Central Network Controller

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IMPORTANT:

When installing the PAC Portico equipment the following should be noted:

HEALTH AND SAFETY

Installation must wired in accordance with National Wiring Regulations (BS7671, IEE National Wiring Regulations in the UK). Failure to do so can result in injury or death by electric shock.

It must also comply with any local Fire, Health and Safety regulations. A secured door that may be part of an escape route from an area must be installed with:

- **A Fail-Safe lock (A). So that the door will be released if the power fails. Ideally a magnetic lock should be used as these are less likely to jam or seize.**

- **A normally-closed Break-Glass or Manual Pull (B)** *in the lock supply wiring*. **So that in an emergency the fail-safe lock can be immediately depowered.**
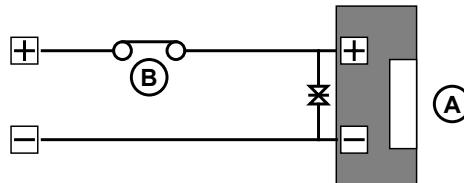
The controller must be connected to Earth Ground. Isolate the controller supply before working on the controller.

CABLING

The cabling used in the PAC Portico access control systems (six wire bus, reader cables, etc.) are not prone to electrical interference. However, you should avoid routing cable close to heavy load switching cables and equipment. If this is unavoidable then cross the cable at right angles every 1-2m (3 to 6 ft) to reduce the interference.

RFID Devices

As similar RFID technology is now widely used in a number of other industries, for example automotive immobilisers, it is possible that interaction between your access control credential and other devices may cause one or the other to function incorrectly. Should you suspect that you have experienced such a problem the solution is to separate your access control credential from other RFID devices.

FCC Notice

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

KeyPAC CNC	**FCC ID OQL-PAC-CNC**
PAC CNC	**FCC ID OQL-P-CNC**

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note

> This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Table of Contents

Table of Figures

Abbreviations Used in this Document

CLK	Clock
CNC	Central Network Controller
COM	Common
COS	Code Operated Switch
CTS	Clear To Send
D/C	Door Controller
DOS	Disc Operating System
GND	Ground
LED	Light Emitting Diode
MS-DOS	Microsoft Disc Operating System
PC	Personnel Computer
PIN	Personal Identity Number
PSTN	Postal Standard Telephone Network
RX	Receive
SIG	Signal
TX	Transmit
VCA	Valid Code Accepted

1. About this Document

This document describes the installation of a PAC Portico Central Network Controller (CNC) and the various communication options available. The CNC allows PAC Portico Door Controllers to be administered from a central Personal Computer (PC). The central PC will be running PAC Portico for Windows or PAC Portico Prism administration software.

1.1 MKI and MKII CNC Hardware

This document is written based on the MKII CNC hardware which has a **9-way** male D-type RS-232 port connectors on the rear of the case, as opposed to the MKI CNC which has **25-way** female D-type RS-232 port connectors.

An upgrade kit (part number 21512) is available that allows installations which use the MKI CNC to be converted - this includes the new CNC itself and adapter cables. Use of this upgrade kit is described fully in Appendix C - 21512 CNC MKI to MKII Upgrade Kit.

The major new features in the MKII CNC are:

- Overall controller download speed improvement of 3-5 times.

- Improved management of 'updates' - i.e. changes made to administration system database.

- Support for external Wiegand readers. It will work with all current Wiegand formats.

- Support for external Magstripe readers. This is for "true" Magstripe readers and does not work with Magstripe readers with a PAC Portico output.

- Dialing of dial-up sites at a programmable interval of between 10 minutes and 24 hours.

- Displays which sites are on-line, even if no updates are waiting to be sent.

- 9-way D-type RS-232 connectors used on rear for compatibility with standard PC-to-modem cables.

- Improved reading range on front panel PAC Portico reader.

- Option switches now accessible through hole in underside of unit, eliminating need to remove the cover.

Two types of front panel reader are available with the MKII CNC:

- PAC Portico PAC reader for use with systems using PAC ID devices.

- PAC Portico KeyPAC reader for use with systems using KeyPAC ID devices.

Note

> CNCs with the KeyPAC front panel reader are identified by having a blue key on the front panel.

1.2 Single-Site and Multi-Site

Previously the MKI CNC was supplied in two versions - single-site and multi-site. The single-site CNC allowed up to 32 door controllers to be connected locally on the PAC Portico six wire bus **only**. The multi-site CNC allows up to 128 sites, including the local six wire bus, to be controlled. The extra 127 sites are connected using serial RS-232 communications.

The MKI Single Site CNC was discontinued with the release of PAC Portico for Windows Version 3.0.

The MKII CNC is supplied in a multi-site version **only**. When upgrading from a single site system, change the CNC and the settings in PAC Portico for Windows to reflect the change.

1.3 Administration Systems

The administration systems available with PAC Portico Access Control Systems are described in the documentation supplied with the door controller. PC-based administration systems run administration software (e.g. PAC Portico for Windows or PAC Portico Prism). The administration software is provided on a CD that includes appropriate documentation and help files.

1.4 Other Documents

This document should be used in conjunction with the following other documents:

1.4.1 Door Controllers

15113 PAC Portico 2100/1100 Installation Guide
15263 PAC Portico 2200/1200 Series Controllers Installation Guide

These documents describe the installation of the PAC Portico controllers which can be connected to the CNC. They include, where appropriate, connection to readers, locks and configuration information.

Information on connecting the door controllers to the CNC, via the six wire bus or RS-232 is included within this document, see Sections 4 and 5.

Note

> Throughout this document reference is made to the door controller. Unless explicitly stated otherwise, this includes PAC Portico 1100, 2100, 1200 and 2200 Door Controllers.

1.4.2 Administration Software

The documentation supplied depends on the administration software used on the application. All administration software documentation is now supplied on CD. Context-sensitive help is also supplied.

1.5 Margin Notes

Throughout the manual wherever there are specific items referring to particular administration systems or particular models of door controller, a margin note will highlight the fact. For example:

PAC Portico 1200   Applies only to the PAC Portico 1200 2-door controller.

PAC Portico for Windows   Applies only to PAC Portico for Windows.

PAC Portico Prism   Applies only to PAC Portico Prism.

MKII Only   Applies only to the MKII CNC.

1.6 Definitions

A full glossary of all terms particular to PAC Portico Access Control Systems is included in the administration documentation supplied on CD.

1.7 CNC Models

The CNC comes in two models with the only difference being the built-in key reader technology (PAC or KeyPAC) for administration of ID devices.

2. Description

The CNC is a flat, steel cased unit ideally suited to being mounted between a PC system unit and the PC monitor.

The front of the CNC has a 16-character display where system messages are displayed and a key reader for key administration and alarm acceptance. The rear of the controller has six 9-way D-type connectors - used for power, six wire bus, host PC and three RS-232 serial ports.

The rear of the CNC also includes an 8-way DIN connector for connection of an external PAC, KeyPAC, Magstripe and/or Wiegand/Smartcard reader.
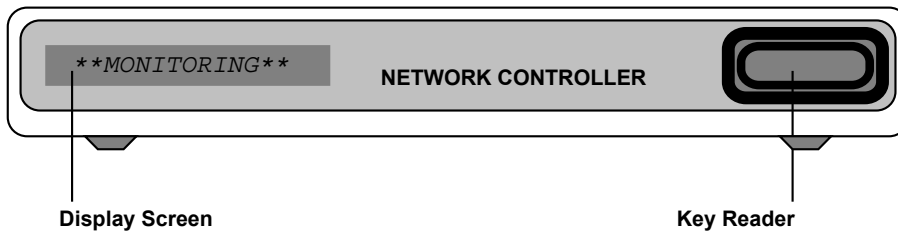
Figure 1 CNC Front Panel (with built-in PAC Portico reader)

Note

> A blue key on the front panel indicates that the built-in reader is a KeyPAC reader.
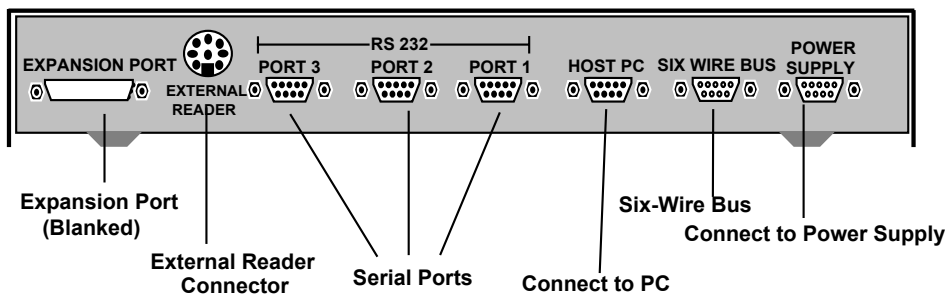
Figure 2 CNC Rear Panel

2.1 Power Supply

Power is provided to the CNC by a separate power supply unit, supplied with every CNC (not included in the MKI to MKII Upgrade Kit). Three versions are available:

1. Boxed version with space for backup batteries (shown below).

2. Boxed version with space for backup batteries (not used with administration software).
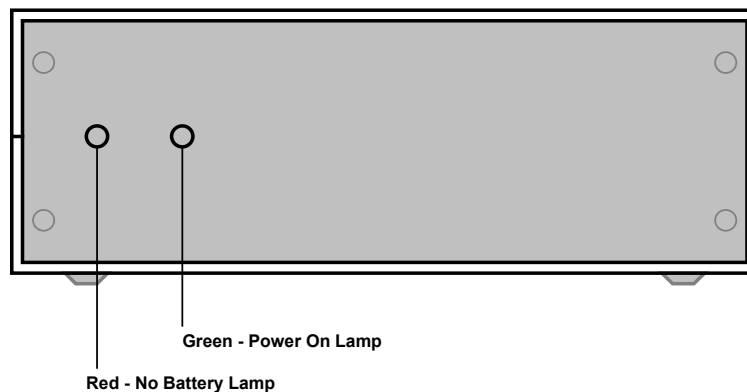
Figure 3 Power Supply Unit - Front View
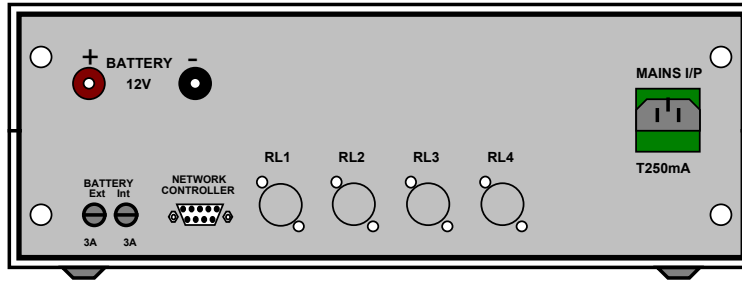
Figure 4 Power Supply Unit - Rear View

2.1.1 LED Operation

The two LEDs provided on the CNC indicate the current status of the mains and battery supply. The following table indicates the status of each LED under different conditions.

Power	Red LED ($\wedge\!\!\vee$)	Green LED ($\dashv\vdash$)
Mains, with battery	ON	ON
Mains, with no battery	ON	ON
No mains, with battery	OFF	ON
No mains, battery low (<10.5V)	OFF	OFF
No mains, no battery	OFF	OFF

Note

> The battery can be low (<10.5V) but it will still operate the CNC as there has been some leeway allowed between the battery low indication and the CNC failing. This allows sufficient time for the battery to be changed.

2.2 Internal Features

You should not need to remove the lid of the CNC unless upgrading the software. The electronics are contained on a single circuit board.
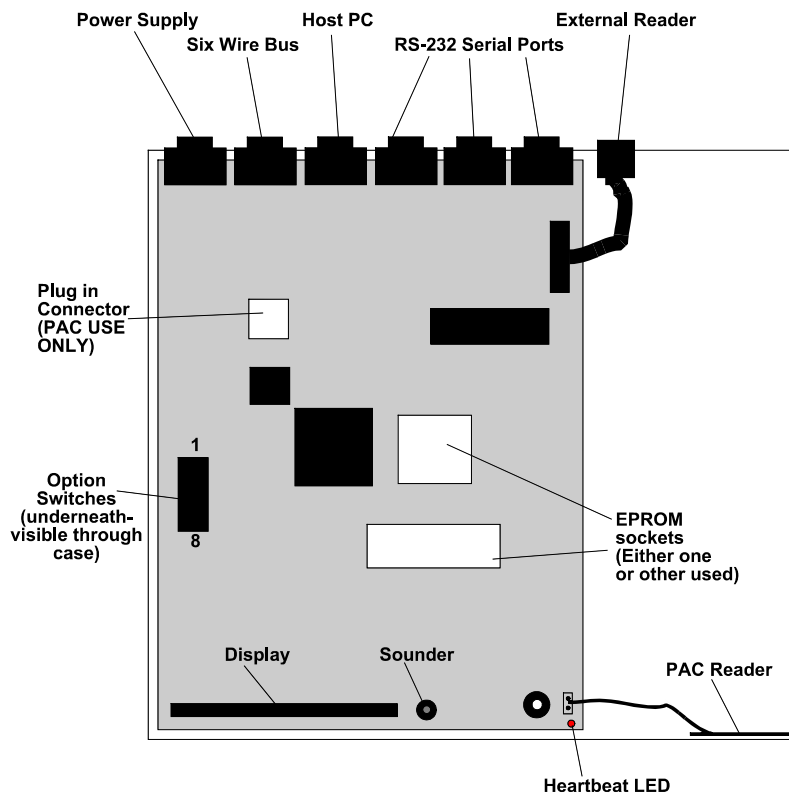
Figure 5 CNC - Internal Components

2.2.1 Switches

MKII
Only

There is a set of switches on the main circuit board, located on the underside and accessible through a hole in the case, **without removing the cover**. On the MKI CNC it was necessary to remove the cover of the CNC to access these switches.

These switches are used for feature selection. Switch 1 is located nearest the rear of the CNC, switch 8 nearest the front.

These switches are **ON** when switched towards the left hand, outer edge of the CNC (closest to switches).

All these switches should be **OFF**, **except** for:

Switch 4 - External Reader:

- **Magstripe Reader:** This switch should be **OFF**, towards the center of the CNC. This is the default setting.

- **PAC, KeyPAC , or Wiegand:** This switch should be **ON**, towards the edge of the CNC.

Switch 5 - Internal Sounder:

When switched **ON** this switch silences the internal sounder - including when alarms are received, and the PC is off-line.

Switch 7 - Host PC to CNC Baud Rate:

- **PAC Portico for Windows (9600):** This switch should always be **OFF**, towards the center of the CNC - this is the default setting.

- **PAC Portico Prism (9600):** This switch should always be **OFF**, towards the center of the CNC - this is the default setting.

2.2.2 Heartbeat LED

The CNC features a red LED, visible through the front panel bezel, which pulses to indicate the CNC is powered and operating.

MKII
Only

The LED will flash more rapidly to indicate a 'bad read' when a Wiegand and/or Magstripe reader is connected to the external reader port on the rear of the CNC

2.2.3 Display

A 16-character vacuum-fluorescent display is used to display a range of messages - including communications to door controllers and the host PC, alarm events when the PC is off-line, and other system messages.

2.2.4 Sounder

When an alarm event is received by the CNC and the host PC is off-line, the CNC will bleep to annunciate the alarm. The sounder may be turned off by turning switch 5 **ON** (not recommended).

2.2.5 Reader

Located behind the front panel bezel, towards the right-hand side is a built-in proximity reader. This may be a PAC reader or a KeyPAC reader (the KeyPAC reader is indicated by a blue key symbol on the front panel). This reader is used for a variety of purposes - including operators logging into the PC software, key administration and acceptance of alarms.

MKII
Only

If any non-PAC Portico ID devices are in use, a Wiegand or Magstripe reader may be connected to the external reader connector on the rear panel, see Section 2.3.5.

2.3 External Connections

The rear panel of the CNC includes six 9-way D-type connectors and one 8-way DIN connector.

The function of each of these connectors is described briefly, starting from the right (as viewed from the rear of the CNC). More detail is provided on the exact connections available in Section 4.

2.3.1 Power Supply

A 9-way male D-type connector is used to connect the CNC to the Power Supply Unit (PSU). This provides all the required voltages to the CNC, and also the feeds to the relays built into the PSU itself.

2.3.2 Six Wire Bus

This port is a 9-way female D-type connector to which up to 32 door controllers may be connected. The **total** distance can be up to 3000ft/1000m with a maximum of 1500ft/500m between door controllers.

2.3.3 Host PC

The host computer connects to this port, using one of the leads supplied, and via a COM: serial port on the PC.

This port is a 9-way D-type male connector (25-way male on MKI CNC).

2.3.4 RS-232 Ports 1-3

A wide variety of devices may be connected to these ports, for communication to door controllers. These devices include PSTN or LAN/WAN modems, radio or microwave communication modules, fiber optic or wire line drivers, etc. - generally any communications device that features an RS-232 interface.

Again these three ports are 9-way D-type male connectors (25-way male on MKI CNC).

These three ports are identical in function - each may be configured independently through the administration software to indicate the communications method in use.

2.3.5 External Reader

MKII Only
This connector, an 8-way female DIN connector, allows the connection of an external reader which can be used in addition to or in place of the built-in proximity reader for keyholder administration purposes, logging into the administration software and acceptance of alarms.

Note

> The external reader can be PAC, KeyPAC, Magstripe and/or Wiegand reader. These different types of reader can be connected directly to this port and no interface unit is required. .

It is possible to use multiple reading technologies on the same CNC (e.g. PAC and KeyPAC PAC and Wiegand, PAC and Magstripe) by using a combination of PC interface kit, built-in reader and external reader. No configuration is required to use the external reader connector.

The CNC supports the following formats of Wiegand/Magstripe compatible devices:

2.3.5.1 Wiegand

- Sensor Engineering 26-bit (2601)
- Casi-Rusco 28 bit
- Standard 34 bit
- Shorrock 56 bit
- Universal Wiegand

Note

> The universal Wiegand option allows any card to produce a token code. Any card greater than 16 bits will produce a token code.

2.3.5.2 Magstripe

- Paxton/MR Sensors 7 digit
- Paxton/MR Sensors 9 digit
- Paxton/MR Sensors 11 digit
- Default Bank Format

Note

> If an external Magstripe reader is being used, the output from this reader **must** be in Magstripe format or PAC format, even if the Magstripe readers on the system output the ID in PAC format.

A 6.6ft/2m flying lead is supplied with the CNC. One end is terminated in an 8-way male DIN plug, the other end is flying leads. See Appendix C - 21512 CNC MKI to MKII Upgrade Kit

2.4 Description

This kit allows you to upgrade an existing CNC-based installation to use the improved features and performance of the new CNC, with the minimum of effort and time involved in performing the upgrade.

2.4.1 Contents of the Kit

The kit consists of a MKII CNC (the power supply is **not** supplied with this kit - the existing power supply should be used) and four cables. These cables should be used to connect the cables that currently connect to the host PC and RS-232 ports of the **existing** MKI CNC to the new MKII CNC.

Note

> Do not attempt to use these cables to connect the MKII CNC directly to the host PC, modem, or other RS-232 device - they will not work. They are 'conversion' cables.

2.5 Installation

1. Ensure the PC administration software is running and the CNC display is showing:

    ```
    ** MONITORING **
    ```

    If any updates are displayed for sites, you should make sure they are sent to the door controllers on those sites first - for sites that communicate via a dial-up modem, you may need to 'force dial' the site first.

2. Make sure that all the connectors currently plugged into the rear of the CNC are labelled and easily identified.

3. Make sure the **On-Line Transaction** display is visible and transactions are being displayed.

4. Disconnect the connectors from RS-232 ports 1 to 3 and the six wire bus on the rear of the CNC.

5. When no further transactions are being displayed by the PC administration software, log in to the PC administration software using the supervisor key/card.

6. Disconnect the host PC and power supply connectors from the rear of the CNC.

7. Ensure the switches on the underside of the MKII CNC are correctly set, see Section 2.2.1. Particular attention should be made to switch 7 - Host PC to CNC Baud Rate which is dependent on the administration system being used.

8. Replace the MKI CNC with the MKII CNC.

9. Connect the cable from the power supply to the power supply connector on the MKII CNC. A sequence of messages should be displayed - as described in Section 3.5.1.

10. Using one of the conversion cables supplied, connect the 9-way D-type connector to the host PC port on the new CNC and the 25-way D-type connector to the **existing** CNC to PC cable.

    Note

    > Do not attempt to use this cable to connect the new CNC directly to administration PC - it will not communicate. It must be used in conjunction with the MKI CNC to PC cable.

11. Verify the PC to CNC communications status.

12. Initialise the CNC - this process will clear the contents of the CNC memory and send to the CNC

information about the sites being controlled.

13. Once the CNC has been initialised, you should reconnect the six wire bus cable from the door controllers (as previously connected to the MKI CNC - no conversion cable is required). Confirm communications are established to the door controllers, check the number of door controllers that are being reported as communicating on the main transaction screen.

14. Next, you should reconnect any RS-232 sites using the remaining three conversion cables supplied with the kit to connect the existing RS-232 leads to the RS-232 ports on the new CNC. These are used in the same way as the host PC conversion cable - they cannot be used to directly connect the new CNC directly to an RS-232 device, such as a modem.

IMPORTANT

Ensure that the correct RS-232 cables are connected to the correct RS-232 port on the CNC - the PC administration software uses the RS-232 port number to help identify sites for communication purposes.

15. Finally, confirm communications with all the RS-232 sites. For sites that communicate via a dial-up modem, you will need to 'force dial' the site first.

2.6 Conversion Cables

Four MKI to MKII CNC conversion cables are supplied with this kit. The wiring of these cables is shown below for information.

Supplied: Quantity 4, each 2 metres length.

Use 8-core 7/0.2mm2 cable, screened, maximum 6.6ft/2m length.

MKI CNC - Existing Cable	MKII CNC Host PC/RS-232
25 pin female D-type connector	9 pin female D-type connector
(Screen) Case ——	Case (Screen)
1 ——	Case (Screen)
2 ——	2
3 ——	3
4 ——	7
5 ——	8
7 ——	5
8 ——	1
20 ——	4
22 ——	9

Appendix D - Cable Descriptions for the color code for this lead and connection information.

Note

This cable must be screened to comply with emission requirements.

2.7 Using More than One CNC

All administration software allows more than one CNC to be used.

However, if you are using more than one CNC on your system (either PAC Portico for Windows or PAC Portico Prism) then you should consider distributing these across multiple PCs (workstations) to improve system performance. Depending on the specifications of the PC, it is recommended that no more then four CNCs be connected to a single PC.

PAC for Windows

PAC for Windows can support up to 20 'masters' which may be connected to different PCs (when using the Multi-PC option). A 'master' is either a CNC or door controller operating in system type 2 - refer to *15113 PAC 2100/PAC 1100 Installation Guide* or *15263 PAC 2200/1200 Series Controller Installation Guide*.

If you are using more than one CNC on your system, you should consider distributing these across multiple PCs (workstations) to improve system performance.

The total number of sites on a PAC for Windows system, cannot exceed 128 per 'division'.

Refer to *15150 PAC Portico for Windows Access Control Overview* for a full description of 'masters', 'divisions' and 'sites'.

PAC Portico Prism

PAC Portico Prism can support up to 50 PCs. Since a CNC connects to a PC via the serial port, the actual limitation is the number of serial ports available.

3. Features

3.1 Dial-Up

The CNC can be programmed (through the PC administration software) to automatically dial any site that communicates via PSTN modems or dial-up network devices.

3.2 Dial-Back

The CNC supports 'dial-back' from sites which communicate via PSTN modems or dial-up network devices. In the event of an alarm (or certain other events), the door controller will immediately dial-back to the CNC. See the documentation supplied with the door controller for full details on programming this feature.

3.3 Communications Protection

This feature will prevent an unauthorized modem from establishing communications with a remote site. It is done by the door controller checking the supervisor (master) token code sent by the CNC and comparing it with its own code. If they do not match, the master code stored in the door controller is compared against the **previous** master code stored in the CNC. If this also fails to match, the session is aborted.

3.4 Site Types/Numbers

Each CNC will support up to 128 sites. The site configuration is determined by the administration software being used to administer the system.

PAC Portico for Windows

- Site 1 is **always** the six wire bus - up to 32 door controllers

- Sites 2-33 are RS-232 sites - up to 8 door controllers each

- Sites 34-128 are RS-232 sites - 1 door controller ONLY each site.

This also means that only one six wire bus site, and a maximum of 32 RS-232 sites with more than one door controller can be configured to communicate through each CNC.

As sites are added, the administration software will automatically assign a site number in the appropriate 'range'. Furthermore, the administration software will not allow you to add more than one 'six wire bus' site, or more than 32 RS-232 sites with more than one door controller.

If the system consists of multiple 'divisions', it is possible for sites from more than one division to communicate with the administration system via the same CNC. However, the above restrictions and rules still apply - for example, you will not be able to have a six wire bus site in each of two divisions if you only have a single CNC on your system.

PAC Portico Prism

- Site 1 is always the Six Wire Bus - up to 32 door controllers

- Sites 2-128 are RS-232 and can be any combination of single controller or controller cluster sites.

3.5 Front Panel Display

At various times, messages will appear on the CNC display. This display consists of 16 green LED segment characters. When a message is too long to fit on the display it will scroll past in a 'ticker tape' fashion. Some messages are accompanied by an audible bleep, especially alarms. All messages are assigned a priority (1 being the highest, 4 the lowest) which determine the order they will be displayed when more than one condition exists that would generate a message.

3.5.1 Start Up

When the CNC is first powered, a sequence of messages is displayed:

`**SYSTEM RESET**`

> The CNC has been reset.

`PAC Portico CNC VX=YZ`

> The software version number. You may be asked this if you experience any difficulties.

`HOST BAUD =19200`
`HOST BAUD =9600`

> The baud rate between the CNC and PC. This should be 9600.

The highest priority message is the CLOCK SYNC message followed by the alarm messages. The lowest priority is the MONITORING message which signifies nothing to report, and the PC is on-line.

In the descriptions of each message, the following code is used to describe parts of the message:

S*nnn*	*nnn* is the site number, range 1-128
D*nnn*	*nnn* is the door number, range 1-128
D/C*nn*	*nn* is the door controller number, range 1-32
ID*nnnnn*	*nnnnn* is the personnel ID number, range 1-18,000

Note

> On multi-division systems, you may have sites from different divisions communicating through a single CNC. The CNC display does not show the division information.

3.5.2 Clock Synchronization

`** CLOCK SYNC **`

> This message is displayed for 6 seconds with the sounder pulsing and can occur on one of two occasions. The first being when 'clock synchronization' is selected by the user to force the CNC and door controllers to synchronize with the PC clock.

> The other occasion is when this occurs automatically at midnight and noon. All door controllers are immediately synchronized if they are connected or at the next time they are dialed up.

3.5.3 Prioritized Messages when PC On-Line

3.5.3.1 Priority 1 - Buffer Full

`**BUFFER FULL**`

> This message appears when the CNC has only room for 1000 transactions left in its internal memory. This will occur if the PC is left disconnected for a long time. The length of time depends entirely on the rate transactions come into the CNC from the door controllers. The message will clear when the CNC has room for 1100 transactions.

> **Note**

> > If this condition is ignored, events will be lost.

3.5.3.2 Priority 2 - Comms Errors

`Snnn D/Cnn ERRnn`

>This indicates an error in the communications link between the CNC and a door controller. In this case `ERRnn` represents the error number, e.g. `S001 D/C03 ERR01`. Error numbers currently displayed are `01, 02, 03, 17` and `18`. If there is more than one error at any one time, the display will show each in turn, allowing 3 seconds for each message.

>PAC Portico equipment may report the following communications errors, which are given to assist in diagnosis of any problems that may occur on the system, either during commissioning or normal system operation:

Comms Error 1 means a door controller was polled but no reply was received. This may be due to:

- The door controller may be disconnected from the communications cable.

- The door controller may be switched off.

- The door controller may be faulty.

- One or more door controllers may have the same address set.

Note

>A **Comms Error 1** can only occur on a six wire bus link.

Comms Error 2 means that an incorrect reply was received to an issued command. This type of error rarely occurs and is usually due to an incorrect system type on the master, noise on the cable or a software incompatibility.

Comms Error 3 means the reply from a door controller to a command was not received or understood. This may be due to:

- Faulty communications cabling.

- One or more door controllers may have the same address set.

Comms Error 17 means that there is a problem with the dial-up device at either the CNC or the remote site. This type of error is sent to the administration software as one of the following transactions:

- Modem not connected.

- Re-dialing.

- Line unobtainable.

Comms Error 18 means that although communications was established with the remote dial-up device, the CNC was unable to communicate with the door controller at the remote site. This type of error is reported to the administration software as `D/C Not Responding`.

3.5.3.3 Priority 2 - Updates/On-line

`SITE nnn=nnnnn`
`SITE nnn*nnnnn`

>This display indicates that the CNC is storing updates waiting to be sent to a site or the CNC is on-line with a particular site. Updates are changes to the administration system database that need to be transmitted to door controllers on the sites. A large number of updates are created when a download is initiated. Updates are also queued up when changes are made at the administration system for a dial-up site that is not currently on-line.

A maximum of 8 sites will be reported on this display. The number of updates for a particular site will be displayed for 3 seconds.

If more than 8 sites have updates waiting, the following rules will apply:

The number of updates for any sites that are currently on-line will **always** be displayed, regardless of the number of updates outstanding.

The remaining 'gaps' in the display buffer will be filled by the sites that have the largest number of queued updates.

For example, if 3 sites are currently on-line and a total of 12 sites have updates waiting, the number of updates for the 3 sites that are on-line and for the 5 off-line sites with the **highest number of updates queued** will be displayed.

If a ***** appears instead of **=**, the site is currently on-line.

If there are **no** updates for a site that is currently on-line, the CNC display will show:

```
SITE nnn*00000
```

for that site.

During a download to the CNC from the administration software, the number of updates will increase rapidly. When all the data has been transferred from the PC to the CNC the number will decrease more slowly. The faster the link to the site, the faster the number will decrease.

3.5.3.4 Priority 3 - Monitoring

```
** MONITORING **
```

This message means that the PC is connected to the CNC, there are no errors reported in the communications links to the door controllers and there are no alarms waiting to be acknowledged.

3.5.4 Prioritized Messages when PC Off-Line

Note

The PC will be unable to take responsibility for alarm annunciation at certain times - for example if the administration software is closed down, the PC is turned off, or is performing a resource-intensive task (this will largely depend on the PC specification). Therefore during this time, alarms and communication errors will appear on the CNC display itself.

The following messages will cause the CNC to beep until acknowledged with a valid operator key. Even though the alarm is acknowledged at the CNC **it will need to be acknowledged again** when the PC is again able to receive alarm events.

3.5.4.1 Priority 1 - Alarms

```
Snnn Dnnn UNAUTHORISED ACCESS
Snnn Dnnn ANTI-TAMPER
Snnn D/Cnn ANTI-TAMPER
Snnn Znnnn RECEIVED ALARM
Snnn D/Cnn OVERRIDE ALARM
Snnn Dnnn IDnnnn DURESS ALARM
```

3.5.4.2 Priority 2 - Comms Errors

```
Snnn D/Cnn ERRnn
```

This indicates an error in the communications link between the CNC and a door controller. In this case, `ERRnn` represents the error number, e.g. `S001 D/C03 ERR01`. Error numbers currently displayed are `01`, `02`, `03`, `17` and `18`. If there is more than one error at any one time, the display will show each in turn, allowing 3 seconds for each message.

A description of the meaning of each error message is shown in Section 3.5.3.

3.5.4.3 Priority 3 - Buffer Full

```
**BUFFER FULL**
```

See the description in Section 3.5.3.1.

3.5.4.4 Priority 3 - PC Offline

```
** PC OFFLINE **
```

The PC is switched off, is not running the administration program or there is a fault in the link between the PC and CNC. On PAC Portico for Windows systems, this may also be displayed if the PC is running a backup operation or if the PC is particularly busy which means it cannot communicate with the CNC properly.

3.5.4.5 Priority 4 - Updates

```
SITE nnn=nnnnn
SITE nnn*nnnnn
```

See the description in Section 3.5.3.3.

4. Installation

4.1 Power Supply

Connect the PSU to the CNC using the cable supplied (9-way male D-type connector at one end, 9-way female D-type connector at the other).

Connect the CNC power supply to the mains via the lead supplied. The red and green lamps on the front of the PSU should both illuminate. If they do not, check the fuse in the mains supply.

If you intend to install a backup battery, this should be connected next, observing polarity. If the battery is healthy, the green LED on the power supply should be illuminated. If it is not, check the battery is charged, connected correctly and the battery fuse in the PSU is not blown using a suitable meter.

The CNC should initialize and display the startup messages described above. If it does not, confirm the condition of the dc fuse in the PSU itself and the correct cable is being used. A description of the cable is contained in Appendix C - 21512 CNC MKI to MKII Upgrade Kit

4.2 Description

This kit allows you to upgrade an existing CNC-based installation to use the improved features and performance of the new CNC, with the minimum of effort and time involved in performing the upgrade.

4.2.1 Contents of the Kit

The kit consists of a MKII CNC (the power supply is **not** supplied with this kit - the existing power supply should be used) and four cables. These cables should be used to connect the cables that currently connect to the host PC and RS-232 ports of the **existing** MKI CNC to the new MKII CNC.

Note

> Do not attempt to use these cables to connect the MKII CNC directly to the host PC, modem, or other RS-232 device - they will not work. They are 'conversion' cables.

4.3 Installation

16. Ensure the PC administration software is running and the CNC display is showing:

```
** MONITORING **
```

If any updates are displayed for sites, you should make sure they are sent to the door controllers on those sites first - for sites that communicate via a dial-up modem, you may need to 'force dial' the site first.

17. Make sure that all the connectors currently plugged into the rear of the CNC are labelled and easily identified.

18. Make sure the **On-Line Transaction** display is visible and transactions are being displayed.

19. Disconnect the connectors from RS-232 ports 1 to 3 and the six wire bus on the rear of the CNC.

20. When no further transactions are being displayed by the PC administration software, log in to the PC administration software using the supervisor key/card.

21. Disconnect the host PC and power supply connectors from the rear of the CNC.

22. Ensure the switches on the underside of the MKII CNC are correctly set, see Section 2.2.1. Particular attention should be made to switch 7 - Host PC to CNC Baud Rate which is dependent on the administration system being used.

23. Replace the MKI CNC with the MKII CNC.

24. Connect the cable from the power supply to the power supply connector on the MKII CNC. A sequence of messages should be displayed - as described in Section 3.5.1.

25. Using one of the conversion cables supplied, connect the 9-way D-type connector to the host PC port on the new CNC and the 25-way D-type connector to the **existing** CNC to PC cable.

    Note

    > Do not attempt to use this cable to connect the new CNC directly to administration PC - it will not communicate. It must be used in conjunction with the MKI CNC to PC cable.

26. Verify the PC to CNC communications status.

27. Initialise the CNC - this process will clear the contents of the CNC memory and send to the CNC information about the sites being controlled.

28. Once the CNC has been initialised, you should reconnect the six wire bus cable from the door controllers (as previously connected to the MKI CNC - no conversion cable is required). Confirm communications are established to the door controllers, check the number of door controllers that are being reported as communicating on the main transaction screen.

29. Next, you should reconnect any RS-232 sites using the remaining three conversion cables supplied with the kit to connect the existing RS-232 leads to the RS-232 ports on the new CNC. These are used in the same way as the host PC conversion cable - they cannot be used to directly connect the new CNC directly to an RS-232 device, such as a modem.

   IMPORTANT

   Ensure that the correct RS-232 cables are connected to the correct RS-232 port on the CNC - the PC administration software uses the RS-232 port number to help identify sites for communication purposes.

30. Finally, confirm communications with all the RS-232 sites. For sites that communicate via a dial-up modem, you will need to 'force dial' the site first.

4.4 Conversion Cables

Four MKI to MKII CNC conversion cables are supplied with this kit. The wiring of these cables is shown below for information.

Supplied: Quantity 4, each 2 metres length.

Use 8-core 7/0.2mm2 cable, screened, maximum 6.6ft/2m length.

MKI CNC - Existing Cable	MKII CNC Host PC/RS-232
25 pin female D-type connector	9 pin female D-type connector
(Screen) Case ———	Case (Screen)
1 ———	Case (Screen)
2 ———	2
3 ———	3
4 ———	7
5 ———	8
7 ———	5
8 ———	1
20 ———	4
22 ———	9

Appendix D - Cable Descriptions.

4.5 Host PC

Once the CNC is correctly powered, the next stage is to connect it to the host PC - i.e. the PC running the administration software. Refer to *15172 PAC Portico for Windows System Configuration Guide* **or** *15964 Portico Prism Operations Guide* for programming information.

4.5.1 Connections

Two cables are supplied that connect the CNC to the PC. Both have a 9-pin D-type male connector for fitting to the CNC host PC port. At the other end, one of the cables has a 9-pin female connector, the other a 25-pin female connector. Two cables are provided to allow for the different types of serial ports provided on PCs, either 9-pin or 25-pin male.

Use the appropriate cable to connect the CNC host port to the desired serial port on the PC.

4.5.2 Establishing Communications

At this stage you should establish and confirm communications between the CNC and the administration software.

PAC Portico for Windows

Use **Status: Masters** to confirm the communications. The CNC display should read:

```
** MONITORING **
```

Use **Installer: Masters** to initialize the CNC.

Portico Prism

The CNC display should read:

```
** MONITORING **
```

Use **Installer: Channel** to initialize the CNC.

4.6 External Reader

MKII
Only
A third party Wiegand reader and PAC reader, Wiegand reader and KeyPAC reader, **or** a Wiegand reader and Magstripe reader (devices encoded ISO track 2) may be connected to the external reader socket on the rear of the CNC. This does not affect the use of the in-built reader which may be a PAC or KeyPAC reader.

Non-PAC ID devices can be used on the CNC without the need for a PC Interface Kit. A Wiegand or other interface unit is not required.

A flying lead, supplied with the CNC is used to connect to the DIN socket on the rear of the CNC. The connection information is detailed in Appendix C - 21512 CNC MKI to MKII Upgrade Kit

4.7 Description

This kit allows you to upgrade an existing CNC-based installation to use the improved features and performance of the new CNC, with the minimum of effort and time involved in performing the upgrade.

4.7.1 Contents of the Kit

The kit consists of a MKII CNC (the power supply is **not** supplied with this kit - the existing power supply should be used) and four cables. These cables should be used to connect the cables that currently connect to the host PC and RS-232 ports of the **existing** MKI CNC to the new MKII CNC.

Note

> Do not attempt to use these cables to connect the MKII CNC directly to the host PC, modem, or other RS-232 device - they will not work. They are 'conversion' cables.

4.8 Installation

31. Ensure the PC administration software is running and the CNC display is showing:

        ** MONITORING **

    If any updates are displayed for sites, you should make sure they are sent to the door controllers on those sites first - for sites that communicate via a dial-up modem, you may need to 'force dial' the site first.

32. Make sure that all the connectors currently plugged into the rear of the CNC are labelled and easily identified.

33. Make sure the **On-Line Transaction** display is visible and transactions are being displayed.

34. Disconnect the connectors from RS-232 ports 1 to 3 and the six wire bus on the rear of the CNC.

35. When no further transactions are being displayed by the PC administration software, log in to the PC administration software using the supervisor key/card.

36. Disconnect the host PC and power supply connectors from the rear of the CNC.

37. Ensure the switches on the underside of the MKII CNC are correctly set, see Section 2.2.1. Particular attention should be made to switch 7 - Host PC to CNC Baud Rate which is dependent on the administration system being used.

38. Replace the MKI CNC with the MKII CNC.

39. Connect the cable from the power supply to the power supply connector on the MKII CNC. A sequence of messages should be displayed - as described in Section 3.5.1.

40. Using one of the conversion cables supplied, connect the 9-way D-type connector to the host PC port on the new CNC and the 25-way D-type connector to the **existing** CNC to PC cable.

    Note

    > Do not attempt to use this cable to connect the new CNC directly to administration PC - it will not communicate. It must be used in conjunction with the MKI CNC to PC cable.

41. Verify the PC to CNC communications status.

42. Initialise the CNC - this process will clear the contents of the CNC memory and send to the CNC information about the sites being controlled.

43. Once the CNC has been initialised, you should reconnect the six wire bus cable from the door controllers (as previously connected to the MKI CNC - no conversion cable is required). Confirm communications are established to the door controllers, check the number of door controllers that are being reported as communicating on the main transaction screen.

44. Next, you should reconnect any RS-232 sites using the remaining three conversion cables supplied with the kit to connect the existing RS-232 leads to the RS-232 ports on the new CNC. These are used in the same way as the host PC conversion cable - they cannot be used to directly connect the new CNC directly to an RS-232 device, such as a modem.

IMPORTANT

Ensure that the correct RS-232 cables are connected to the correct RS-232 port on the CNC - the PC administration software uses the RS-232 port number to help identify sites for communication purposes.

45. Finally, confirm communications with all the RS-232 sites. For sites that communicate via a dial-up modem, you will need to 'force dial' the site first.

4.9 Conversion Cables

Four MKI to MKII CNC conversion cables are supplied with this kit. The wiring of these cables is shown below for information.

Supplied: Quantity 4, each 2 metres length.

Use 8-core 7/0.2mm2 cable, screened, maximum 6.6ft/2m length.

MKI CNC - Existing Cable	MKII CNC Host PC/RS-232
25 pin female D-type connector	9 pin female D-type connector
(Screen) Case ————	Case (Screen)
1 ————	Case (Screen)
2 ————	2
3 ————	3
4 ————	7
5 ————	8
7 ————	5
8 ————	1
20 ————	4
22 ————	9

Appendix D - Cable Descriptions. The built-in reader can be used in conjunction with a Magstripe **or** Wiegand reader connected to the external reader port.

Notes

1. If the external reader is a PAC, KeyPAC, Wiegand, or Magstripe reader, switch 4 must be set ON.

2. The universal Wiegand option allows any card to produce a token code. This option is enabled by default. Any card greater than 16 bits will produce a token code.

The formats of Wiegand and Magstripe readers supported are listed in Section 2.3.5.

4.10 Six Wire Bus

The six wire bus is PAC Portico's proprietary communications link for local connection of door controllers. It uses up to 3000ft/1000m of standard unscreened signal cable to connect door controllers. No single length of cable should be longer than 1500ft/500m.

4.10.1 Cable Specification

Use multi-stranded, unscreened, 6-core, 22AWG/0.355mm² alarm or signal cable.

The cable can be arranged as shown below as long as the total amount of cable does not exceed 3000ft/1000m, and no single length is longer than 1500ft/500m.

If you do use screened cable, you should reduce the maximum distance allowed to 1100ft/350m total, 490ft/150m between devices on the bus.

Note

A linear configuration is recommended but you can have up to four 'spurs'. Each a maximum of 33ft/10m in length.
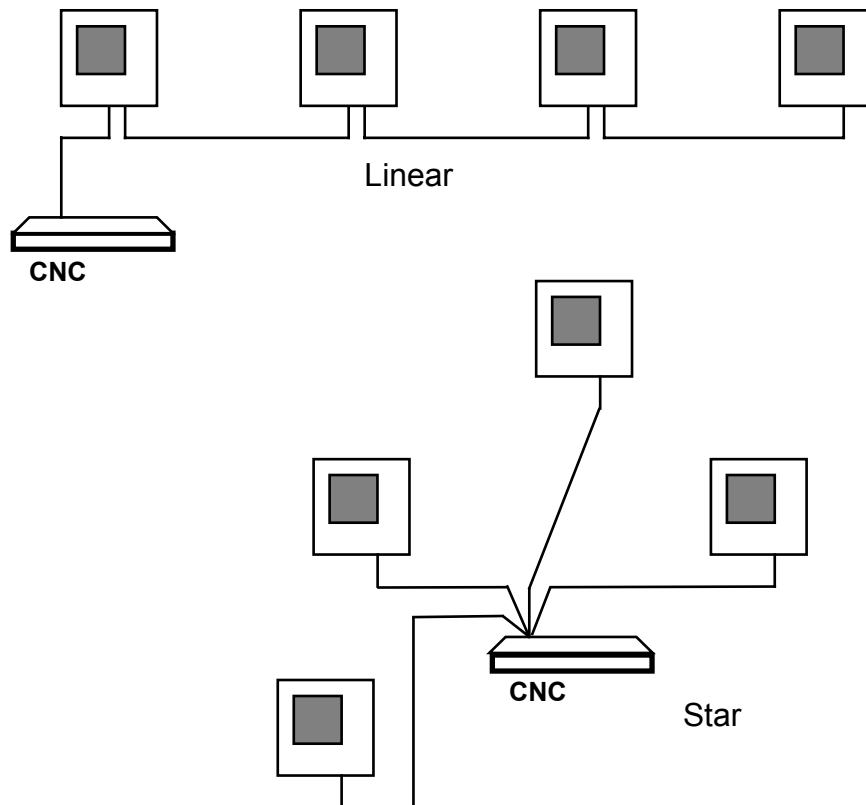
Figure 6 Possible Six Wire Bus Wiring Configurations

4.10.2 Addresses

The six wire bus works by each door controller having its own unique address. It is good practice to address door controllers consecutively.

However, on a site that communicates to the CNC via RS-232, the door controller connected to the remote end of the RS-232 link **must have address 1**. The other door controllers will have addresses 2-8.

4.10.3 System Types/Controller Types

Door controllers can be configured in different 'system types' depending on the exact configuration they are being used in. Only two of these types are used with the CNC:

System Type 2

The door controller connected directly to the remote end of an RS-232 communications link should be configured as system type 2.

Up to 7 additional 'slave' (system type 3) controllers may then be connected to this controller via the six wire bus.

System type 2 controllers are referred to throughout this document as 'remote masters'.

There is no equivalent to this type of controller from the earlier PAC Portico 2000 Series. A PAC Portico 2000N controller can be connected to the remote end of an RS-232 communications link but **no further door controllers can then be added on this site** via the six wire bus.

To summarize, master controllers may be:

- PAC Portico 2100 and PAC Portico 2200 Series Door Controllers (4-door) set to system type 2.

- PAC Portico 1100 and PAC Portico 1200 Door Controllers (2-door) set to system type 2.

System Type 3

Any door controllers that communicate to the CNC via the six wire bus, either directly to the CNC or via a

remote master should be configured as system type 3.

These controllers are referred to throughout this document as 'slaves' and may be considered equivalent to the earlier PAC Portico 2000N controllers, which some installers may be aware of.

Therefore, slave controllers may be:

- PAC Portico 2100 and PAC Portico 2200 Series Door Controllers (4-door) set to system type 3.

- PAC Portico 1100 and PAC Portico 1200 Door Controllers (2-door) set to system type 3.

- PAC Portico 2000N MKI and MKII.

4.10.4 Direct Connect to CNC

Up to 32 slave door controllers, addressed 1 to 32, via 'six wire bus' port on CNC.

4.10.5 Direct RS-232 Link from CNC

One master door controller (configured as system type 2) and up to 7 slave door controllers, addressed 2, 3, 4, 5, 6, 7 and 8.

Note
>   You can have up to three such sites connected to the CNC.

4.10.6 Setting the Door Controller Address

See *15113 PAC Portico 2100/1100 Installation Guide* or *15263 PAC Portico 2200/1200 Series Controllers Installation Guide* for details on how to set a door controller's address and system type.

4.10.7 Programming the System

Refer to *15172 PAC Portico for Windows System Configuration Guide,* **or** *15964 Portico Prism Operations Guide* for details on programming the system.

5. Serial Communications

This type of communication uses the serial RS-232 outputs on the rear of the CNC to communicate with door controllers.

There are two types of serial communication:

Direct Connection

A permanent connection to a door controller using line-drivers, leased line modems, pIPer Serial Ethernet Units, etc. This type of connection is permanently on-line, events are reported as they happen and updates are immediate. The user will not be aware of any difference between a directly connected serial site and a six wire bus site. Up to three sites may be directly configured in this way to each CNC.

Dial-Up Connection Using PSTN Modems and LAN/WAN Communications Devices

The CNC can dial each site once or twice a day or at a programmable interval of between 10 minutes and 24 hours. On each occasion, transactions are received from the door controllers and updates are sent. The door controller is also able to dial-back to the CNC when an alarm (2100 and 2200 Series Controllers) or access authorized (2200 Series Controllers) events occurs. Up to 127 sites may be connected in this way.

In addition, each site can be 'force dialed' via operator intervention from the administration software.

A single dial-up device connected to the CNC may dial different sites at different times of day. Up to three dial-up devices may be connected to a single CNC.

Note

> This section refers to dial-up devices; these may be modems or pIPer Serial Ethernet Units.

5.1 Direct Connection

There are three RS-232 serial ports fitted as standard to the CNC allowing up to three directly connected sites. The maximum length of cable between the CNC and a door controller is 50ft/15m, to exceed this distance you will need to use some type of line driver, leased line modem or other device.

There are several methods for directly connecting a CNC to a door controller over a distance greater than 50ft/15m:

- Line drivers or baseband modems.
- Fiber optic links.
- Radio data.
- Microwave.
- Extended distance RS-232 cable.
- TCP/IP.

Most serial communication devices will operate provided they satisfy the following specification:

- Asynchronous.
- Full duplex.
- Baud rate of 300, 1200, 2400, 4800, 9600.
- No parity, 8 data bits, 2 stop bits.
- Hardware/software flow control.

5.2 Dial-Up Communications

5.2.1 Description

By using dial-up devices, it is possible to communicate with more than 3 sites or with sites too distant to be directly connected. Dial-up sites require the use of dial-up devices connected to standard public (PSTN) telephone lines or LAN/WAN network.

From the administration software, remote sites are assigned to one of the three RS-232 ports on the CNC. The CNC will dial up sites via the dial-up device connected to one of the RS-232 ports. A dial-up device installed at each site, connected to the remote master door controller will answer the call.

Once communications are established, the CNC will receive transactions from the door controller and send any database updates. A communications session will last as long as required for all transactions to be received and all updates to be sent **or** until a programmable pre-set time limit expires.

5.2.2 Dial-Back

Normally events are only sent back to the central point at set times of the day when the CNC dials up the site. This may be satisfactory for records of normal access events, however if an alarm occurs this would not be reported until the next routine dial-up. A feature of the door controller allows it to 'dial-back' to the CNC in the event of an alarm condition.

PAC Portico 2200/ 1200 Series

The current version PAC Portico 2200/1200 Series Door Controllers **also** allows the door controller to be programmed so that in the event of an `Access Authorized`, `Exit Authorized` or `Entry Authorized` transaction being generated the door controller will dial-back to the CNC. This powerful facility may be configured on an individual door basis for each door controller on the site. For example, it is possible to configure the master door controller so that it will dial-back in the event of access being authorized through door one on each of door controllers 2, 3 and 4 on the site but not on any other doors. This is in addition to dialing back in the event of any alarm occurring. Detailed information on programming this feature is included in *15263 PAC Portico 2200/1200 Series Controllers Installation Guide.* The dial-back option can be set via the administration software.

The door controller stores one or two telephone numbers which it will use for the dial-back. A dial-up device on the CNC will answer the call and connect to the door controller. Once the calling site has been identified, all the high priority transactions will be sent from the site and only high priority commands will be sent from the CNC to the site, allowing alarm acknowledgements to be sent back to the door controllers. To ensure that a dial-back dial-up device is not tied up too long, the dial-back will be aborted after 2 minutes of inactivity.

It is recommended that one dial-up device is used for routine dial-ups, and a second connected to another CNC port, to be used for dial-back only. You could use the routine dial-up device as the backup dial-up, i.e. the second phone number programmed into the door controller.

Note

> When a dial-back occurs no low-priority transactions will be uploaded to the CNC and no 'updates' will be downloaded to the door controllers on the site.

5.2.3 'Forget' Transactions

A feature of the door controllers allows it to 'forget' (if programmed) certain groups of transactions such as `Request to Exit, Access Authorized,` etc. This prevents these transactions from being sent and therefore keeps communication times to a minimum.
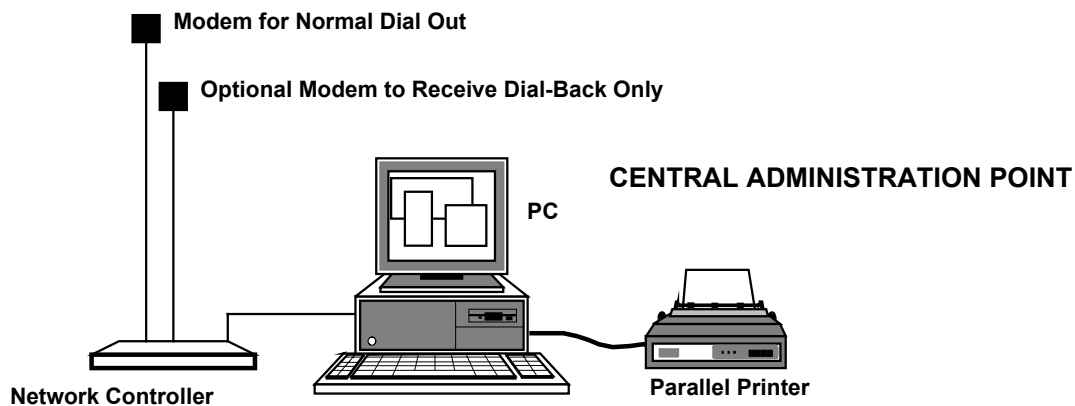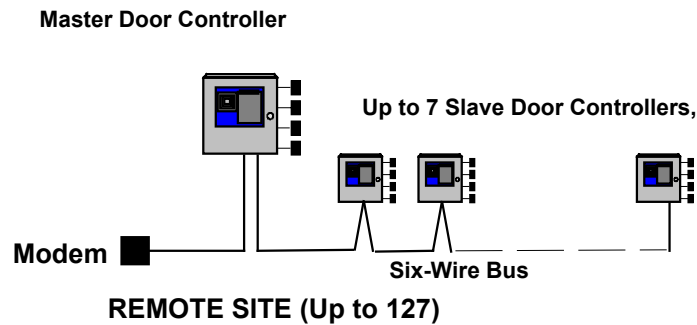
Figure 7 CNC Using Dial-Back

5.2.4 Communication Protection

A feature of the door controller allows dial-up communications between a CNC and the door controller to be protected. This is done by the CNC sending its supervisor keycode to the door controller, if this compares with the door controller's supervisor keycode, communications will be established. If the codes do not compare, the **previous** supervisor keycode stored in the CNC will be compared. If this also fails comparison, the communications session will be aborted. Refer to *15113 PAC Portico 2100/1100 Installation Guide* or *15263 PAC Portico 2200/1200 Series Controllers Installation Guide* for full details.

Note

> If this feature is in use, you should be careful not to change the supervisor keycode in the administration system more than once without first dialing **all** the remote sites, to avoid 'locking yourself' out of communications with a site.

5.2.5 Phone Lines

Each dial-up device you connect to the CNC will require its own phone line. If using the dial-back feature, the phone number of the dial-back line is the number programmed into the door controller.

If you are using the dial-back feature, ensure that the number of the dial-up device at the CNC can be reached directly - i.e. not through a switchboard and that the number does not have 'incoming calls barred'.

Each site will also require a phone line.

5.2.6 Network Communications

In order to communicate with remote controllers via a network, a specific network communication device is required. This device is called a pIPer Serial Ethernet Unit. The same rules described in Section 5.2.5 apply for network communications. Instead of using a phone number these devices use IP addresses. For more information, refer to the document *15407 pIPer Serial Ethernet Unit Installation and Configuration Guide* or call PAC Portico Technical Suppor*t.*

6. Specification

6.1 Dimensions

All dimensions are in inches and millimeters (in/mm).

In both cases below at least 4in/100mm clearance should be allowed behind each unit for cables and connectors.

CNC

Length x Width x Height   380 x 350 x 57

Power Supply Unit

Length x Width x Height   270 x 345 x 125

6.2 Power Requirements

Input Voltage	240V ac or 110V ac (different versions supplied)
Battery Output	13.8V dc at up to 370mA
Current Consumption	CNC 12V dc @ 600mA

6.3 Fuses

The following table details the location, type and rating of each fuse.

Ref	Location	Type	Rating
Mains Input	Mains fuse under mains input connection	HBC, anti-surge	250mA
Ext Battery	On back panel	20mm glass, anti-surge	3A
Int Battery	On back panel	20mm glass, anti-surge	3A

6.4 Cables Supplied

Note

> Drawings for all of these cables (except for the mains supply) are included in *Appendix C - 21512 CNC* MKI to MKII Upgrade Kit

6.5 Description

This kit allows you to upgrade an existing CNC-based installation to use the improved features and performance of the new CNC, with the minimum of effort and time involved in performing the upgrade.

6.5.1 Contents of the Kit

The kit consists of a MKII CNC (the power supply is **not** supplied with this kit - the existing power supply should be used) and four cables. These cables should be used to connect the cables that currently connect to the host PC and RS-232 ports of the **existing** MKI CNC to the new MKII CNC.

Note

> Do not attempt to use these cables to connect the MKII CNC directly to the host PC, modem, or other RS-232 device - they will not work. They are 'conversion' cables.

6.6 Installation

46. Ensure the PC administration software is running and the CNC display is showing:

```
** MONITORING **
```

If any updates are displayed for sites, you should make sure they are sent to the door controllers on those sites first - for sites that communicate via a dial-up modem, you may need to 'force dial' the site first.

47. Make sure that all the connectors currently plugged into the rear of the CNC are labelled and easily identified.

48. Make sure the **On-Line Transaction** display is visible and transactions are being displayed.

49. Disconnect the connectors from RS-232 ports 1 to 3 and the six wire bus on the rear of the CNC.

50. When no further transactions are being displayed by the PC administration software, log in to the PC administration software using the supervisor key/card.

51. Disconnect the host PC and power supply connectors from the rear of the CNC.

52. Ensure the switches on the underside of the MKII CNC are correctly set, see Section 2.2.1. Particular attention should be made to switch 7 - Host PC to CNC Baud Rate which is dependent on the administration system being used.

53. Replace the MKI CNC with the MKII CNC.

54. Connect the cable from the power supply to the power supply connector on the MKII CNC. A sequence of messages should be displayed - as described in Section 3.5.1.

55. Using one of the conversion cables supplied, connect the 9-way D-type connector to the host PC port on the new CNC and the 25-way D-type connector to the **existing** CNC to PC cable.

   Note

   Do not attempt to use this cable to connect the new CNC directly to administration PC - it will not communicate. It must be used in conjunction with the MKI CNC to PC cable.

56. Verify the PC to CNC communications status.

57. Initialise the CNC - this process will clear the contents of the CNC memory and send to the CNC information about the sites being controlled.

58. Once the CNC has been initialised, you should reconnect the six wire bus cable from the door controllers (as previously connected to the MKI CNC - no conversion cable is required). Confirm communications are established to the door controllers, check the number of door controllers that are being reported as communicating on the main transaction screen.

59. Next, you should reconnect any RS-232 sites using the remaining three conversion cables supplied with the kit to connect the existing RS-232 leads to the RS-232 ports on the new CNC. These are used in the same way as the host PC conversion cable - they cannot be used to directly connect the new CNC directly to an RS-232 device, such as a modem.

   IMPORTANT

   Ensure that the correct RS-232 cables are connected to the correct RS-232 port on the CNC - the PC administration software uses the RS-232 port number to help identify sites for communication purposes.

60. Finally, confirm communications with all the RS-232 sites. For sites that communicate via a dial-up modem, you will need to 'force dial' the site first.

6.7 Conversion Cables

Four MKI to MKII CNC conversion cables are supplied with this kit. The wiring of these cables is shown below for information.

Supplied: Quantity 4, each 2 metres length.

Use 8-core 7/0.2mm2 cable, screened, maximum 6.6ft/2m length.

MKI CNC - Existing Cable	MKII CNC Host PC/RS-232
25 pin female D-type connector	9 pin female D-type connector

```
(Screen) Case   ————    Case (Screen)
           1   ————    Case (Screen)
           2   ————    2
           3   ————    3
           4   ————    7
           5   ————    8
           7   ————    5
           8   ————    1
          20   ————    4
          22   ————    9
```

Appendix D - Cable Descriptions.

All the cables below are supplied by PAC Portico labeled and identified. However, a brief description is included below for each cable.

6.7.1 Mains Supply

One mains lead is supplied with a molded plug and 5ft/1.5m of cable. A standard molded IEC socket connects to the rear of the power supply unit.

6.7.2 Power Supply to CNC

One lead with 6.6ft/2m of cable is used to connect the power supply to the CNC. A male 9-pin D-type connector fits to the power supply, a female 9-pin D-type connector fits to the CNC.

6.7.3 CNC to PC

Two cables are supplied, both 6.6ft/2m long with a female 9-pin connector at one end to connect to the CNC host PC port. One cable has a female 9-pin D-type connector, the other a female 25-pin D-type connector at the other end. You only need to use the cable that connects to the appropriate serial (COM:) port on your PC.

6.7.4 Six Wire Bus

A short length of cable is supplied with a male 9-pin D-type connector at one end, the other end is flying leads.

6.7.5 RS-232 Ports

Three RS-232 leads are supplied - to allow any RS-232 device to be connected (e.g. line drivers) to one of the three RS-232 ports on the CNC. Each of these is 6.6ft/2m in length.

These are fitted with a 9-way female D-type for connecting to the CNC itself, and a 25-way male D-type for connecting to the dial-up device or other RS-232 device. You should confirm with the installation documentation of the RS-232 device that the connections match those expected by this cable. In the event of the RS-232 device having different connection requirements, the 25-way connector may be removed and the required connections made, using the color coding detailed in *Appendix C - 21512 CNC* MKI to MKII Upgrade Kit

6.8 Description

This kit allows you to upgrade an existing CNC-based installation to use the improved features and performance of the new CNC, with the minimum of effort and time involved in performing the upgrade.

6.8.1 Contents of the Kit

The kit consists of a MKII CNC (the power supply is **not** supplied with this kit - the existing power supply should be used) and four cables. These cables should be used to connect the cables that currently connect to the host PC and RS-232 ports of the **existing** MKI CNC to the new MKII CNC.

Note

> Do not attempt to use these cables to connect the MKII CNC directly to the host PC, modem, or other RS-232 device - they will not work. They are 'conversion' cables.

6.9 Installation

61. Ensure the PC administration software is running and the CNC display is showing:

```
** MONITORING **
```

If any updates are displayed for sites, you should make sure they are sent to the door controllers on those sites first - for sites that communicate via a dial-up modem, you may need to 'force dial' the site first.

62. Make sure that all the connectors currently plugged into the rear of the CNC are labelled and easily identified.

63. Make sure the **On-Line Transaction** display is visible and transactions are being displayed.

64. Disconnect the connectors from RS-232 ports 1 to 3 and the six wire bus on the rear of the CNC.

65. When no further transactions are being displayed by the PC administration software, log in to the PC administration software using the supervisor key/card.

66. Disconnect the host PC and power supply connectors from the rear of the CNC.

67. Ensure the switches on the underside of the MKII CNC are correctly set, see Section 2.2.1. Particular attention should be made to switch 7 - Host PC to CNC Baud Rate which is dependent on the administration system being used.

68. Replace the MKI CNC with the MKII CNC.

69. Connect the cable from the power supply to the power supply connector on the MKII CNC. A sequence of messages should be displayed - as described in Section 3.5.1.

70. Using one of the conversion cables supplied, connect the 9-way D-type connector to the host PC port on the new CNC and the 25-way D-type connector to the **existing** CNC to PC cable.

    Note

    > Do not attempt to use this cable to connect the new CNC directly to administration PC - it will not communicate. It must be used in conjunction with the MKI CNC to PC cable.

71. Verify the PC to CNC communications status.

72. Initialise the CNC - this process will clear the contents of the CNC memory and send to the CNC information about the sites being controlled.

73. Once the CNC has been initialised, you should reconnect the six wire bus cable from the door controllers (as previously connected to the MKI CNC - no conversion cable is required). Confirm

communications are established to the door controllers, check the number of door controllers that are being reported as communicating on the main transaction screen.

74. Next, you should reconnect any RS-232 sites using the remaining three conversion cables supplied with the kit to connect the existing RS-232 leads to the RS-232 ports on the new CNC. These are used in the same way as the host PC conversion cable - they cannot be used to directly connect the new CNC directly to an RS-232 device, such as a modem.

IMPORTANT

Ensure that the correct RS-232 cables are connected to the correct RS-232 port on the CNC - the PC administration software uses the RS-232 port number to help identify sites for communication purposes.

75. Finally, confirm communications with all the RS-232 sites. For sites that communicate via a dial-up modem, you will need to 'force dial' the site first.

6.10 Conversion Cables

Four MKI to MKII CNC conversion cables are supplied with this kit. The wiring of these cables is shown below for information.

Supplied: Quantity 4, each 2 metres length.

Use 8-core 7/0.2mm2 cable, screened, maximum 6.6ft/2m length.

MKI CNC - Existing Cable	MKII CNC Host PC/RS-232
25 pin female D-type connector	9 pin female D-type connector
(Screen) Case ———	Case (Screen)
1 ———	Case (Screen)
2 ———	2
3 ———	3
4 ———	7
5 ———	8
7 ———	5
8 ———	1
20 ———	4
22 ———	9

Appendix D - Cable Descriptions.

6.10.1 External Reader

A 6.6ft/2m cable is supplied for connection of a PAC, KeyPAC, and/or Wiegand **or** Magstripe reader. This is fitted with an 8-way DIN plug (male) at one end. The other end is flying leads - the color code for the cable is given in *Appendix C - 21512 CNC* MKI to MKII Upgrade Kit

6.11 Description

This kit allows you to upgrade an existing CNC-based installation to use the improved features and performance of the new CNC, with the minimum of effort and time involved in performing the upgrade.

6.11.1 Contents of the Kit

The kit consists of a MKII CNC (the power supply is **not** supplied with this kit - the existing power supply should be used) and four cables. These cables should be used to connect the cables that currently connect to the host PC and RS-232 ports of the **existing** MKI CNC to the new MKII CNC.

Note

Do not attempt to use these cables to connect the MKII CNC directly to the host PC, modem, or other RS-232 device - they will not work. They are 'conversion' cables.

6.12 Installation

76. Ensure the PC administration software is running and the CNC display is showing:

```
                    ** MONITORING **
```

If any updates are displayed for sites, you should make sure they are sent to the door controllers on those sites first - for sites that communicate via a dial-up modem, you may need to 'force dial' the site first.

77. Make sure that all the connectors currently plugged into the rear of the CNC are labelled and easily identified.

78. Make sure the **On-Line Transaction** display is visible and transactions are being displayed.

79. Disconnect the connectors from RS-232 ports 1 to 3 and the six wire bus on the rear of the CNC.

80. When no further transactions are being displayed by the PC administration software, log in to the PC administration software using the supervisor key/card.

81. Disconnect the host PC and power supply connectors from the rear of the CNC.

82. Ensure the switches on the underside of the MKII CNC are correctly set, see Section 2.2.1. Particular attention should be made to switch 7 - Host PC to CNC Baud Rate which is dependent on the administration system being used.

83. Replace the MKI CNC with the MKII CNC.

84. Connect the cable from the power supply to the power supply connector on the MKII CNC. A sequence of messages should be displayed - as described in Section 3.5.1.

85. Using one of the conversion cables supplied, connect the 9-way D-type connector to the host PC port on the new CNC and the 25-way D-type connector to the **existing** CNC to PC cable.

Note

Do not attempt to use this cable to connect the new CNC directly to administration PC - it will not communicate. It must be used in conjunction with the MKI CNC to PC cable.

86. Verify the PC to CNC communications status.

87. Initialise the CNC - this process will clear the contents of the CNC memory and send to the CNC information about the sites being controlled.

88. Once the CNC has been initialised, you should reconnect the six wire bus cable from the door controllers (as previously connected to the MKI CNC - no conversion cable is required). Confirm communications are established to the door controllers, check the number of door controllers that are being reported as communicating on the main transaction screen.

89. Next, you should reconnect any RS-232 sites using the remaining three conversion cables supplied with the kit to connect the existing RS-232 leads to the RS-232 ports on the new CNC. These are used in the same way as the host PC conversion cable - they cannot be used to directly connect the new CNC directly to an RS-232 device, such as a modem.

IMPORTANT

Ensure that the correct RS-232 cables are connected to the correct RS-232 port on the CNC - the PC administration software uses the RS-232 port number to help identify sites for communication purposes.

90. Finally, confirm communications with all the RS-232 sites. For sites that communicate via a dial-up modem, you will need to 'force dial' the site first.

6.13 Conversion Cables

Four MKI to MKII CNC conversion cables are supplied with this kit. The wiring of these cables is shown below for information.

Supplied: Quantity 4, each 2 metres length.

Use 8-core 7/0.2mm2 cable, screened, maximum 6.6ft/2m length.

MKI CNC - Existing Cable	MKII CNC Host PC/RS-232
25 pin female D-type connector	9 pin female D-type connector

```
     (Screen) Case  ————        Case (Screen)
                1   ————        Case (Screen)
                2   ————        2
                3   ————        3
                4   ————        7
                5   ————        8
                7   ————        5
                8   ————        1
               20   ————        4
               22   ————        9
```

Appendix D - Cable Descriptions.

6.14 Door Controller Software

Please note that when using a MKII CNC the software in the door controllers must be as follows:

6.14.1 PAC Portico 1100 and PAC Portico 2100

- Version 3.15 or later

6.14.2 PAC Portico *2200/1200* Series

- Version 1.08 or later.

> *Failure to ensure this could result in corrupt and incorrect transactions being reported and changes made to the PC administration system not updating the information stored in the door controllers correctly.*

PAC Portico strongly recommends that to obtain maximum benefit from the improved features of the MKII CNC, that all door controllers installed on the system are upgraded to PAC 1100, 2100 1200 or PAC 2200 Series Door Controllers with the firmware versions listed above.

6.15 Mean Time Between Failures

MTBF   >100,000 hours

7. Appendix A - Full Download

7.1 Description

This appendix describes how to perform a full download to remote dial-up sites. The procedure in this appendix must be used to ensure a successful download.

7.2 Download Procedure

Check that the CNC display shows MONITORING. If this is not the case, it is likely there are updates in the CNC buffer waiting to be sent. If there are pending updates, each site **must** be dialed in order to clear the CNC buffer prior to initiating a download to a remote site.

Note
> The CNC will display a maximum of 8 sites that have updates pending.

Example
> If 3 sites are currently on line and a total of 12 sites have updates waiting, the number of updates for the 3 sites on-line and the 5 off-line sites with the **highest** number of updates will be displayed. When you hang-up from a site that has completed receiving its updates, if there are more than 8 sites with updates, it is only now that you will see a new site appear in the CNC display.
>
> A typical display when on-line to a site will look as follows:
>
>   SITE 33 *00037
>
> This shows that site 33 is on-line (the asterisk * indicates on-line), with 37 updates remaining. These updates will decrement as the controller receives them. An equals sign to the left of the updates, e.g. = 00037 means the site is **not** on-line and there are 37 updates waiting.

Notes
> 1. If more than 5 off-line sites have equal updates, the 5 highest numbered sites will be displayed.
> 2. If the site is on a six wire bus arrangement or is connected using a direct RS-232 connection , updates will occur in real-time.

7.2.1 Initializing a CNC

There are certain situations (e.g. troubleshooting CNC problems) which may require the CNC to be initialized. Initializing the CNC effectively clears out the update buffer, which means any sites that have updates will be cleared. Each site that had updates will therefore need to be dialed and a **full download** to the site will be required in order to get the previously cleared updates into the door controllers.

7.2.2 Initializing a Door Controller

Care should be taken prior to initializing a door controller. Initializing a door controller will erase its database (e.g. all keyholders, door programming, access rights, etc). A download from the PC will be required to get the door controller operational.

8. Appendix B - Non-PAC Portico Communication Devices

This appendix describes various non-PAC Portico serial communication devices, including modems and line drivers. pIPer Serial Ethernet Units can be used instead of modems, refer to the documentation supplied with the pIPer units. For the most up-to-date information on recommended devices, please call PAC Portico Technical Support.

8.1 Dial-Up Modems

Dial-up modems are usually described by the speeds at which they will operate. These are usually given in the form of CCITT 'V' numbers - some examples are given below:

V21	300 baud
V22	1200 baud
V22bis	2400 baud
V32	9600 baud
V32bis	14400 baud
V34	28800 baud

Note

> V22bis and faster dial-up devices will fall back to a slower speed if they encounter a bad line. As PAC Portico equipment operates at a fixed baud rate, this will usually result in a communications failure. The system will attempt to dial-up again and perhaps get a better quality line. This problem can be overcome for most makes of dial-up device by programming using terminal emulation software.

Under most circumstances a V32, 9600 baud, dial-up device should be suitable.

Usually the faster the dial-up device the more it costs, but it is on-line for a shorter period of time. For use with PAC Portico equipment, you should select a dial-up device that gives the best price/performance. A busy site with many transactions and updates will require a faster dial-up device, a quiet site not updated very often will require a lower performance device.

The dial-up device at the CNC should always match the highest performance dial-up device on the remote sites. For instance, you may have a 9600 baud dial-up device on a busy site and three 1200 baud dial-up devices on three quieter sites. In this case, you should have a 9600 baud dial-up device at the CNC. A dial-up device will usually support all speeds up to its own maximum.

Please consult PAC Portico Technical Support for the latest information on recommended dial-up devices and other communications equipment.

8.2 Black Box Non-Powered Short Haul Modem - SHM-NPR

A pair of these devices will extend the distance that you can send the RS-232 signal from 50ft/15m to 12miles/20km, depending on the baud rate used (see Section 8.2.2). These devices should be used with your own twisted-pair cable.

The devices may be used:

- Between the CNC and door controller.
- Between the CNC and a Black Box Code Operated Switch (COS).
- Between a Black Box COS and a door controller.

8.2.1 Description

These short haul modems are small devices that take their power from the RS-232 line itself. They allow communications over distances between 0 and 12miles/20km depending on the speed of communications.

Note

> These devices are **not** suitable for connection to leased lines.

Each unit has a small switch labeled DCE/DTE on its side, this should be set to DCE.

These units are available with either a male or female 25-pin connector.

8.2.2 Distance

Baud Rate	Maximum Distance	
	miles	km
9600	3	5
2400	4	7
1200	6	10
300	12	20

8.3 Black Box Line Driver - LD-120MP

A pair of these devices, also known as baseband modems, will extend the distance that you can send the RS-232 signal from 50ft/15m to 5miles/8km. These devices are BABT approved for connecting to leased lines or they may be used with your own twisted-pair cable.

Do not attempt to connect one of these devices to the public telephone system.

The devices may be used:

- Between the CNC and a door controller.
- Between the CNC and a Black Box COS.
- Between a Black Box COS and a door controller.

8.3.1 Description

These short haul modems are mains powered devices that allow communications over distances between up to 5miles/8km at speeds up to 9600 baud.

8.3.2 Distance

Baud Rate	Maximum Distance	
	miles	km
up to 9600	5	8

8.4 pIPer Serial Ethernet Units

The pIPer units are dial-up devices that can be used instead of modems. For more information, refer to the document *17407 pIPer Serial Ethernet Unit Installation and Configuration Guide* or call PAC Technical Suppor*t.*

9. Appendix C - 21512 CNC MKI to MKII Upgrade Kit

9.1 Description

This kit allows you to upgrade an existing CNC-based installation to use the improved features and performance of the new CNC, with the minimum of effort and time involved in performing the upgrade.

9.1.1 Contents of the Kit

The kit consists of a MKII CNC (the power supply is **not** supplied with this kit - the existing power supply should be used) and four cables. These cables should be used to connect the cables that currently connect to the host PC and RS-232 ports of the **existing** MKI CNC to the new MKII CNC.

Note

>   Do not attempt to use these cables to connect the MKII CNC directly to the host PC, modem, or other RS-232 device - they will not work. They are 'conversion' cables.

9.2 Installation

91. Ensure the PC administration software is running and the CNC display is showing:

    ```
    ** MONITORING **
    ```

    If any updates are displayed for sites, you should make sure they are sent to the door controllers on those sites first - for sites that communicate via a dial-up modem, you may need to 'force dial' the site first.

92. Make sure that all the connectors currently plugged into the rear of the CNC are labelled and easily identified.

93. Make sure the **On-Line Transaction** display is visible and transactions are being displayed.

94. Disconnect the connectors from RS-232 ports 1 to 3 and the six wire bus on the rear of the CNC.

95. When no further transactions are being displayed by the PC administration software, log in to the PC administration software using the supervisor key/card.

96. Disconnect the host PC and power supply connectors from the rear of the CNC.

97. Ensure the switches on the underside of the MKII CNC are correctly set, see Section 2.2.1. Particular attention should be made to switch 7 - Host PC to CNC Baud Rate which is dependent on the administration system being used.

98. Replace the MKI CNC with the MKII CNC.

99. Connect the cable from the power supply to the power supply connector on the MKII CNC. A sequence of messages should be displayed - as described in Section 3.5.1.

100. Using one of the conversion cables supplied, connect the 9-way D-type connector to the host PC port on the new CNC and the 25-way D-type connector to the **existing** CNC to PC cable.

     Note

     >   Do not attempt to use this cable to connect the new CNC directly to administration PC - it will not communicate. It must be used in conjunction with the MKI CNC to PC cable.

101. Verify the PC to CNC communications status.

102. Initialise the CNC - this process will clear the contents of the CNC memory and send to the CNC information about the sites being controlled.

103. Once the CNC has been initialised, you should reconnect the six wire bus cable from the door controllers (as previously connected to the MKI CNC - no conversion cable is required). Confirm communications are established to the door controllers, check the number of door controllers that are being reported as communicating on the main transaction screen.

104. Next, you should reconnect any RS-232 sites using the remaining three conversion cables supplied with the kit to connect the existing RS-232 leads to the RS-232 ports on the new CNC. These are used in the same way as the host PC conversion cable - they cannot be used to directly connect the new CNC directly to an RS-232 device, such as a modem.

IMPORTANT

Ensure that the correct RS-232 cables are connected to the correct RS-232 port on the CNC - the PC administration software uses the RS-232 port number to help identify sites for communication purposes.

105. Finally, confirm communications with all the RS-232 sites. For sites that communicate via a dial-up modem, you will need to 'force dial' the site first.

9.3 Conversion Cables

Four MKI to MKII CNC conversion cables are supplied with this kit. The wiring of these cables is shown below for information.

Supplied: Quantity 4, each 2 metres length.

Use 8-core $7/0.2mm^2$ cable, screened, maximum 6.6ft/2m length.

MKI CNC - Existing Cable		MKII CNC Host PC/RS-232
25 pin female D-type connector		9 pin female D-type connector
(Screen) Case	———	Case (Screen)
1	———	Case (Screen)
2	———	2
3	———	3
4	———	7
5	———	8
7	———	5
8	———	1
20	———	4
22	———	9

10. Appendix D - Cable Descriptions

10.1 Power Supply

Supplied: Quantity 1, 6.6ft/2m length.

Use 10 core 7/0.2mm^2 cable, maximum 6.6ft/2m length.

CNC, Power Supply Port				Power Supply Unit	
9 pin female D-type connector				9 pin male D-type connector	
Relay 4	1	———		1	Relay 4
Relay 3	2	———		2	Relay 3
Relay 2	3	———		3	Relay 2
Relay 1	4	———		4	Relay 1
+13.8 V dc	5	———		5	+13.8 V dc
GND	6	———		6	GND
GND	7	———		7	GND
Relay Power	8	———		8	Relay Power
Ground	9	———		9	Ground

10.2 Host PC

Supplied: Quantity 2, each 6.6ft/2m length. One with 25-way D-type female, one with 9-way D-type female at one end. Both have 9-way female D-type at other end.

Use 8 core 7/0.2mm^2 screened cable, maximum 33ft/10m length.

10.2.1 9-way COM Port

CNC, Host PC Port				PC	
9 pin female D-type connector				9 pin female D-type connector	
RX	2	——<—		3	TX
TX	3	——>—		2	RX
DTR	4	——<—		8	CTS
GND	5	———		5	GND
DSR	6	——<—		7	RTS
RTS	7	——>—		6	DSR
CTS	8	——<—		4	DTR
(Screen) Case		———		Case	(Screen)

10.2.2 25-way COM Port

CNC, Host PC Port				PC	
9 pin female D-type connector				25 pin female D-type connector	
RX	2	——<—		2	TX
TX	3	——>—		3	RX
DTR	4	——>—		5	CTS
GND	5	———		7	GND
DSR	6	——<—		4	RTS
RTS	7	——<—		6	DSR
CTS	8	——>—		20	DTR
(Screen) Case		———		Case	(Screen)

10.3 Six Wire Bus

Use multi-stranded, unscreened, 6-core, 22AWG/0.355mm² alarm or signal cable. If you do use screened cable, you should reduce the maximum distance allowed by 3 times, i.e. to 1100ft/350m maximum.

Total amount of cable not to exceed 3000ft/1000m, and no single length more than 1500ft/500m.

10.3.1 CNC to Door Controller

Supplied: Quantity 1, flying lead - 6.6ft/2m length. Flying leads one end.
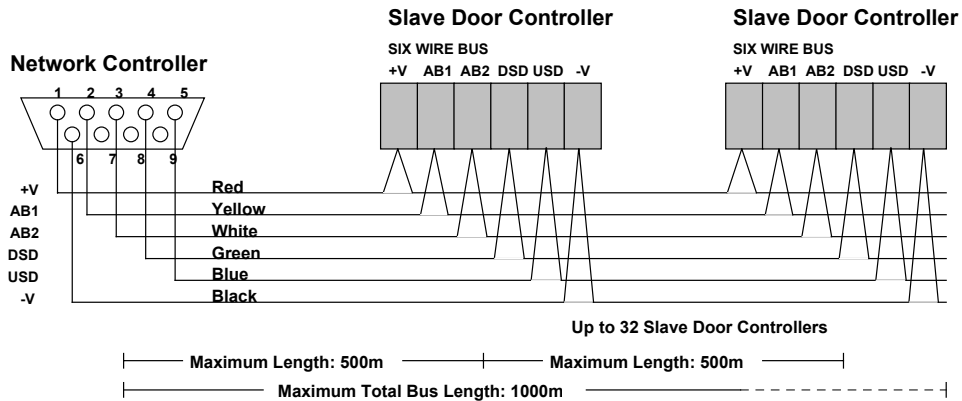
Figure 8 CNC to Door Controller Wiring

10.3.2 Remote Site Master Door Controller to Slave Door Controller
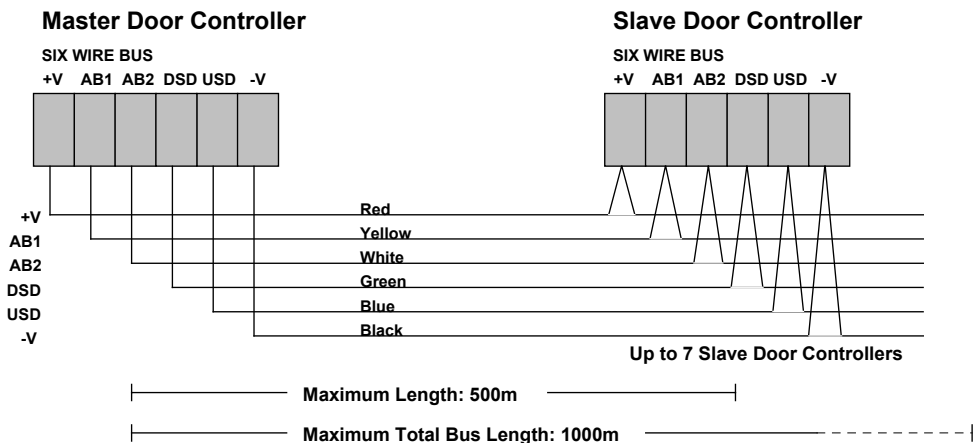
Figure 9 Remote Site Master to Slave Wiring

10.4 RS-232 Ports

10.4.1 Cable for Direct Connection to Door Controller

Use 4-core 24AWG/0.22mm² screened signal cable, maximum length: 50ft/15m.

CNC RS-232 Port 1, 2 or 3	Door Controller
9 pin female D-type connector	5-way terminal block
TX3 ———	TX
RX2 ———	RX
GND5 ———	GND
see Note DTR4	
see Note CTS8	

Note

The CTS signal should always be kept high at the CNC when a site is connected. The best way of doing this is to connect the CTS signal (pin 8) to DTR (pin 4).

10.4.2 Cable for Connecting CNC to Modem

Use 8-core 24AWG/0.22mm² screened signal cable, maximum length: 50ft/15m.

Supplied: Quantity 3, each 6.6ft/2m length.

CNC, RS-232 Port 1, 2 or 3				Modem		
9 pin female D-type connector				25 pin male D-type connector		
Screen (Case)		———		(Case) Screen **AND Pin 1**		
RX	2	——<——	3	TX	Red	
TX	3	——>——	2	RX	Blue	
DTR	4	——>——	20	DTR	Orange	
GND	5	———	7	GND	Brown	
DSR	6	——>——	6	DSR	Yellow	
RTS	7	——>——	4	RTS	Green	
CTS	8	——<——	5	CTS	Black	
see Note	RI	9	——<——	22	RI	White

Note

RI (pin 9) is only required if dial-back is being used.

10.4.3 Cable for Connecting Modem to Door Controller

Use 6-core 24AWG/0.22mm² screened signal cable, maximum length: 50ft/15m.

Modem				Door Controller
25 pin male D-type connector				5-way terminal block
RX	2	——<——		TX
TX	3	——>——		RX
GND	7	———		GND
CTS	5	——>——		CTS
RTS	4	———		DTR
DTR	20	——<——		DTR

10.4.4 Short Haul Modems (SHM-NPR)

10.4.4.1 CNC to Short Haul Modem

Use 4-core 24AWG/0.22mm² screened signal cable, maximum length: 50ft/15m.

CNC RS-232 Port				Short Haul Modem (DCE)	
9 pin female D-type connector				25 pin male D-type connector	
TX	3	—>——	3	RX	
RX	2	—<——	2	TX	
GND	5	———	7	GND	
CTS	8	⌐			
see Note	DTR	4	——>—	20	DTR

Note

DTR at the short haul modem is used for providing power.

10.4.4.2 Short Haul Modem to Door Controller

Use 4-core 24AWG/0.22mm² screened signal cable, maximum length: 50ft/15m.

Short Haul Modem (DCE)			Door Controller
25 pin male D-type connector			**5-way terminal block**
TX	2	—>——	RX
RX	3	—<——	TX
GND	7	————	GND
see Note DTR	20	—<——	DTR

Note

DTR at the short haul modem is used for providing power.

10.4.4.3 Between Short Haul Modems

Use twin twisted pair, maximum length: speed dependent, see Section 8.2.2.

Short Haul Modem (DCE)		Short Haul Modem (DCE)
screw terminals		**screw terminals**
TXA	——>——	RXA
TXB	——>——	RXB
RXA	——<——	TXA
RXB	——<——	TXB

10.4.5 Connecting RDT to Door Controller
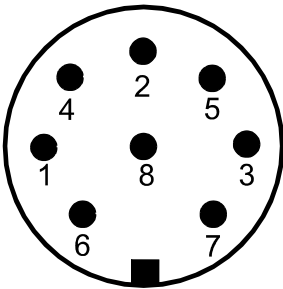
Use 4-core 24AWG/0.22mm² screened signal cable, maximum length: 50ft/15m.

RDT			Door Controller
9 pin female D-type connector			**5-way terminal block**
TX	3	——>——	RX
RX	2	——<——	TX
GND	5	————	GND
CTS	4	————	DTR

10.5 External Reader

Supplied: Quantity 1, flying lead, 8 core screened, 6.6ft/2m length.

Refer to documentation supplied with reader for cable specifications.

	CNC Pin	Cable Wire Color	PAC or KeyPAC	Wiegand	Magstripe
	1 MAG DATA	Yellow			DATA
	2 GND	Black			
	3 WIEG D0	Green		D0	
	4 MAG CLK	Blue	SIG		CLK
	5 WIEG D1	White		D1	
	6 +5V	Red			
	7 +13.8V	Brown	+V	+V	+V
	8 GND	Orange	-V/0V	GND	-V
Connector viewed from outside CNC	Connector Case		Cable Screen	Cable Screen	Cable Screen

Notes

1. **:** Pins 6 and 7 (+5V and +13.8V dc) are rated at 200mA **each**.

2. The external reader port offers no LED/VCA support.

10.6 LD-120MP Line Drivers

10.6.1 CNC to LD-120MP

Use 4-core 24AWG/0.22mm² screened signal cable, maximum length: 50ft/15m.

CNC RS-232 Port				LD-120MP	
9 pin male D-type connector				25 pin male D-type connector	
RX	3	——<—	3	TX
TX	2	——>—	2	RX
GND	5	———————	7	GND
CTS	8	⌐		
see Note DTR	4	—		

Note

The CTS signal should always be kept high at the CNC when a site is connected. This should be done by connecting the CTS signal (pin 8) to DTR (pin 4).

10.6.2 LD-120MP to Door Controller

Use 4-core 24AWG/0.22mm² screened signal cable, maximum length: 50ft/15m.

LD-120MP			LD-120MP	
25 pin male D-type connector			5-way terminal block	
RX	2	—<——	TX
TX	3	—>——	RX
GND	7	———————	GND

10.6.3 Between LD-120MPs

Use twin twisted pair, maximum length: speed dependent, see Section 8.3.2.

LD-120MP			LD-120MP
screw terminals			screw terminals
1	———————	4
2	———————	3
3	———————	2
4	———————	1

11. Appendix E - COS-4/8 Data Switches

An alternative arrangement to using the six wire bus at a remote site is to use a Black Box Code Operated Switch (COS). This device, available in 4-port or 8-port versions, switches control between the CNC and up to 4 or 8 door controllers. Each door controller should be configured as a slave, system type 3.

The COS may be connected directly to the CNC, or via a dial-up modem. Connections from the COS to the door controllers may use line drivers or other directly communicating devices, see Section 5.1.

Note

> It is **not** possible to use dial-back when using a COS.

This configuration is only used where it is not practical to run a new cable for the six wire bus between door controllers on a site or where the distances involved exceed those permitted by the six wire bus.

Note

> If the first door controller on a site is a PAC Portico 2000N and it is required to add further door controllers to the site, it is recommended that this is upgraded to a PAC Portico 2100 (via upgrade kit, part number 21720) instead of using a COS, wherever practical. A PAC Portico 2100 with a local six wire bus to additional slave controllers will give a greatly enhanced performance over using a COS.

Connecting and Configuring the COS

The COS is a complex piece of communications equipment - the design and specification of which varies from time to time.

For this reason, you should contact PAC Portico Technical Support for information regarding wiring and configuration of the COS if you intend to use one. The relevant information will be made available to you once the exact COS specification has been established.

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