's expansion slots require hardware settings. These settings are:

- ROM addresses
- I/O port addresses
- Interrupts
- DMA channels

Settings are usually selected using jumper pins or dipswitches on the interface card.

The settings you make for each adapter card must not conflict with the settings on any other card.

Follow Tables 2-1 through 2-4 to choose the settings for the adapter cards of commonly installed peripherals.

Switch settings for the following recommended computers are to be found in [Appendix C](#):

HP VECTRA XU/XUC/XMA 590 - ETHERNET
HP VECTRA VL2 - ETHERNET
DEC VENTURIS (486) - ETHERNET
DEC VENTURIS (486) - CLIENT - ETHERNET
DEC CELEBRIS/VENTURIS 590 - ETHERNET

Memory Address Locations

Each PC made to AT Compatible standards has memory allocated between 640K and 1MB for use with expansion cards. The addresses start at A0000 and continue to FFFFFF. The memory blocks are in 64K segments and a typical map looks something like this:

A0000-AFFFF EGA/VGA VIDEO LOCATION

B0000-BFFFF CGA/MONO (TEXT MODE ON VGA CARD)

C0000-CFFFF Hard Disk ROM (SOME SPACE AVAILABLE)

D0000-DFFFF

E0000-EFFFF Large BIOS

F0000-FFFFFF Not Available

The space from A0000 to AFFFF is used for the video EGA/VGA, there may be some space available here or there may not.

B0000 to BFFFF is not available since the text portion of the VGA card uses this area.

C0000 to CFFFF has some available space, as an example you can set your SCSI controller to sit at CC00 and have your Ethernet card at C800. (The size between breaks is 16KB, (4000hex), so that would be C8000 + 4000 = CC000.)

D0000 to DFFFF is unused initially, and is available for expansion cards. This may be a ROM or RAM address depending on the card being used.

E0000 to EFFFF is the last available memory location and may already be used with a large BIOS.

Table 2-1. ROM Addresses

Adapter Card	Factory Setting	Recommended Setting	Notes
ARCnet Network Card	dc000-ddfff	ce0000-cffff	—
CTI Intellicon Serial Communications Card	d0000-dffff	d0000-dffff	—
Video adapter cards	—	—	not set by user
Adaptec AHA-1540 SCSI Host Adapter	dc000	cc000	—
Adaptec AHA-1542B SCSI Host Adapter	dc000	cc000	—
Adaptec AHA-1540C SCSI Host Adapter	dc000	cc000	set via dipswitches
Adaptec AHA-1542C SCSI Host Adapter	dc000	cc000	set via dipswitches
Alta NE2000 Ethernet Adapter	—	c8000 or D4000	jumper selectable

I/O Ports

Input output ports (I/O ports) allow your microprocessor to communicate with your expansion cards. Each card must use a unique set of ports. No two cards can share a port and most cards use a series of ports.

Some typical uses are:

Table 2-2. Typical I/O Ports

I/O Ports	Uses
200-20F	Joystick
23C	Bus mouse
270-27F	LPT2
2E0-2FF	Com2/Com4
320-320	XT disk controller
370-37F	LPT1
3B0-3BB	Monochrome display
3C0-3CF	Ega display
3E0-3EF	Com1/Com3, Floppy controller

Other standard hardware used with LAN-90 PCV uses:

Table 2-3. Other I/O Ports

I/O Ports	Uses
300-303	CTI Intellicon serial card
234-237	Adaptec SCSI

Table 2-4. I/O Port Addresses

Adapter Card	Factory Setting	Recommended Setting	Notes
ARCnet Network Card	not used	—	not used
CTI Intellicon Serial Communications Card	300-303	300-303	—
Video adapter cards	—	—	not set by user
Adaptec AHA-1540 SCSI Host Adapter	330	234	—
Adaptec AHA-1542B SCSI Host Adapter	330	234	
Adaptec AHA-1540C SCSI Host	330-333	234-237	set via dipswitches
Adaptec AHA-1542C SCSI Host	330-333	234-237	set via dipswitches
Alta NE2000 Ethernet Adapter	300	320, 340 or 360	jumper selectable

Interrupts

Most cards need to tell the processor when they have information for the processor to handle. Getting the attention of the processor is done through interrupts. Each card is assigned an interrupt number through which it can make requests of the processor. Interrupts are also called IRQs, which stands for Interrupt ReQuest. The number used by each card must be unique.

There are only fifteen IRQs available as IRQ 9 cascades to IRQ 2. The recommended settings are found in Table 2-5.

Table 2-5. Common IRQ assignments

IRQ	Usage
0	Unavailable - Timer
1	Unavailable - Keyboard
2	Mouse*
3	Mylar keyboard** (Com2)
4	CIU** (Com1)
5	Lpt2 (hard drive on XTs)
6	Floppy
7	ARCNET card* (Lpt1)
8	Unavailable - System clock
9	Unavailable - cascaded by IRQ 2
10	Ethernet card*
11	SCSI adapter*
12	
13	IDE hard drive
14	
15	CTI multiport serial card*

*recommended setting.

**recommended if no CTI card.

Usually IRQ7 is not used by the printer, as printers seldom send data to the computer, and thus this IRQ can service the Arcnet Card.

Table 2-6. Interrupts

Adapter Card	Factory Setting	Recommended Setting	Notes
ARCnet Network Card v2.1 and earlier	2	7*	set with jumpers
ARCnet Network Card v2.2 and later	7	7*	set via menu
CTI Intellicon Serial Communications Card	3	15	—
Video adapter cards	not used		—
Adaptec AHA-1540 SCSI Host Adapter	11	11	—
Adaptec AHA-1542B SCSI Host Adapter	11	11	
Adaptec AHA-1540C SCSI Host	11	11	set via menu
Adaptec AHA-1542C SCSI Host	11	11	
Alta NE2000 Ethernet Adapter	3	10	jumper selectable

*You may need to use an interrupt of 5 if you experience a conflict between the network card and the printer port.

DMA Channels

The hard drive uses the direct memory access (DMA) controller for rapid data transfer from disk to memory. The recommended DMA channel is shown below.

Table 2-7. DMA Channels

Adapter Card	Factory Setting	Recommended Setting	Notes
ARCnet Network Card	not used	—	—
CTI Intellicon Serial Communications Card	not used	—	—
Video adapter cards	not used	—	—
Adaptec AHA-1540 SCSI Host Adapter	5	5	—
Adaptec AHA-1542B SCSI Host Adapter	5	5	—
Adaptec AHA-1540C SCSI	11	11	set via menu
Adaptec AHA-1542C SCSI	11	11	
Adaptec AHA-1542CF SCSI	11	11	

VIDEO ADAPTER CARDS

Super VGA and VGA Cards

Most VGA video cards have internal software switches that determine the display mode or output to different types of monitors. These software settings can only be changed by using a configuration program supplied by the manufacturer of the card. If you have a SVGA card and you find it doesn't display graphics properly after you have completed installing (e.g.,

only two thirds of the graphics display appears on the screen), reboot the computer using DOS, and run the configuration program supplied by the card manufacturer. Check that the default display mode is set to SVGA, the resolution is set to 1024x768 and the monitor type matches the monitor you have connected to your card.

LAN-90 PCV supports the ATI Graphics Ultra (family of SVGA) cards with 2Mb of video memory.

NOTE: Ensure that the ATI Graphic card is configured to operate in 16-bit mode. Cards set to 8-bit mode will result in degraded performance.

SERIAL AND PARALLEL PORTS

Usually, there are serial ports and parallel ports already built into the computer, so you do not have to install them yourself.

Some computers require that you add an expansion board with a second serial or parallel port. If so, follow the directions in the manual supplied with the card or the manual supplied with your computer.

CTI Intellicon Serial Card

The CTI card's default settings is IRQ 3. This is the IRQ line normally assigned to a second serial port. If your computer has a second serial port, you must disable it if you wish to use the CTI card's default settings. We recommend you, select IRQ 15 or another IRQ not in conflict with any other of your computer's settings.

If you have followed the instructions given in this manual and still experience interrupt conflicts, contact your Elsag Bailey service representative for details on changing settings on the CTI card and modifying the console configuration to use the new settings.

Figure 2-1 shows the correct dipswitch and jumper settings for the CTI Intellicon serial card.

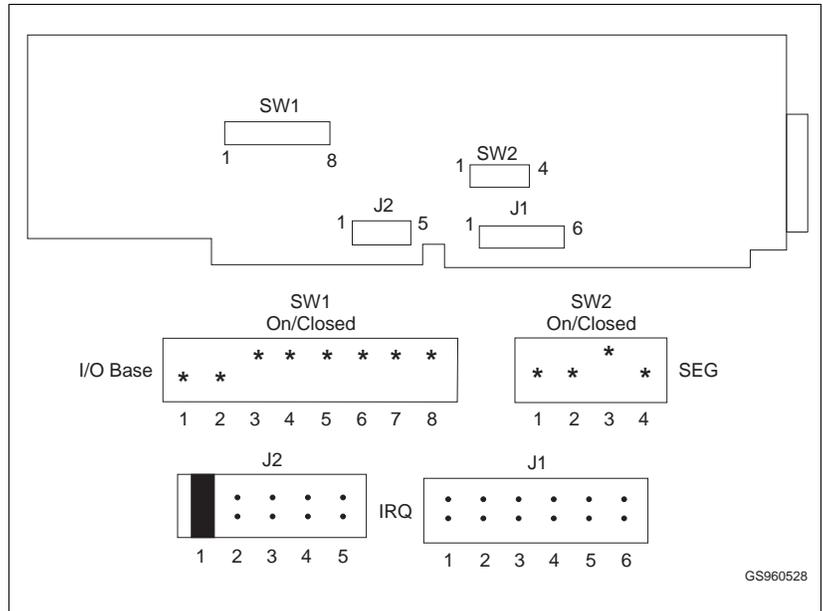


Figure 2-1. CTI Intellicon Serial Card Switch Settings

NETWORK CARDS

Ethernet Network Card

If you are setting up an Ethernet network, you will need one card for each computer connected to the network.

You will need to record the Ethernet address and keep track of the computer it is in. Use copies of the form supplied as Appendix B. The Ethernet's 12 digit address can be found on a label on the card or can be displayed using the card's DOS based software utilities. Refer to Figure 2-2.

Diskless Clients require different hardware settings than those of Servers and Clients with disks.

HP On-Board Ethernet

The HP XU and XM series of computers have a built in ethernet adapter. This adapter is supported for use in the LAN-90 PCV system. This adapter is NOT support for use with a diskless Clients.

To configure the adapter, you must use the ROM BIOS setup provided by HP. On boot up, the "System Hardware Test" screen will show the progress of the BIOS as it checks the computer's hardware.

- Press <F2> on this screen to enter the setup screen.

- Locate the entry for the PCI Integrated Ethernet Interface, refer to the computer's User's Guide.
- Enable the PCI Integrated Ethernet Interface.
- Press <F3> to save the change, exit the setup program and reboot the computer.
- When the computer reboots, the unique PCI Integrated Ethernet Interface address will be enabled and displayed. For the XU series you must return to the page in the setup menu where you enabled the interface. For the XM series, it is displayed on the summary of the computer's hardware. Record this address in the Network Planning form.

When you install both the QNX Operating System and later on the LAN-90 PCV software, selected the NE2100 Ethernet driver. Using the NE2100 ethernet driver will not require an entry for the IRQ or I/O address.

WinStar-16

The WinStar-16 is an ISA bus, NE1000/NE2000 compatible ethernet card. All configuration settings are done using a DOS based setup program supplied with the card. Refer to the **WinStar-16** manual for details on the various settings. Using the following procedure to start the DOS based setup program to configure the WinStar-16 Ethernet card as shown in Table 2-8.

- Boot the PC into DOS
- Place the WinStar-16 Utility disk in the floppy drive
- Enter the command: **a:WSPNP**
- Select the menu item **View Current Configuration** from the Main Menu
- Record the Ethernet address in Appendix B for this node
- Verify the ethernet's card settings as listed in Table 2-8. If they do not match, then return to the Main Menu and select the menu item **Setup WINSTAR-16** and modify the configuration accordingly.

Table 2-8. WinStar-16 Configuration

Option	Recommended Settings	
	Server or Client-with-Disk Node	Diskless Node
Operating Mode	Jumperless	Jumperless
Ethernet Address ¹	*****	*****
Medium Type ²	Auto Detect	Auto Detect
Full-duplex	Disabled	Disabled
I/O Base ³	340h	340
Interrupt ⁴	10	10
Boot ROM	No Boot ROM	C800, 16K

Notes:

1. The 12 digit ethernet address is unique per card.
2. The card's firmware will automatically detect the type of cable connected to the card. You can also specifically select either 10BaseT or 10Base2.
3. Alternative I/O Base addresses available are 320 and 360. Before using address 360, check that the parallel port is not assigned to address 378.
4. Alternative Interrupts are 5 and 11. Before using interrupt 11, check that your PC is not using a SCSI controller.

ALTA EtherCombo-16 T/C

The ALTA is an ISA bus, NE1000/NE2000 compatible ethernet card. All configuration settings can be done using either the provided DOS based utility program or jumpers (Figure 2-2), it is recommended that the jumpers be used to configure the card. The recommended jumper settings are listed in Table 2-9. The DOS based utility program supplied with the card also provides a number of diagnostics. Refer to the **ALTA EtherCombo-16+ T/C** manual for details on the various jumper settings and diagnostics.

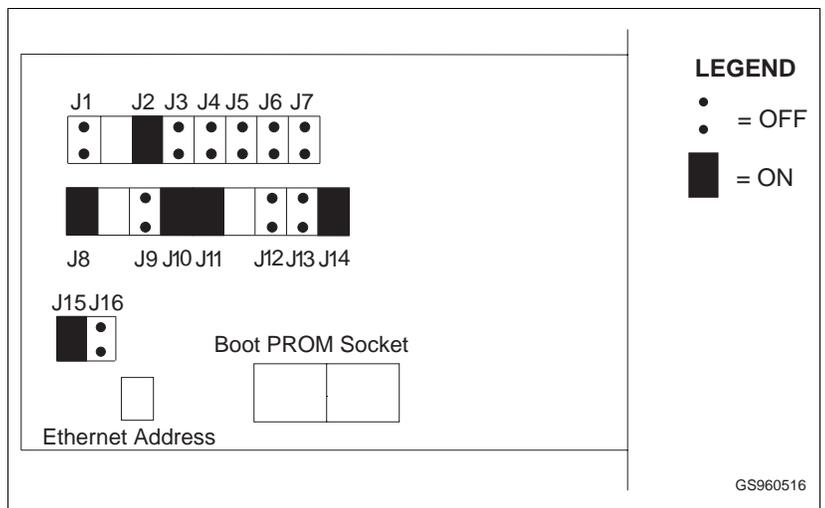


Figure 2-2. Alta Ethernet Network Card Settings

Using the following procedure to start the DOS based setup program to configure the ALTA EtherCombo-16 T/C Ethernet card as shown in Table 2-9.

- Boot the PC into DOS
- Place the ALTA EtherCombo-16+ T/C Utility disk in the floppy drive
- Enter the command: **a:\ALTA**
- When the Software Configuration menu is displayed, press <Enter>.
- Record the Ethernet address in Appendix B for this node
- Verify the Ethernet's card settings as listed in Table 2-9. If they do not match, then exit the program, power down the PC and check the jumpers.

Table 2-9. ALTA EtherCombo-16 T/C Configuration

Option	Recommended Settings			
	Server or Client-with-Disk Node		Diskless Node	
	Value	Jumpers	Value	Jumpers
Configuration Mode	Hardware	J1 = OFF	Hardware	J1 = OFF
Cabling Type ¹	BNC	J2 + J3 =ON + OFF	BNC	J2 + J3 =ON + OFF
ROM Address ²	C800h	J5 + J6 =OFF + OFF	C800h	J5 + J6 =OFF + OFF
ROM State	Disabled	J7 = OFF	Enabled	J7 = ON
Access Mode	I/O Port	J8 = OFF	I/O Port	J8 = OFF
I/O Base Address ³	340h	J9 + J10 + J11 = OFF + ON + ON	320h	J9 + J10 + J11 = ON + OFF + ON
IRQ Settings ⁴	10	J12 + J13 + J14 = OFF + OFF + ON	10	J12 + J13 + J14 = OFF + OFF + ON
8/16 Bit Mode	16 Bit	J15 = ON	16 Bit	J15 = ON
Bus Timing	CHRDY	J16 = OFF	CHRDY	J16 = OFF

Notes:

1. You must specifically select either UTP (10BaseT, using RJ-45 connectors) or BNC (10Base2).
2. Although the Boot ROM is disabled, do not use address D000h. We have found the Boot ROM if installed on the cards will sometimes interfere with the CTI card even though the Boot ROM is disabled. Alternative ROM addresses available are C800h or D400h.
3. Alternative I/O Base addresses available are 320 and 360. Before using address 360, check that the parallel port is not assigned to address 378.
4. Alternative Interrupts are 5 and 11. Before using interrupt 11, check that your PC is not using a SCSI controller.

Arcnet Network Card

If you are setting up an Arcnet network, you will need one card for each computer connected to the network.

Change the dip switches to set the ROM address to CE00 from DC00 to avoid conflicts with the CTI Intellicon card.

The card has a dipswitch in the upper left corner of the card as shown in the Figure 2-3.

On cards with a 12 position switch, you will need to change switches 4, 5, and 6 to 1, 0, 0 as shown in Figure 2-3.

On cards with a 4 position switch, the switch should be set to 1,0,0,1 and the IRQ must also be set to 7 using the jumpers. If a conflict occurs between the network card and the printer port, use interrupt 5.

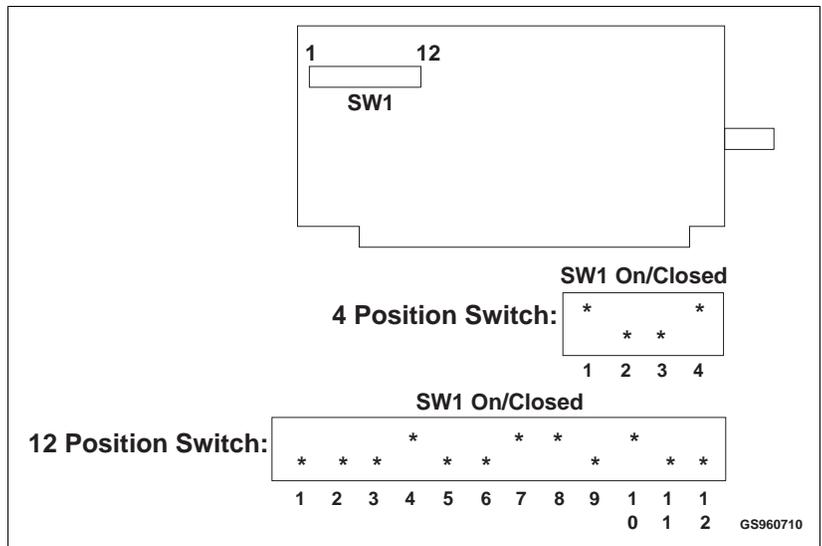


Figure 2-3. QNX Arcnet Network Card Settings

Both cards contain firmware switches that must be set through a configuration program at boot-up time. See **CONNECTING THE COMPUTER TO THE NETWORK** in Section 4 for instructions. Configuring a Diskless Client is also covered there.

ADAPTEC 1540B/1542B SCSI HOST ADAPTER CARD

Make the following changes to the Adaptec 1540B/1542B SCSI Host Adapter card jumper to allow the SCSI card to interface to the Optical Disk Drive only.

- You MUST disable BIOS control on the card by removing the jumper from pin 1 on J6.
- Change the I/O Port setting from 330 to 234 by moving the jumper from pin 2 to pin 3 on J7. This prevents conflicts with the CTI Intellicon serial card.
- If you are using the AHA-1542B, disable the floppy disk controller on the Adaptec card by removing the jumper

from pin 1 on J8. This will allow the computer's regular floppy disks to work properly.

Figure 2-4 shows the final settings for the card.

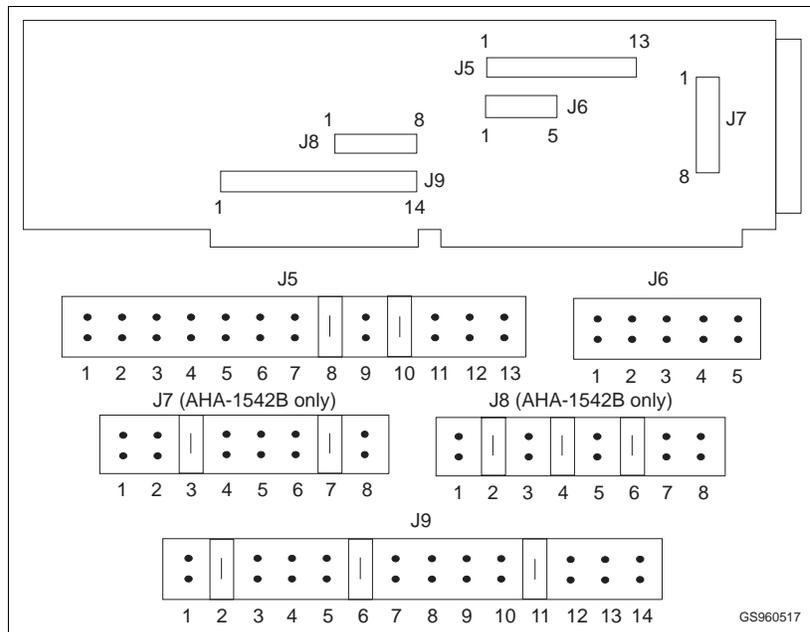


Figure 2-4. Adaptec SCSI Host Adapter Card

- Make these additional changes if the Adaptec 1540B/1542B SCSI Host Adapter also interface to the hard disk:
- If you are using a SCSI controller hard disk, J6 pin 1 must be installed for BIOS control.
- Also Change the ROM address to CC00 by adding a Jumper to J7 (7), pin 7 and remove the jumper from pin 8, if any.

ADAPTEC SCSI HOST ADAPTER CARD: MODEL 1540C/1542C/1542CF

The Adaptec SCSI Adapter card has divided its configuration options between physical dipswitch settings and a group of software set-up menus.

The following settings apply to the Adaptec 1540C/1542C and 1540CF/1542CF SCSI cards interfacing to only the hard disk. Changes in these settings are noted if the SCSI card interfaces to the Optical disk drive only, with the hard disk being interfaced to by another type of disk controller (i.e. IDE).

Dipswitch Settings

Make the following changes to the Adaptec SCSI Host Adapter card dipswitch bank S1 before inserting it in an expansion slot.

- Change the ROM address from the factory setting to the recommended setting as per Table 2-1. Switches 6,8 should be ON (CLOSED) and switch 7 should be OFF (OPEN)
- Change the I/O PORT address from the factory setting to the recommended setting as per Table 2-2. Switch 2,3 should be ON (CLOSED) and switch 4 should be OFF (OPEN)
- The floppy disk option MUST be disabled by ensuring that switch 5 is ON (CLOSED). The default setting for an Adaptec 1542C SCSI controller is OFF (OPEN)
- If the Adaptec SCSI Adapter card ONLY controls either an internal hard disk or an external optical disk drive then the AHA Termination must be enabled, set switch 1 to OFF (OPEN) to allow the termination to be controlled by the software set-up menus.

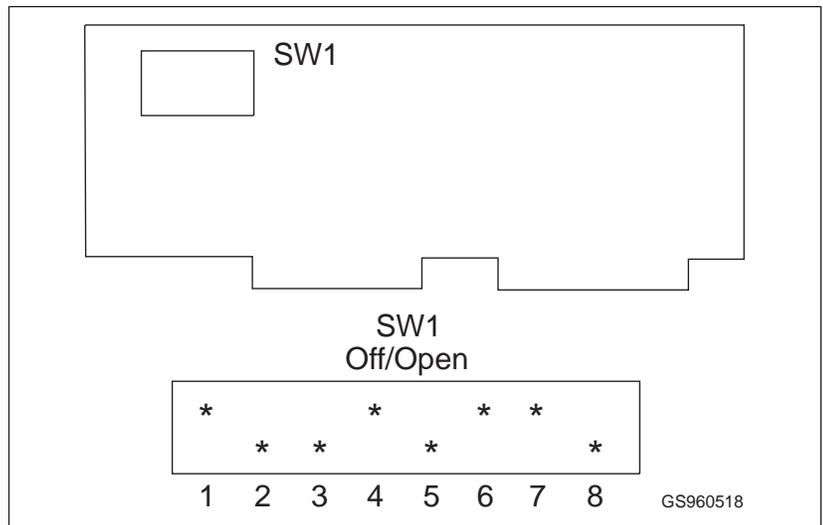


Figure 2-5. Adaptec 1540C/1542C SCSI Host Adapter Card

Software Set-up

The software set-up menus are viewed by rebooting the PC into DOS, during the reboot procedure a heading will appear on the monitor requesting the user to press <Ctrl-A> to access the set-up menus.

The Host Adapter Port Address menu shows a list of all the I/O PORT addresses available, with a highlight bar on the I/O PORT address selected by the dipswitches. Press <Enter> to select the correct Port Address.

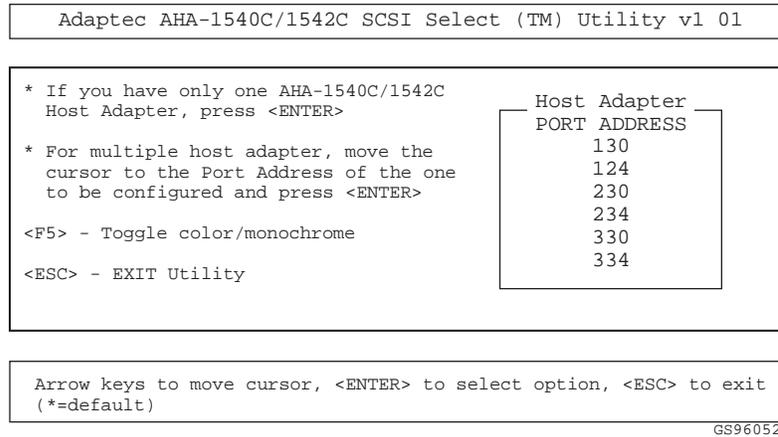


Figure 2-6. Adaptec 1540C/1542C SCSI Host Adapter Card Port Address Menu

The Main Menu allows the user to access one of Configure/View Host Adapter Settings, SCSI Disk Utilities, Host Adapter Diagnostics.

Proceed to the Configure/View Host Adapter Settings Menu and confirm that the settings have been made as per Figure 2-7.

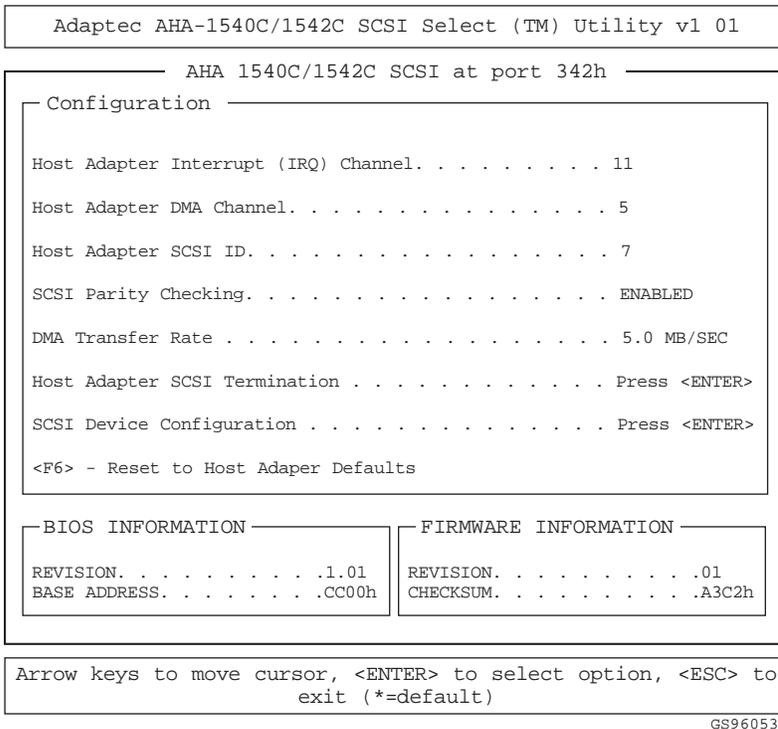
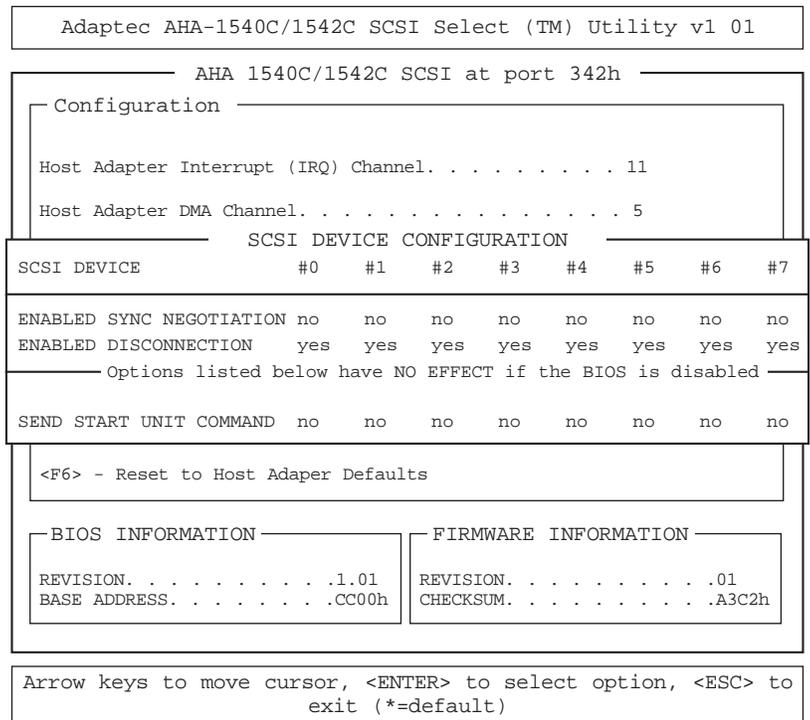


Figure 2-7. Adaptec 1540C/1542C SCSI Host Adapter Card Configure/View Host Adapter Settings Menu

NOTE: The "Host Adapter SCSI Termination" should be DISABLED if the SCSI card interfaces to both the internal hard disk and external optical disk drives.

From the Configure/View Host Adapter Settings Menu, proceed to the SCSI Device Configuration sub-menu and confirm for SCSI Device ID's #0 to #7 that the settings have been made as per Figure 2-8.

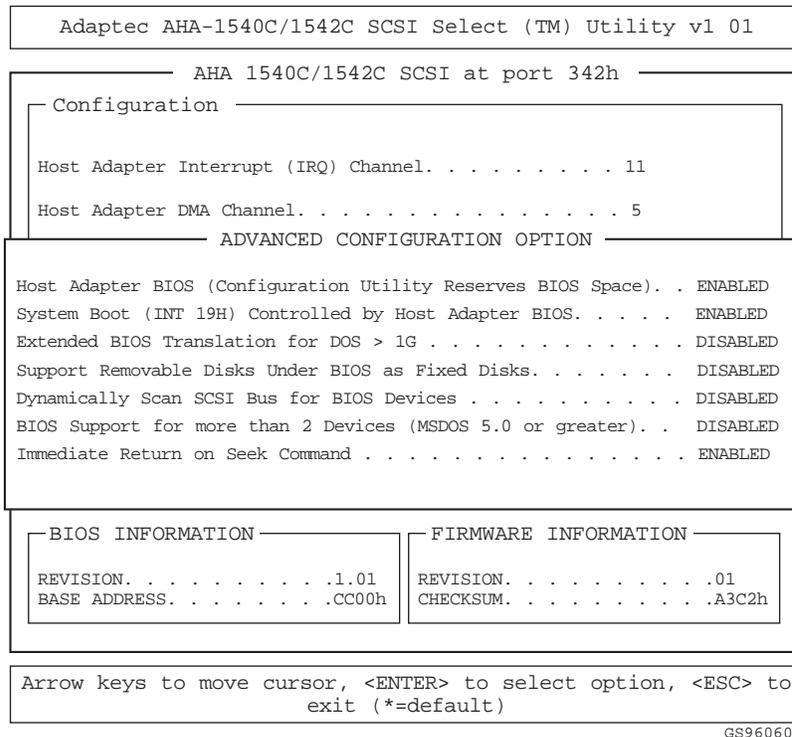


GS960531

Figure 2-8. Adaptec 1540C/1542C SCSI Host Adapter Card SCSI Device Configuration Menu

Press <Esc> to return to the Configure/View Host Adapter Settings Menu.

From the Configure/View Host Adapter Settings Menu, proceed to the Advanced Configuration Options sub-menu and confirm that the settings have been made as per Figure 2-9.



GS960601

Figure 2-9. Adaptec 1540C/1542C SCSI Host Adapter Card Advanced Configuration Options Menu

Press <Esc> to return to the Configure/View Host Adapter Settings Menu.

NOTE: The “System Boot (INT 19H) Controlled by Host Adapter BIOS” should be DISABLED if the SCSI card interfaces to the Optical disk drive only.

Both the “Dynamically Scan SCSI Bus for BIOS Devices” and the “BIOS support for more than 2 devices” should be ENABLED if the SCSI card interfaces to the optical disk drive only.

MKM/EMKI KEYBOARD SWITCHING

If you are installing an MKM or EMKI keyboard, you can set up two computers on the QNX network so that the one keyboard can be used to operate both computers. This lets operators watch and use two displays, such as a process graphic and the alarm summary, at the same time by switching the MKM or EMKI keyboard input between the two computers (indicators on the screen tell the operator which computer is the active console). Set the two computers so that their monitors can be placed close together. Attach the MKM/EMKI keyboard to one computer. The computer with the MKM/EMKI keyboard is called the main keyboard node; the other computer is called the auxiliary keyboard node. Connect both computers to the network. Further steps are needed to enable the MKM/EMKI keyboard switching, and these are discussed in [Section 9](#).

SECTION 3 - CONNECTING PERIPHERAL DEVICES

OVERVIEW

This section covers the procedures for connecting the following peripheral devices:

- Monitors
- Pointing Device
- Operator Keyboards
- Annunciator Display Panels
- Printers
- Security Key
- Optical Disk Drives

For peripherals not covered in this section, contact your nearest Elsag Bailey Service Centre.

MONITORS

Connect the monitor to the output from the video card.

Second Monitor

If you are installing an MKM or EMKI operator keyboard, you can use one operator keyboard to operate two monitors. The monitors, however, are attached to different computers, which are connected by the network. See [Section 4](#), for details.

POINTING DEVICES

LAN-90 PCV console software uses a pointing device to move a pointer/arrow across the screen. Normally the pointing device is either a two or three button mouse. As an option a Trackball can be used instead of the mouse.

Both the left and right hand buttons on the mouse or trackball are used for specific functions by the LAN-90 PCV console.

Left Button Pressing the left button while on a menu or icon button will activate the menu or icon button function.

Right Button Pressing the right button while on a menu or icon button will cause a sub-menu to be displayed, if it exists.

CAUTION	Do not attach the pointing device with the power on the PC.
----------------	--

OPERATOR KEYBOARDS

Operator or mylar keyboards can be connected to LAN-90 PCV consoles. These keyboards have a flat panel surface that is resistant to spills and dirt. The panel surface can be produced with standard keys or with specialized keys. These keyboards are built into Elsasg Bailey industrial consoles.

In order to use these keyboards with a standard PC, the keyboards require their own power and a special interface to the PC. The interface and the power are contained in a separate interface box. Mylar keyboards attach to the interface box which is attached to a serial port on the PC.

CAUTION Do not attach the keyboards with the power on.

There are two different interface boxes: the MKI and the EMKI. There are three different main keyboards: N90, I90 and OIS as well as an auxillary ADS panel. The Nema 4 standard PC style (QWERTY) keyboard is installed identically to any other PC keyboard.

The MKI keyboards are flat and use a large modular (phone) type connector. The EMKI keyboards are wedge shaped and use a round DIN connector.

MKI Connections

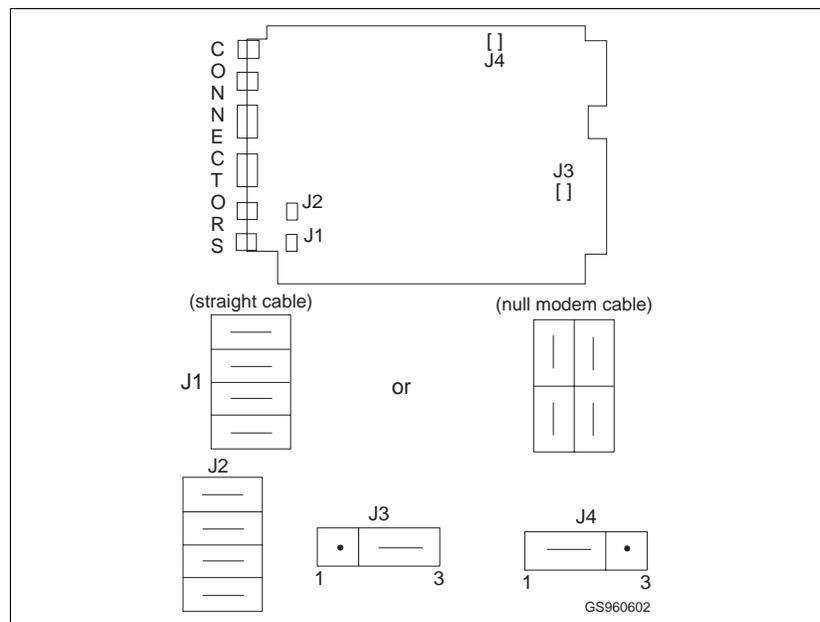


Figure 3-1. IIMKM01 Keyboard Interface Board

Connect the interface unit to the computer using a serial cable between the J1 port on the rear face of the interface unit and the second serial port of the computer. The serial port would be Com2 "/dev/ser2" or the second port of the CTI Intellicon Serial port "/dev/cti2".

Jumper settings on the IIMKM01 keyboard interface board inside the interface box determine whether the serial cable is straight through or a null modem cable (Figure 3-1).

The OIS input distribution board in the front half of the box must have all switches on switch block one (SW) set to open (off). This selects OIS10 mode.

EMKI Connections

Connect the interface unit to the computer using a serial cable between the J1 port on the rear face of the interface unit and the second serial port of the computer. The serial port would be Com2 "/dev/ser2" or the second port of the CTI intellicon serial port "/dev/cti2".

The serial cable is a straight through cable. A null modem is not required.

Connect the keyboard to the interface box.

The EMK keyboard must be set to use power supplied by the interface unit. This is the default setting. If necessary you can verify the setting. Open up the keyboard unit and set the jumpers on J1 to J3 to connect positions 1-2 (the pins furthest from connector P2) Leave pin 3 bare.

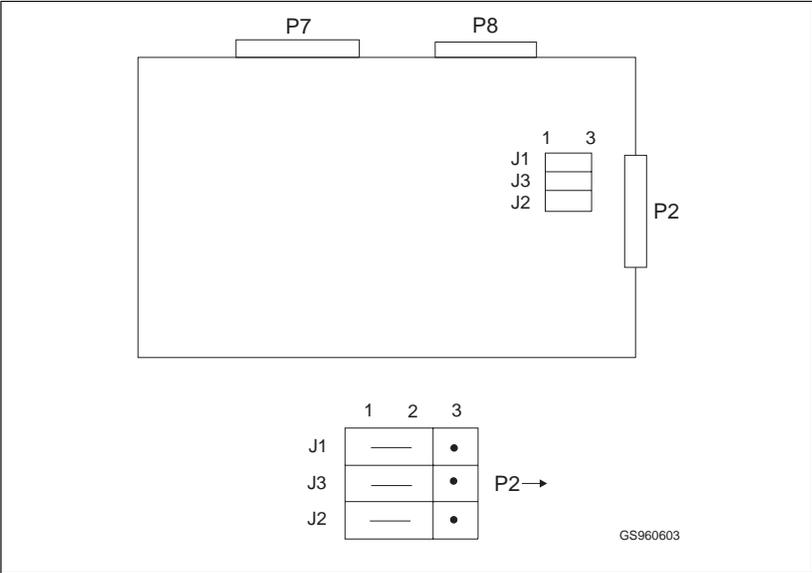


Figure 3-2. EMKI Keyboard Jumper Settings

Keyboard Identification

Look on the upper left for a key labelled I90 status or N90 status. If there is no such key, assume the keyboard is an OIS keyboard. Most standard keyboards would be I90 keyboards while specialized keyboards would be OIS type.

Software Configuration

The keyboard will not function with LAN-90 PCV until LAN-90 PCV has been configured to use the keyboard.

From the LAN-90 PCV Main Menu, select **Configuration**, then **System Options**, then **Console Configuration**.

- Set the keyboard to one of **N90**, **I90** or **OIS**.
- Set the device to either “/dev/com2” or “/dev/cti2”

If you are using a CTI card it too will need configuring. See **SERIAL AND PARALLEL PORTS** in Section 2 of this manual.

ADP

The ADP (Annunciator/Display select Panel) connects to the MKM interface unit or the EMKI keyboard.

CAUTION

Make sure power to the MKM or EMKI keyboard interface is OFF before connecting the ADP. Failure to disconnect the power from the keyboard interface may result in blown fuses or damage to the ADP or keyboard.

For MKM keyboard systems, connect the ADP to the AUX1 port on the front face of the MKM keyboard interface unit.

For EMKI keyboard systems, connect the ADP to either the leftmost or rightmost 15 pin connector on the rear of the keyboard. You can use either connector, but there can only be ONE ADP connected to the keyboard at a time.

NOTE: Do NOT disconnect the ADP during operation. If disconnected, the ADP will not work until the console is restarted.

If you must disconnect an ADP, turn off the MKM/EMKI keyboard first, and only turn the keyboard back on after you have reconnected the ADP.

PRINTERS

The default printer is a black & white IBM graphics-compatible printer attached to the first parallel port ("/dev/par1") of node1.

If you are using a black-and-white GENICOM printer, make sure it is set for IBM emulation.

If you are using a color GENICOM printer, make sure it is set for ANSI emulation mode.

You can change the printer setup after the installation. See the **Operations** manual - Section 2, Printer Setup, for details.

You will need a Post-script Compatible printer attached to the second parallel port ("/dev/par2") if you want to print screen/window displays.

Printers can be attached to any console, then shared through the network.

INSTALLATION OF SECURITY KEY

Included with your LAN-90 PCV software is a SentinelC-plus Security Key to be attached to the parallel port of the console. This device is used to identify registered copies of LAN-90 PCV. Without the key, a pop-up window will appear once every 5 minutes declaring the software to be unregistered.

CAUTION

Before installing the security key ensure that the computer power is off and proper static safety precautions are followed.

To install the security key, simply attach the key to the parallel port 25 pin DIN connector at the rear of your Personal Computer. The port selected must be configured as LPT1. Tighten the thumb-screws to secure the key and connect the printer to the key. The SentinelC-plus security key is a passive device which allows the parallel port to functions normally.

NOTE: A hardware conflict may exist between the LPT1 parallel port and an NE2000-compatible Ethernet card if the card has been configured to use the 360-3ff I/O port range. By default, the LPT1 parallel port is configured to reside at ports 3f8-3ff (within the 360-3ff range). If this is the case, either an alternate address will have to be used for the ethernet card or the parallel port must be changed in the BIOS to use addresses 2f8-2ff (normally used for LPT2, in which case if there is a second parallel port on the computer, it should be disabled).

CAUTION

Before connecting a printer to the security key ensure the power to the printer is turned off.

OPTICAL DISK

Set the SCSI address of the optical drive with the pushbuttons on the back of the drive. The SCSI address you set for the drive must differ from any other SCSI device attached to the computer. You will probably set an address of 2 (two), if this is the only device on the SCSI bus.

Connect the optical drive to the Adaptec SCSI Host Adapter card using a SCSI cable.

Follow the manufacturer's instruction (supplied with the optical drive) regarding the use of special terminators.

Optical disks are removable hard drives. With LAN-90 PCV they can be used as archive devices or as standard drives for manual or automatic backup purposes.

When your hard drive is a SCSI, the drive will automatically be available to the system for archive purposes. It will not be available for backup unless you configure LAN-90 PCV. When your hard drive is an IDE or you will be using the drive as a QNX file system (for backups) then you will need to configure LAN-90 PCV. To configure LAN-90 PCV; from the Main Menu, choose **Configuration, System Options, Console Configuration** and set the optical disk as installed. If there is only one optical on this computer select "/dev/hd2". At this release LAN-90 PCV does not support more than one optical drive per computer at a time. If you have more, you may make any one, but only one as active.

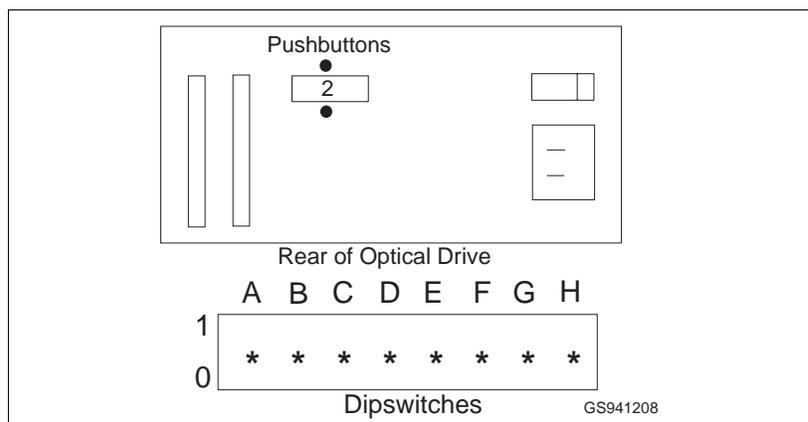


Figure 3-3. Optical Drive Address Setting

Since optical drives are standard drives, they can be partitioned. LAN-90 PCV assumes that the QNX partition is always the first partition. If the first or only partition is a DOS partition then LAN-90 PCV will report that there is no room on the partition.

To verify the optical hardware is working on a newly installed LAN-90 PCV system, first select the Main Menu, choose **Configuration**, then **System Options, Console Configuration** and set or verify that the optical disk is installed. Shutdown and reboot if you needed to change the configuration. From the Main Menu, choose **Utilities**, then **Misc Disk Utilities** and if the disk is formatted use **Media Usage** and **Contents, F1 Usage**. If you get a report on free and available space your drive is working. If the disk is new, choose **Format/Initialize Media, F1 Format**. After one to two minutes the utility will report free space. If you formatted, this disk is formatted for QNX.

Backup Usage

The backup and restore utilities use the optical as a QNX disk. Use the **Misc Disk Utilities** to initialize disks for backup.

SECTION 4 - LAN-90 PCV NETWORKING

SETTING UP THE NETWORK

The LAN-90 PCV software has been designed to work in both the one node standalone environment and a multiple node local area network (LAN) environment. The QNX Operating System upon which the LAN-90 PCV software has been based supports the both the Ethernet and Arcnet types of network communication protocols.

ETHERNET SETUP

An Ethernet network can use a combination of different types of network cards, cables and other hardware. **NETWORK CARDS** in Section 2 of this manual describes the configuration of the currently supported Ethernet network cards for the LAN-90 PCV console network.

The two most common types of ethernet network cables (or communication media) are 10Base2 (also referred to as BNC or coax) and 10BaseT (also referred to as twinax or twisted pair). These two methods of cabling nodes together can be combined by use of mutiport concentrators.

Ethernet networks are also commonly used in office networks, however, it is recommended that the LAN-90 PCV network be isolated from the office network by means of a bridge due to the amount of traffic generated by the nodes within the LAN-90 PCV network.

10Base2 Network

In order to use 10Base2 cables for the LAN-90 PCV network it is necessary that the correct type of cable (RG-58), terminators (50 ohm), connectors ("T") be used. Figure 4-1, illustrates a basic 10Base2 network of LAN-90 PCV nodes.

- here are also other standard ethernet limitations to be aware of, such as:
- a BNC "T" connector must be used to attach each nodes network card to the segment
- the maximum length of a segment is 185 meters
- the minimum length of cable between two nodes is 0.5 meters

- each end of a segment must be terminated with a 50 ohm terminator
- a maximum of 29 nodes (or adapters) can be attached to a single segment, the repeater counts as the 30th node
- segments can be connected together by use of repeaters
- a maximum of 4 repeaters can be used to extend the total LAN length to 1000 meters
- the maximum number of nodes is 1024

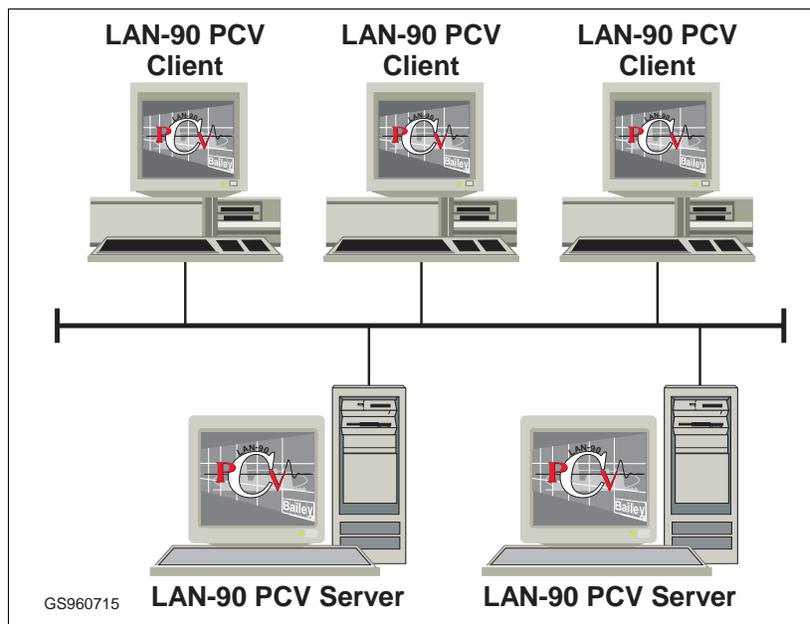


Figure 4-1. Sample 10Base2 Network

10BaseT Network

In order to use 10BaseT cables for the LAN-90 PCV network it is necessary that the correct type of cable (UTP), repeater (HUB), connectors (RJ-45) be used. Figure 4-2, illustrates a basic 10BaseT network of LAN-90 PCV nodes. There are also other standard ethernet limitations to be aware of, such as:

- each node must be connected to a repeater using a cable segment
- the maximum length of a segment is 100 meters
- a maximum of 29 nodes (or adapters) can be attached to a single segment, the repeater counts as the 30th node
- segments can be connected together by use of repeaters

- maximum of 4 repeaters can be used to extend the total LAN length to 1000 meters
- the maximum number of nodes is 1024

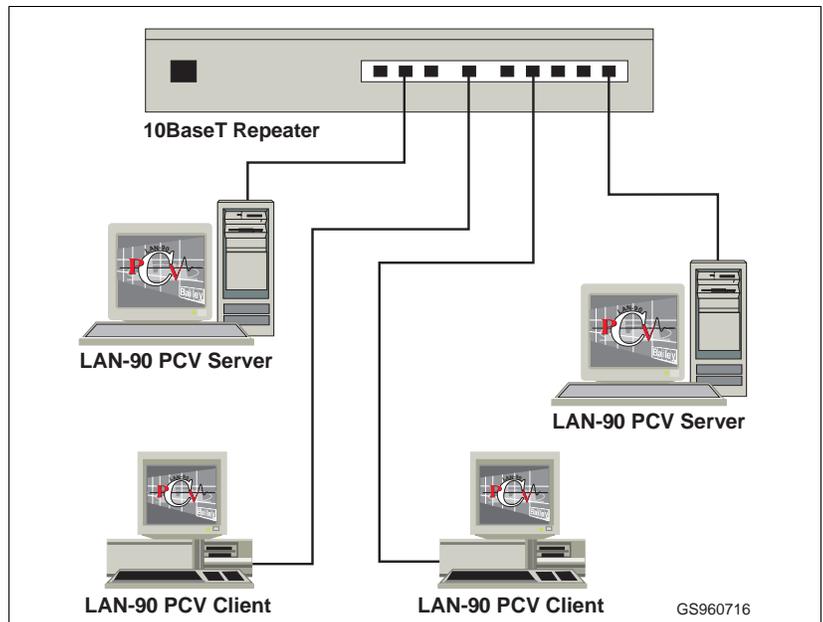


Figure 4-2. Sample 10BaseT Network

ARCNET SETUP

Network setup and cabling information is also covered in your **GNX4 User's Guide** manual, Section 5 - Network Installation.

Cables

The recommended Arcnet cable is RG62/U, 93 ohm coax, terminated with BNC male connectors.

Network cables must be routed so that they will not be crushed, severed, exposed to excessive heat, or bent (causing permanent kinks).

Cables can be up to 2000 feet long.

Hubs

The active hub (ARC-208) is an eight port, externally powered hub that allows eight network cables to be connected. The active hub regenerates even highly degraded signals received from one port, and repeats it, completely restored, at the other seven ports.

You do not need an active hub if your network only consists of two computers that are closer together than 2000 feet.

You will need an active hub if your network consists of two computers that are farther apart than 2000 feet or if your network consists of more than two computers.

The active hub must be plugged into a 110V/60Hz power supply. Make sure that power is available at the site for the active hub when you lay out your network.

To connect a network cable to the port on a hub, simply push the cable connector onto the port connector, then turn the cable connector clockwise until it locks.

You can connect and disconnect network cables from the active hub at any time without affecting the rest of the network (however, you will interrupt the communication to/from the disconnected console).

CONNECTING THE COMPUTER TO THE NETWORK

To connect a computer to the network, you must:

1. Configure the ARCnet Network card.
2. Connect a network cable to the card.

NOTE: Do NOT connect the network cable to the network card, until after you configure the card as described below.

Configuring the ARCnet Network Card

Before connecting each computer to the network, you must configure each computer's network card with the correct information via a menu. To call up this menu:

1. Start up your computer <Ctrl><Alt><Shift>.
2. As soon as you see the message Node ## displayed in the center of your screen, press <Esc>.
3. You will see the following menu displayed on the screen:

Node ##

N Boot from Network.

D Boot from Disk.

Enter "N" or "D".

Press <Esc> again (ignore the prompt to Enter "N" or "D").

4. You will see the *QNXnet Network Interface Configuration Menu* displayed on the screen.

Make sure that the network card settings match those listed in Table 4-1. The menu selections displayed may differ slightly from those listed in Table 4-1 depending on the version of network card you are using.

Table 4-1. Network Card Menu Settings

Menu Field	Type of Node	
	Client Server-Client or Stand-Alone	Diskless Client
1. Boot from Boot Node ¹	No	Yes
2. Local Node ID	1-254	1-254
3. Boot Node ID	0	1
4. Alternate Boot Node ID	0	2
5. Retries from Boot Node	0	3
6. Boot Filename	-	-
7. Hardware Interrupt Level	7	7

¹An Arcnet network can have only one Boot Node to service Boot request from Diskless Clients.

To change a menu setting, press the number displayed to the left of the setting, type the new setting, then press <Enter>.

The manual provided with the card fully describes the purpose of all settings and Table 4-2 provides a summary.

When you have set all the necessary items in the menu, select the option **Exit Menu And Boot**, and the computer will restart with the new settings.

Table 4-2. Arcnet Network Card Settings

Field	Network Card Version	Explanation
Boot from Network	all	If this is set to NO, the computer will start up (boot) from its own hard disk as is normally done without a network card. Only diskless clients set this to YES and the computer will use files on the Boot node to load the operating system.
Local Node ID		This number must be unique for each computer on the network. Valid numbers are 1-254.
Boot node ID or Primary Boot node ID	all	This specifies the node number of the computer that is acting as the Boot node. This setting is used only by diskless clients. All other computers set to zero.
Alternate Boot Node ID	2.2 and later	This specifies an alternative node number to boot from if the regular Boot node is unavailable (e.g., it has been disconnected or turned off).
Retries from Boot Node	2.4 and later	This specifies the number of times this node will try to boot from the regular Boot node, before using the Alternate Boot node.
Boot filename	all	Leave Blank.

Table 4-2. Arcnet Network Card Settings (continued)

Field	Network Card Version	Explanation
Software Interrupt Level*	2.2 and later	This specifies the hardware interrupt used by the card. For QNX Network card versions 2.2 and later, the default value is set to 7 and this is the setting you should normally use. For QNX Network card versions 2.1 and earlier, the hardware interrupt is set with a jumper on the card itself, and you enter the interrupt number set by the jumpers on the card. The default value for network card versions 2.1 and earlier is 2, and you MUST change this to 7.
	2.1 and earlier	The default value is 7 and must NOT be changed.

* If a conflict occurs between the printer port and the network card, use Interrupt 5.

SECTION 5 - CONNECTING TO THE ICI OR CIU

OVERVIEW

The LAN-90 PCV console communicates with the INFI 90 OPEN or Network 90 system through the INFI 90 OPEN Computer Interface (ICI) or through the Computer Interface Unit (CIU).

There are two basic versions of CIU, the first version is for use on Elsasg Bailey systems using Plant Loop communication, the second version is for use on Elsasg Bailey systems using INFI-NET communication.

The ICI is made up of two modules:

- INNIS01 (Network Interface Slave)
- INICT01 (INFI-NET to Computer Transfer Module) or INICT03 (added functionality over INICT01)

The INFI-NET type of CIU is made up of two modules:

- NLIS01 (Loop Interface Slave)
- NSSM01 (SuperLoop Slave Module)

The Plant Loop type of CIU is made up of three modules:

- NLIM01 (Loop Interface Module)
- NBTM01 (Bus Transfer Module)
- LSM (Loop Storage Module)

Both the ICI and CIU connect to the Termination Unit, NTMF01, using the cable NTKU01.

NOTE: If using the INICT03 replace the NTMF01 with NTMP01 and replace the NKTU01 cable with NKTU02 cable.

This section only describes the module settings to use with LAN-90 PCV. For complete information on these modules refer to the **INFI-NET Communications Modules** manual (Product Instruction) or the **NCIU02/03 Enhanced Computer Interface Unit** manual (Product Instruction).

ICI/CIU SWITCH AND STRAP SETTINGS

ICT/SSM/LSM Switch Settings

Set the ICT, SSM, or LSM for:

- ROM checksumming ON

- 8 data bits, 1 stop bit, no parity
- All ports act as serial ports for connection to a host computer
- Modem password protection OFF
- Port addressing OFF
- Checksumming ON
- Primary LSM
- 9600 baud or 19200 baud (see Table 5-1)

Figure 5-1 shows the ICT/SSM/LSM switch settings required.

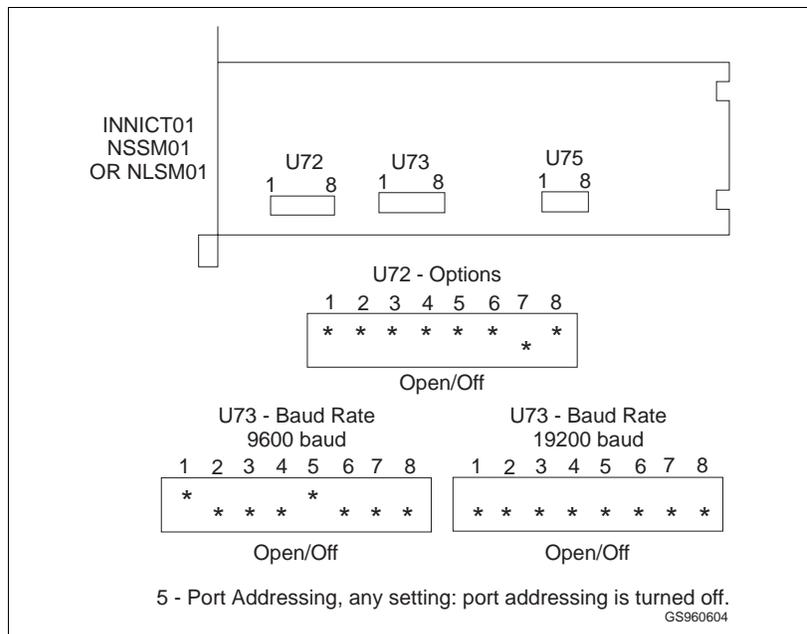


Figure 5-1. ICT, SSM, or LSM Settings

Table 5-1. ICI/CIU Baud Rate Settings

Type of Serial Card Installed in Computer	Baud Rate Setting for the ICT, SSM, or LSM
Regular Serial Card	9600 baud
CTI Intellicon Serial Card	19200 baud

NIS/LIS Switch Settings

Set the NIS or LIS for:

- PCU or ICI network processing compatibility
- ROM checksumming ON
- Normal operating mode

Figure 5-2 shows the NIS/LIS switch settings required.

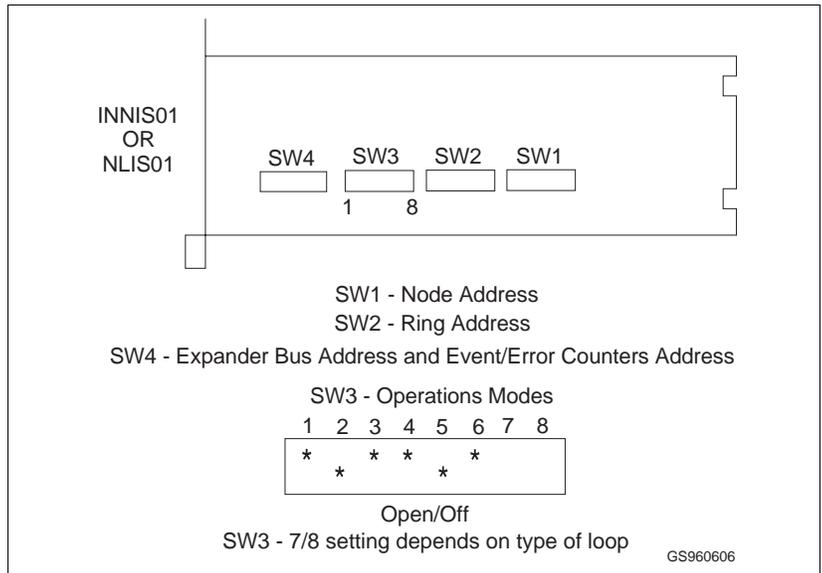


Figure 5-2. NIS or LIS Settings

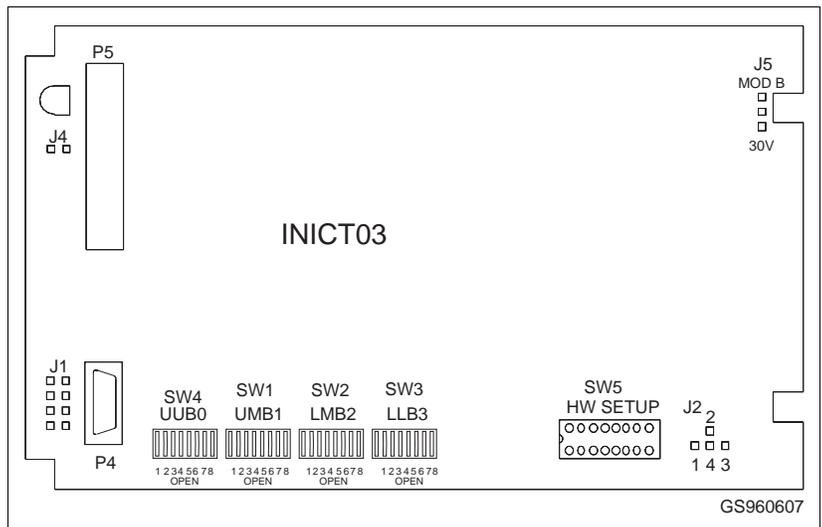


Figure 5-3. INICT03 Switch Settings

Table 5-2. Mandatory Switch Settings for INICT03

Switch	Settings
SW1	All poles open (19200 baud)
SW2	All poles closed
SW3	Poles 1 to 4 closed; Poles 5 to 8 open
SW4	All poles closed

LIM Switch Settings

Set the Loop Interface Module (LIM) to transmit total messages, including forwarding (see Figure 5-4).

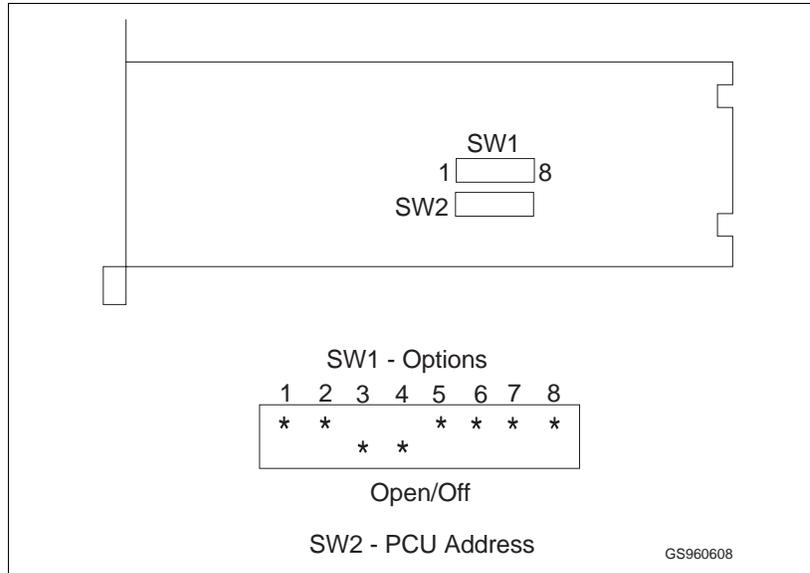


Figure 5-4. LIM Settings

BTM Switch Settings

Set the Bus Transfer Module (BTM) for normal operation (see Figure 5-5).

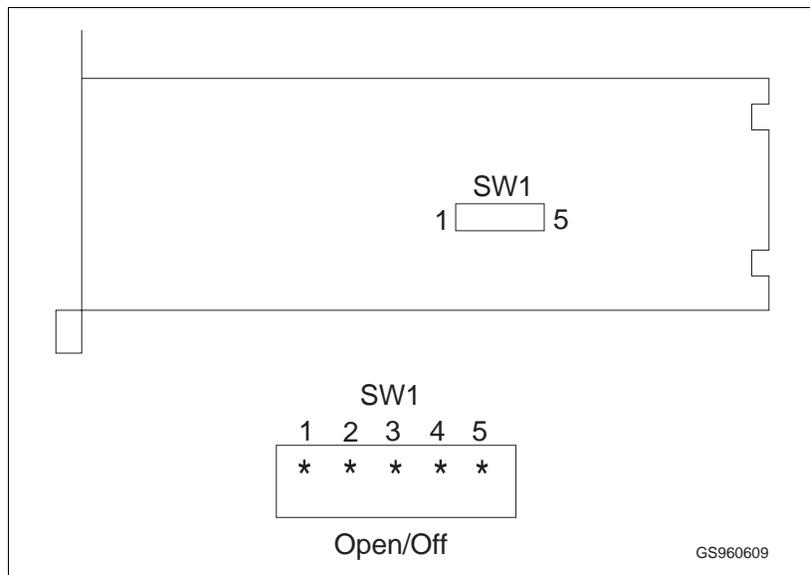


Figure 5-5. BTM Settings

Termination Unit Strapping

The Termination Unit should be strapped for communication with IBM-compatible computers (see Figure 5-6).

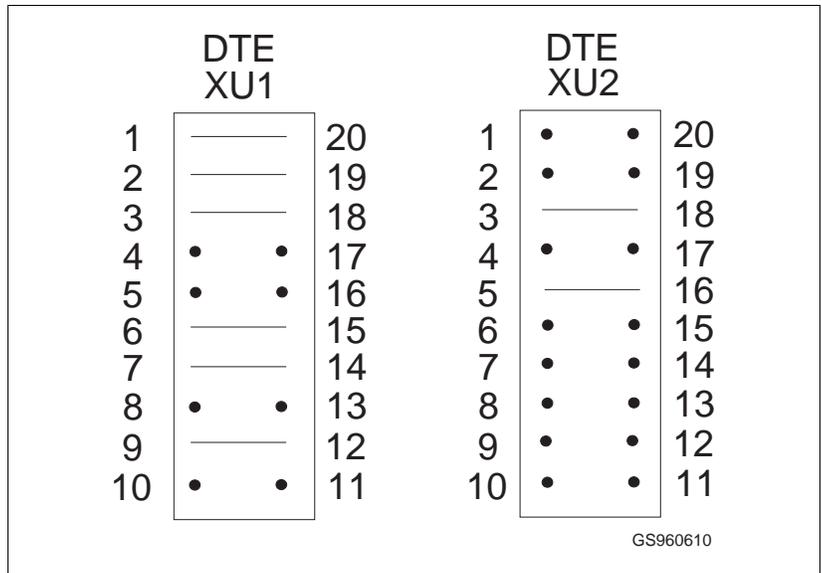


Figure 5-6. NTMF01 Dipshunt Strapping

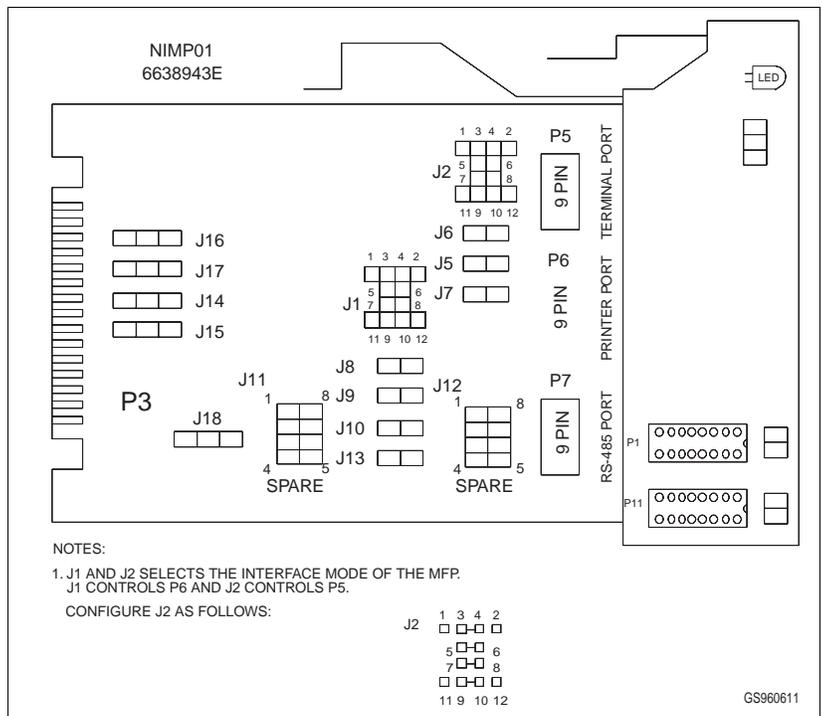


Figure 5-7. NIMPO1 Jumpering

CONNECTING THE ICI OR CIU

A serial cable connects the terminal port of the Termination Unit to the /dev/ser1 (COM1) or /dev/cti1 port of the CTI card of the console (see Table 5-3).

CAUTION

Elsag Bailey recommends that you use isolating modems at each end of the serial cable connecting the computer and the ICI/CIU, to avoid groundloops between the two. Without isolating modems, it is possible for a potential difference to form along the serial cable that could damage the computer or the ICI/CIU.

NOTE: The INICT03 cannot power on isolating modem. An externally powered isolating modem must be used with the INICT03.

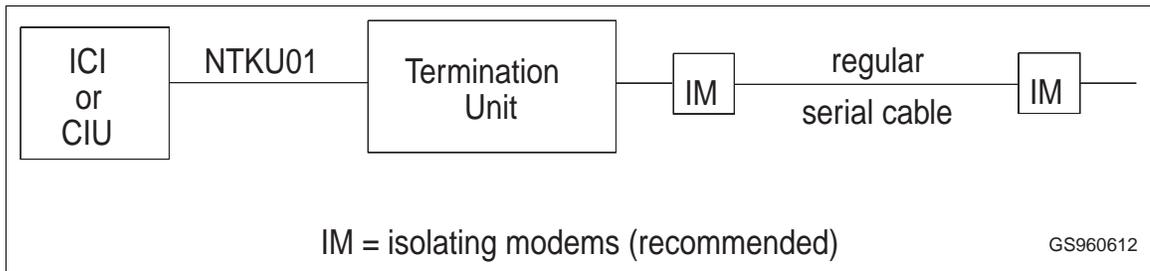


Figure 5-8. ICI/CIU Cable Connections

Figure 5-9 shows the pin connections in both a 25 pin to 25 pin serial cable and a 9 pin to 25 pin serial cable.

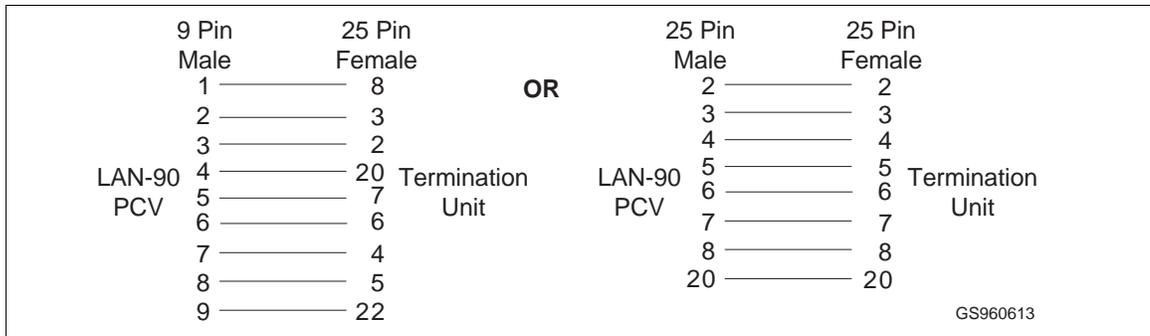


Figure 5-9. Termination Unit Serial Cable

Table 5-3. ICI/CIU to Serial Port Connections

Type of Serial Card Installed in Computer	Serial Port Used to Connect to ICI or CIU
Regular serial card	/dev/ser1 (COM1)
CTI Intellicon serial card	/dev/cti1

SOFTWARE CONFIGURATION

The CIU to which the LAN-90 PCV Server console is attached will not be on-line when the console is first rebooted after being loaded with the LAN-90 PCV software. You must first configure the Server by choosing **Main Menu, System Options, Console Configuration**. The highlighted bar must then be moved using the arrow keys to the node number of the Server that is connected to the CIU, then press <F2> Edit Console Options. On the first hardware page, select the type of communication loop, Serial driver, baud rate and Serial Device. Refer to the subsection **Edit Console Configuration** located in Section 2 of the **Configuration** manual for details.

SECTION 6 - INSTALLING DOS

CONSIDERATIONS WHEN INSTALLING DOS

To have both QNX and DOS on your hard disk, you must install DOS first, leaving enough room for QNX and LAN-90 PCV (at least 100Mb).

If your hard disk has more than 1024 cylinders, make sure you leave space on the hard disk below 1024 for QNX. QNX boot files must be located below cylinder 1024, otherwise QNX cannot start up from the hard disk.

Loading Both DOS and QNX

To load both DOS and QNX on the same hard disk, you must follow these restrictions:

- Install DOS BEFORE you install QNX - refer to [Appendix A](#)
- Do NOT use the entire hard disk for DOS; leave at least 200Mb available for LAN-90 PCV use.

Accessing DOS Partition from QNX

To be able to access files on your DOS partition from QNX (such as graphic display files created with SODG), you must set up your DOS partition the following way:

- Set up a Primary DOS partition
- You can set up Extended DOS partitions, and you will be able to access any files on them from QNX

The details of creating the DOS partition depend on the version of DOS you are installing. The DOS partition is set up using the FDISK program, which is run either as part of a DOS installation program or from the DOS prompt.

For a complete description of how to install DOS, refer to your DOS manuals.

It is recommended that copies of configuration utilities for the computer, video card, and network adapter be kept on the DOS partition. This allows system configuration to be quickly tested.

ADAPTER CARD UTILITIES

Some of the adapter cards installed in the LAN-90 PCV console (such as graphic cards, network cards) have provided a utility or configuration disk and user's guide. These utilities should be installed in the DOS partition of the hard disk, using the instructions provided in the adapter card's user's guide.

SECTION 7 - INSTALLING QNX

OVERVIEW

LAN-90 PCV requires a real time operating system so that more than one task can be performed at the same time. This section covers installation of QNX, the operating system used. A specific version of QNX is supplied with your program disks. If you are currently running an older version, you will need to back up your configuration. The QNX install program initializes the section of your hard drive used by the QNX operating system. Unless you change the partition sizes, any DOS partition will remain untouched.

The network card in the computer should be reconfigured correctly, refer to [Section 2](#).

You can upgrade your LAN-90 PCV system one computer at a time. The entire system does not need to be shut down in order to upgrade. However, each computer being upgraded will need to be shut down just before it is installed. See [UPGRADING](#) in Section 8.

INSTALLING QNX

CAUTION	If you are upgrading your LAN-90 PCV system, you must back up your configuration and data before you begin. If you have stored any other files, you should also back them up. LAN-90 PCV will only back up its own files. Refer to UPGRADING in Section 8.
----------------	---

CAUTION	QNX must be installed on each computer on the network that has its own hard disk.
----------------	--

NOTE: Diskless computers can be configured on any of the other operator stations and do not need any installation. Refer to the *Configuration* manual after installing the servers and clients-with-disk.

Assumptions

1. If upgrading you must have backed up your configuration and data.

2. You have the following disks:

BOOT disk	1 disk
INSTALL disks	3 disks
NETWORK EXPANSION	0 or more disks (if applicable)
QNX WINDOWS	2 disks

3. You have a Node number plan stating what node number to use for each computer and its Ethernet address. Refer to **LICENSING** later in this section for details on defining node numbers. A sample form is provided in **Appendix B**.

Identifying Ethernet Addresses

The Ethernet address is twelve digits long. There are four sets of three hexadecimal numbers. Hexadecimal numbers also use the letters A-F as digits. An example is 00C 093 00D B4F.

Refer to the subsection **Ethernet Network Card** in Section 2 in this manual for the procedure to get the Ethernet card address.

INSTALLATION

An automated install program is used to install QNX onto the hard disk.

STEP A **Booting from the Floppy Boot Disk**

- Insert the Boot disk into the first drive (/fd/0) (A:)
- If you are upgrading, exit LAN-90 PCV.
- Boot from the computer. Press <Ctrl><Alt><Shift>.
- As QNX is loading you will see a spinning arrow.
- Booting from the floppy is slow.

NOTE: The following step numbers follow the pattern used by the automatic QNX installation program.

Step 1 **Creating a QNX Hard Disk Partition**

At the # prompt type:

install

QNX's hard disk installation screen is displayed.

This screen displays the QNX Technical support phone number and other miscellaneous warnings. If you require support call your Elsag Bailey representative.

Follow the prompts which are shown below.

U.S. Keyboard:

Answer **Y** (U.S. keyboard is the default)

Step 1 screen is displayed

Creating a QNX Hard Disk Partition.

Value point machine:

Answer **N** (No is the default)

Verify hard disk type (IDE or SCSI)

1a Verify drive size (Accept defaults)

The installation program will then run either “fsys.ide” or “fsys.scsi” device driver.

1b Query free

1c Query QNX

1d Fdisk

The fdisk hard drive partition table screen is then displayed.

If no changes are needed to the partition table press **Q** to quit, otherwise, refer to the QNX documentation for a full description of the Fdisk Utility.

Step 2 *Initializing the QNX File Structure*

2a mount -p /dev/hd0

Warning Qnx partition found

2b dinit

2c mount hd0t77

Which test do you want?

Answer **V**.

Step 3 Copying Files from Floppy to Hard Drive.

When the Step 3 title box is displayed you will need to wait for the disk access to complete. When the disk light goes out, insert disk 1 and press enter. Insert disks 2 and 3 when prompted.

Step 4 Making QNX Boot from the Hard Drive

Do you wish to install the 32 bit kernel?

Answer **Y**

Enter logical Node #

This is the logical node number you have assigned to your computer. Enter the node number as per your Network Planning Form in [Appendix B](#).

rundos

Answer **N**

Press <Enter> when prompted.

```
4b  Install setup
4b1 tic /usr/lib/...

4c  make ....

4d  cp -t .....

4e  fdisk ...

4f  fdisk ...
```

Step 5 Create a System Initialization File

Select your time zone.

Select the time zone representing your local time.

Example **U** for Toronto, Canada which is in the Eastern Time Zone.

CAUTION

Ensure that the same time zone is used on all computers.

Select time use

This specifies the time to which the battery charged hardware clock is set. This is the clock that keeps time while the computer is turned off. Standard dedicated LAN-90 PCV computers should use Global time. Global time is also called Greenwich Mean Time or Universal Co-ordinated Time (UTC). However if

this computer is only occasionally used for LAN-90 PCV and is mostly used for DOS applications then the clock should probably be set to local time.

Answer **G** - global

How many consoles would you like mounted?

Answer **6**

Will you be using a mouse with this machine?

Answer **Y**

Step 6 Configure a Network Boot Server

Do you wish to configure this machine for use on the QNX network?

Answer **Y**

CAUTION

You MUST choose to make every node a “Network Boot Server” in order for the installation program to properly configure the network.

Do you have any network expansion diskettes?

Answer **Y** if you have any QNX Network Expansion disks or if you are networking more than one LAN-90 PCV Server together, otherwise, answer **N**.

Prior versions of LAN-90 PCV used dedicated boot servers. The approach used by this version is discussed in “Upgrading” in the next section.

NOTE: If this is not a standalone machine there will be one or more network expansion disks or set of QNX Operating System disks.

Insert network expansion licenses

Depending on your LAN-90 PCV system configuration, you may have more than one Server and/or Client nodes. For each Server node, a complete set of QNX O/S disks have been provided, for each Client node, a QNX Network Expansion disk has been provided. To increase the network size, all the INSTALL 1 disks and QNX Network Expansion disks must be inserted into the computer, one at a time, at this point of the installation procedure. After inserting each disk, press the <Enter> key.

Answer **No** when finished.

Driver selection

For NE1000 or NE2000 compatible ethernet cards
choose **b** - ne1000

For NE2100 compatible ethernet cards
choose **d** - ne2100

NOTE: Two NE2000 error messages will be displayed at the top of
the screen. Please ignore them.

Standard arcnet choose **a** - arcnet

Physical to logical mapping

For Ethernet, enter the 12 digit Physical Node Number. Refer
to the Network Planning Form in **Appendix C**.

For Arcnet, answer **Y** - use the physical node as the logical
node#.

*Do you wish to configure this machine as a boot server for other
machines?*

Answer **Y**.

When instructed, remove disk from floppy drive, and
reboot - <Ctrl><Alt><Shift><Enter>.

Login as **root**

Step 7 Install QNX Windows Disks

At the command line prompt #, type

install

Insert window disk 1

Press <Enter> when prompted

restoring archive

Press <Enter> when prompted

Insert disk 2 and press <Enter> when prompted.

Remove any floppies from the drives.

This completes the QNX and QNX windows installation.

Proceed to **Section 8**.

QNX Background Information

It's a good idea to familiarize yourself with the basic philosophy and operation of QNX as described in **QNX4 System Architecture** and **QNX4 User's Guide** (Section 1). The remainder of this section will provide a brief technical overview of QNX. To continue the installation of LAN-90 PCV, proceed to [Section 8](#).

NOTE: In a standard installation of LAN-90 PCV, there will be no need to modify any of the files described in this section. This information is intended to provide technical background information only.

THE SYSTEM INITIALIZATION FILE

What Happens When You Boot

When you boot QNX, you are booting an image composed of several processes. The first process in the image is always the Process Manager (which contains the Microkernel). The Process Manager performs processor initialization, and then schedules each process included within the image for execution. The last process in the image is the "sinit" utility.

The "sinit" utility initiates the second phase of your system initialization by starting a shell that executes commands from a file. This file (the system initialization file) contains commands that set up services for the machine. It's a standard shell file that runs just like any other shell file except that breaks are disabled.

Being able to start system services after boot is one of the benefits of QNX's modular architecture. The image that is booted typically contains only those few essential services needed to start all other desired services.

When "sinit" runs, it first determines if the image it's part of was booted from disk or from over the network. If the image was booted from disk, "sinit" checks to see if a normal boot or an alternate boot occurred. (You can optionally select an alternate boot by pressing <Esc> when prompted by the boot loader during powerup). Based upon this information, "sinit" attempts to open one of two system initialization files:

a normal boot (from disk or network)	"/etc/config/sysinit.n (where n=node #) If this fails, it tries: "/etc/config/sysinit"
an alternate boot (from disk only)	"/etc/config/altsysinit" If this fails, it tries: "/etc/config/sysinit"

The “sinit” utility will attempt to open “sysinit” only if it can't open the first file. If it can open neither file, “sinit” terminates and no system initialization will be performed. If the open succeeds, “sinit” replaces itself with the Shell (*/bin/sh*) and passes it the name of the file that “sinit” opened.

Each of the system initialization files that may be executed by “sinit” serves a particular purpose:

- “sysinit.*node*”
- “sysinit”
- “altsysinit”

“*sysinit.node*”

This file contains the custom commands needed to set up the environment and services for your machine, allowing every node in the network to have its own setup. The node suffix, which is used by “sinit”, is the logical node ID of your machine. This is a value between 1 and the number of nodes in your network.

A “sysinit.1” file is always created by the install program. The file's initial contents reflect the installation parameters determined by install.

“*usrinit.node*” and
“*postinit.node*”

To customize a workstation's setup, you have to create either a “usrinit.*node*” file or a “postinit.*node*” file. The “usrinit.*node*” file is executed just before PCV tasks are started. The “postinit.*node*” file is executed just after PCV tasks have been started.

Remember that the node suffix must be the logical node ID of the workstation you're customizing.

CAUTION

Never use the 'vedit' editor to modify system files. Use of this editor can result in system corruption. Instead, use 'qed'.

“*sysinit*”

This file is executed if a “sysinit.*node*” file isn't present. It should contain services that will work on any machine. QNX ships a generic file that should be able to boot any machine. We recommend that you make few or no modifications to this file.

The sysinit file is automatically put on your system during the installation.

NOTE: If you change the logical node ID of a machine, the machine will now look for a different “sysinit.*node*” file.

“*altsysinit*”

This file serves as a safety net in case a modification to your “sysinit.*node*” file leaves the system in a state where you can't log in. The “altsysinit” file is executed only if you specify an

alternate boot when booting from local disk (i.e. you press <Esc> when the boot loader prompts you for an alternate boot).

The “altsysinit” file should always contain a backup of the last working copy of the “sysinit.*node*” file for a machine that boots from a local hard disk. So, before you make any changes to a working “sysinit.*node*” file that could prevent the machine from booting from hard disk, you should copy the “sysinit.*node*” file to “altsysinit”:

```
cp /etc/config/sysinit.node /etc/config/altsysinit
```

We recommend that you update the “altsysinit” file after all successful changes to your “sysinit.*node*” file.

We recommend that you also copy the operating system image after successfully installing QNX:

```
cp /.boot /.altboot
```

USING THE SYSTEM INITIALIZATION FILE

Base-Level Services

The contents of each machine's system initialization file reflects the hardware on that machine and the services it is to provide. The following describes a base set of services that will be in most initialization files.

NOTE: If several machines will be using a common set of commands, you can place the commands in a separate shell file and have the file executed via the . (dot) shell built-in. For example, let's say you create a file called “techies” containing commands to be used by all the machines in your Technical Department. The file could be executed from within the “sysinit.*node*” file of each machine in that department with the following command:

```
./etc/config/techies
```

You would add node-specific commands after this “dot” line. For more information on the dot command, see “sh” in the **Utilities Reference**.

Establishing the time zone

The following lines define the time zone (EST in this case) and get the time from the realtime clock. These two lines should be the first in the file for machines that boot from hard disk.

They are optional in a machine that boots over the network, since the machine inherits this information from the node it boots from.

```
export TZ=est05edt04,M4.1.0/2,M10.5.0/2  
rtc hw
```

For more information, see the following section **TIME ZONES AND THE REAL-TIME CLOCK**, as well as [Appendix D](#).

You may also set time zone during the installation of LAN-90 PCV, described in [Section 8](#).

Starting device drivers

The following lines start the Device Manager and the console driver with eight virtual consoles, then instructs the Shell to reopen its standard I/O through the new console device.

```
Dev &
Dev.con -n 8 &
reopen //0/dev/con1
```

The following lines start up any other device drivers you may need. They start both a serial driver, which will look for COM1 and COM2, and a parallel driver. These drivers will terminate if they can't find the necessary hardware.

```
Dev.ser &
Dev.par &
```

If you started “Dev.ser” you might need to use the “stty” utility to change the default line configuration. For example, the following lines change the baud rate to 192000:

```
stty baud=19200 < /dev/ser1
stty baud=19200 < /dev/ser2
etc ...
```

Starting the floating-point emulator

If your programs use floating point and you don't have an 80x87 chip, you need to start the floating-point emulator:

```
emu87 &
```

Loading node mapping

When booting a node on a network, you must run the “netmap” utility, which informs the Network Manager of node ID mapping. You should place the following “netmap” command in the “sysinit.node” file, even if the node isn't currently running on a network (the command has no effect on a non-networked machine):

```
netmap -f
```

Note that this command is included in the standard sysinit files shipped by QNX.

Starting a name Server

At least one machine in the network must run the global name server. You could start the name server on this machine if it isn't rebooted frequently:

```
nameloc &
```

You may also run “nameloc” on other nodes (up to a total of 10) in order to provide redundancy in case one node running “nameloc” fails.

Starting a terminal daemon

The following line starts a login on the first console and arms all other consoles:

```
tinit -T /dev/con* -t /dev/con1 &
```

While it isn't mandatory, almost all installations use the “tinit” utility. Hence system initialization files provided by QNX contain “tinit”

NOTE: When it is included, “tinit” must be the last command executed in the system initialization file.

Optional Services

You can add many other services to your system initialization file. You should add these services just before the line containing the “tinit” command. The following examples show commonly used optional services. Note that these utilities typically support common-line options to modify their behavior—these options are explained in the documentation for each utility.

Defining environment variables

Define any environment variables you wish inherited by all processes started in the system initialization file:

```
export var=value
```

The EXPORT command is described under the “sh” command in the **QNX4 Utilities Reference**.

Starting a floppy driver

Start a local floppy driver (if the QNX filesystem is running locally, don't include the first line):

```
Fsys &  
Fsys.floppy &
```

If a floppy driver is running, you can use the “vol” and “pax” utilities to access the block special file (e.g. “/dev/fd0”). If you want to access it as a QNX filesystem, you must mount it as such (we recommend you use “pax” to transport files between QNX filesystem):

```
mount /dev/fd0 /fd0
```

Starting a DOS

Start a DOS filesystem to access DOS floppies and partitions. This requires that the QNX filesystem be running with a driver for the floppy and/or hard disk:

```
Dosfsys &
```

Selecting a cron server If you think this machine will rarely be rebooted, you may also select a cron server:

cron &

Starting a clock Start a clock that will always display the time in the upper right corner of the screen:

clock -f green "+%X" &

Supporting Non-USA Keyboards

By default, the QNX console driver assumes a 101-key USA keyboard layout. However, QNX provides a variety of configurations corresponding to the keyboards most commonly used throughout the world. If you need to select an alternate keyboard configuration, you use the "kbd" utility.

If you select a non-USA keyboard when installing QNX on a hard disk machine, the appropriate "kbd" command will be added to the machine's "sysinit.node" file. If you subsequently set up workstations, you'll have to change their "sysinit.node" files to include this command.

Note that you can also generate custom keyboard layouts with the "kedit" utility.

TIME ZONES AND THE REAL-TIME CLOCK

It's important that the correct date, time, and time zone information be established early during initialization. This should be the first step in your system initialization file. The install program assumes your hardware clock has a valid date and time and asks you for the time zone information.

You may also configure these settings during the installation of LAN-90 PCV, described in [Section 8](#).

Internally, QNX uses Coordinated Universal Time (UTC), which is often referred to as Greenwich Mean Time. Applications and utilities convert a local time by using information about your time zone.

NOTE: If the time zone isn't set, QNX will assume that local time is the same as UTC time. This would present a problem only if you wish to transfer files to another system in a different time zone. In this case, the dates on the file will appear to be shifted by the difference between the two time zones. If you plan to use QNX's update system to download new software, the time zone should be set correctly.

Establishing The Time Zone

The time zone information should be established before the current date and time is set. If the realtime clock in your computer has been set to local time, QNX needs the time zone information in order to establish UTC.

In the following example, the time zone as well as the time change rules are set for Eastern Standard Time in North America:

```
export TZ=est05edt04,M4.1.0/2,M10.5.0/2
```

where:

export	Shell command to set an environment variable
TZ	Name of variable
est	Eastern Standard Time
05	5 hours before Greenwich Mean Time
edt	Eastern Daylight Savings Time
04	4 hours before Greenwich Mean Time
M4.1.0/2	First Sunday of April at 2am
M10.5.0/2	Last Sunday of October at 2am

NOTE: For more information on the time zone rules, see [Appendix D](#).

Getting The Date And Time From The Realtime Clock

If you're booting from disk, you should follow the first line in your system initialization file with the "rtc" utility to establish the current date and time from the realtime clock. The following two lines would accomplish this:

```
export TZ=est05edt04,M4.1.0/2,M10.5.0/2  
rtc hw
```

This will set the date and time on an IBM AT-compatible computer.

Note that there are two possible approaches to take when setting the realtime clock in your machine:

- setting the realtime clock to UTC
- setting the realtime clock to local time

We recommend that you set the time in the realtime clock to UTC. But if you're also running operating systems that assume the realtime clock is set to local time (e.g. DOS), you'll want to use the "rtc" utility with the -l ("el") option:

```
rtc -l hw
```

This invocation of "rtc" assumes that the realtime clock was set to local time. Note that when you use local time in the realtime clock, you'll have to manually change the value in the realtime clock when you switch to an from daylight savings time in locales where it's used.

NOTE: If the time in your hardware clock is incorrect (perhaps the battery has been replaced), you should set the system time using the "date" utility, then set the realtime clock using the "rtc" utility with the -s option. For details, see the documentation for these utilities in the **QNX4 Utilities Reference**.

If you're booting over the network

If you boot over the network, the booting machine will inherit the UTC time and time zone environment variable from the node it boots from. Therefore, you don't need to put this information in your system initialization file.

LICENSING

Operating System Licensing

QNX must be licensed for each computer it runs on. This is true whether you're using 10 standalone machines or 10 networked machines.

In a network, each machine is referred to as a "node" and each node is assigned a "logical" node ID. Logical node IDs range from 1 to the number of nodes in the network. For example, a network licensed for three nodes would support logical node IDs 1, 2, and 3. You set the size of the network by running the "license" utility (see the section **Expanding Your License**).

To verify licensing, you can use the "ls" command. The following would indicate a single-node QNX license:

```
ls/etclicenses
qnx000178n001
|         |         |
|         |         |Number of Nodes
|         |         |
|         |         |Serial Number
|         |         |
|         |         |Product
```

If you've installed other QNX applications (e.g. Watcom C), their licenses will also be displayed.

Application Licensing

Per-node licensing

Most applications are licensed per node in a QNX network in the same way as the operating system. If you have an application licensed for, say, three nodes, then you would be restricted to running it on only three nodes of your network. (Your network license size may exceed the license size for an application).

You may run multiple invocations of the application on each licensed node. When you run an application licensed per node, the invoking node will consume one of the licenses. The license will remain with that node until it is rebooted.

By convention, serial numbers that end in “**n**ddd” are licensed per node.

Concurrent-use licensing

Applications may also be licensed for the number of copies in concurrent use. For example, if an application is licensed for three concurrent copies, then up to three copies may be run anywhere in the network at one time. Note that on a non-networked single node machine, you may still run only three concurrent invocations.

By convention, serial numbers that end in “**u**ddd” are licensed per use.

Expanding Your License

You expand your license size for the operating system or an application using the “license” utility. This utility installs license serial numbers from floppies to your hard disk. Each QNX boot diskette and application diskette contains a serial number license for one node (or for one use).

The following example transfers the license from floppy drive 0 (“drive A:” in DOS terminology) to your hard disk. Note that the floppy driver (“Fsys.floppy”) must be running:

license

NOTE: After adding new serial numbers to your set of licenses, you must activate them. To do so, you can run “license -r”, which reads licenses from “/etc/licenses” on the hard disk and places them in the machine's in-memory license database.

On a network, you can run “license -r” node to read up-to-date licenses from another node's current in-memory license database.

Any machines that boot over the network will inherit the serial numbers from the machine they boot from. If you wish to boot network machines from their local hard disk, you must use the “license” utility to add serial numbers to each hard disks you wish to boot from. Once you have done this on a single hard disk, you can use “license” to copy the serial numbers across the network from one hard disk to another and thus avoid having to re-insert floppies. Note that license files cannot be copied by **cp**.

For more information on the “license” utility, see the ***Utilities Reference***.

NOTE: For licensing to work across a network, the boot server (the machine with the licenses) must be running the “nameloc” utility. If a machine has a local hard disk (with licenses) and a network card, but isn't on a network, a portable, for example, it must also run “nameloc” for licensing to work.

SECTION 8 - INSTALLING LAN-90 PCV SOFTWARE

INTRODUCTION

This installation guide is written for a first time installation of LAN-90 PCV. If this is an upgrade be sure to follow the upgrade notes.

OVERVIEW

The consoles are networked to share information between each other. Each computer keeps a list of all other computers in the network. As new computers are added, they are added to these lists. When operator consoles are started, they check with other consoles to see if they missed any additions while they were turned off. When installing the network for the first time each new additional computer must be able to communicate with a running console in order to obtain a list of the other consoles it should communicate with. The first console installed must be fully installed and running before the second or any other console is installed. Once the first and second consoles have been installed, either one of them can be turned off while other consoles are installed. Any installed console can serve to add new computers to the network.

Client Vs Server

- Server consoles are connected to the INFI-NET loop through a CIU or equivalent. Servers run additional software to support this connection. They also maintain a tag database, updating tags with values received from the loop and transmitting operator actions to the loop.
- Client consoles provide operator interfaces. They communicate with all or selected servers to obtain tag values.
- Server/Client consoles run both server and client software. The client software can attach to any server on the network.

UPGRADING

Saving Historical Data Files

Before upgrading your current system, you may have to backup any historical data which has been collected by the Enhanced Data Collection System (EDCS).

If you are running the current LAN-90 PCV (Software Release 5.2), refer to the subsection Back Up/Restore EDCS Data location in Section 7 of the **Configuration** manual.

If you are running a previous version of LAN-90 PCV (Software Release 5.1 or 5.1A) and have been using the Enhanced Data Collection System, historical information will be stored on the hard-disk and will span the times selected for retention in each of the historical classes.

Perform the following steps to backup your historical data files:

- Shutdown LAN-90 PCV console software
- Exit the QNX Windows by right-clicking on the desktop and selecting **Exit** and **Exit QNX Windows**
- Press <Enter> to get a login prompt
- Login as **root** (the default password is 'root' if you haven't changed it)
- Type the following commands:

```
cd /usr/lib/bailey/server/pcv/data/hist  
wc -c *.*
```

The 'wc' command will check through all your EDCS data files and return the total amount of disk space used by these files. You can use this number to determine how many diskettes you will need to backup this data. Type the following command to determine how many diskettes you will need:

```
expr <total from wc> / 2500000
```

```
(e.g. expr 7649384 / 2500000)
```

The result returned will be the number of diskettes you will need.

To backup the EDCS data files, type the following command:

```
pax -wv *.* | freeze | vol -w /dev/fd0
```

You will then be prompted to insert your first diskette to begin the backup, the diskettes do not have to already formatted for QNX4.

After you have completed the installation of LAN-90 PCV Software, you will be able to backup or restore the historical information using the new Backup/Restore EDCS Data function located in the Utilities Menu.

Saving Configuration & Data Files

Next, back up your configuration, and data using the file backup utilities provided. Also back up any other non-LAN-90 PCV files that you might have created. Be sure to back up the configuration on EACH console.

You can upgrade your system one machine at a time. The entire system does not need to be shut down in order to upgrade. However, each console being upgraded will need to be shut down and will remain shut down while it is being reloaded. As consoles are brought up, they communicate only with other consoles of the same release version of the software.

You will need to plan the change-over with regards to: the order of consoles to upgrade, the order the configurations will be reloaded, missing tags which are located only on old release servers and, moving cables if necessary. LAN-90 PCV generally provides the operator interface, while automatic process control occurs in the Process Control Units. However, if you are using Logging to export values to tags in the database, you may have a control scheme in LAN-90 PCV which you will need to account for during the upgrade.

After you upgrade a console, install the configuration using the **File Restore Utilities**, then shut down and reboot. This configuration is read during system start-up.

LAN-90 PCV 5.0 and 5.0A, only boot servers booted from their own hard drives. With the current version all except diskless consoles will boot from their own hard drives. Although there is no need for specifically identified boot servers, each console must be configured as a boot server. This allows any of the Server-Clients or Clients-With-Disk to service boot requests from Diskless-Clients. With Ethernet, the Boot Server is transparently selected. For an Arcnet network, you configure the Diskless-Client's Arcnet card to select the most appropriate computer to service its Boot requests. This node selection can be changed at any time through the firmware configuration program.

For Ethernet cards you will need to modify the card's configuration as described in [Section 2](#).

For Arcnet cards you will need to run the firmware configuration program as described in [Configuring the ARCnet Network Card](#) in Section 4.

Assumptions

1. You have installed the QNX Operating System as described in [Section 7](#).
2. You have the volumes as listed in Table [8-1](#) to install the base LAN-90 PCV software:

CAUTION

Do not press <Esc> unless you want to abort the installation. After aborting you will need to re-install QNX and LAN-90 PCV software so that the software is correctly installed.

Install the redundant server as a normal server-client. Following instructions in the subsection Redundancy located in Section 2 of the **Configuration** manual to configure redundancy, later.

INSTALLATION**Step 1 Booting from Disk.**

Reboot using the following steps:

Remove any floppy disks from the drives.

Press <Ctrl><Alt><Shift>

Login: **root**

Step 2 Setting Configuration Options.

Insert the pcvInstall disk in the first floppy drive.

Type **install**

You now will see the Introduction screen.

```
----- Introduction -----
This program will guide you through the installation
procedure. Before continuing, check the Installation
Manual to make sure you have enough memory to run the
LAN-90 PCV software.

If you are upgrading from an older version of software,
you must have a recent backup of your configuration. Each
computer has its own configuration so you should have a
backup for each computer on your network.

If you DO NOT have the existing configuration for this
computer backed up, you are NOT ready to continue with the
installation.

You can quit the installation program at any prompt by
pressing <Esc>.

This procedure will:
- Build operating system files.
- Add the node to the network, if this is a networked
  installation.
- Copy the diskettes to the hard disk and start the LAN-90
  PCV software

Press <Enter> to continue, to exit Install
```

Figure 8-1. LAN-90 Introduction Screen

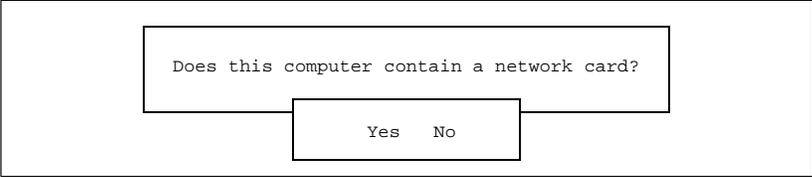


Figure 8-2. Network Card Query

Answer **No** ONLY if this is the only computer running LAN-90 PCV or you will not be networking these computers.

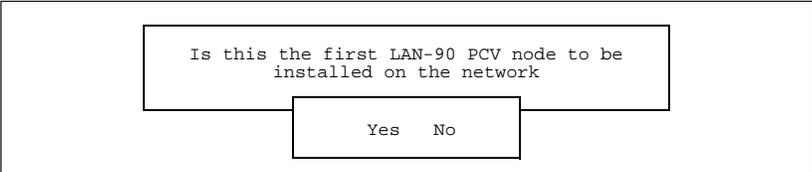


Figure 8-3. 1st Node Query

Only answer **Yes** on one machine. See Overview above.

The hardware configuration screen presents a list of hardware related selections. Verify each in the list and make any necessary changes. The fields CONSOLE TYPE and NETWORK TYPE will not appear if console is standalone.

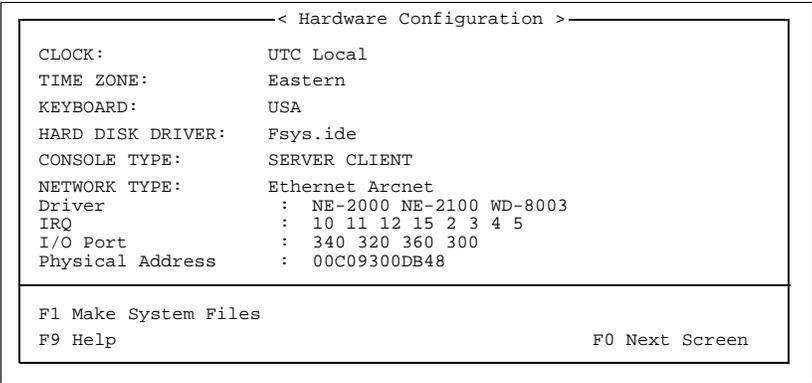


Figure 8-4. Hardware Configuration

CLOCK [UTC, local]

This specifies how the battery charged hardware clock is set. This is the clock that keeps time while the computer is turned off. Standard dedicated consoles should use UTC (Universal Co-ordinated Time) formerly known as Greenwich Mean Time. However if this computer is only occasionally used for LAN-90 PCV and is mostly used for DOS applications then the clock would probably be used with local time.

Answer: **UTC**

TIME ZONE:

A pop-up window is displayed. Choose the local time zone in which this computer is located, by using the <Ctrl> and <Up> and <Down> arrow keys. Standard time and daylight-savings time are automatically handled by the operating system.

KEYBOARD:

A pop-up window is displayed. Choose the language style of the keyboard, by using the <Ctrl> and <Up> and <Down> arrow keys.

Answer: **USA**

HARD DISK DRIVER:

Displays the name of the driver that LAN-90 PCV has detected. The two standards are IDE or SCSI.

CONSOLE TYPE: [Server, Client]

Servers always have a connection to a CIU.

Clients never do.

NOTE: You will need to re-install starting with the QNX Operating System to change the computer from client to server or back.

NETWORK

Set the following entries to match the network card's configuration. Enter the 12 digit Ethernet address for the physical address.

Type [Ethernet, Arcnet]
Driver
IRQ
I/O Port
Physical Address

Confirm fields and write system files. Press <F1>

Exit configuration screen. Press <F10>

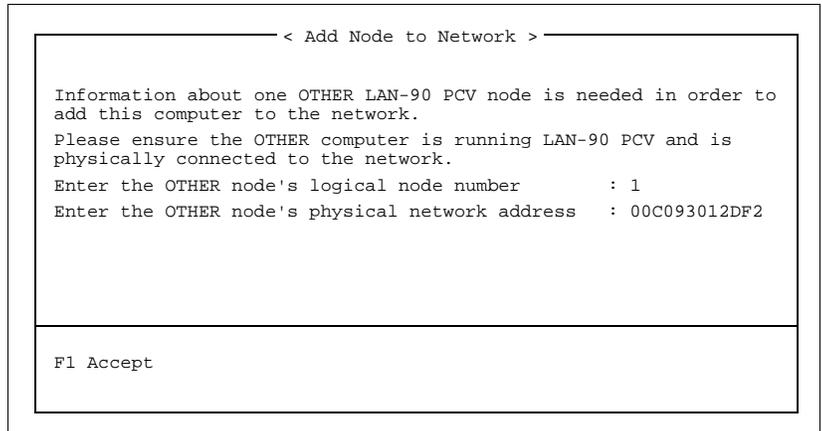


Figure 8-5. Adding a Node to the Network

Other node's Node Number and Ethernet address:

For computers with Ethernet cards, the installation program will request the logical node number and Ethernet address of another computer on the network. If the logical node number or Ethernet address is incorrect or this computer is currently turned off you will receive an error message. Correct the address or enter the address of another computer that is running. When communication across the network is established, this computer will be added into the list of computers on this network, and system files will be created and copied.

Step 3 Copying Volumes

You will now see the Copy Software screen.

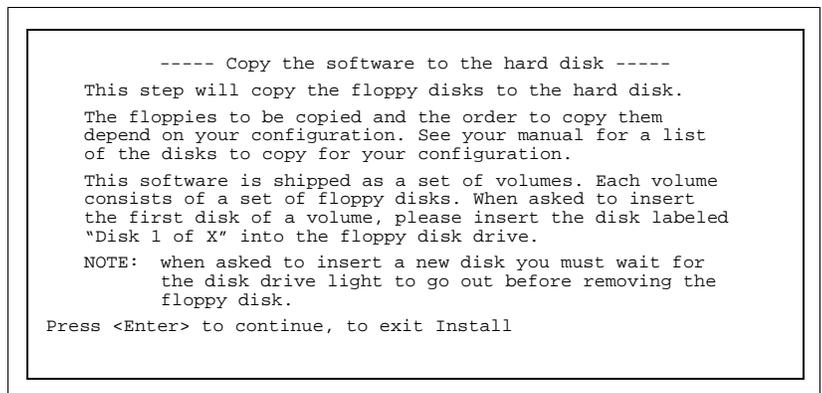


Figure 8-6. Copying Volumes

This screen prompts you to insert the LAN-90 PCV volumes based on the type of node this computer is, refer to Table 8-1. Each volume may include one or more actual disks.

Table 8-1. Standard LAN-90 PCV Volumes

Volume Name	Type of LAN-90 PCV Node	
	Server	Client
Installation	YES	YES
Programs	YES	YES
Server	YES	NO
Client	NO	YES
Tag Database (one of 250, 500, 1500, 3000 or 5000)	YES	NO

As the first disk of each volume is inserted, pressing enter will display an “accessing archive message” and the name of the volume set. Press enter again to install this volume.

Step 4 Copying Optional Volumes

Other optional packages (Table 8-2), such as logging, or redundancy can be installed now as well. You may also install optional packages from inside LAN-90 PCV. Use the **Main Menu, Configuration, Setup, Install Options** selections.

Table 8-2. Optional LAN-90 PCV Volumes

Volume Name	Type of LAN-90 PCV Node	
	Server	Client
Redundancy ¹	YES	YES
LOGGING PACKAGE	*****	*****
Logging Application	YES	YES
Ripcam	YES	YES
LAB DATA ENTRY PACKAGE	*****	*****
Lab Data Entry	YES	YES
QUALITY ANALYSIS & CONTROL	*****	*****
Quality Analysis & Control	YES	YES
CUSTOM APPLICATION TOOLKIT	*****	*****
Custom Application Toolkit	YES ²	YES ²
classConnect/DDE PACKAGE ³	*****	*****
1 Node TCP-Link or 4 Node TCP-Link ⁴	YES ⁵	YES ⁵
HARMONY	*****	*****
Protocol Specific Driver ⁶	YES	NO

NOTES:

1. Installing the Redundancy Volume on all nodes allows every node to have access to the Redundancy functions.
2. The C Compiler is provided with a one node license, it must be loaded on Node 1. It is not important whether Node 1 is defined as a Server or Client node.
3. Refer to the Section 2 - Installation of the *classCONNECT/DDE* manual for details in loading the QNX TCP/IP disk onto the LAN-90 PCV node and the set of classConnect/DDE disks to be loaded into the DOS computers.
4. Either a 1 Node or a 4 Node TCP-Link Volume is supplied with the classConnect package and is dependant on the number of DOS computers (1 or 4) allowed to communicate with the LAN-90 PCV system.
5. The node selected to be the bridge between the LAN-90 PCV network and the DOS network can be either a Server or Client node.
6. The actual Protocol Specific Driver (PSD) provided will depend on the type of PLC with which you wish to communicate.

Step 5 Install Completed

When all volumes are installed, remove the disks and press <F10>. The program will adjust system files.

When the finished screen is displayed press <Enter> to reboot and start LAN-90 PCV.

ADDING A NEW CONSOLE

Step 1 Updating Current Consoles

Each console on the network requires a copy of every license issued. Any console lacking enough licenses will not be able to communicate with the network. Thus the first step to installing a new console is to add the new license to every console on the network.

Method 1 - Console by Console

On each console, menu <right> click on the grey background, select **Programs** from the Workspace menu presented. Choose **Shell** from the Programs menu. You will be presented with a new window and the QNX prompt. Insert the new license expansion disk in the floppy drive.

Enter **login root** (you will need the password)

Enter **license**

Enter **license -r**

On the last console,

Enter **slay -fsSIGUSR1 bciNet.dbase**

Enter **exit** (to cancel root privileges and close the window)

The window will close. Go to the next console and repeat on every console.

Method 2 - Over the Network

On the node 1 (/ / 1) console, menu <right> click on the grey background, select **Programs** from the Workspace menu presented. Choose **Shell** from the Programs menu. You will be presented with a new window and the QNX prompt.

Insert the new license expansion disk in the floppy drive.

Enter **login root** (you will need the password)

Enter **license**

Enter **license -r**

Enter **license //1/etc/licenses //2/etc/licenses**

Enter **license //1/etc/licenses //3/etc/licenses**

... etc for all nodes

Enter **slay -fsSIGUSR1 bciNet.dbase**

to have the network database recognize the new network size.

Enter **exit** (to cancel root privileges and close the window)

Step 2 Update the Network Plan

Refer to your network plan and identify the logical node number for the new console.

Step 3 Configure Computer

Follow the instructions in Section 2 through 6.

Step 4 Install QNX

Follow the instructions in **Section 7**. Be sure to install license expansion disks for every other console on the network, not just the new console. If you are adding a fifth console to a network of four consoles, you will need to insert five license expansion disks into the new console.

Step 5 Install LAN-90 PCV Software

Follow the instructions under the subsection heading **INSTALLATION** in Section 8.

Step 6 If the new console is a Server, all other nodes in the LAN-90 PCV network must be shutdown and rebooted so that the Network Status menu will include the new Server.

Changing a Standalone Console to a Networked Console

Step 1 Installing and Configuring the Network Card

Install your network card. If you are installing an Ethernet card, remember your I/O port address, interrupt and Ethernet address. See Section 2 through 6 for details on recommended hardware settings and installation instructions.

NOTE: If the reason you are adding networking support to your console is to run as a classCONNECT/DDE Server, and not to network with other LAN-90 PCV consoles, you may skip to Step 3.

Step 2 Adding Licenses to a Standalone Console

With the console running, follow Method 1 of Step 1 in **ADDING A NEW CONSOLE** to install additional licenses on the standalone console.

Step 3 Changing to a Networked Console

Next, you must rebuild your system files to change the standalone console to a networked console. Press/click **D Configuration** from the Main Menu to display the Configuration menu. Press/click **J Setup** to display the Setup menu. Press/click **A Network Setup** to display the Network Setup menu. Press/click **B Rebuild System Files** to display the Hardware Configuration screen.

You'll notice that you are now asked whether the console is still standalone. Answer the default of "No".

Since the computer now has a network card, a new section for network settings appears in the Hardware Configuration screen. Confirm the settings and enter your 12 digit Ethernet address. Press <F1> to rebuild the system files with your current settings.

Shut-down your standalone console and reboot. Once restarted, your console is ready to recognize other consoles as they are added to the network.

Changing the Ethernet Card in Your Console

If you change the Ethernet card you are using in your console, you must let the LAN-90 PCV software know about this change. Follow these steps to identify and use the settings on your new Ethernet card.

Step 1 Installing and Configuring the Network Card

Install your new network card. Record your I/O port address, interrupt and new Ethernet address in **Appendix B**. See Section 2 through 6 for details on recommended hardware settings and installation instructions.

Step 2 Recognizing the Console on the Network

On one of the other consoles on the network follow these steps:

Menu <right> click on the grey background, select **Programs** from the Workspace menu presented. Choose **Shell** from the Programs menu. You will be presented with a new window and the QNX prompt.

Enter **login root** (you will need the password)

Enter **netmap -m**"<node><Space>1<Space><Ethernet address>"
-n<othernode>

Where:

<node> is the node number of the console in which you changed the ethernet card.

<Ethernet address> is the 12 digit ethernet address of the new network card you installed in the console

<space> at least one space must be left between each entry

<othernode> is the node number of each of the other nodes on the network

For example: **netmap -m "3 1 00c09300efdf" -n1**
netmap -m "3 1 00c09300efdf" -n2

This identifies node 3's new Ethernet card on the network.

For nodes 1 and 2

Enter **netmap**

This displays the current network mapping used by this node.

Enter **exit** or press <Ctrl-D>

This cancels root privileges and closes the window

The network is now up to date. You do not have to reboot any of the consoles.

Step 3 *Configuring Your Network Card Settings with the Software*

You must rebuild your system files to use the new physical ethernet address and keep the console recognized on the network. Press/click **D Configuration** from the Main Menu to display the Configuration menu. Press/click **J Setup** to display the Setup menu. Press/click **A Network Setup** to display the Network Setup menu. Press/click **B Rebuild System Files** to display the Hardware Configuration screen.

Confirm your I/O port address and interrupt. Enter the 12 digit physical Ethernet address of your new network card. Press <F1> to rebuild the system files with your current settings.

Connecting Two LAN-90 PCV5.x Networks Together

Connecting two LAN-90 PCV5.x networks together can be hazardous at best. The primary problem lies in the fact that the two network definitions may be using the same internal identifiers for different Servers and nodes. If you simply connected the two networks together, the network databases would exchange definitions resulting in mismatched and/or duplicate entries in the network database, the result being erratic behaviour and 'ghost' servers. Before beginning the procedure listed below, you **must** be familiar with the QNX operating system and LAN-90 PCV.

To join two networks together the following procedure should be used:

1. Ensure that ALL nodes in the combined network have unique node numbers. For any node that have duplicate node numbers, one node must be reloaded starting with QNX and must be given a unique node number. This change to the node should be done before performing the remainder of this procedure and can be connected to the master network (see Step 3).
2. Ensure that ALL nodes have enough QNX licenses to support the total number of nodes in the combined network.
3. Choose one network to be the master network, the other network will be called the source network. You will be transferring nodes from the source network to the master network one at a time.
4. On one of the nodes on the source network, log into LAN-90 PCV as SYSOP.
5. Format a QNX floppy using the **Utilities -> Miscellaneous Disk Utilities -> Format Media** from the LAN-90 PCV Main menu.
6. Open a shell. (<Right> click the mouse on the desktop (grey background) and select **Programs -> Shell** from the Workspace menu).
7. Change to the root user by typing **su** <Enter>, followed by the root password (default is 'root').
8. Create a copy of the source system's 'netmap' file on the floppy disk by typing the command:
netmap > /fd/0/netmap1.
9. Take the floppy disk over to a node on the master network.
10. Login as SYSOP, open a shell (as described in Step 6), and switch to the root user (as described in Step 7).

11. Create a copy of the master system's 'netmap' file on the floppy disk by typing the command:

netmap > /fd/0/netmap2.

12. Merge and sort the two 'netmap' files by typing the command:

sort -u /fd/0/netmap1 /fd/0/netmap2 > /fd/0/netmap

13. Copy the combined 'netmap' file to the network by typing the command:

cp /fd/0/netmap /etc/config

NOTE: If LAN-90 PCV is not running on the network when you copy the file, you will have to copy the file to every node on the network.

14. Get a list of all the nodes on the network by typing the command:

sin net

15. Update the 'netmap' on each of the listed nodes by typing the command:

netmap -f -n <node>

where <node> is the node number.

16. Take the floppy over to the source network and repeat steps 13, 14, and 15. Both the master and source network should have the same 'netmap' file.

17. Go to the node on the master network (that was used previously), insert the floppy disk and copy the master 'network' file onto the floppy by typing the command:

cp /usr/lib/bailey/system/config/net_dbase/network /fd/0

18. Return to the source network and copy the 'network' file to each node on the source network by typing the command:

cp/fd/0/network//<node>/usr/lib/bailey/system/config/net_dbase

where <node> is the node number.

At this point, all the nodes on the two networks should contain the combined 'netmap' and master's 'network' files. The next steps will merge the two networks together in a safe manner. At this point you have three options depending on the physical layout of your network. The easiest method is to simply power down all the nodes on the source network. If you have no operational problem in doing this then follow steps 19 to 21. If you cannot power down the entire source network but you can physically switch the nodes between the source and master network then follow steps 22 to 25. If neither of these options is practical then you will have to follow steps 26 to 30.

Power Down Option

19. Power down every node on the source network.

WARNING: If you forget to power down even one node you will experience problems.

AVERTISSEMENT : Si vous oubliez de mettre même un seul noeud hors tension, vous éprouverez des problèmes.

20. Join the two network segments together.

21. Power up each node, one at a time. You should wait for the node to enter graphics mode before powering up the next node. If the node is a Server node then it will boot up as a Client node, using **Configuration -> System Options -> Console Options** from the LAN- 90 PCV Main menu (for that particular node) and redefine it as a Server node again (including creating a redundant group, if necessary) then shutdown and reboot the node to enable the Server software.

Physically Switch Networks Option

22. Power down a node on the source network.

23. Disconnect the node from the source network and reconnect it to the master network.

24. Power up the node. If the node was a Server node then it will boot up as a Client node, using **Configuration -> System Options -> Console Options** from the LAN-90 PCV Main menu (for that particular node) and redefine it as a Server node again (including creating a redundant group if necessary) then shutdown and reboot the node to enable the Server software.

25. Repeat steps 22 to 24 for each node on the source network.

Operational Option

26. Disconnect as many Server nodes from the source network as you need to maintain operational status. Until they are reconnected to the master network, they will act as stand-alone machines. (Redundant Server pairs will become independent stand-alone Servers.)

27. Power down all other nodes on the source network.

28. Join the two network segments together.

29. Power up each node, one at a time. You should wait for the node to enter graphics mode before powering up the next node. If the node is a Server node then it will boot up as a Client node, using **Configuration -> System Options -> Console Options** from the LAN- 90 PCV Main menu (for that particular node) and redefine it as a Server node again (including creating a redundant group if necessary) then shutdown and reboot the node to enable the Server software.

30. Power down one of the stand-alone Server nodes.
31. Connect it to the master network.
32. Power up the node. It will boot up as a Client node, use the menus **Configuration -> System Options -> Console Options** from the LAN-90 PCV Main menu (for that particular node) so you will have to go into System Options and redefine it as a Server node again (including creating/assigning a redundant group if necessary) then shutdown and reboot the node to enable the Server software. At this point, any attached Client nodes will regain access to the Server node.
33. Repeat steps 30 to 32 for each remaining stand-alone Server node.

After rebooting all the nodes from the source network, you will notice that the list of Servers on the Network Status menu is incomplete (usually on the nodes on the original master network). To make this list complete, each node on the master network must be shutdown and rebooted. This doesn't have to be done all at once, the restarting of each node can take place whenever it is most convenient to you.

Error Recovery

Despite the best laid plans things can still go wrong. If you are experiencing problems after connecting two networks together then there are two important places to look for the cause.

If the node cannot be seen by any other node then check the **/etc/config/netmap** files. The most likely cause is an incorrect ethernet address or multiple addresses for the same node. Use the ``qed'` editor to correct these files.

If ghost Server names appear or Clients cannot locate Servers on the network then check the **/usr/lib/bailey/system/config/net_dbase/network** file. Choose one node and open the network file using the ``qed'` editor. Look for duplicate Server entries for the same node:

```
PCV -N 1 -I 9 -F PCV.1 -B //1/usr/lib/bailey/pcv/rel5.2 -W...
PCV -N 2 -I 10 -F PCV.2 -B //2/usr/lib/bailey/pcv/rel5.2 -W...**
PCV -N 2 -I 11 -F BOILER2 -B //2/usr/lib/bailey/pcv/rel5.2-W...**

**Duplicate entry
```

In the above example; there are two LAN-90 PCV Server entries (-F) for node 2 (-N 2). In this case, simply delete the entry that should not be there (most likely the PCV.2 entry). Once you

have corrected the error save the file and then run the following command:

```
slay -sSIGUSR1 -f bciNet.dbase
```

This will cause the network database to reread the network file.

SECTION 9 - INITIAL CONFIGURATION

OVERVIEW

Once each computer has booted and you have logged in, not all your hardware is ready to work. There are some further tasks to complete the installation. These tasks include, configuring as appropriate:

- CIU Communication
- Intellicon Serial card
- Optical Disk
- Diagnostic Output
- Mylar Keyboard
- Alarm Terminal
- Keyboard Switching
- Printer configuration
- Server software options
- Enhanced Data Collection System
- Archiving
- Redundancy

Computers can be configured across the network. You do not need to be seated at that screen in order to change the configuration.

All these tasks (except Printer Configuration) are performed through the **Main Menu, Configuration, System Options, Console Configuration** menu path. These items are described in Section 2 of the **Configuration** manual.

The Printer Configuration is performed through the **Main Menu, Configuration, Configure Printer Spoolers** menu path. This item is described in Section 8 of the **Configuration** manual.

SECTION 10 - OPTIONAL LOGGING INSTALLATION

OVERVIEW

Usually Logging is installed with the base system and no special installation instructions are required. Refer to [Section 8](#) of this manual for information on installing base system software.

These instructions are intended for users who purchase the Logging option as a separate package and install it after the base system has been installed.

INSTALLING LOGGING ON AN EXISTING SYSTEM

Start the Installation Program

From the Main Menu, select **Configuration, Setup** and **Install Options**.

Because you are performing a system update by adding the logging option to the existing system you will be performing the following steps:

- Source Drive Selection

By default the first floppy drive, “/dev/fd0”, will be used. You are given the option to confirm this prior to installation. If you are performing the installation from the second floppy drive, select **N** and choose **2**. You will be asked for a confirmation of your selection, press **Y** if the response is correct.

- The installation program will run displaying white text on a blue background.

The installation program will first protect some required system files. A working message will be displayed while this is being performed.

Load Logging Option

Logging is shipped as a set of archived volumes. There are two logging programs disks and one RIPCAM disk in the package.

Press <Enter> and insert the disk labelled “Logging Disk 1 of 2”, press <Enter> and the system will access the drive. Press <Enter> again to continue with the reading of the floppy disk. The software archive *PCVLOG*, and your serial number will be displayed prior to the actual files being loaded.

When prompted, insert the second logging disk, “Logging Disk 2 of 2” into the floppy drive and press <Enter>. Once the logging disks have been loaded you will see a message stating the Logging Application Disks are loaded. Insert the RIPCAM disk and press <Enter>. When the drive has been accessed press <Enter> again to load the archive.

When the second archive is successfully loaded press <F10>. The installation program will report the two archives, the “Logging Application Disks” and the “RIPCAM 2.0 Application”, have been loaded. Press <Enter> to continue.

The logging options will have to be enabled for the correct start up of the logging application. When the main window screen is displayed, select the Main Menu by clicking the right mouse button on the Main Menu window button or pressing <Ctrl> or {GENL FCTNS Menu} from the keyboard.

Click the left mouse button on Configuration, or press **D**, to display the Configurations Menu.

Click the left mouse button on System Options, or press **G**, to display the Systems Options Menu.

Click the left mouse button on Console Configuration, or press **B**, to display the Console Configuration Menu application (Figure 10-1).

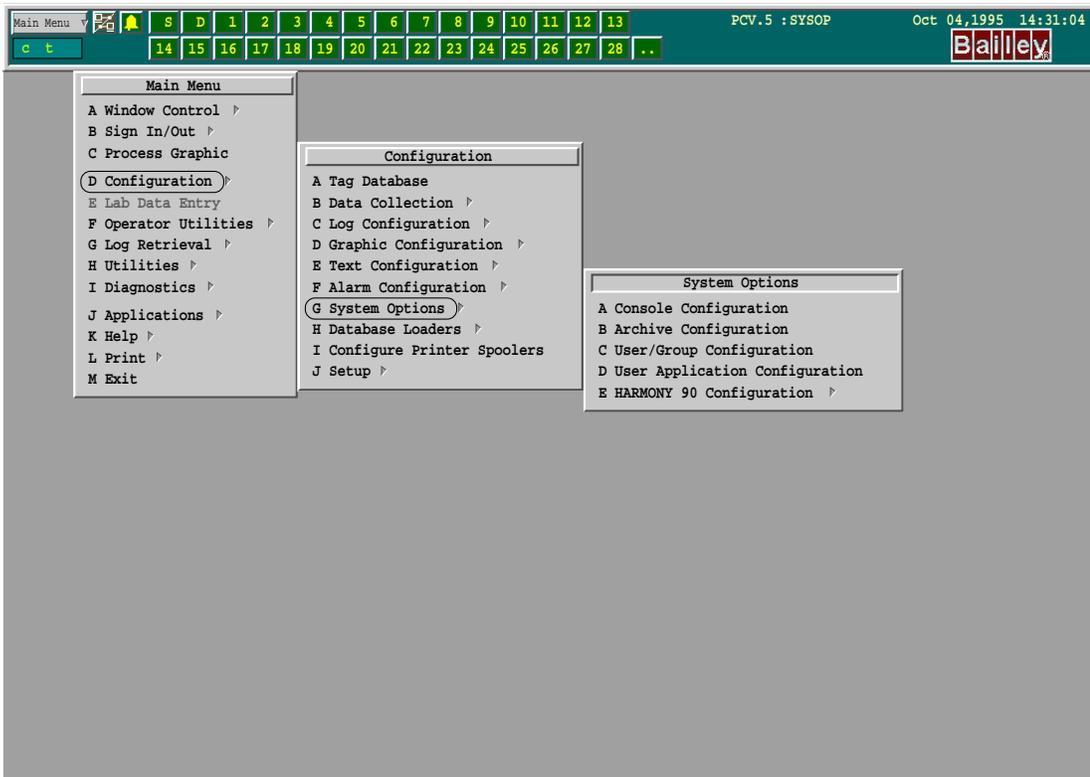


Figure 10-1. Console Configuration Application Menu

Using the <Up>/<Down> cursor keys, position the highlight bar over the current node and press <F2> (Figure 10-2).

< Console List >				
NODE	NODE-NAME	CONSOLE-TYPE	SERVER-NAME	GROUP-NAME
1	QNX4_SERVER	SERVER-CLIENT	PCV.1	*STAND-ALONE*
2	BCI.2	CLIENT-ONLY	PCV.1	
3	BCI.3	CLIENT-ONLY	PCV.1	
4	BCI.4	CLIENT-ONLY	PCV.1	
5	BCI.5	CLIENT-ONLY	PCV.1	
6	BCI.6	CLIENT-ONLY	PCV.1	
7	BCI.7	CLIENT-ONLY	PCV.1	

F1 Edit Console Definition	F2 Edit Console Options
F9 Help	F0 Exit

Figure 10-2. Console List Menu

On the Server-Client Options Menu application, select the **Base Logging System** entry and enable it (Figure 10-3).

< Server-Client Options (PCV.1) >		
SOFTWARE OPTIONS		Page 1 of 2
Number of Tags	3000	
Base Logging System	Disabled	Enabled
System Event Printing	Disabled	Enabled
System Event Logs	Disabled	Enabled
Periodic/Trigger Logs	Disabled	Enabled
Trip Logs	Disabled	Enabled
Trend Logs	Disabled	Enabled
SOE Logs	Disabled	Enabled
Batch Historian	Disabled	Enabled
Enhance Data Collection	Disabled	Enabled
Lab Data Entry	Disabled	Enabled
SPC Manager	Disabled	Enabled
SPC Alarming	Disabled	Enabled

F1 Save F9 Help F10 Exit PgDn Hardware Page

Figure 10-3. Server Client Options Menu

Use the <Up>/<Down> cursor keys to move to the desired row. Use the <Left>/<Right> cursor keys to highlight the desired option of Enabled/Disabled. The option will be enabled if moving the cursor to another row the word *Enabled* is shown in white. Once the required options are set to your system requirements, press <F1> to save the configured options and <F10> to exit the application.

If you have made changes and not pressed <F1>, you will be prompted to save the changes. Select **YES** and press <Enter>.

Once your changes are saved, exit the Console Configuration Menu by pressing <F10>.

For the configuration change to take effect you will need to reboot the server. You can do this now or later.

Move the pointer to the Main Menu button and press the right mouse button to display the Main Menu. Press the left mouse button to select Exit. Click the left mouse button on the Exit & Shutdown button (Figure 10-4). The Executive Bar will be removed and LAN-90 PCV will be stopped from running.

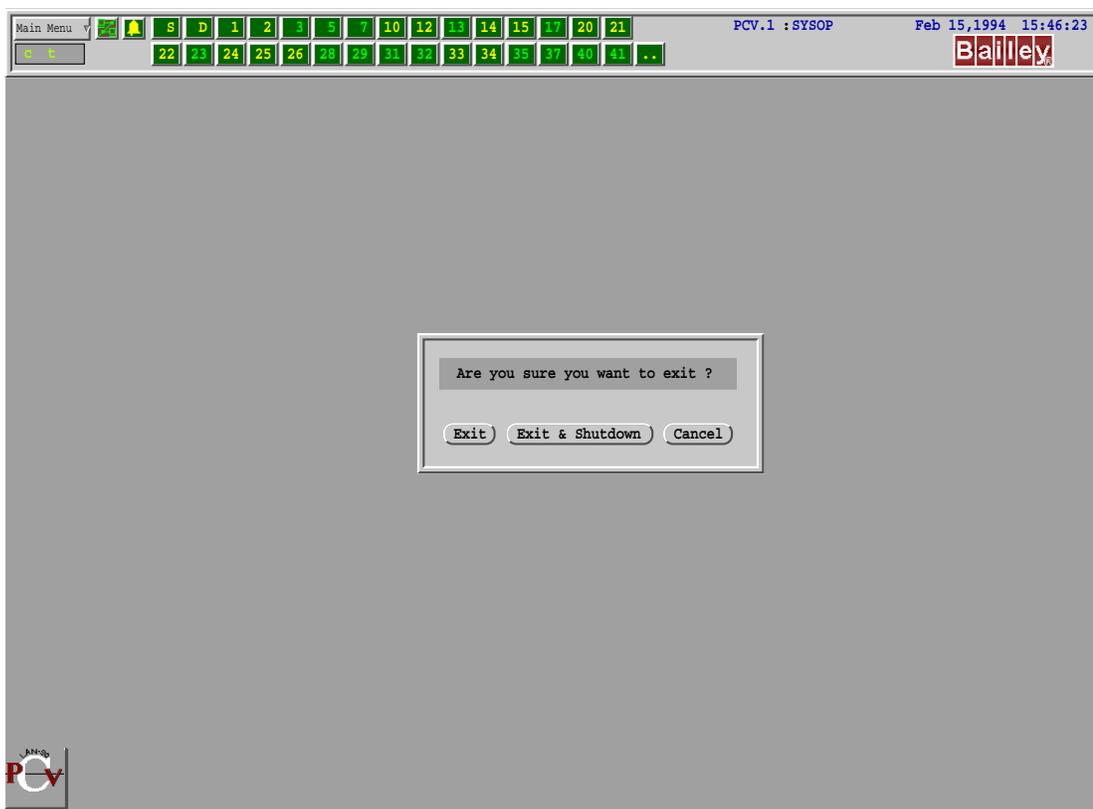


Figure 10-4. Main Menu

To Reboot, press and hold <Ctrl><Alt><Shift> then press . In a few seconds a yellow bar will appear and the system will restart.

SECTION 11 - INSTALLING A HARMONY 90 PROTOCOL SPECIFIC DRIVER

INSTALL DISKS

Starting from a working LAN-90 PCV console, insert the Protocol Specific Driver Diskette into the drive. Select **Install Options**, as shown in the Figure 11-1.

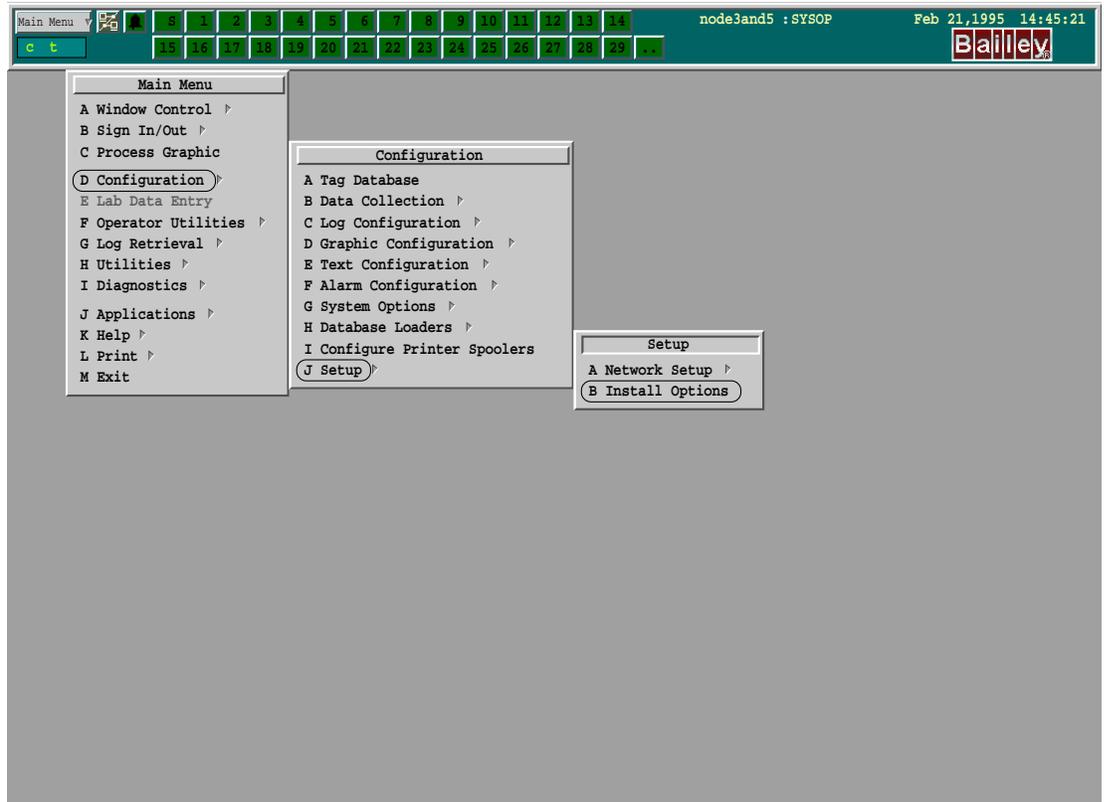


Figure 11-1. Install Options

Then, follow the prompts provided by the install program to complete installation of the PSD. Press <F10> to reset the system files once the installation is complete.

EDIT STARTUP FILE

First check the documentation for your specific PSD to determine what the default parameters represent and whether any of them need to be altered.

If changes are required or to check the default file, pull up a shell window in the following manner. If you do not have sufficient permissions to access the shell, then you should not continue. If the startup parameters are wrong, you will need to

reboot in order to correct them. The startup file is only read on startup.

Menu click on the grey background screen. From the Workspace menu, select “Programs”, then from the Programs menu select “Shell”. The menu access is shown in Figure 11-2.

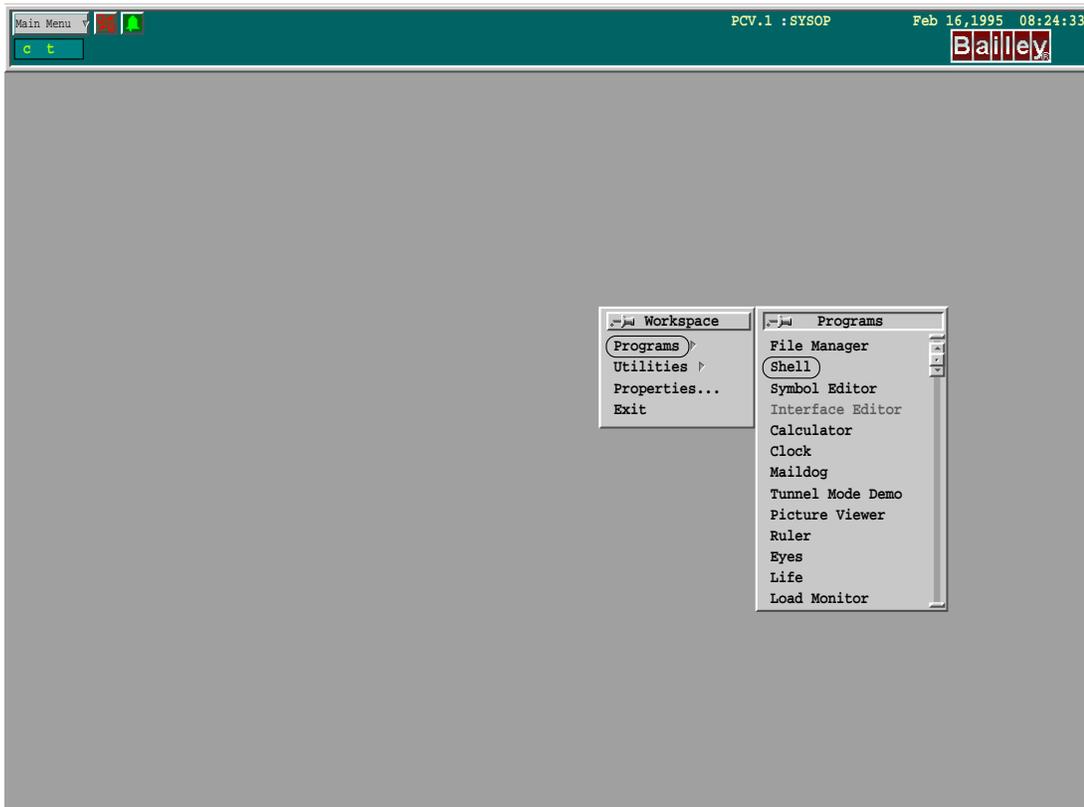


Figure 11-2. Starting a QNX Wterm Window

To Edit the Startup File:

The following text shows the QNX shell commands used to edit the startup file for the Modbus PSD and the corresponding responses.

The location and name of the startup file for each driver can be found in the driver's User Manual. It is probable that the only change required will be to the port identifier.

Directional comments are enclosed in square brackets [].

[Change to the psd directory]

```
# cd /bci/pcv/config/psd
```

[Confirm PSD/directory name]

```
# ls
. .. modbus
```

[Change to driver directory]

```
# cd modbus
```

[Confirm startup filename]

```
# ls
. .. mb_start
```

[Edit startup file to set correct port connection]

```
# qed mb_start
```

[A screen similar to the following will be displayed:]

```
last=8 (1 ,8) a+ b- c- d- f- i- j- l- m+ n- s- t- w+
                                     mb_start R
P:/dev/cti2 i:P b:9600 d:8 s:1 a:NO Primary port
R:N Not reply blocked
W:100 Sleep time (msec)
V:2 Number of retries
U:1000 Transaction Timeout
T:584-Network1 Modbus device type
T:984-Network1 Modbus device type
T:984/875-Network1 Modbus device type
```

Figure 11-3. Edit the Startup File Screen

[Change **/dev/ser1** to **/dev/cti2** or as connected.]

[Press <Enter> to leave command line]

+	[go to command line at top of screen]
w	[write changes]
q	[quit]
# exit	[return to PCV]

ACTIVATING HARMONY 90

HARMONY 90 is a component of LAN-90 PCV and, therefore, requires no separate installation. However, you will need to activate HARMONY 90 and set the starting tag number.

The Console configuration menu should be accessed via the menus sequence shown in Figure 11-4.

Move the highlight bar to the Server node whose options are to be modified.

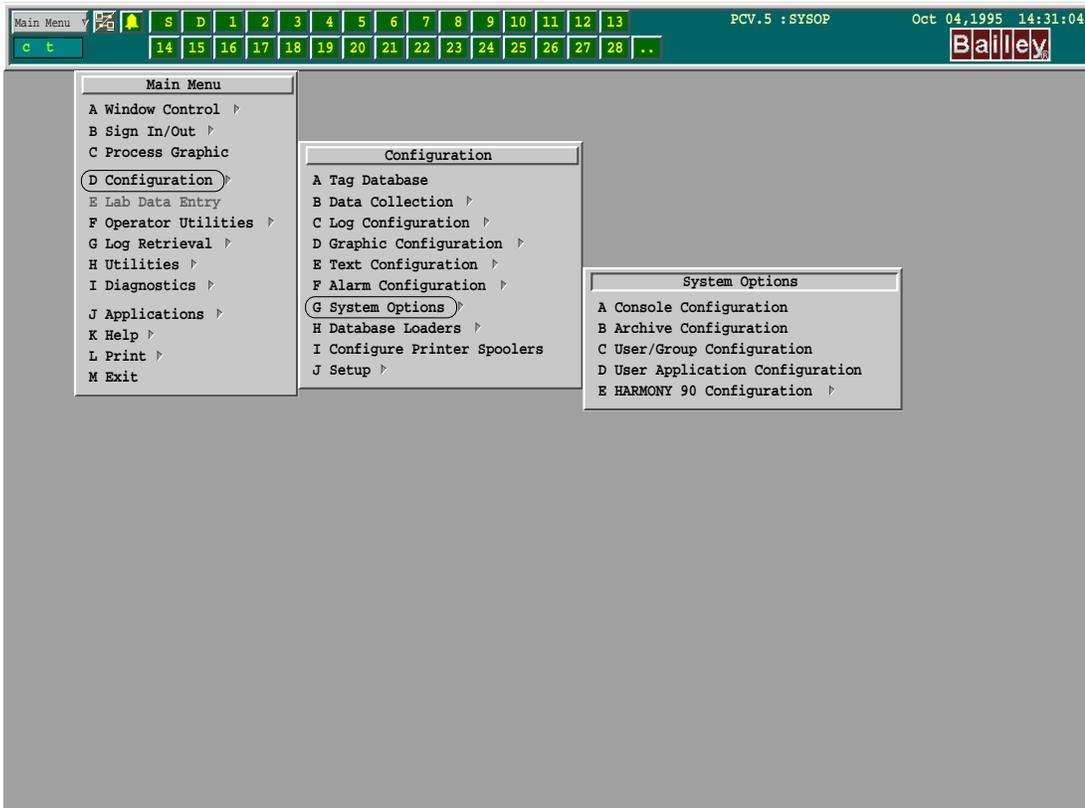


Figure 11-4. Console Configuration Menu Selection

Press <F2> - Edit Console Options

Page down to the second screen as shown in Figure 11-5.

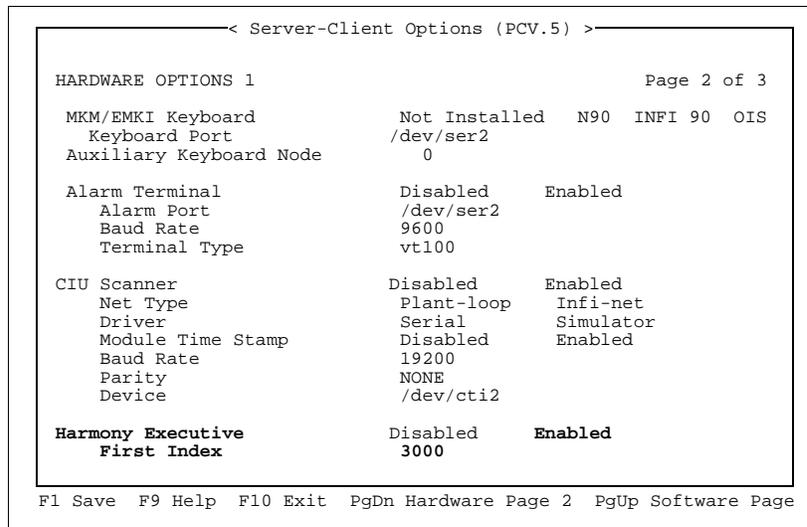


Figure 11-5. Hardware Options Menu

The area of the screen being referenced is in **bold** type.

By default, HARMONY 90 Executive is disabled. Select "Enabled", then set the HARMONY 90 starting tag index. Any tags before this index are standard PCV/CIU/Net-90 tags. Tags including, and after, the starting index are HARMONY 90 tags. In the example, tag 3000 is the first HARMONY 90 tag.

Press <F1> - Save settings

Press <F10> - Exit

REBOOT THE COMPUTER

In order to establish the new options, the node must be re-started.

First, shut down LAN-90 PCV to allow it to properly close the files currently in use:

Main menu -> Exit -> Shutdown

Wait until the Shutdown Complete message box is displayed. To reboot the computer, simultaneously press: <Ctrl><Alt><Shift>.

DRIVER CONFIGURATION

Access the Configuration Menu (Figure 11-7) via the menu path as shown in Figure 11-6.

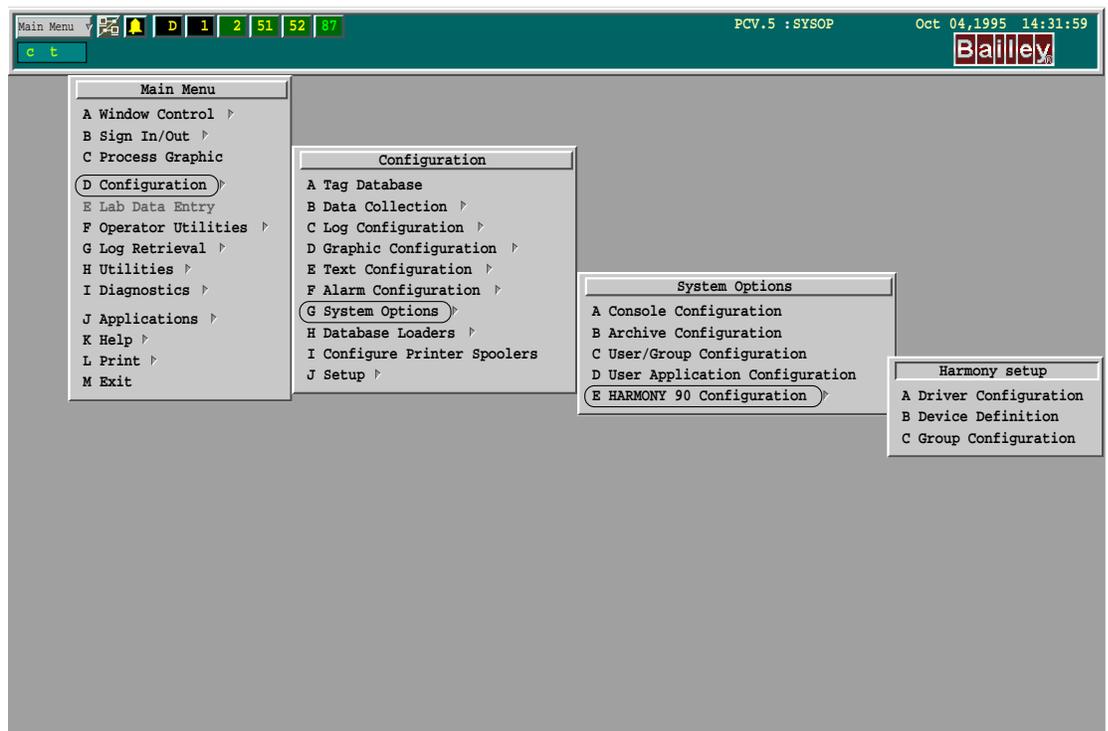


Figure 11-6. HARMONY 90 Configuration Menu

Setting Driver Parameters

Click on the **Driver Name 1** field and set the fields as follows. This is a Modbus example, the actual field contents are shown in the driver's User Manual.

DRIVER: modbus [Same as directory name]

PARAMETERS: -fmb_start [Same as file in directory]

Update and **Exit** to the main screen.

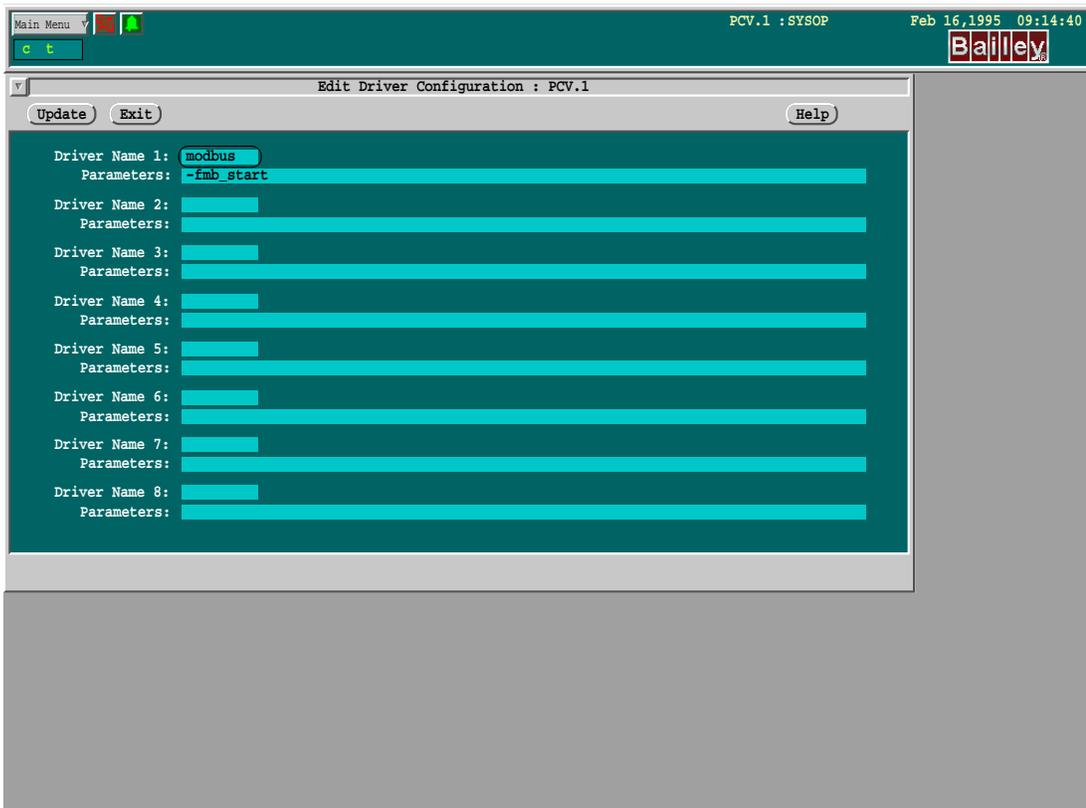


Figure 11-7. HARMONY 90 Driver Configuration Menu

NOTE: The driver name and parameters must be supplied

HARMONY 90 will start the driver using the parameters supplied and the startup file entered.

DEVICE DEFINITION

Set the device definitions via the following menu path:
Main menu -> Configuration -> System Options -> Harmony Configuration -> Device Definition

Complete the device definition. The following is a Modbus-related example.

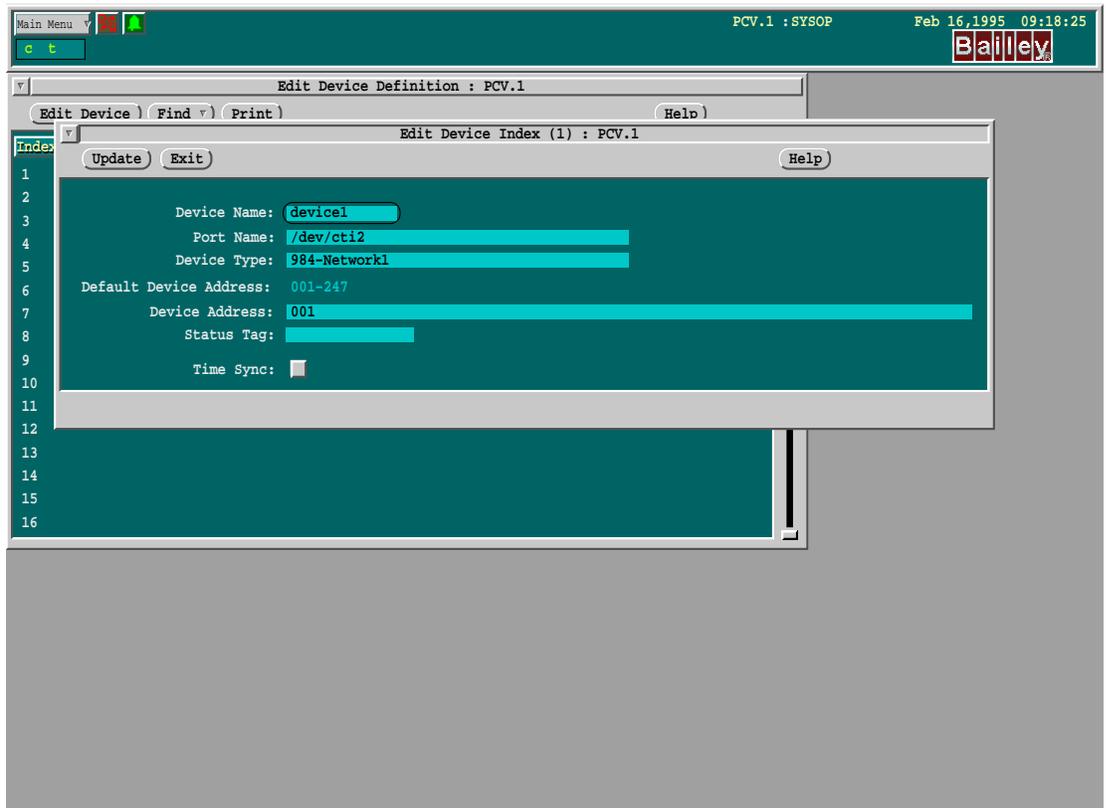


Figure 11-8. HARMONY 90 Device Definition Menu

Device Name:	device1	[Anything]
Port Name:	/dev/cti2	[or as connected]
Device Type:	*	[menu click and select from available devices]
Device Address:	001	[Use actual device address]

NOTE: When selecting the device type, the pick list will contain all devices that are currently supported by all drivers currently configured. The list is not limited to the driver using the port that was specified.

CONFIRM COMMUNICATION

You may confirm communication with the device by first creating a group. The driver will start reading this group from the device at the specified interval. This will be used to confirm that the device is being read.

Since no tags are configured to write to this group, your process control is still secure.

Access Group Definition (Figure 11-6) via:

Main menu -> Configuration -> System Options-> Harmony Configuration -> Group Definition.

See Defining a Group in Section 15 of the **Configuration** manual, for examples.

Once the group has been added and saved, HARMONY 90 will start polling the PLC at the specified interval. If you are using Burr-Brown isolation modems, then you will be able to see the transmit LED flashing each time a read is attempted. This confirms that the driver is attempting communication. If the receive LED also flashes, then the device is responding. However you should continue these instructions to confirm communication.

Create a DIGRPT tag within the HARMONY 90 range, and specify this tag as the status tag for the read group. Then create a faceplate display using the graphic configuration editor (GraD) to observe the status of the tag. Connect and disconnect the communications cable to confirm proper operation. The tag should go into and out of alarm, depending on the connection.

You may further confirm communications by configuring an ANALOG tag to read an analog value or a DIGITAL tag to read a boolean value. You may then toggle the point in the PLC and observe the value changing.

If you have problems:

1. Confirm the hardware settings for the Server. The Console Configuration must specify use of the CTI card if it is in use. If you have a CTI card, do not use the serial port for either CIU or HARMONY 90.
2. Confirm the driver startup file has the proper port baud rate and parity configured.
3. Check your cabling. Do you need a null modem?

APPENDIX A - INSTALLING DOS

INSTALLING DOS

The details of creating the DOS partition depend on the version of DOS you are installing. The examples that follow refer to the MS-DOS 6.0 FDISK program. The DOS partition is set up using the FDISK program, which is run either as part of a DOS installation program or from the DOS prompt.

To prepare console for DOS, you must create a primary DOS partition. This is done by using the menu driven utility called "fdisk". In the following example, the primary DOS partition will be set to 100 MB.

How to Start the MS-DOS FDISK Program

The "fdisk" utility is easy to use because it uses menus to lead you through each procedure. To start "fdisk", follow these steps:

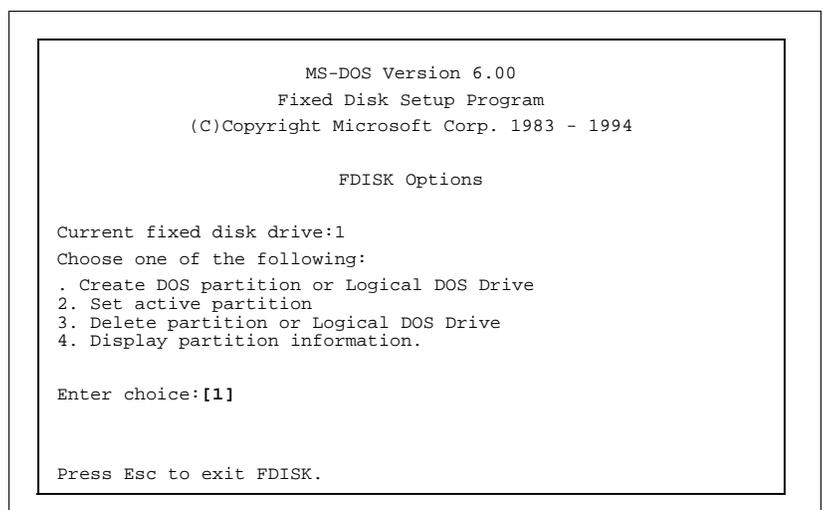
Place the DOS boot floppy in the floppy drive.

Turn on the console and allow it to boot.

At the DOS prompt type:

```
fdisk <Enter>
```

The "fdisk" program's main menu will appear (see Figure A-1).



```
MS-DOS Version 6.00
Fixed Disk Setup Program
(C)Copyright Microsoft Corp. 1983 - 1994

FDISK Options

Current fixed disk drive:1
Choose one of the following:
1. Create DOS partition or Logical DOS Drive
2. Set active partition
3. Delete partition or Logical DOS Drive
4. Display partition information.

Enter choice:[1]

Press Esc to exit FDISK.
```

Figure A-1. Fdisk Disk Options Menu

Remove Current Partition

Select **“Delete partition or Logical DOS Drive”** and delete the primary DOS partition. This partition should be the total size of the hard disk.

You are now ready to create a new primary DOS partition.

Create a Primary DOS Partition

After selecting the **“Create DOS partition”** option from Figure A-1, the menu shown in Figure A-2 will appear.

```
                Create DOS Partition or Logical DOS Drive

Current fixed disk drive: 1
Choose one of the following:
1. Create Primary DOS Partition
2. Create Extended DOS Partition
3. Create Logical DOS Drive(s) in the
   Extended DOS Partition.

Enter choice: [1]

Press Esc to return to FDISK Options.
```

Figure A-2. Fdisk's Create DOS Partition or Logical DOS Drive Menu

From this menu choose the **“Create Primary DOS Partition”** option, the menu shown in Figure A-3 will appear.

```
                Create Primary DOS Partition

Current fixed disk drive: 1

Do you wish to use the maximum available size for a Primary DOS
Partition and make the partition active (Y/N).....?[N]

Press Esc to return to FDISK Options.
```

Figure A-3. Fdisk's Create Primary DOS Partition Menu

This menu will ask the question “Do you wish to use the maximum size for a DOS partition and make the DOS partition active (Y/N).....?” select **N** for NO (Figure A-3). The menu shown in Figure A-4 will appear and here you must enter **100** to create a one hundred megabyte primary DOS partition (Figure A-4).

```

Create Primary DOS Partition

Current fixed disk drive:1
Total disk space is 540 Mbytes (1 Mbyte 1048576 bytes)
Maximum space available for partition is 540 Mbytes (100%)

Enter partition size in Mbytes or percent of disk space (%) to create a Primary DOS Partition.....[100].

Press Esc to return to FDISK options.
    
```

Figure A-4. Fdisk's Create Primary DOS Partition Menu

The primary DOS partition is now created but NOT set active. To set the primary DOS partition active, go back to the main FDISK options screen and select option **2**. (Change Active Partition).

Enter the number **1** to make the first partition active as shown in Figure A-5.

```

Set Active Partition

Current fixed disk drive: 1

Partition  Status  Type   Volume  Label  Mbytes  System  Usage
C: 1      A          PRI  DOS           100    Unknown  2%

Total disk space is 540 Mbytes (1 Mbyte = 1048576 bytes)
Enter the number of the partition you want to make active.....[1].

Press Esc to continue.
    
```

Figure A-5. Fdisk's Set Active Partition Menu

An 'A' in the status field shows that this partition is now active.

The following message will appear after the partition is set active and you escape from the fdisk program:

System will now restart

Insert DOS diskette in drive A:

Press any key when ready...

Put the DOS setup disk in the floppy drive and press any key to restart DOS.

The 100 Megabyte primary DOS partition has now been created and set active. This partition must now be formatted and made bootable.

The MS-DOS 6.0 setup program will now run, it will copy all the DOS files into the "c:\DOS" directory, created by the program. When asked if you want the setup program to continue press <Enter> to continue and accept all the defaults. The program will give you a choice to format the new partition. Select "Format Partition" and press <Enter>. The setup program will create an autoexec.bat and a config.sys file.

Create DOS Bootable Disk

Place a blank disk in the console drive "A". Enter the following command:

format A: /S

This will create a bootable DOS disk. Label it as such and store with the LAN-90 PCV disks.

NOTE: The numbers in the menus, shown for hard disk size, may vary.

APPENDIX B - NETWORK PLANNING FORM

It is recommended that a copy of the completed form be inserted in each console's Installation manual, for future reference. This form should be revised and, if necessary, expanded any time there is a change to the network configuration.

Table B-1. Network Planning Form

Network Planning Form				
Logical Node #	Card Id	Irq	I/O Addr.	Description
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Card ID

Enter the Ethernet address or the arcnet physical node number.

IRQ

Enter the IRQ used for the card in this console.

I/O Addr.

Enter the I/O address used for the card in this console.

Description

Describe the console by it's location or other features so that you will know which console is being referred to.

APPENDIX C - SWITCH SETTINGS

This appendix contains the switch settings for the following recommended computers;

HP VECTRA XM4 - ETHERNET

HP VECTRA XU Series - ETHERNET

HP VECTRA VL2 - ETHERNET

DEC VENTURIS - ETHERNET

DEC VENTURIS - CLIENT - ETHERNET

DEC CELEBRIS - ETHERNET

COMPUTER MAKE	<u>HP VECTRA</u>	MODEL	<u>XU SERIES or XM4</u>
HARD DRIVE TYPE	IDE <input type="checkbox"/>	SCSI <input checked="" type="checkbox"/>	NONE <input type="checkbox"/>
NETWORK:	ARCNET <input type="checkbox"/>	ETHERNET <input checked="" type="checkbox"/>	

ON							
•			•			•	
•			•			•	
S8			OFF			S1	

SCSI ADAPTEC CARD

ON							
		•		•			
		•		•			
S1			OFF			S8	

ON			
		•	
		•	
S1		OFF	S4

CTI SERIAL CARD

• Indicates the Position of the Switch

GS960714

Figure C-1. Switch Settings for HP VECTRA XU Series or XM4

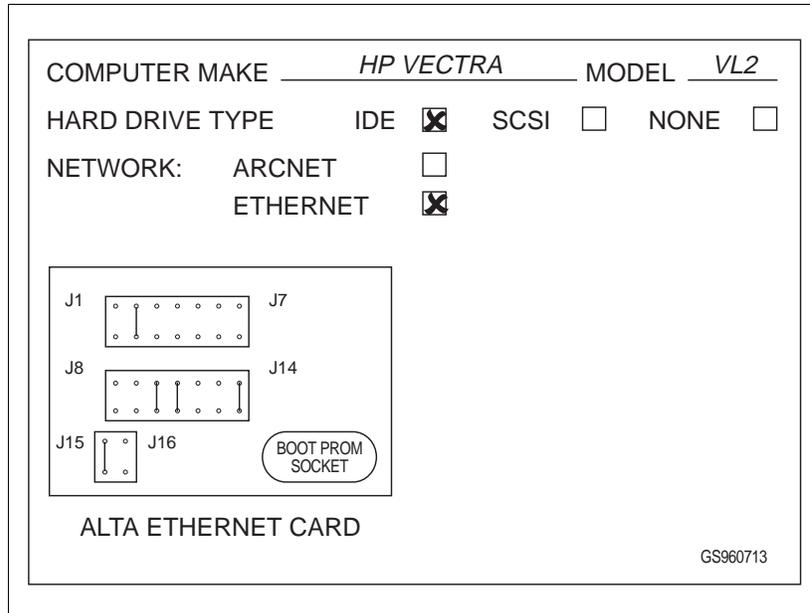


Figure C-2. Switch Settings for HP VECTRA VL2

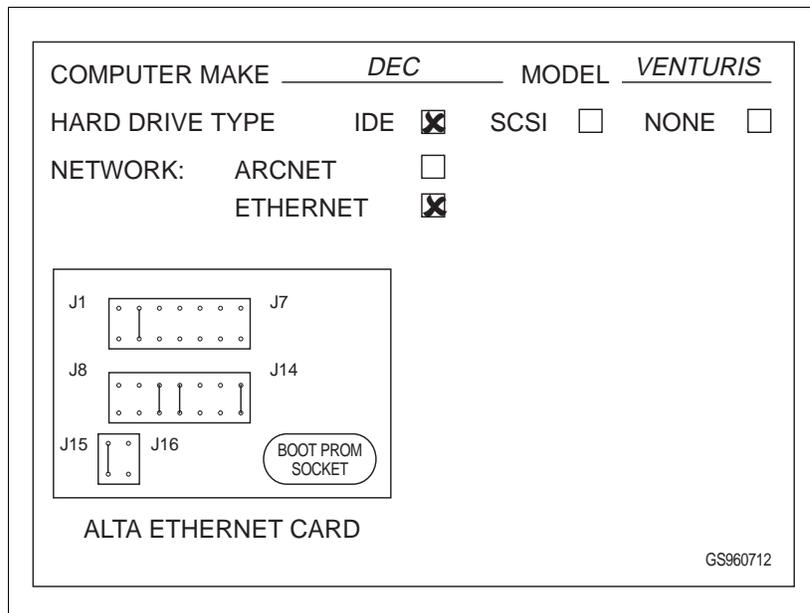


Figure C-3. Switch Settings for DEC VENTURIS

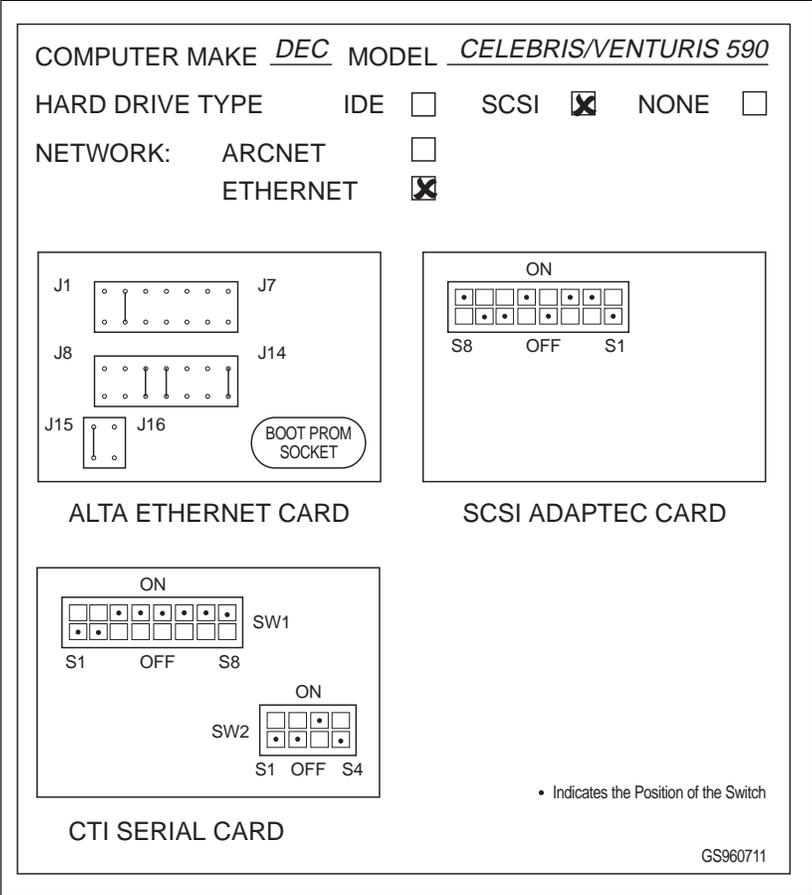


Figure C-4. Switch Settings for DEC CELEBRIS/VENTURIS 590

APPENDIX D - TIME ZONE RULES

TIME ZONE RULES AVAILABLE IN QNX/PCV 5.2

Table D-1. Time Zone Rules

Name of Time Zone	Rule
Greenwich Mean Time	utc00
New Zealand	nzst-12
Eastern Australia	east-10
Central Australia	cast-09:30
Japan	jst-09
Western Australia	wast-08
China	cst-08
Hong Kong	hkt-08
Korea	kst-09
India	ist-05:30
Moscow	mst-02mdt-03,M3.5.0/2,M9.5.0/2
Eastern Europe	eet-02eest-03,M3.5.0/2,M9.5.0/2
Central Europe	cet-01cest-02,M3.5.0/2,M9.5.0/2
Middle Europe	met-01mest-02,M3.5.0/2,M9.5.0/2
Western Europe	wet00west-01,M3.5.0/2,M10.5.0/2
United Kingdom	wet00west-01,M3.5.0/2,M10.5.0/2
Eastern Brazil	bst03
Newfoundland	nst03:30ndt02:30,M4.1.0/2,M10.5.0/2
Western Brazil	bwst04
Atlantic	ast04adt03,M4.1.0/2,M10.5.0/2
Eastern	est05edt04,M4.1.0/2,M10.5.0/2
Central	cst06cdt05,M4.1.0/2,M10.5.0/2
Mountain	mst07mdt06,M4.1.0/2,M10.5.0/2
Pacific	pst08pdt07,M4.1.0/2,M10.5.0/2
Alaska	akst09akdt08,M4.1.0/2,M10.5.0/2
Hawaii	hast10
Samoa	sst11

Index

A		E	
Adaptec SCSI Adapter		Error Recovery.....	8-16
Settings Menu.....	2-14		
Adaptec SCSI Adapter Card	2-11		
1540B/1542B.....	2-11		
1540C/1542C.....	2-12		
Configuration Menu	2-16		
Dipswitch Settings	2-12		
Port Address Menu	2-14		
Settings Menu.....	2-15		
Software Set-Up	2-13		
Adding New Console.....	8-9		
Updating Current	8-9		
ADP Panel.....	3-4		
Hardware Set Up	3-4		
ALTA EtherCombo-16 T/C	2-9		
Applications	1-3		
Custom Applications Toolkit	1-4		
Lab Data	1-4		
Logging package	1-3		
Optional	1-3		
Quality Analysis & Control	1-3		
C		F	
CIU	5-1	Functions	1-2
Baud Rate.....	5-2	Control.....	1-2
BTM Switch Settings.....	5-4	Process Monitoring	1-2
Cable Connections	5-6		
Connecting to Software Release 5.1	5-6		
ICT/SSM/LSM Switch Settings	5-1		
INICT03 Switch Settings.....	5-3		
LIM Switch Settings	5-4		
NIMPO 1 Jumpering	5-5		
NIS/LIS Switch Settings.....	5-2		
NTMF01 Dipshunt Strapping	5-5		
Termination Unit Strapping.....	5-5		
classConnect.....	1-4		
Connecting Two LAN-90 PCV Networks.....	8-13		
Conventions	1-6		
CPU			
Hardware	1-5		
CTI Serial Card.....	2-6		
Switch Settings	2-6		
D		G	
Documents Related	1-7	GENICOM Printer	3-5
DOS.....	6-1		
Accessing DOS from QNX.....	6-1		
Installing.....	6-1		
Loading Both DOS and QNX.....	6-1		
		H	
		Hard Disk	
		Hardware.....	1-5
		Hardware	1-5
		CPU.....	1-5
		Floppy Disk Drive	1-5
		Hard Disk	1-5
		Installation Considerations	2-1
		Memory	1-5
		Settings	2-1
		Hardware Requirements	1-5
		HARMONY 90.....	1-4, 11-1
		Activating.....	11-3
		Confirm Communications	11-7
		Device Definition	11-6
		Driver Configuration	11-5
		HP On-Board Ethernet.....	2-7
		I	
		I/O Ports.....	2-3
		Addresses	2-4
		ICI	
		CIU	5-1
		I-E93-901-21	1-8
		I-E93-905-2	1-8
		I-E96-107	1-8
		I-E96-200A.....	1-8
		I-E96-601	1-7
		I-E96-701	1-8
		I-E96-716	1-8
		I-E97-811-2.1	1-7
		I-E97-811-2.2	1-7
		I-E97-811-4	1-7
		I-E97-811-5	1-7
		Initial Configuration	9-1
		Interrupts.....	2-4, 2-5
		Factory Setting	2-5

System Initialization File	
Base-Level Services	7-9
Device Drivers	7-10
Establishing the Time Zone	7-9
Floating-Point Emulator	7-10
Name Server.....	7-10
Node Mapping	7-10
Optional Services.....	7-11
QNX.....	7-7
Terminal Daemon	7-11

T

Time/Date.....	7-12
Coordinated Universal Time (UTC)	7-12
Setting.....	7-13

U

Utilities	1-2
Disk	1-2
File	1-2
Printer.....	1-3
System Diagnostic	1-3
Tag.....	1-2

V

Video Adapter Cards.....	2-5
SVGA	2-6
VGA.....	2-5

W

WinStar-16.....	2-8
-----------------	-----

Visit Elsasg Bailey on the World Wide Web at <http://www.bailey.com>

Our worldwide staff of professionals is ready to meet *your* needs for process automation.
For the location nearest you, please contact the appropriate regional office.

AMERICAS

29801 Euclid Avenue
Wickliffe, Ohio USA 44092
Telephone 1-216-585-8500
Telefax 1-216-585-8756

ASIA/PACIFIC

152 Beach Road
Gateway East #20-04
Singapore 189721
Telephone 65-391-0800
Telefax 65-292-9011

EUROPE, AFRICA, MIDDLE EAST

Via Puccini 2
16154 Genoa, Italy
Telephone 39-10-6582-943
Telefax 39-10-6582-941

GERMANY

Graefstrasse 97
D-60487 Frankfurt Main
Germany
Telephone 49-69-799-0
Telefax 49-69-799-2406