



CPC202 and CPC204 Shared Occupancy Access Controllers

INSTALLATION MANUAL & USER GUIDE



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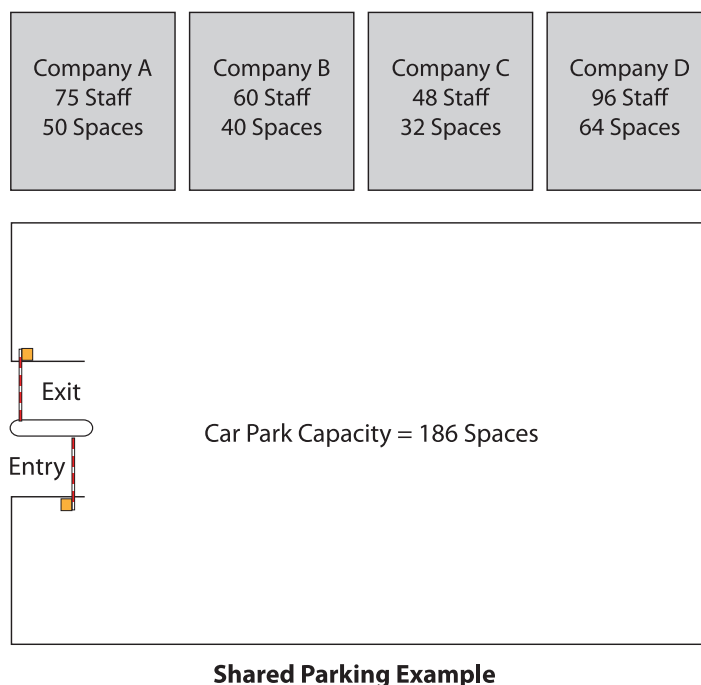
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1. Introduction

The CPC202 and CPC204 are shared occupancy controllers that control access for groups of users that are sharing the same facility by keeping a count of the users from each group that are within the facility. The CPC202 is used to control one or two count groups and the CPC204 can control up to four count groups.

These devices are designed to control the entry to and exit from a secured facility by authorised users via one entry point and one exit point, while keeping a count of the number of users from each group that are within the facility. Each controller supports one entry reader and one exit reader. These readers can be of any type that has a standard Wiegand or Clock and Data interface. Optionally, each reader can be used in conjunction with a pulsed input from a sensor or vehicle detector to confirm the entry or exit of the vehicle.

Each count group represents a group of card holders that would typically be employees of the same company or belong to the same department. For example, where four companies share the same parking facility, each company will be represented by a different count group. The employees of each company would each be issued with a pass card that has been assigned to the count group associated with their employer. Each of the count groups will be allocated a number of spaces within the facility, which will be shared by the group members. The shared occupancy controller keeps a count of the number of members of each count group that are present within the facility. Employees with valid cards will only be allowed into the facility if the number of the members of their group that are already present within the facility is below the allocated allowance.



This provides an effective method of automatically enforcing the access limits for each count group, therefore protecting the spaces allocated to the other groups. Typically, this will be used for shared parking but may also be used in other facility sharing applications including for applications where personnel access restrictions are required using turnstiles.

1.1 Features

- Supports the connection of two independent readers, each with a latch relay to operate a barrier or turnstile
- Capacity for up to 4 count groups (CPC204) or 2 count groups (CPC202)
- Counting capacity up to 9999 users per group (limit imposed by VMS)
- Total system card capacity using random is 8,000

- Total system card capacity using sequentially numbered cards is 65,000
- Up to 8 visitor PIN's
- Card number learning
- Output latch relay time selectable from 0.5 second to 30 seconds
- Count input based on valid card read only or on card read combined with an input from sensor or vehicle detector
- Reader arming input per reader
- Count output to up to four message signs
- Four open collector outputs to control Space/Full signs or traffic signals
- Optional access denied indication for entry and exit points
- Anti-passback with programmable auto reset
- Count reset input
- Automatic count reset at specified time of day
- 15 programmable time periods to control when cards are valid for use
- 15 programmable time periods to control when access restrictions don't apply
- Anti-timeback with selectable time period from 1 to 30 minutes in 1-minute increments.
- Compact design and easy installation
- Selectable reader supply output (5 volts or supply voltage)
- Real-time clock
- Supports both Clock & Data and Wiegand card formats
- Password protection

2. Designing The System

2.1 Overview

The flexibility of the CPC20x products (CPC202 and CPC204) offers a wide range of options for controlling shared occupancy. Before starting an installation, it is advisable to think through all of the options and decide on the most suitable configuration. This section explains the options available at each stage of the process.

2.2 Vehicle Identification/Card Reading

The CPC20x controllers can be used with a wide range of readers and ID devices. Vehicle identification systems such as ANPR (Automatic Number Plate Recognition) and Long-Range Tag readers offer hands-free access control. Vehicle identifications systems supplied by Nortech are supported by the CPC20x reader interface (although consideration must be given to the way in which an ANPR system will be used).

The best solution for your project will depend upon the range of vehicle types involved and the configuration of the entrance and exit lanes.

Where hands-free access is not required, proximity card and fob readers offer a simple solution where the card reader is mounted on a pedestal or goose-neck post just before the barrier. In most cases, existing cards and fobs can be used by the system due to the wide range of reader output formats that can be supported. Cards and fobs don't need to be supplied in sequentially numbered blocks - any card can be assigned to any count group.

Depending upon the reader configuration, an arming loop installed under the road in front of the reader (or where a vehicle tag or number plate is expected to be detected) increases security and avoids accidental reads that may affect the accuracy of the count.

Have you considered how you will manage visitors? If your end user is not able to supply visitors with cards in advance, you may need to consider fitting keypads at the entrance and exit. This will allow visitors to be counted correctly as PINs are allocated on a Count Group basis. This feature can also serve for staff members that have lost their cards. Alternatively, you may wish to fit a keypad at the entrance and a card capture reader at the exit so that 'exit cards' can be issued to visitors for single use at the exit. The cards are recovered at the exit and recycled.

Remember, once a shared occupancy system is in place, the use of an intercom with a remote barrier control button can't be used because it would not support the group counting of visitors when they enter and leave the facility.

Choose the reader and card/tag system, method of dealing with visitors, and identify whether or not reader arming is required.

2.3 Count Groups and Counting Method

The number of count groups sharing a facility will affect the equipment requirement. If the shared occupancy control is required to simply enforce occupation limits for a single group of users (to prevent parking in restricted areas within the facility, for instance) then the CPC202 provides the ideal solution. This will also suit shared parking by two groups. For applications with more than two groups, the CPC204 can support up to four groups. Where it is necessary to manage more than four groups, then it may be possible to 'cascade' two or more shared occupancy controllers. This involves

connecting the entry and exit readers to the reader interfaces of two or more controllers in parallel with each controller managing different groups. The ability to do this will depend on the type of readers used and the configuration of the system. If you are planning to do this, we recommend that you submit your plans to Nortech's technical support team for assessment before you attempt to carry it out.

The method of counting vehicles as they enter and exit the facility will depend on the type of entry and exit barriers and the required level of accuracy. The CPC20x controllers offer two methods of counting vehicle in and out:

Method 1 - Readers Only

This is the simplest method to implement but less accurate than Method 2. When a valid card is presented to the reader and access is granted, the controller immediately changes the value of the corresponding group count. If a valid card is presented to the reader but the vehicle does not pass through the control point, then this will result in an inaccurate count. If this is likely to be a regular occurrence, then you should consider using Method 2.

Method 2 - Reader and Input

This method requires the installation of a vehicle sensor on the opposite side of the barrier to the reader. This may be a vehicle detector installed just after the barrier (or it may be possible to use an output from the safety loop). Alternatively, an optical sensor such as an infrared beam system can be installed to detect vehicles once they have passed through the barrier. In either case, the input in the controller must receive a ground pulse when a vehicle is detected.

Using this method, when a valid card has been presented to the reader, the controller will send an open signal to the barrier and will start a timer. If it receives a signal from the sensor/detector within a preset time, then the corresponding group count value will be adjusted (only one pulse will be accepted). If no signal is received before the timer ends, the count value will not be affected.

The timer for the input signal can be set on the controller to a value between 1 and 30 seconds (default is 2 seconds). The value of this setting should allow for the time taken to raise the barrier and for the vehicle to move from the point of detection/card presentation to the monitoring point beyond the barrier.

Note: Regardless of the method used, it is advisable to ensure that physical installation is set out in a way that will minimise the possibility of tailgating. If a vehicle does manage to tailgate, the system would not be able to count it correctly because it would not be able to identify its count group, and it would therefore be ignored.

Similarly, where Method 2 is used, to minimise the risk of unauthorised vehicles entering after a barrier has been opened where the original vehicle did not enter, the barrier controller should have a relatively short automatic close period (where safety loop does not register a detect).

Decide on the occupancy controller model(s) and the equipment/layout required to support the counting method that you require.

2.4 Signs and Signals

To ensure that users are aware of the reason why they can't enter a facility, and to avoid delays at the entrance, it is advisable to provide them with some form of visual indication. There are several options available:

- Variable Message Signs to display the available spaces or the current occupancy for each count

group (or 'FULL' when the count group has used up its quota).

- Space/Full signs or traffic signals per count group to indicate which groups have used up their quota.
- Validity feedback (sign or traffic signal) to indicate whether or not a card has been accepted and access has been granted.

The validity feedback option can be provided on its own or in addition to the Variable Message Sign option.

The Variable Message Signs and Space/Full signs/traffic signals would be fitted at the entrance only. The validity feedback signs/signals can be fitted at both entrance and exit (for invalid cards and PIN codes).

Choose which signs and signals you require and decide where to mount them.

2.5 Access Times and Count Reset Method

Consider how the end user is going to manage the counts throughout the day. Will there be times when users will need to enter or exit the facility without using their pass cards or vehicle tags? How will the counts be managed at such times? Will there be times of day or days of the week when some or all of the users will not be allowed to enter the facility?

The Shared Occupancy Controller has an input that can be wired to a remote button that will allow an administrator to reset all of the group counts to zero from an office or kiosk. The reset should normally take place when the facility is completely empty. Adjustment of the individual counts is possible, but this must be carried out at the controller itself. The ideal location of the controller may be a consideration if this is a regular requirement.

The controller can be programmed to automatically reset the group counts to zero at a particular hour of the day, if that is required.

Once you are aware of the end user's requirements regarding count management and access restrictions, you can set them up using the following menu items under the 'Installer' menu:

- Time Zones (Section 5.3.4)
- Access Levels (Section 5.3.5)
- Door Open TZ (Section 5.3.6)
- Set Reset Time (Section 5.3.11)

Also see the explanation of Access Levels and Time Zones in Section 4.2.2.5.

3. Installation

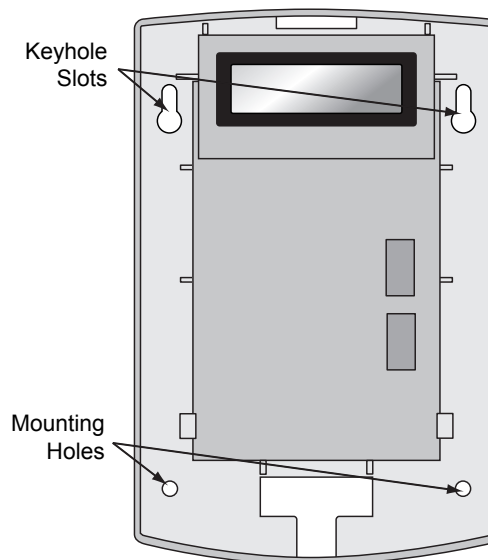
3.1 Mounting the Unit

The CPC20x can be wall-mounted when used indoors or fixed inside a weatherproof housing for outdoor use.

Identify a location convenient for cabling while ensuring that the LCD screen and keypad are easily accessible for programming the unit and carrying out diagnostics. Also ensure that the CPC20x is protected from excessive temperatures and moisture.

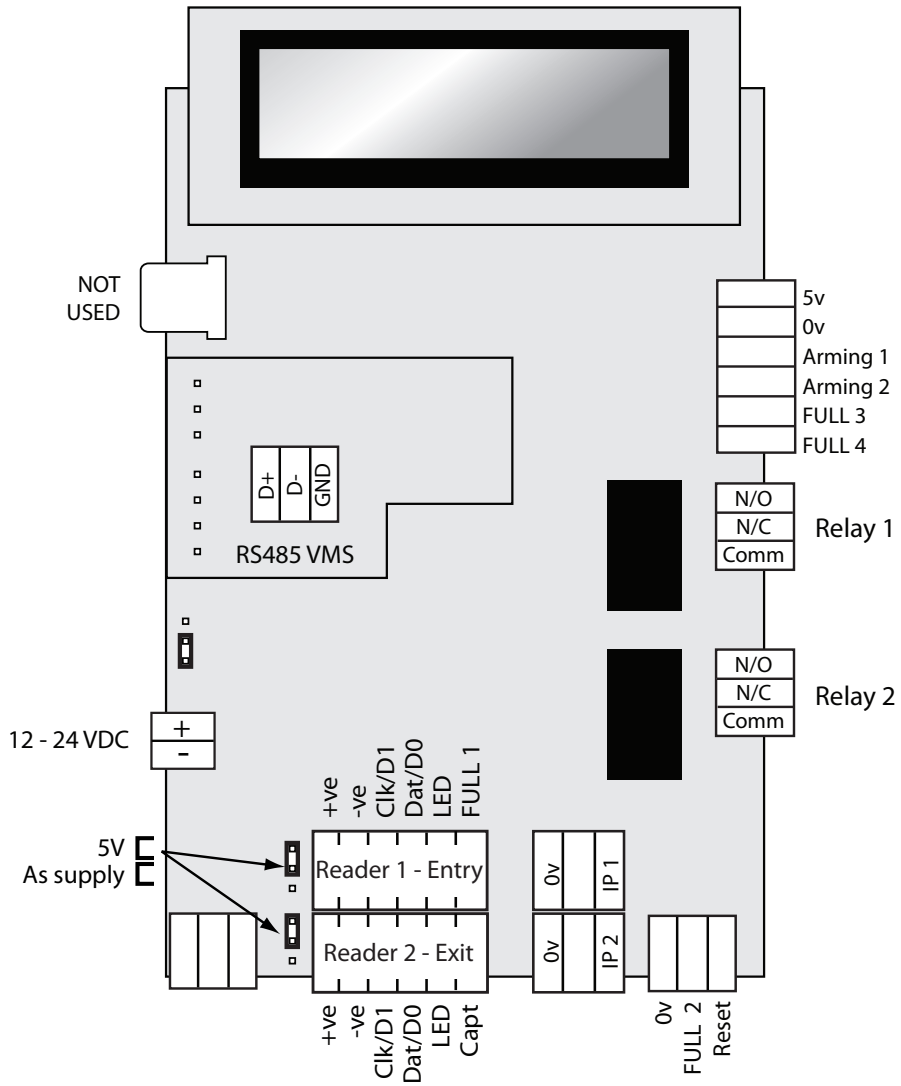
The mounting procedure is as follows:

- Release the front cover from the main unit by pressing the retaining buttons at the base of the unit while you lift off the cover from the bottom (hinging the cover at the top).
- Carefully unplug the ribbon cable linking the cover to the main unit. Avoid pulling or bending the ribbon cable.
- Completely remove the front cover.
- Mount the unit on the mounting surface through the 2 keyhole slots and 2 mounting holes in the back plate. Use 4 appropriate screws or nuts/bolts (M4) according to the type of mounting surface.
- After wiring the unit, support the cover with one hand and carefully re-insert the end of the ribbon cable into its socket. Refit the cover by engaging the top of the cover with the top of the housing and hinging in the bottom of the cover until the retaining buttons are fully engaged in the housing.



3.2 Power Supply and Cabling Requirements

The diagram below shows the CPC204 with the cover removed. All terminal blocks and configuration jumpers are shown. For the CPC202, the connections are the same except for the use of outputs 'FULL 3' and 'FULL 4', which are not used when 'OPEN/FULL' signs are enabled.



CPC204 Connection Diagram

3.2.1. Inputs and Outputs

Inputs	Description	Explanation
Reader 1	Entry Reader connection (Section 3.2.4)	This supports a wide range of readers/ ID devices that are used to validate a user at the entrance. Where both PINs and Cards need to be supported, then a combined Card Reader/Keypad can be used or a keypad can be connected to this interface in parallel with the card reader (subject to the specifications of the card reader).
Reader 2	Entry Reader connection (Section 3.2.4)	Used to validate a user at the exit. Connection options are the same as for reader 1.
Reset	When grounded, resets all counts to zero (Section 3.2.6)	Can be connected to a reset button that can be pressed to reset the group counts to zero when the parking facility is empty.
IP1	Used together with the Entry Reader to increment group count (ground pulse from detector /sensor) (Section 3.2.6)	Used only when the Counting Method is set to 'Input' (see section 5.3.10). This requires a ground pulse from a vehicle detector or optical sensor that is used to confirm that the vehicle has entered the facility. This must be received within a preset time of a valid card read at the entry reader.
IP2	Used together with the Exit Reader to decrement group count (ground pulse from detector /sensor) (Section 3.2.6)	Used only when the Counting Method is set to 'Input' (see section 5.3.10). This requires a ground pulse from a vehicle detector or optical sensor that is used to confirm that the vehicle has exited the facility. This must be received within a preset time of a valid card read at the exit reader.
Arming 1	When connected to ground, disables the Entry Reader (Section 3.2.6)	This can be connected to the 'Presence' normally closed output of a vehicle detector fitted in front of the Entry Reader to prevent the fraudulent or erroneous use of cards.
Arming 2	When connected to ground, disables the Exit Reader (Section 3.2.6)	This can be connected to the 'Presence' normally closed output of a vehicle detector fitted in front of the Exit Reader to prevent the fraudulent or erroneous use of cards.

Outputs	Description	Explanation
FULL 1	Controls SPACE/FULL sign (if fitted) for group 1 (Section 3.2.7)	Goes low when the group 1 count reaches its limit (see section 5.2.1). This is typically used to set a SPACES/FULL sign to show 'FULL'
FULL 2	Controls SPACE/FULL sign (if fitted) for group 2 (Section 3.2.7)	Goes low when the group 2 count reaches its limit (see section 5.2.1). This is typically used to set a SPACES/FULL sign to show 'FULL'
FULL 3	Controls SPACE/FULL sign (if fitted) for group 3 otherwise controls entry error sign (Section 3.2.7)	Functions in the same way as FULL1 and FULL2 when a SPACES/FULL sign is fitted. Otherwise it goes low whenever an invalid card is presented to the entry reader or when a card is presented to the reader when count of the group associated with the card has reached its limit (access refused)
FULL 4	Controls SPACE/FULL sign (if fitted) for group 4 otherwise controls exit error sign (Section 3.2.7)	Functions in the same way as FULL1 and FULL2 when a SPACES/FULL sign is fitted. Otherwise it goes low whenever an invalid card is presented to the exit reader.
RS485 VMS	RS485 bus to VMS signs (Section 3.2.5)	Up to 4 VMS signs can be connected to the controller. Each sign will display either the current group occupancy or the available spaces available for a group (see section 5.3.9)
Relay 1	Relay output to entry control (Section 3.2.8)	The contacts of this relay can be connected to an entry barrier controller, for example, to give an open signal when a valid card has been presented at the Entry Reader.
Relay 2	Relay output to entry control (Section 3.2.8)	The contacts of this relay can be connected to an exit barrier controller, for example, to give an open signal when a valid card has been presented at the Exit Reader.
Capt	Card capture control (Refer to MRC350 manual)	This is used at the Exit Reader if a 'Card Capture' reader is fitted. It is used to signal when a card is to be captured.

3.2.2. Power Supply

You must feed power to the CPC20x from a suitable power supply that is capable of supplying between 12 and 24 volts DC (see warning following this section). The supply current requirements for the unit are 100 mA quiescent, and 230 mA while reading with a passive reader. Some reader types such as motorised readers need to be powered by a separate supply (refer to the reader's installation instructions).

Connect the power supply to the power input connector at the bottom left of the unit (see connection diagram). Do not apply power at this stage.



Warning: Use of CPC20x with 12V readers

If a 12V DC reader is to be powered from the CPC20x, then the power supply to the CPC20x must be rated at 12V DC. When the “supply voltage” reader supply output is selected, the input +ve pin is connected directly to the reader supply output pin. If therefore, an incorrectly rated supply is connected to the input, it is likely to damage the reader when power is applied.

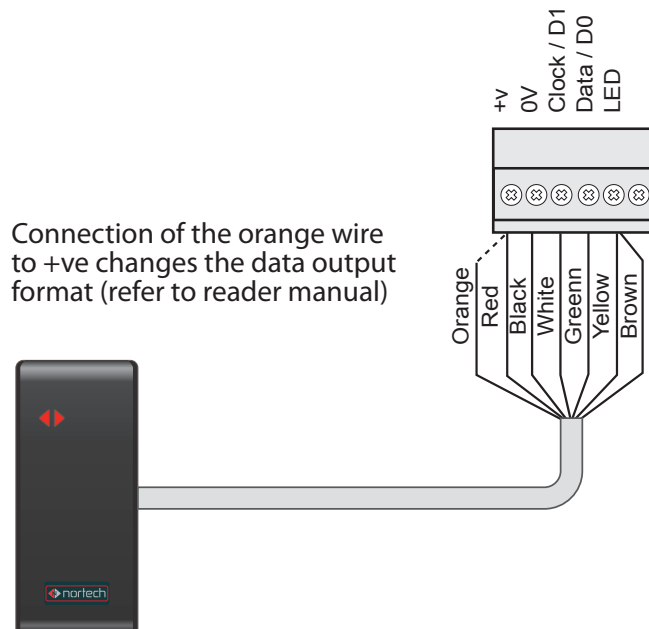
3.2.3. Reader Voltage Settings

Each of the two reader interfaces includes a power supply output. These power supplies can be individually set to either 5V or “supply voltage” to match the requirements of the corresponding reader. The voltage for each reader is set on a jumper to the left of the corresponding terminal block. The factory setting for these jumpers is 5 volts. To avoid damage to the readers, you must set the correct voltage for each reader before applying power to the CPC20x.

If you are in any doubt about the output voltage to the reader, apply power to the CPC20x without connecting the readers and measure the voltage at the reader connector(s).

3.2.4. Connecting the Reader

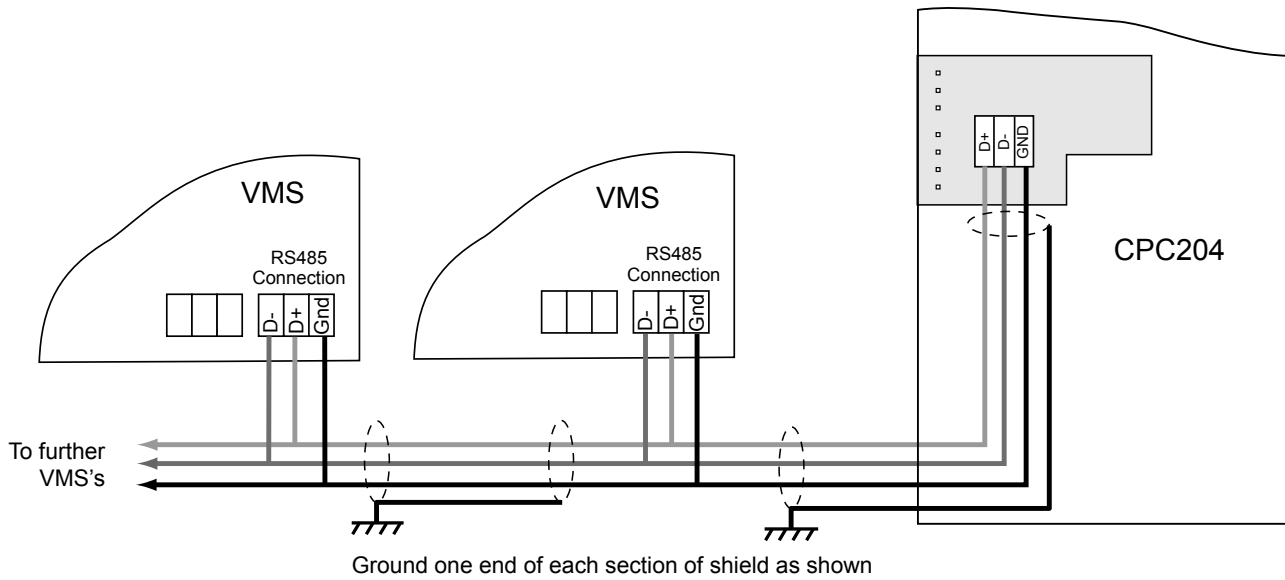
The wiring will depend upon the type of reader and whether the reader is fed directly from a separate power supply. If you need to extend the reader cable, use an overall screened cable such as Belden 9536. Connect the screen of the cable to a suitable earth at one end only (to avoid earthing loops). Connection to earth at the controller end is recommended. The illustration below shows the connection of a Nortech reader to a CPC20x controller.



3.2.5. Connecting the VMS Control Bus

The Variable Message Signs are connected via an RS485 control bus. The signs must be connected in a ‘Daisy Chain’ and terminated on the RS485 VMS connector block. The cabling must conform to RS485 standards to ensure that the communication is reliable.

Use only screened twisted pair cable such as Belden 9729. The total length of the cabling must not exceed 1,200m. The screen of each length of cable must be connected to an earth point at one end only. Use one twisted pair for D+ and D- and the other twisted pair for ground (both conductors). It may be necessary to attach terminal resistors between D+ and D- at each end of the chain on longer cable runs.



The diagram shows the connection method for Nortech VMS signs.

Each VMS must be given a node number to identify which count value to display. On Nortech VMS signs, the node number is set on DIP switches on the VMS PCB (refer to VMS Quick Setup Guide).

The VMS nodes are related to counters as follows:

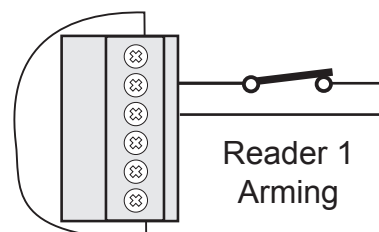
VMS Node Number	Count Group
0	1
1	2
2	3
3	4

Note: For connection to and configuration of Scanlite VMS see Appendix C.

3.2.6. Connecting Inputs

For connection to IP1, IP2 and the Counter Reset input, use voltage-free normally open contacts connected between 0v common and the input terminal.

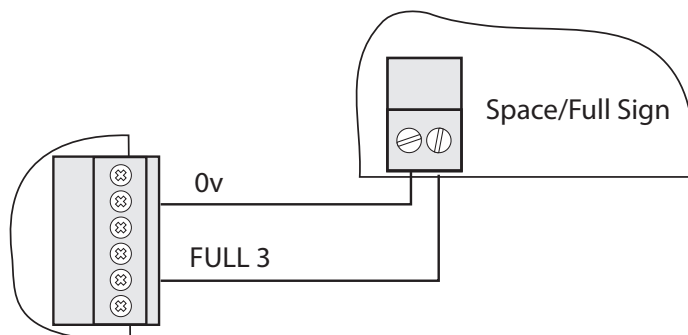
For each of the reader arming inputs, connect the 0v common and the Arming input via voltage-free relay contacts. The contacts must be open (open circuit between pins) to arm the associated reader, and closed (short circuit between pins) to disable the associated reader.



3.2.7. Connecting FULL Outputs

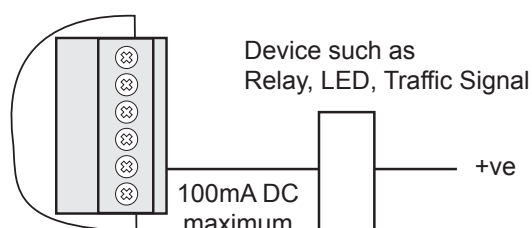
The 'FULL' controls are implemented as open collector outputs.

For connection to a local Nortech Space/ Full sign, connect as shown here:



If the Space/Full sign needs to be located at a distance from the controller, it may require the fitting of an intermediate relay circuit.

Where the output is used to drive a third party device, it should be wired to the device as shown here:



Where an open collector output is required to drive a large load, an intermediate relay circuit should be used.

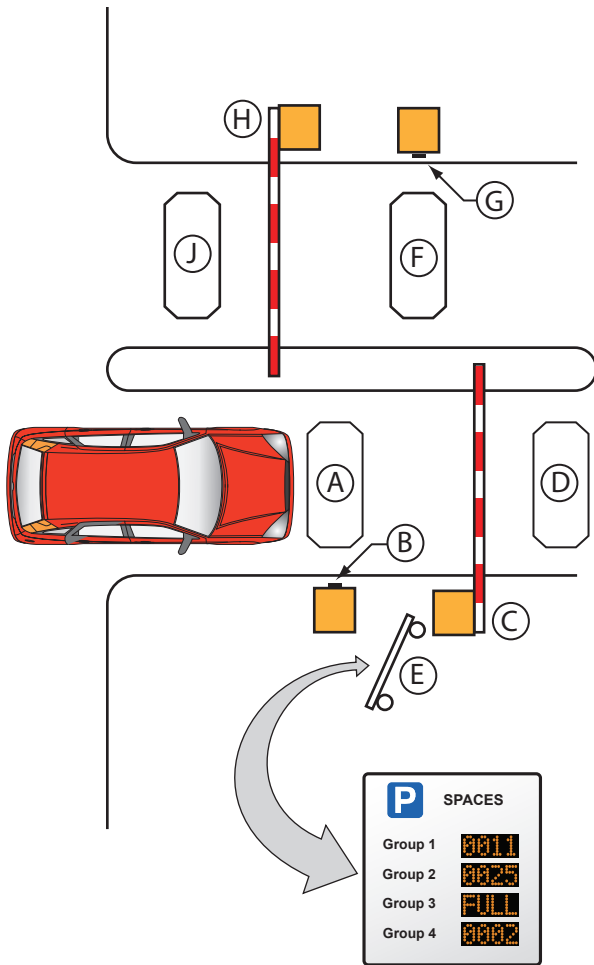
3.2.8. Output Relay Connections

Each of the reader inputs is associated with a set of voltage free relay output pins (relay common, normally closed and normally open). Connect these according to the specific requirement.



A back EMF protection device must always be fitted where an inductive load, such as an electric door strike or magnetic locking device, is connected to the output relays. The protection device should be connected as close to the load as possible.

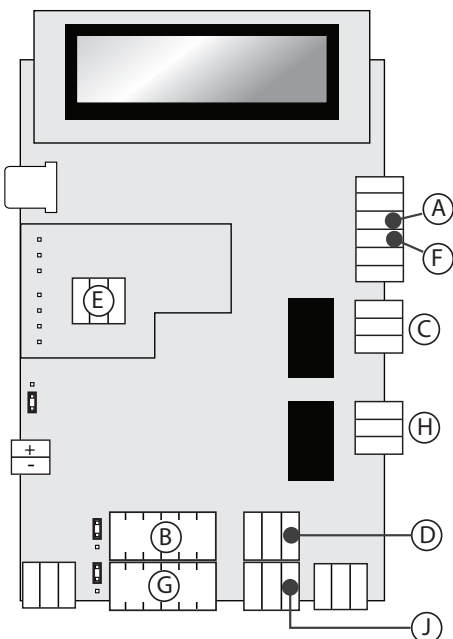
3.3 Example Application Using CPC204



Components

- Ⓐ Entry Reader arming loop (Arming 1). Vehicle must be over the loop for Entry Reader to accept a card.
- Ⓑ Entry Reader. When user presents card to reader, access will be granted if:
 - The reader is armed
 - The access level of the user is valid
 - The group count corresponding to the user is below the set limit
 - Anti-passback is not detected
 - Anti-timeback is not detected
- Ⓒ Entry barrier. Open signal received when access is granted by the controller.
- Ⓓ Entry detection loop connected to Input 1. Detection of a vehicle by the loop within the set period following card validation will increment the users group counter.
- Ⓔ Count Display. Shows the available spaces for each of the count groups.
- Ⓕ Exit Reader arming loop (Arming 2). Vehicle needs to be over the loop for Exit Reader to accept a card.
- Ⓖ Exit reader. When user presents card to reader, access will be granted if:
 - The reader is armed
 - The access level of the user is valid
 - Anti-passback is not detected
 - Anti-timeback is not detected
- Ⓗ Exit barrier. Open signal received when access is granted by the controller.
- Ⓙ Exit detection loop connected to Input 2. Detection of a vehicle crossing the loop within the set period following the card validation will decrement the group counter associated with the user.

Cable Termination

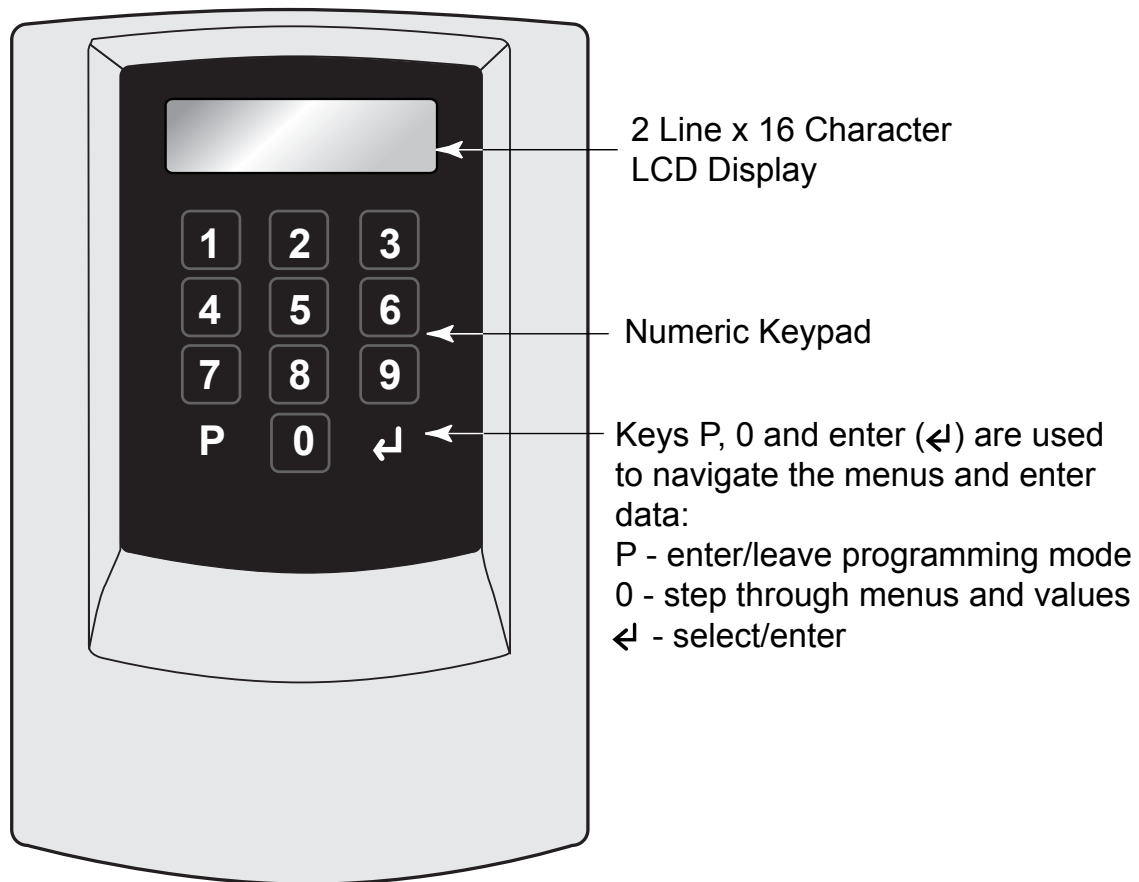


4. Programming the CPC20x

Once the controller has been installed and powered up, the next stage is the programming of the operating parameters to match the requirements of the installation.

This section explains how to program all of the CPC204 settings according to the application and the features used. The differences that apply to the CPC202 will be indicated. Section 5 is a reference section that provides step-by-step detail of each procedure.

4.1 Programming Overview



When you power up the control unit, the screen will briefly display the product code and the version number:

CPC204 Vx.xx Node N:

Key:

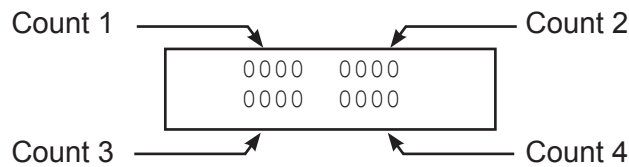
CRC204 = Product code (CRC204 or CRC202)

Vx.xx = Firmware version number

Node: N - indicates the network node identity network. This is not currently used and can be ignored.

The screen then reverts to the standard operational display.

The operational display shows the four counts (two counts for CPC202) as below:



Press **P** (program) to enter the programming mode. The display will show the first menu item.

Press **0** repeatedly to cycle through the menu items. To enter a particular menu item, simply press **↵** (enter) while that item is displayed on the screen. The first parameter of that item will then be displayed in the bottom row of the screen (unless you move to a sub menu).

To enter or change a parameter, type the new value (or use **0** to step through options) and press **↵** (enter) to confirm the change. The unit will then move to the next parameter.

On entering the final parameter of a menu item, the unit will automatically move either to the next menu item or back to the beginning of the current menu item depending upon the particular item.

When you reach the last menu item, a further press of **0** will take you back to the first menu item again.

To go back to the opening display, press **P** repeatedly until it is shown (up to 3 times depending upon where you are in the menu structure).

The structure of the CPC204 menu system is illustrated in Appendix A.

4.2 Installation Settings

Before you set up the counts and add cards to the CRC204, you need to configure the way in which it will operate. These settings are in the “Installer” menu and are used to control the way in which the controller operates.

4.2.1. Date & Time

Although the time and date settings are factory set, it is advisable to check them briefly before entering specific installation details.

Press **P** once and then press **0** repeatedly until the ‘Installer’ screen is displayed, press **↵** once again to enter the sub-menu, and press **0** repeatedly until “Date/time” is displayed.

Press **↵** to show the first parameter. Refer to section 5.3.3 for details of this procedure.

4.2.2. Operating Parameter

For these parameters, you will need to have the following information available:

4.2.2.1. Card Numbering Method

The controller can support up to 65,535 sequentially numbered cards. If you will be using sequentially numbered cards within the range 1 to 65,535 (with or without a site code) then you can set the controller to support sequentially numbered cards. If the card numbers are not sequential, or if

they include numbers higher than 65,535, then you must set the controller to support random card numbers. This is set from within the 'Config' menu (see section 5.3.1)

4.2.2.2. Reader Settings

The following information is required for each reader:

- The required relay operating time (the period for which the open signal is active)
- Whether anti-timeback is required and, if so, the anti-timeback period.

When you have these details available, follow the procedure in section 5.3.1 to enter them into the controller.

4.2.2.3. Card Reader Output Format

You must determine whether the cards used on the system are in Clock & Data or Wiegand format. You also need to know the position and length of the card number on the card. If a site code is used, you need to know the site code and its position and length on the card. Follow the procedure in section 5.3.8 to set the card format parameters (refer to Appendix B for information on card formats).

Note: A useful feature to help identify the card format is provided by the 'Card Test' menu item. This will check the format of a card presented to reader1 and display the format type, number of digits/bits and the actual number on the card.

Follow the procedure in section 5.3.8 to check a card format.

4.2.2.4. Door Open Time Zones

Should any doors or barriers be left unlocked/open at specific times of the day on certain days of the week?

The use of Door Open Time Zones enables doors to be set to be unlocked during specific times of the day on certain days and controlled by a reader at all other times.

In addition to the two default time zones (0=always inactive, 1=always active), there are 15 programmable time zones (2 to 16). Each time zone can be programmed to unlock the door for a fixed period of the day and may be active on specific days of the week.

You may assign any of the time zones to a door/barrier such that it is open/unlocked when the time zone is active, and controlled by the reader when the time zone is inactive.

4.2.2.5. Card Validity Access Levels and Time Zones

Are any of the cards to be valid only at specific times of the day on certain days of the week?

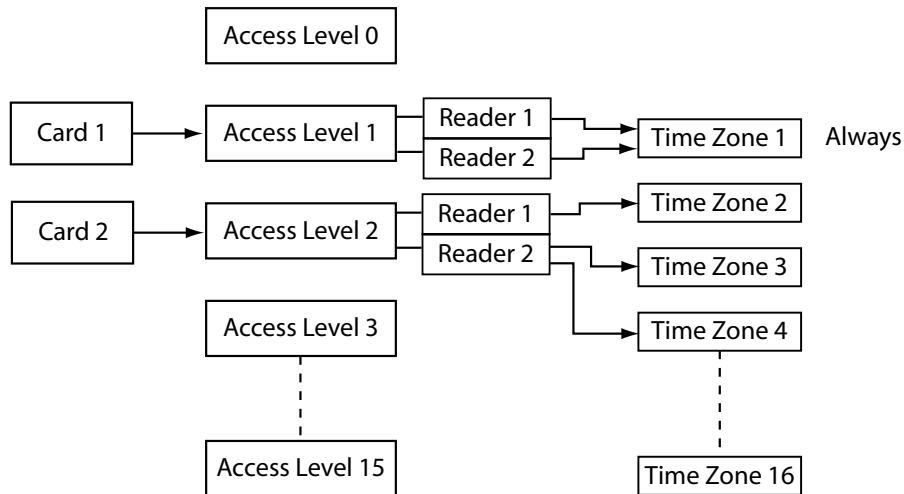
The CPC20x supports extended access control requirements for different types of card holder relating to the following factors:

Valid reader(s)

Valid times of the day

Valid days of the week

There are 16 access levels, each of which can be assigned a different set of validity time zones for each of the two readers. There are 15 programmable time zones available in addition to a fixed time zone (1 = always valid). Several time zones can apply to the same access level, therefore allowing very complex validity period tables to be set up. The diagram shows the relationship between cards, access levels and time zones.



In this example, Card 1 is assigned to Access Level 1 where it is always valid on both readers. Card 2 is assigned to Access Level 2. For this Access Level, the card is valid on reader 1 for those times of day/days of week set up in Time Zone 2, and is valid on reader 2 for both those times of day/days of week set up in Time Zone 3 and those times of day/days of week set up in Time Zone 4.

The procedure for setting up access levels and time zones is:

1. Choose all likely active time periods (e.g. working hours, morning, afternoon, evening, etc.) and active days (e.g. weekdays, weekend, etc.) and set up appropriate time zones (see section 5.3.4 for programming procedure).
2. Choose the access levels for groups of cardholders based on applicable validity periods specific to each reader, and add them to the controller (see 5.3.5 for programming procedure).
3. Add cards and assign the appropriate access levels (see sections 5.1.1 and 5.1.2 for programming procedure).

It is important that you carefully plan and write down time zones and access levels before attempting to add them to the controller.

Note: The factory default Access Level settings are:

Access Level 0: All Time Zones inactive on both readers (no access)

Access Level 1: Time Zone 1 active on both readers (full access)

We recommend that you do not alter these settings.

4.2.2.6. Door Open Time Zones

Should any doors or barriers be left unlocked/open at specific times of the day on certain days of the week?

The use of Door Open Time Zones enables doors to be set to be unlocked during specific times of the day on certain days and controlled by a reader at all other times.

In addition to the two default time zones (0=always inactive, 1=always active), there are 15 programmable time zones (2 to 16). Each time zone can be programmed to unlock the door for a fixed period of the day and may be active on specific days of the week.

You may assign any of the time zones to a door/barrier. Follow the procedure in section 5.3.6 to program Door Open Timezones.

4.2.2.7. Anti-Passback

Anti-Passback is a feature designed for one-by-one access control (i.e. using a turnstile or barrier system) where the presentation of a valid card to a reader allows just one person to pass. If Anti-passback is activated, it will ensure that once a card has been presented to one of the two readers, it is made invalid for subsequent use on that reader until it has been presented to the opposite reader. If this is required, you must activate anti-passback.

Where anti-passback is activated, you can program the controller to reset anti-passback at up to four times per day. Each reset will cause the APB record (records of APB card numbers that have been presented to one reader but not to the other reader) to be deleted, allowing these cards to be valid once more on both readers. Follow the procedure in section 5.3.2 to program anti-passback mode.

4.2.2.8. VMS Settings

If you intend to install Variable Message Signs, Space/Full Signs or other signs or signals you will need to configure the type of signs that you wish the controller to manage.

The sign options are VMS-001 (standard, single-colour VMS), VMS-RGB (full colour VMS sign with several display options), VMS-S0x (legacy high-intensity VMS), and VMS-005 (displays OPEN or SPACE for count values above zero).

Follow the procedure in section 5.3.9 to program VMS settings.

4.2.2.9. Count Method

This is where you set the way in which you want the controller to count vehicles in and out the facility. If you have fitted detectors or sensors to trigger the count, then you need to set the controller to that operation mode and set the timer value. Otherwise, it will count when access is granted.

Follow the procedure in section 5.3.10 to program count method settings.

4.2.2.10. Set Reset Time

You can set the controller to reset the counts to zero at the same time every day. This will normally be at a time when the facility is usually empty. This ensures that the new day starts without any count errors without the need for manual intervention.

Follow the procedure in section 5.3.11 to program the reset time.

4.3 Programming the Cards

Once you have configured the controller, you need to tell it which cards to accept, when they are valid and which count group they belong to. You can add card numbers either individually or in batches (if they are numbered sequentially).

How you program cards into the controller will depend on whether the cards are sequentially numbered (between 1 and 65,535) or randomly numbered. You can add sequentially numbered cards using the 'Program cards' option. Random cards can be added either by the 'Program cards' option or they can be 'learnt' using the 'Learn Card' option.

You must assign each card an access level. By default, Access Level 0 has no Times Zones active (no access) on either reader, and Access Level 1 has Time Zone 1 (full access with no time restriction) activated for both readers. You must also assign the card to a Count Group. Where a card capture reader is connected as the exit reader, you can set the card to be captured by triggering the 'card capture' output.

Where random card numbers are used, the card numbers are stored against indices. It is recommended that you take a note of each index and associated card number. An example form is provided in Appendix D.

Follow the procedure in section 5.1.1 to program either sequential or random cards.

Alternatively, if the controller is set to manage random cards, you can get it to 'Learn' card numbers by presenting the cards to Reader 1. Follow the procedure in section 5.1.2 to add cards using the learning method.

Note: A 'Verify Card' feature is also provided to quickly check the programming of any card. To verify a randomly numbered card, you must enter the index against which the card has been stored. On entering an index, you will be presented with the card number and access level.

Follow the procedure in section 5.1.3 to verify cards.

4.4 Setting PIN Codes

If a keypad or keypad/reader combination is connected to the controller, you can add up to 8 PIN codes to be assigned to count groups.

Follow the procedure in section 5.1.5 to add PIN codes.

5. Programming Procedures

5.1 Users

This menu is used for adding cards/tags to the system, setting their access rights and assigning them to a count group.

5.1.1. Program Cards

To program cards, at the operational screen press **P** once and then **↵**. The following is displayed:

```
Program Cards
NNNN cards
```

Where 'NNNN' = the number of cards currently in the memory (only applies to random card mode).

Press **↵** and carry out the following procedure:

Display

Action

```
Program Cards
Frm:
```

Enter the first card number & press **↵**

```
Program Cards
To:
```

Enter the last card number & press **↵**.
(the card number must be greater than that entered in the previous step). For single card validation, simply press **↵**.

```
Program Cards
Acc Level: 0
```

Enter the required Access Level and press **↵**

```
Program Cards
Count Group: 0
```

Enter the required Count Group and press **↵**

```
Program Cards
Capt no
```

Use **0** to toggle between 'Yes' or 'No' to indicate whether these cards should be captured at the exit and press **↵**

The display moves back to the first parameter of 'Program Cards' for the next batch of cards to be added. Press **P** to escape from this menu item and press **0** to move the next menu item.

5.1.2. Learn Cards (Random Card Mode)

This menu item only appears when the CPC20x is in 'Random Card' mode. It allows you to add cards to the controller by presenting them to a connected reader. Ensure that an appropriate reader is connected to the 'Reader 1' (entry reader) input of the controller before starting the procedure.

To reach this menu item from the operational screen, press **P** once, press **↵** once and then press **0** repeatedly until the following screen is displayed:

Learn Cards

Press **⏏** and carry out the following procedure:

Display

Action

Learn Cards
Acc Level: 0

Enter the required Access Level and press **⏏**

Program Cards
Count Group: 0

Enter the required Count Group and press **⏏**

Learn Cards
Capt no

Use **⏏** to toggle between 'Yes' or 'No' to indicate whether these cards should be captured at the exit and press **⏏**

Learning

This display indicates that the controller is waiting for a card to be presented to reader 1. Present a card to the reader.

Learning
XXXX NNNNNNNN

Card number NNNNNNNN has been stored against Index XXXX.

You can now present further cards for the same Count Group (requiring same access rights) to be learnt or press **⏏** to escape Learning Mode. Keep a note of the index number that each card is stored against.

5.1.3. Verify Cards

To reach this menu item from the operational screen, press **⏏** once, press **⏏** once and then press **⏏** repeatedly until the following screen is displayed:

Verify Cards

The way cards are verified depends upon whether the controller is in sequential or random card mode.

For sequential cards, you must enter the card number.

For random cards, you must enter the index number that the card is stored against. It is important therefore that you keep a record of the card database as mentioned in section 3.4.

5.1.3.1. Verify Cards in Sequential Mode

Press **⏏** to enter the menu item, enter the card number at the prompt 'Card:' and then press **⏏**. You will see a display similar to:

Verify Card
C:00055 02 1 C

The first number is the card number that you entered ('55' in this case), the second number is the Access Level assigned to it. The third number is the Count Group and the 'C' indicates card capture at the exit. Where card capture is not activated, the space is left blank.

Press **⏪** to verify subsequent cards numbers, press **⏩** to verify a new card number, or press **⏹** to escape Verify Mode.

5.1.3.2. Verify Cards in Random Card Mode

Press **⏪** to enter the menu item, enter the index number for the card location in response to the prompt 'Card Idx:' and then press **⏪**. You will see a display similar to:

```
Verify:0005  
00000055 02 1 C
```

The the number on the top line is the index that you entered ('5' in this case), the first number on the bottom line is the card number ('55' in this case), the second number is the Access Level assigned to it, the third number is the Count Group and the 'C' indicates card capture at the exit. Where card capture is not activated, the space is left blank.

Press **⏪** to verify subsequent cards numbers, press **⏩** to verify a new card number, or press **⏹** to escape Verify mode.

5.1.4. Show User/Group

This menu item enables you to check how many users have been assigned to each group.

To reach this menu item from the operational screen, press **⏹** once, press **⏪** once and then press **⏩** repeatedly until the following screen is displayed:

```
Show User/Group
```

Press **⏪** to display the group values. The following screen is displayed briefly (up to 2 seconds):

```
Show User/Group  
Calculating ...
```

The results screen will appear similar to:

```
G1:xxxx G2:xxxx  
G3:xxxx G4:xxxx
```

Where G1, G2, G3 and G4 are the group numbers and 'xxxx' is the number of users currently assigned to that group. In the CPC202 only G1 and G2 will be displayed.

Press any key to escape and then use **⏩** to step through the menu items or press **⏹** to return to operating mode.

5.1.5. Clear Cards

This menu item is for high level administrators only and must be used with care. When activated, all card records will be cleared from the CPC20x memory. It is password protected for this reason. Prior

to using this feature, ensure that 'Password Protection' has been activated and a 4-digit password has been set (see section 5.3.1). Even if 'Password Protection' is no longer active, the latest password set can be used for clearing cards.

To reach this menu item from the operational screen, press **(P)** once, press **(←)** once and then press **(⊙)** repeatedly until the following screen is displayed:

Clear Cards

Press **(←)** and carry out the following procedure:

Display
Action

Clear Cards
Password?

Enter the 4-digit password and press **(←)**.



WARNING: All cards will be deleted from memory when you press **(←)**.

Clear Cards
Cards Cleared

While the cards are being cleared, the screen displays 'Clearing'. When the process is completed, the 'Cards Cleared' message is shown momentarily. Press **(⊙)** to move on to the next menu item.

5.1.6. Set PIN Code

This menu item enables you to set up to 8 four-digit PIN codes for use with a suitable keypad or keypad/reader combination connected.

To reach this menu item from the operational screen, press **(P)** once, press **(←)** once and then press **(⊙)** repeatedly until the following screen is displayed:

Set PIN Code

Press **(←)** and carry out the following procedure:

Display
Action

Set PIN Code
PIN 1: P P P P

The current PIN Code (PPPP) for PIN location 1 is displayed on the bottom line. Type in a new PIN Code for PIN location 1 and press **(←)**

Set PIN Code
P P P P AL=A :

The new PIN Code is shown on the bottom line (PPPP) together with the current Access Level (A). Type in the required Access Level for PIN location 1 and press **(←)**

Set PIN Code
P P P P Group=G :

The new PIN Code is shown on the bottom line (PPPP) together with the current User Group (G). Type in the required User Group for PIN location 1 and press **(←)**

```
Set PIN Code
PIN 2: P P P P
```

The current PIN Code (PPPP) for PIN location 2 is displayed on the bottom line. Edit the details in the same way as shown for PIN location 1.

Repeat the process for all PIN locations where a PIN is required or press **Ⓟ** to escape Set PIN mode.

5.2 Counts

This menu is used for setting count limits for each of the count groups and for manually setting count values for each Count Group.

5.2.1. Set Count Limits

Use this menu item to set the count limit for each count group. Once the count value for a count group has reached this value, the entry reader will not accept further valid cards from this group and the corresponding FULL output will be activated (if configured).

To reach this menu item from the operational screen, press **Ⓟ** once, press **⓪** once and then press **Ⓜ**. The following screen is displayed:

```
Set Count Limits
```

Press **Ⓜ** and carry out the following procedure:

Display

```
Set Count Limits
Cnt1:NNNN >
```

Action

The current count limit for Count Group 1 is shown (NNNN). Enter a new count limit and press **Ⓜ** or simply press **Ⓜ** to keep the current value.

```
Set Count Limits
Cnt2:NNNN >
```

The current count limit for Count Group 2 is shown (NNNN). Enter a new count limit and press **Ⓜ** or simply press **Ⓜ** to keep the current value.

For the CPC204, continue with Count Groups 3 and 4. Once all count limits have been set, press **⓪** to move to the next menu item.

5.2.2. Set Counts

Use this menu item to set the count value for one or more of the count groups. It may be necessary to do this to correct a count inaccuracy after a maintenance action or free movement period, or where tailgating has occurred.

To reach this menu item from the operational screen, press **Ⓟ** once, press **⓪** once and press **Ⓜ** once and then press **⓪** again. The following screen is displayed:

```
Set Counts
```

Press **Ⓜ** and carry out the following procedure:

Display

```
Set Counts
Cnt1:NNNN >
```

Action

The current count value for Count Group 1 is shown (NNNN). Enter a new count value and press \ominus or simply press \ominus to keep the current value.

```
Set Counts
Cnt2:NNNN >
```

The current count value for Count Group 2 is shown (NNNN). Enter a new count value and press \ominus or simply press \ominus to keep the current value.

For the CPC204, continue with Count Groups 3 and 4. Once all counts have been set, press \ominus to move to the next menu.

5.3 Installer

This menu is used to set up all installation options. Unqualified personnel should not alter any values within this menu as this may cause the unit to operate incorrectly.

To reach this menu item from the operational display, press \textcircled{P} once and then press $\textcircled{0}$ repeatedly until the following screen is displayed:

```
Installer
```

This menu includes a set of menu items for installation set-up procedures.

Press \ominus to move to the first menu item:

5.3.1. Config

This menu item contains a sequence of settings that enable you to configure the main operational parameters of the controller.

To reach this menu item from the operational display, press \textcircled{P} once and then press $\textcircled{0}$ repeatedly until the 'Installer' screen is displayed, and press \ominus once. The following screen will be displayed

```
Config
```

Press \ominus once. The first parameter will be displayed on the bottom line. Set the parameters as follows:

Display

```
Config
Relay1:xxx>
```

Action

Enter a value of between 1 and 255 to set the pulse duration for relay 1 in second (or set to '0' for 500ms) & then press \ominus .

```
Config
Relay2: xxx>
```

Enter a value of between 1 and 255 to set the pulse duration for relay 2 in second (or set to '0' for 500ms) & then press \ominus .

```
Config
Card DB xxxxxx
```

This setting is used to set the database storage mode to match the card numbering method. The options are:

- 64k Select this option if the cards are sequentially numbered with a common site code. The maximum number of cards that can be stored is 65,535.

- RANDOM Select this option if the card numbers are completely random or where card numbering is not controllable (e.g. cards are supplied by a third party). The maximum number of cards that can be stored is 8,000.

Use **⓪** to toggle between the modes. When the required mode is displayed press **Ⓜ**.

```
Config
Node: x
```

This parameter is not currently required. Press **Ⓜ** to move to the next item.

```
Config
RDr1 ATB:xx>
```

Anti-timeback (ATB) prevents a card being used twice on the same reader within a given period.

Enter the ATB period for reader 1 in minutes (between 1 and 30 minutes) and then press **Ⓜ**.

To disable anti-timeback, set this value to '0'.

```
Config
Rdr2 ATB:xx>
```

Enter the ATB period for reader 2 in minutes (between 1 and 30 minutes) and then press **Ⓜ**.

To disable this feature, set this value to '0'.

```
Config
Dr1: TZ:0>
```

Enter a value between 0 and 2 to set the operating mode for the entry door/barrier where:

- 0 = normally closed, opens on valid card read
- 1 = always open

2 = normally closed, opens on valid card read. Also remains open during active Door Open Time Zones.

This should normally be set to '0' unless you need to set periods of the day when the door/barrier remains open (see section 5.3.6)

Press **Ⓜ** to save the value.

```
Config
Dr2: TZ:0>
```

Enter a value between 0 and 2 to set the operating mode for the exit door/barrier where:

- 0 = normally closed, opens on valid card read
- 1 = always open

2 = normally closed, opens on valid card read. Also remains open during active Door Open Time Zones.

This should normally be set to '0' unless you need to set periods of the day when the door/barrier remains open (see section 5.3.6)

Press **Ⓜ** to save the value.

```
Configuration
Password No
```

Press **⓪** to toggle the Password option 'Yes' or 'No' and press **Ⓜ** when the desired state is displayed.

If set to 'Yes', you will be prompted for a four-digit number. Enter a 4-digit number and press **Ⓜ**.

You will then need to enter this number whenever you select programming mode from the opening display. (See warning below)



IF YOU LOSE YOUR PASSWORD YOU WILL BE PERMANENTLY LOCKED OUT OF THE CONTROLLER PROGRAMMING MENUS. PLEASE CONTACT THE INSTALLER IF THIS OCCURS.

Once the password parameters have been entered, press **Ⓟ** to move to the next menu item.

5.3.2. Set APB Mode

This sub-menu item allows you to activate anti-passback mode and set the associated parameters.

This sub-menu item is automatically selected when the final parameter of 'Config' has been entered and **Ⓟ** is pressed.

To reach this sub-menu item from the operational display, press **Ⓟ** once and then press **⓪** repeatedly until the 'Installer' screen is displayed, press **Ⓜ** once to enter the sub-menu, and press **⓪** repeatedly until the following screen is displayed:

```
Set APB Mode
```

Press **Ⓜ** and carry out the following procedure:

Display

Action

```
Set APB Mode
APB no
```

Use the **⓪** key to toggle between "yes" and "no", then press **Ⓜ**. If you change the state, the unit will take a moment to initialise all cards to that state. Also if you select 'no', the unit will skip to the next menu option. If you select 'yes' then it will continue as follows:

```
Set APB Mode
APB Hour0: 25
```

You may then enter an hour in the 24-hour clock (0 to 23). At this hour every day the Anti-passback will reset, allowing all valid cards to operate on both readers.

'0' = midnight, any number above 23 will disable this 'APB Hour'.

On pressing **Ⓜ** you then have a further three 'APB Hours' (1 to 3), which you can set in the same way.

Note: When APB is active, anti-passback initialisation takes place when the controller is powered up. This process may take several seconds to complete depending upon the number of cards in the memory.

Pressing **Ⓜ** after the last APB hour will take you to the next menu item.

5.3.3. Date & Time

This menu item allows you to adjust the time and date in the controller’s real time clock.

This menu item is automatically selected when the final parameter of ‘APB Mode’ has been entered.

To reach this menu item from the operational display, press **(P)** once and then press **(O)** repeatedly until the ‘Installer’ screen is displayed, press **(E)** once to enter the sub-menu, and press **(O)** repeatedly until the following screen is displayed:

Date/time

Press **(E)** and carry out the following procedure:

Display	Action
Date/time Year: xx	Enter the year as two digits and press (E) .
Date/time Month: xx	Enter the month in two-digit format and press (E) .
Date/time Date: xx	Enter the day of the month as two digits and press (E) .
Date/time Day: x	Enter a number corresponding to the day of the week, where 1 = Monday, 2 = Tuesday, etc.
Date/time Hour: xx	Enter the current hour as two digits and press (E) .
Date/time Min: xx	Enter the current minute as two digits and press (E) .
Date/time Sec: xx	Enter the current second as two digits and press (E) .

On completion of these parameters, the unit will move to the ‘Timezones’ menu item.

5.3.4. Time Zones

This menu item is used for setting up Time Zones where they are required (refer to section 4.2.2.5). Use these in conjunction with ‘Access Levels’ (see section 5.3.5).

To reach this menu item from the operational display, press **(P)** once and then press **(O)** repeatedly until the ‘Installer’ screen is displayed, press **(E)** once to enter the sub-menu, and press **(O)** repeatedly

until the following screen is displayed:

```
Timezones
```

Press **⏎** and carry out the following procedure:

Display
Action

```
Timezones
Timezone:?
```

Enter a number between 2 and 16 to select the Time Zone that you wish to configure and press **⏎**.

```
Timezone nn
FHour: xx
```

Enter a number for the 'From Hour' of the chosen Time Zone and press **⏎**.

```
Timezone nn
FMin: xx
```

Enter a number for the 'From Minutes' of the chosen Time Zone and press **⏎**.

```
Timezone nn
THour: xx
```

Enter a number for the 'To Hour' of the chosen Time Zone and press **⏎**.

```
Timezone nn
TMin: xx
```

Enter a number for the 'To Minutes' of the chosen Time Zone and press **⏎**.

```
Timezone nn
Mon: NO
```

Use the **⏏** key to toggle between "YES" and "NO", then press **⏎**. When set to 'YES', the active period set above will be active on that day of the week (Monday in this case). Repeat this sequence for each day of the week.

```
Timezones
Timezone:?
```

You can now select a new Time Zone to edit or press **Ⓟ** once to move on to the next menu item.

5.3.5. Access Levels

This menu item is used for setting up Access Levels where they are required (refer to section 4.2.2.5). Use these in conjunction with 'Time Zones' (see section 5.3.4).

This menu item is selected when **Ⓟ** is pressed in 'Time Zones'.

To reach this menu item from the operational display, press **Ⓟ** once and then press **⏏** repeatedly until the 'Installer' screen is displayed, press **⏎** once to enter the sub-menu, and press **⏏** repeatedly until the following screen is displayed:

```
Access Levels
```

Press **⏏** and carry out the following procedure:

Display	Action
<pre>Access Levels Level:?</pre>	Enter a number between 0 and 15 to select the Access Level that you wish to configure and press ⏏ .
<pre>Acc Level: nn Rdr1: TZ1: NO</pre>	Use the ⏏ key to toggle between "YES" and "NO", then press ⏏ . When set to 'YES', Time Zone 1 will be active for access level 'nn' .
<pre>Acc Level: nn Rdr1: TZ2: NO</pre>	Repeat the sequence for each Time Zone for reader 1. After the last Time Zone (Time Zone 16) the display will change to show Time Zones for reader 2
<pre>Acc Level: nn Rdr2: TZ1: NO</pre>	Follow the same procedure as for reader 1 to set the Time Zones for reader 2.
<pre>Access Levels Level:?</pre>	Once the access level has been programmed, the next access level can be chosen and the above sequence repeated.

To escape from this menu, press **⏏** once.

5.3.6. Door Open Time Zones

This menu item allows you to add parameters for the programmable Door Open Time Zones (1 to 16). Each Time Zone will determine a period during which a door will be unlocked (strike relay kept operated). A single Time Zone cannot span midnight (e.g. from 22:00 to 02:00). For Door Open Time Zones to function on a door, the corresponding Door Mode in the 'Config' settings must be set to '2' (see section 5.3.1).

This menu item is selected when **⏏** is pressed in 'Access Levels'.

To reach this menu item from the operational display, press **⏏** once and then press **⏏** repeatedly until the 'Installer' screen is displayed, press **⏏** once to enter the sub-menu, and press **⏏** repeatedly until the following screen is displayed:

```
Door Open TZ
```

Press **⏏** and carry out the following procedure:

To edit a time zone, enter a number between 1 and 16 to select the required Time Zone and proceed as follows:

Display	Action
Timezones Timezone:?	Enter a number between 2 and 16 to select the Time Zone that you wish to configure and press ⊲ .
Timezone 1 FHour: xx	Enter a number for the 'From Hour' of the chosen Time Zone and press ⊲ .
Timezone 1 FMin: xx	Enter a number for the 'From Minutes' of the chosen Time Zone and press ⊲ .
Timezone 1 THour: xx	Enter a number for the 'To Hour' of the chosen Time Zone and press ⊲ .
Timezone 1 TMin: xx	Enter a number for the 'To Minutes' of the chosen Time Zone and press ⊲ .
Timezone 1 Mon: NO	Use the ⓪ key to toggle between "YES" and "NO", then press ⊲ . When set to 'YES', the active period set above will be active on that day of the week (Monday in this case). Repeat this sequence for each day of the week.
Timezone 1 RDR1 no	Use the ⓪ key to toggle between "yes" and "no", then press ⊲ . When set to 'yes', this Time Zone will apply to Reader 1.
Timezone 1 RDR2 no	Use the ⓪ key to toggle between "yes" and "no", then press ⊲ . When set to 'yes', this Time Zone will apply to Reader 2.
Timezones Timezone:?	You can now select a new Time Zone to edit or press Ⓟ to move on to the next menu item.

5.3.7. Card Format

This menu item is used to set the format of the card data that will be read to the controller so that it can identify the card number for validation. Please refer to Appendix B for help on identifying the required data.

This sub-menu item is automatically selected when **Ⓟ** is pressed to leave 'Door Open TZ'.

To reach this sub-menu item from the operational display, press **Ⓟ** once and then press **⓪** repeatedly until the 'Installer' screen is displayed, press **⊲** once to enter the sub-menu, and press **⓪** repeatedly until the following screen is displayed:

Card Format

Press **↵** and carry out the following procedure:

Display

Action

Card Format
Mag

The controller supports:
 Mag - Clock & Data (ISO/ABA Track 2)
 Wiegand - Wiegand format
 Use the **⓪** key to select the required format and then press **↵**. The next set of parameters depend on the chosen format.

5.3.7.1. Clock & Data Format

For an example of the values to enter for an ISO card number format, see Appendix B.

Display

Action

Card Format
Digits: xx

Enter the number of digits that you want to read from the card and press **↵**.

Card Format
M. SDigs: xx

Enter the number of digits used as the site code and press **↵**.
 For random cards, set this to '0' (site code not used).

Card Format
M. SLoc: xx

Enter the location of the first digit of the site code within the card data (counting from 0) and press **↵**. Not required for random cards (set to '0').

Card Format
Card Len: xx

Enter the number of digits used to represent the card number and press **↵**.

Card Format
Card Loc: xx

Enter the location of the first digit of the card number within the card data (counting from 0) and press **↵**.

Card Format
Site: xx

Enter the site code to be used for this installation and press **↵**.
 Not required for random cards (set to '0').

5.3.7.2. Wiegand Format

For an example of the values to enter for a Wiegand format, see Appendix B.

Display	Action
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Card Format W. Bits: xx </div>	Enter the total number of Wiegand bits and press \leftarrow .
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Card Format W. Even: xx </div>	Enter the number of even parity bits and press \leftarrow .
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Card Format W. Odd: xx </div>	Enter the number of odd parity bits and press \leftarrow .
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Card Format W. SBits: xx </div>	Enter the number of bits used as the site code and press \leftarrow . For random cards, set this to '0' (site code not used).
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Card Format W. SLoc: xx </div>	Enter the location of the first bit of the site code within the bit string (counting from 0) and press \leftarrow . Not required for random cards (set to '0').
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Card Format W. CBits: xx </div>	Enter the number of bits used to represent the card number and press \leftarrow .
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Card Format W. CLoc: xx </div>	Enter the location of the first bit of the card number within the bit string (counting from 0) and press \leftarrow .
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Card Format Site: xx </div>	Enter the site code to be used for this installation and press \leftarrow . Not required for random cards (set to '0').

Upon completion of the setting of these parameters, the unit will display the next sub-menu item

5.3.8. Card Test

This menu item is used to read the card data format to ensure that it is compatible with the unit's settings and to test cards to verify the data format on them. Please refer to Appendix B for help on interpreting this data.

This menu item is automatically selected when the final parameter of 'Card Format' has been entered.

To reach this menu item from the operational display, press \textcircled{P} once and then press $\textcircled{0}$ repeatedly until the 'Installer' screen is displayed, press \leftarrow once to enter the sub-menu, and press $\textcircled{0}$ repeatedly until the following screen is displayed:

Card Test

Press \odot to enter the item. When the '>' symbol appears on the bottom line, present the card to reader 1.

Where the card data is in Mag format and the 'Card Format' setting is 'Mag', the top line will display an 'M' followed the number of digits on the card, and the second line will display the card number.

Example:

M10
0012340001

This indicates a 10-digit Mag number with a value of 0012340001.

Where the card data is in Wiegand format and the 'Card Format' setting is 'Wiegand', the bottom line will display the number of bits followed by the card number in hexadecimal format.

Example:

Card Test
26 000A0006

This represents a 26-bit Wiegand number with card data 000A0006. (655366 random card number or site code 10, card number 6)

Further cards can be presented to reader 1 – the display will change accordingly. Press \odot to leave this menu item.

Notes:

1. If you are investigating an unknown card, you may get either an unusual reading or no result. Where this happens, swap the Wiegand/Mag setting in 'Card Format' and test it again.
2. The card data value shown for Wiegand cards has odd and even parity check bits removed. Use a scientific calculator (available on MS windows) to convert from Hex to binary and refer to Appendix B. in order to identify the card number and site code, if applicable.

5.3.9. VMS Settings

Use this menu item to select and configure the signs that the controller will be driving. There are several sign options available:

VMS-001 (RS485) - Standard, single-colour Nortech VMS, controlled via RS485.

VMS-RGB (RS485) - Nortech full colour VMS sign with several display options, controlled via RS485.

VMS-S0x (RS485) - Legacy high-intensity VMS, controlled via RS485.

VMS-005 (Relay) - Displays OPEN or SPACE for count values above zero. Relay operation.

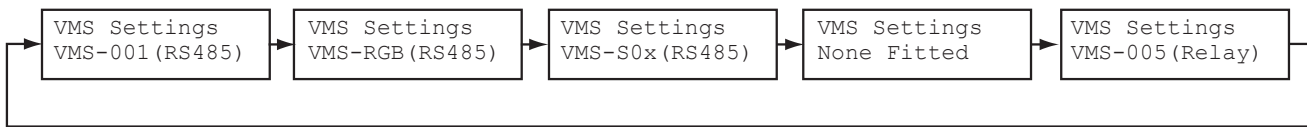
This menu item is automatically selected when \odot is pressed in the Card Test menu item.

To reach this menu item from the operational display, press \odot once and then press \odot repeatedly until the 'Installer' screen is displayed, press \odot once to enter the sub-menu, and press \odot repeatedly until the following screen is displayed:

VMS Settings

Press \odot and carry out the following procedure:

The currently selected VMS option is displayed. Use ⓪ to cycle through the options:



Once the required option is displayed, press Ⓜ once to save the selection.

If you selected 'None Fitted' or 'VMS-005 (Relay)', go straight to Section 5.3.10.

The procedures for configuring the VMS settings for each type of VMS are described below:

5.3.9.1. VMS-001

If you selected VMS-001 (RS485), carry out the following step:

Display

Action

```
VMS Settings
Set Brightness
```

This allows you to set the brightness of the LED display. Press Ⓜ to set the brightness of a node or press Ⓟ to skip this item.

```
Set Brightness
Node (0-3):
```

Choose which node you wish to set the brightness of. Enter the node number followed by Ⓜ.

```
Set Brightness
Level (1-4):
```

Select a brightness level from 1 to 4 where 1 is minimum and 4 is maximum brightness. Enter a number between 1 and 4 followed by Ⓜ.

```
VMS Settings
Show Spaces
```

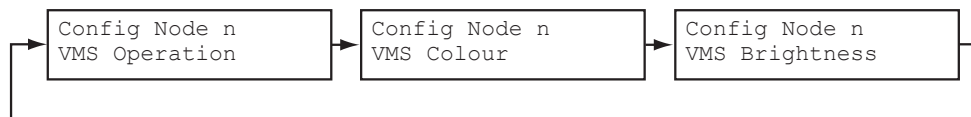
The VMS can display either the number of spaces available for the Count Group or the count value (i.e. the number of users currently within the facility). Use ⓪ to toggle between the options and press Ⓜ once to save the selection. The next menu item will be displayed.

5.3.9.2. VMS-RGB

If you selected VMS-RGB (RS485), carry out the following step:

Display	Action
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> VMS Settings Set Node </div>	To be able to communicate with the VMSs, each VMS must be assigned a node address between 0 and 3 that corresponds with count groups 1 to 4. Count Group 1 value is displayed on VMS node 0, Count Group 2 value is displayed on VMS node 1, etc. Press ⏎ if you wish to assign node addresses to the signs or press ⏏ to skip this item.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Fit 1 VMS only! Node (0-3): </div>	To be able to assign a node to a VMS, connect only that VMS to the controller, enter the required node number and press ⏎ . Repeat this procedure for each sign. Once all signs have been assigned addresses, they can be connected to the controller in a daisy chain as explained in Appendix C.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> VMS Settings Config Node </div>	The VMS-RGB can be configured for several types of operation, several LED colours and several brightness modes. Press ⏎ to carry out the configuration of a node or press ⏏ to skip this item.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Config Node Node (0-3): </div>	Choose which node you wish to configure. Enter the node number followed by ⏎ .

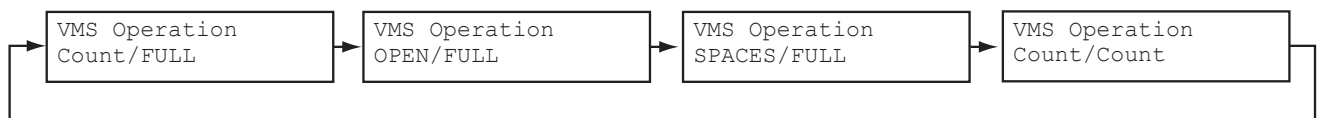
The following configuration options are now available. Use **⏏** to cycle through the options:



Press **⏎** to select the displayed option.

VMS Operation

Use this to set which information will be displayed for positive and negative count values. When VMS Operation is selected, the following options are available. Use **⏏** to cycle through the options:



Where the two values shown represent the display for 'count value = 1 or more' / 'count value = less than 1'.

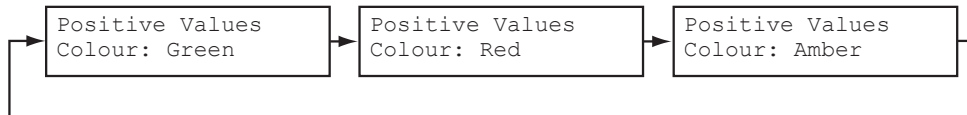
'Count' is the actual count value.

Press **⏎** to select the displayed option. You can now use **⏏** to cycle through the VMS Config Node options if you wish to select another setting to change, or press **⏏** to move to the next menu item.

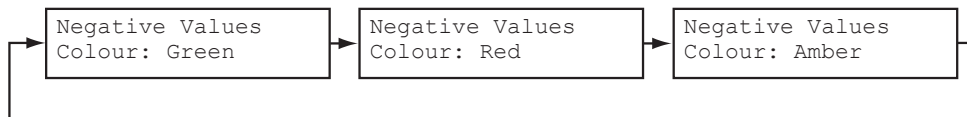
VMS Colour

Use this to set the display colour for positive (1 or more) and negative (less than 1) values.

When VMS Colour is selected, the following positive value options are available. Use ⏪ to cycle through the options:



Press ⏩ to select the displayed option. The display changes to display the following negative value options. Use ⏪ to cycle through the options:

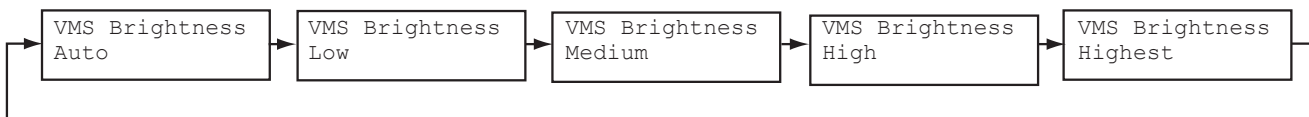


Press ⏩ to select the displayed option. You can now use ⏪ to cycle through the VMS Config Node options if you wish to select another setting to change, or press ⏭ to move to the next menu item.

VMS Brightness

This option allows you set the correct display brightness for your application. If set to 'Auto', the display brightness will be automatically adjusted to suit the ambient light level measured at the built-in light sensor. If you choose a fixed brightness level, the sign will continue to display at that brightness regardless of the level of ambient light.

When VMS Brightness is selected, the following options are available. Use ⏪ to cycle through the options:



Press ⏩ to select the displayed option. You can now use ⏪ to cycle through the VMS Config Node options if you wish to select another setting to change, or press ⏭ to move to the next menu item.

VMS Settings
 Show Spaces

The VMS can display either the number of spaces available for the Count Group or the count value (i.e. the number of users currently within the facility). Use ⏪ to toggle between the options and press ⏩ once to save the selection. The next menu item will be displayed.

5.3.9.3. VMS-S0x

If you selected VMS-S0x (RS485), carry out the following steps:

Display

Action

```
VMS Settings
Set Node
```

To be able to communicate with the VMSs, each VMS must be assigned a node address between 0 and 3 that corresponds with count groups 1 to 4. Count Group 1 value is displayed on VMS node 0, Count Group 2 value is displayed on VMS node 1, etc. Press **⏎** if you wish to assign node addresses to the signs or press **Ⓟ** to skip this item.

```
Fit 1 VMS only!
Node (0-3):
```

To be able to assign a node to a VMS, connect only that VMS to the controller, enter the required node number and press **⏎**.

Repeat this procedure for each sign. Once all signs have been assigned addresses, they can be connected to the controller in a daisy chain as explained in Appendix D.

```
VMS Settings
Show Full? Y
```

The VMS-RGB can be configured to either display negative values (less than 1) as well as positive values, or to represent all negative values with the word 'FULL'. Use **⓪** to toggle between 'Y' and 'N' and then press **⏎** to set the selected value. This applies to all signs connected to the controller. Press **Ⓟ** if you wish to skip this item.

```
VMS Settings
Show Spaces
```

The VMS can display either the number of spaces available for the Count Group or the count value (i.e. the number of users currently within the facility). Use **⓪** to toggle between the options and press **⏎** once to save the selection. The next menu item will be displayed.

5.3.10. Count Method

Use this menu item to select the way that the vehicles will be counted. You can simply use the detection of valid cards at the readers to increment and decrement the group counts. This assumes that a vehicle will pass through the barrier every time that access is granted. For a more accurate method of counting, the controller can start a timer when it grants access and monitor a vehicle detector located on the opposite site of the barrier to the reader. An input from the detector within the timer period will then be used to adjust the count, ensuring that the vehicle did pass through the barrier.

This menu item is automatically selected when VMS Settings have been completed.

To reach this menu item from the operational display, press **Ⓟ** once and then press **⓪** repeatedly until the 'Installer' screen is displayed, press **⏎** once to enter the sub-menu, and press **⓪** repeatedly until the following screen is displayed:

```
Count Method
```

Press **⏎** and carry out the following procedure:

Display

```
Count Method
Count On: Reader
```

Action

Use **⊖** to toggle between 'Reader' and 'Input' and then press **⊕**.
If you choose 'Reader' then there is nothing more to add. The next menu item will be displayed. If you choose 'Input' then the following screen is displayed:

```
Input Timeout
Secs: SS
```

This is the length of time after access is granted when the controller monitors the associated input for a signal. It can be set to between 1 and 30 seconds. Enter the value and press **⊕**. The next menu item will be displayed.

5.3.11. Set Reset Time

Use this menu item to set a time of day when the counters will be automatically set to zero. This menu item is automatically selected when the Count Method settings have been completed.

To reach this menu item from the operational display, press **Ⓟ** once and then press **⊖** repeatedly until the 'Installer' screen is displayed, press **⊕** once to enter the sub-menu, and press **⊖** repeatedly until the following screen is displayed:

```
Set Reset Time
```

Press **⊕** and carry out the following procedure:

Display

```
Set Reset Time
Hour: 24
```

Action

To set a reset hour enter an hour in the 24-hour clock (0 to 23). '0' = midnight, any number above 23 will disable the automatic reset. Enter the value and press **⊕**.

```
Set Reset Time
Min: 00
```

To set reset minutes, enter a value between 00 and 59. Enter the value and press **⊕**. The next menu item will be displayed.

5.3.12. Clear Events

This menu item is for support staff only and should be ignored by normal users.

To escape from this menu, press **Ⓟ**.

6. Technical Specifications

Electrical

Supply Voltage:	12 - 24V DC
Current Requirement:	100 mA quiescent, 230 mA while reading (both readers)
Reader Supply:	5V DC (100mA max.) or supply voltage

Physical

Display:	2 lines x 16 character LCD
Keypad:	12 button membrane. Keys 0 to 9 plus 'Program' and 'Enter'
Dimensions (mm):	190 x 130 x 43 (H x W x D)
Cable Termination:	Pluggable Screw terminal blocks

Environmental

Operating Temperature:	0°C to 40°C
Storage Temperature:	-20°C to 70°C
Relative Humidity:	95% non-condensing

Capacity

Card Numbers	Sequential Mode - 65,535 sequential card numbers Random Mode - 8,000 random card numbers
--------------	---

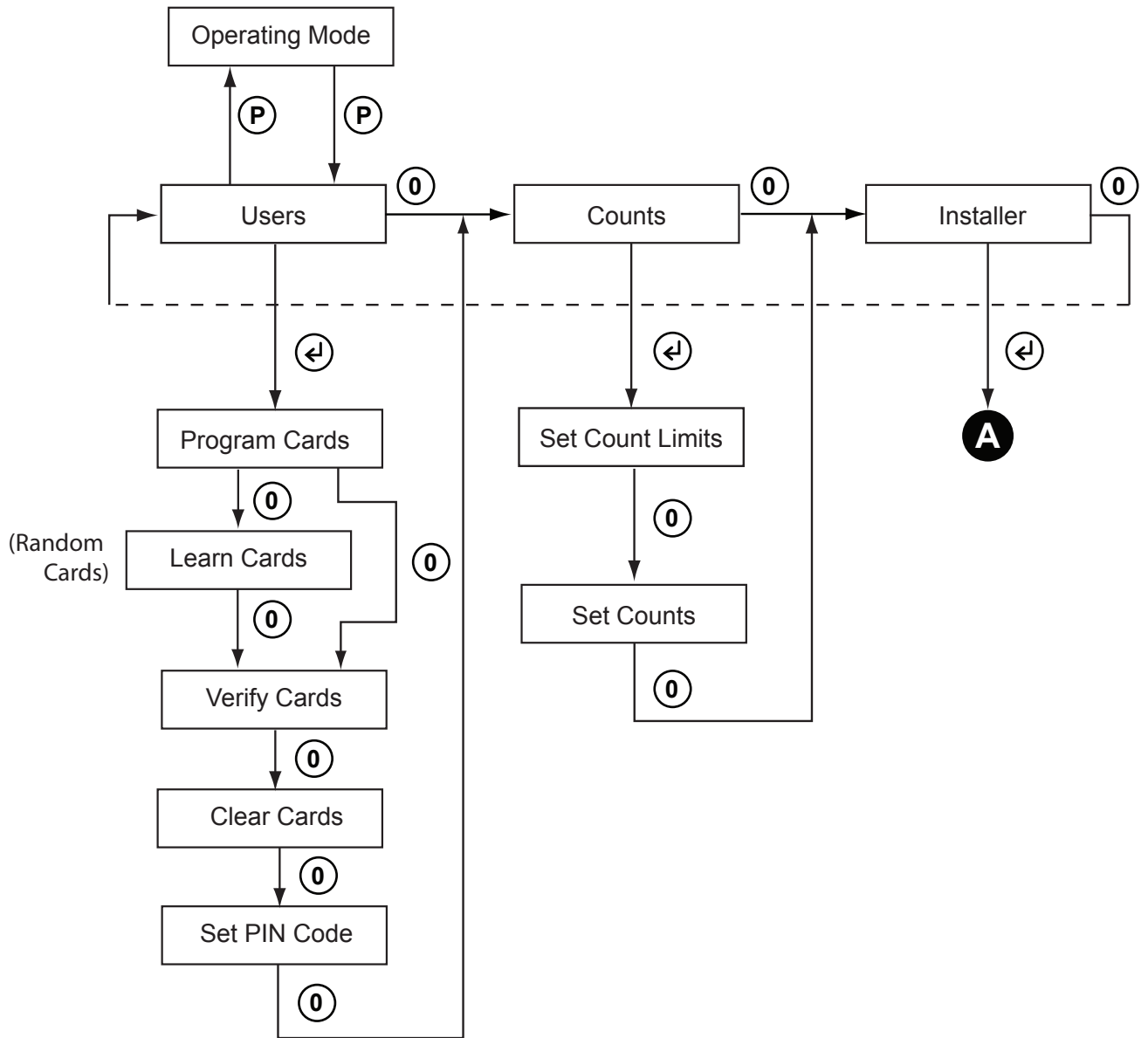
Inputs

Readers:	2 x 5-wire reader interfaces for Clock & Data (ABA Track 2) & Wiegand formats
Arming:	2 independent, ground activated inputs - open-circuit arming.
Count Inputs:	2 ground activated inputs
Count Reset:	Ground activated input

Outputs

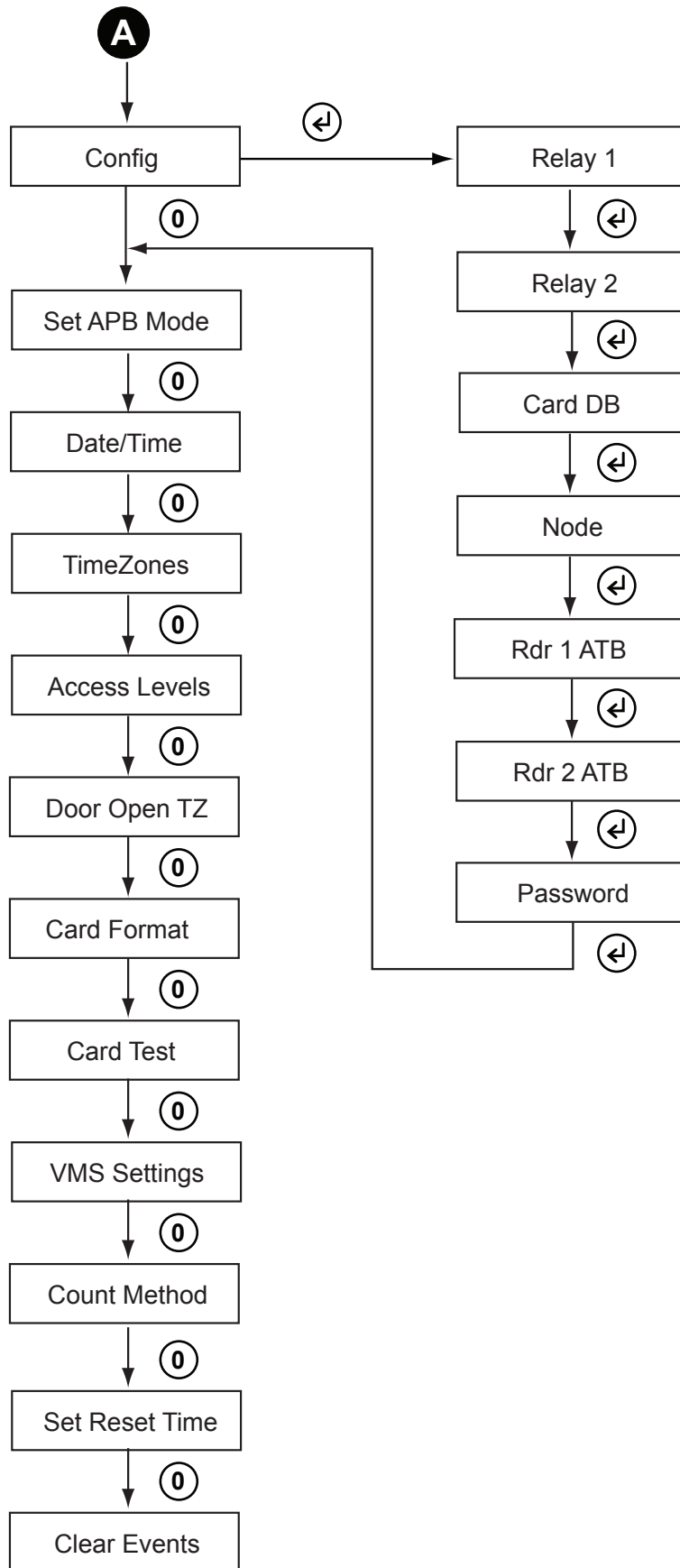
Latch Relays	2 independent latch relays with change-over contacts rated at 2A at 30V DC
Auxiliary Output:	1 independent open-collector output for card capture control.
FULL signals:	4 independent open-collector outputs used to control Space/Full signs or traffic signals
VMS Control Interface:	RS485 (up to 4 count values)

Appendix A - Menu Structures



Press **↵** to enter a menu item

Press **P** to escape a menu item or move up a level



Appendix B - Card Formats

Clock & Data (ISO/ABA Track 2)

This is an example of card format parameters for an ISO card to be entered in the 'Card Format' menu item. The card number is 0012340001 all digits of which need to be read. You wish to set the site code to 1234 and assign the last four digits as the card number as shown below.

	SITE CODE					CARD NUMBER				
Digit No.	0	1	2	3	4	5	6	7	8	9
Value	0	0	1	2	3	4	0	0	0	1

You would set it up as follows: -

Digits:	10	Card Len:	4
Site Len:	4	Card Loc:	6
Site Loc:	2	Site:	1234

Wiegand

This is an example of card format parameters for a card using standard 26-bit Wiegand format. The structures for other Wiegand formats can be more complex.

The information is displayed on the 'Card Test' screen in hexadecimal form. The conversion from an example hexadecimal reading of 103884 to a binary frame structure is shown below:

	1				0				3				8				8				4				
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
x	0	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	1	0	0	x
P	SITE CODE								CARD NUMBER																P
	16								14468																

Use a scientific calculator (available on MS Windows) to convert the most significant 8 binary digits to decimal for the site code, and the next 16 binary digits to decimal for the card number.

You would then set the Controller up as follows:-

Number of Bits:	26	Wiegand Site Loc:	1
Wiegand Even Bits:	13	Wiegand Card Bits:	16
Wiegand Odd Bits:	13	Wiegand Card Loc:	9
Wiegand Site Bits:	8	Site Code:	16 (binary = 00010000)

Alternatively, the card number can be treated as a 24-bit whole number (no site code) with a decimal value of 1063044. To support this format, the controller must be set to Random Card mode.

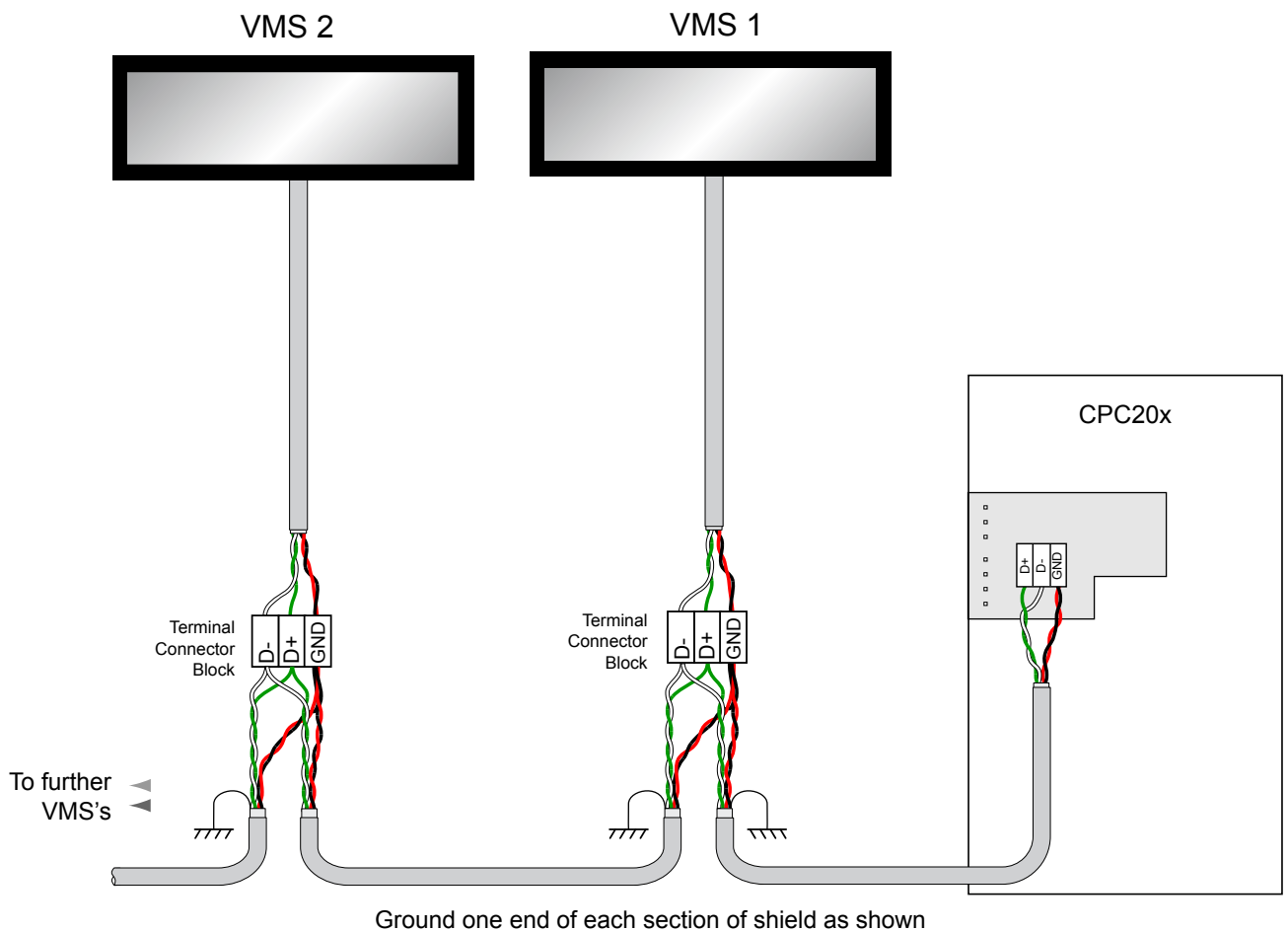
Set the Wiegand Site Bits to '0', Wiegand Site Loc to '0', Wiegand Card Bits to '24', Wiegand Card Loc to '1' and Site Code to '0' (not applicable).

Appendix C - VMS-RGB Configuration

Wiring Instructions

The VMS-RGB control output from the CPC20x is an RS485 control bus. All signs must be connected in a 'Daisy Chain' and terminated on the RS485 VMS connector block. As with all RS485 networks, the cabling must conform to RS485 standards to ensure that the communication is reliable.

Each sign is fitted with a 'pigtail' that needs to be connected via a terminal block to the RS485 bus. Connect the pigtail directly to the bus as shown below. Never connect an extension to the pigtail as this may affect the communication quality. Use only screened twisted pair cable for linking the VMS units together and to the CPC20x. The total length of the cabling must not exceed 1,200m. The screen of each length of cable must be connected to an earth point at one end only. Use a twisted pair for D+ and D-. It may be necessary to attach terminal resistors between D+ and D- at each end of the chain on longer cable runs.

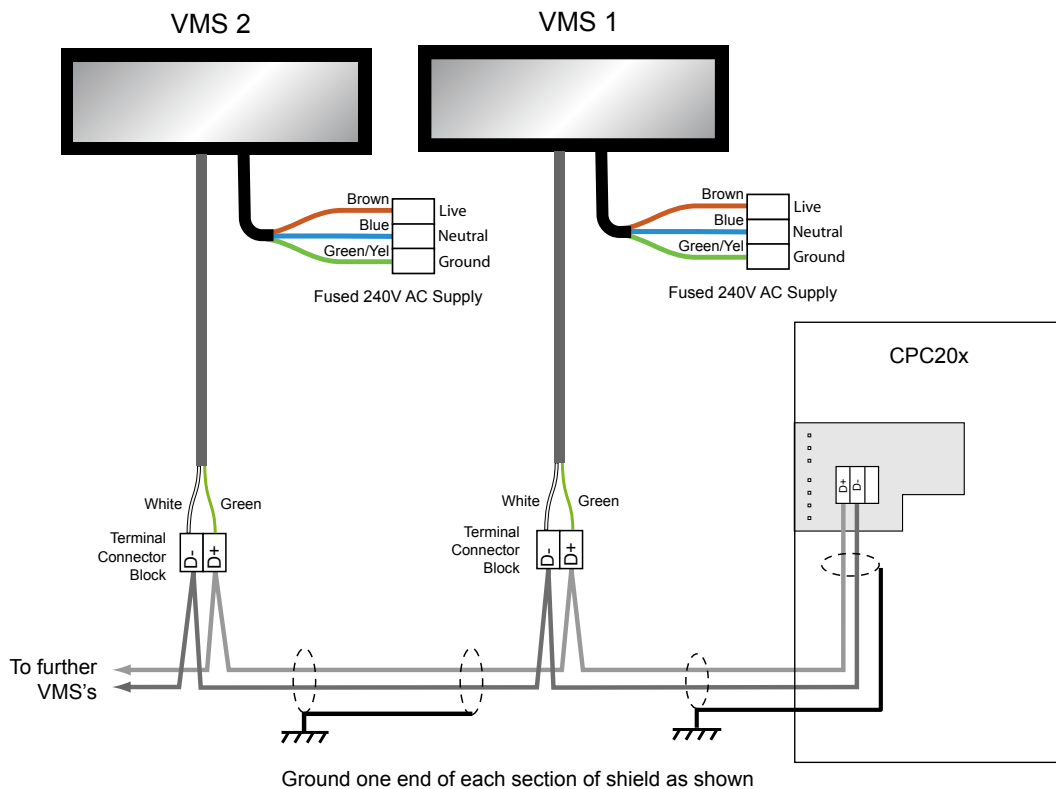


Appendix D - Scanlite Configuration

Wiring Instructions

The VMS-S0x control output from the CPC20x is an RS485 control bus. All signs must be connected in a 'Daisy Chain' and terminated on the RS485 VMS connector block. As with all RS485 networks, the cabling must conform to RS485 standards to ensure that the communication is reliable.

Each sign is fitted with a 'pigtail' that needs to be connected via a terminal block to the RS485 bus. Connect the pigtail directly to the bus as shown below. Never connect an extension to the pigtail as this may affect the communication quality. Use only screened twisted pair cable such as Belden 9729 for linking the VMS units together and to the CPC20x. The total length of the cabling must not exceed 1,200m. The screen of each length of cable must be connected to an earth point at one end only. Use a twisted pair for D+ and D-. It may be necessary to attach terminal resistors between D+ and D- at each end of the chain on longer cable runs.





Appendix E - Random Card Record Sheet

Index	Card No.	Date Issued	Card Holder	Count Group	Date Returned