

CR355 Card Reader Controller

Revision number - 02.17

CONTENTS

1	SCOPE	4
2	WARNINGS AND CAUTIONS	4
3	APPLICABLE DOCUMENTS	4
4	GENERAL SPECIFICATION	5
4.1	Features	5
4.2	Peripheral devices	5
4.3	Input / output capability	5
4.4	Cable type and length	6
4.5	Housing and dimensions	6
4.6	Environmental conditions	6
4.7	Power supply	6
5	GENERAL INFORMATION	7
5.1	Introduction	7
5.2	Controller	7
5.3	Configuration	12
5.4	Access control	12
5.5	Time and alarm functions	16
5.6	Input/output functions	18
6	PERIPHERALS	19
6.1	Card reader	19
6.2	PIN-Pads	25
6.3	Reader disable	26
6.4	LCD	26
6.5	Action complete	26
6.6	Egress (push button)	27
6.7	Latch	27
6.8	Booth / mantrap / interlock	28
6.9	Card capture bin	29
6.10	Terminal / TEST	30
6.11	Modems	31
7	TRANSPORT AND STORAGE	33
8	UNPACKING	33
9	INITIAL INSPECTION	33
10	ASSEMBLY	33
11	INSTALLATION	33
12	MOUNTING	33
13	CABLING	34
14	CONNECTIONS	35
15	JUMPER AND DIP SWITCHES	36
16	STARTING UP	36
17	PRE-START CHECKS	36
18	PROGRAMMING	36
18.1	Hand programmer	37
18.2	LAN programming	37
19	IN OPERATION	37
20	CLOSING DOWN	37
21	MAINTENANCE	37
21.1	User	37
21.2	Installer	38
21.3	Workshop	38
22	SOFTCON CR374 HAND HELD TERMINAL	39
22.1	Function keys	39
22.2	Menus	39
23	HAND HELD SET-UP / DEFAULT MEMORY	48
24	FW REVISION HISTORY (PCB B02)	51
25	PCB REVISION HISTORY	55
26	CARD READER CONTROLLER P.C. BOARD	55

27	CR355 INSTALLATION CHEKLIST	56
28	INSTALLATION CHECKLIST	59
29	REPAIR GUIDE	61
30	ABRIVIATIONS and TERMS	62

1 SCOPE

This help file contains all information on the Softcon product CR355 card reader controller (hereafter referred to as the CRC). The document contains the following:

- General product specifications.
- Detail technical specifications.
- Installation instructions.
- Operators manual.
- Parts lists.
- PCB versions.
- FirmWare (FW) versions.

In this document plug (connector) numbers are indicated as Px[y] where x=PCB versions>B633 and y=versions<B634.

2 WARNINGS AND CAUTIONS

The controller poses no hazard to the user of such equipment if installed correctly. The controller is powered by 110 or 220/240 VAC and should therefore always be kept locked with the transformer plate screwed into place. Both fuses on the board are rated at 2 amps and should never be exceeded. All supply voltages, environmental specifications, as well as general specifications should be considered when installing the controller.

In installations where the equipment effects control, potential hazards may occur, depending on the item being controlled. Correct system design and implementation should eliminate such hazards, e.g. installing detection loops under barrier arms.

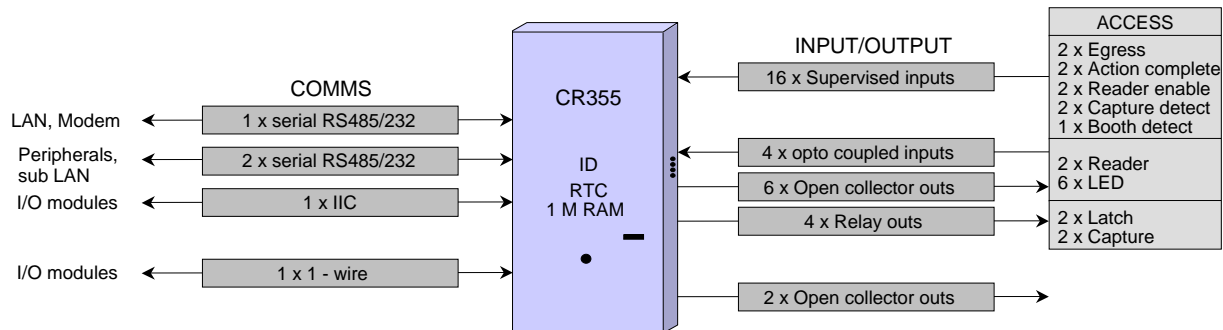
3 APPLICABLE DOCUMENTS

All information regarding the CR355 controller is included in this document. The PC SW manuals are available for information on the LAN systems.

This document is available on WWW.softconserv.com

4 GENERAL SPECIFICATION

An intelligent Access Controller of one or two entry points, via one or two Card Readers and/or Keypads (with Data/clock, Wiegand, Dallas Touch or serial interfaces) utilized in stand-alone mode or integrated into on-line PC based systems.



4.1 FEATURES

Multiple Card Technologies: Interfaces to Wiegand, Magnetic Stripe, Dallas Touch, Proximity, Infra Red, Serial (RS232 or RS485).

Remote Transmitters and barcode readers.

Multiple Time Zones for Access, Readers, Keypads, Door Monitoring and aux inputs.

Booth (mantrap) and interlock Logic, Card Capture and Audible Alarm.

Supervised auxiliary inputs, Auxiliary outputs.

Anti-Pass back, Anti-Time back (Pedestrians and vehicles).

6 500 to 65 000 local users.

10000 Unique PIN Codes (1 to 5 digits).

Programmable via Handheld Programmer, Terminal, PC (on-line system).

AC or DC Power Source.

950 or 2900 LAN transaction buffer.

4.2 PERIPHERAL DEVICES

Readers: Wiegand, Magnetic Stripe, Dallas Touch, Proximity, Infra-Red, Remote Transmitters and Bar-Code.

Keypads: Via CR374.

Terminal: For testing : VT100, ASCII, Main port RS232 full duplex, 19200 Baud, 1 Start, 1 Stop, no parity.

4.3 INPUT / OUTPUT CAPABILITY

2 Card readers: Data/clock, Wiegand, Dallas Touch or serial (RS232,RS485) interface. Non-serial is opto-coupled.

3 Status LED's.

2 Keypads (Via CR374).

2 LCD displays (Via CR374).

16 supervised inputs (short circuit, closed, open, open circuit), 5VDC maximum.

Special function inputs:

2 Action-complete

2 APB follow

APB reset

Booth occupied

2 Egress (push button)

2 Latch monitor

2 Reader disable

2 Tamper

Relay outputs (30 VDC / 250 VAC, 3 Amp potential free relays), 2 NO, 2 NC.

8 Open collector outputs (Darlington, 500 mA / 12 VDC). 6 used for reader LEDs if connected locally.

Special function outputs:

Booth/interlock busy

2 Buzzer

2 Capture

2 Latch

Serial communication: RS232 (TX, RX, RTS) or RS485 (Data, /Data, RTS, /RTS - transzorb protection).

2 Peripheral serial communication: RS232 (TX, RX) or RS485 (Data, /Data).

4.4 CABLE TYPE AND LENGTH

Reader to CR355: 8-core multi-strand Mylar, 0.2 mm, with screen. 50 m maximum.

CR374 to CR355: 2 pair twisted multi-strand Mylar, 0.2 mm, with screen. 2 000m max total length.

Terminal to CR355: 3-core multi-strand Mylar, 0.2 mm, with screen. 20 m maximum.

LAN cable: 2 pair twisted multi-strand Mylar, 0.2 mm, with screen. 2 000m max total length.

4.5 HOUSING AND DIMANSIONS

White powder-coated steel enclosure with lock.

255mm (H) x 300mm (W) x 115mm (D), or 315mm (H) x 300mm (W) x 90mm (D) with integrated UPS.

4.6 ENVIRONMENTAL CONDITIONS

Storage Temperature: -20 to 65 degrees C (-46 to 150 degrees F).

Operational Temperature: 0 to 40 degrees C.

Humidity: 80 % non-condensing.

4.7 POWER SUPPLY

110/220 VAC +/- 10% 35 Watt total power consumption.

Data setup parameters and clock are battery backed-up for 10 years (with power off).

12 VAC and 15 VDC (1.5 A - not regulated available for latches).

5 VDC (regulated) or 15 VDC (not regulated) at 500mA, available for readers.

Integrated UPS option with 7 AH battery, mains monitor.

5 GENERAL INFORMATION

5.1 INTRODUCTION

The card reader controller (CRC) is microprocessor-based equipment designed to execute control of one or two doors, barriers, turnstiles etc. Control of these doors could be via card readers (MAG, prox, touch, infra red, barcode or Wiegand), PIN-pads or push buttons (egress). The controller can be used as a stand-alone unit or in an "on-line" PC based LAN system.

The controller has 16 supervised inputs that can be used to monitor potential free contacts (in PC based option), or be set as special function access related inputs.

4 relay and 8 open collector outputs are configured as special function access related outputs or as auxiliary outputs controlled on time and/or by the PC.

The set-up is set and can be viewed with a hand programmer that is plugged in to the controller. In on-line systems, the PC can change the set-up.

An integrated UPS option of the CR355 is available.

The controller can be set to function in modes as described below. The **CR355** and **CR355A** mode differ only in time groups. **CR355** has 15 Access time groups, 15 input time groups, 15 output groups and a time group for each reader and PIN required and each door open time group. **CR355A** has 60 time groups (8 time zones per 15 groups) with selection of any time group for any of the functions – Access, reader, PIN, latch, input and output. Note that for CR355A, db2 is limited to 32000 cards. **PC translator type** is set as CR355 or CR355A respectively.

The controller can be set to function as a **CR351/2/4** controller (previous Softcon access controller), with dedicated special function inputs and outputs, 4 auxiliary inputs and 1 auxiliary output. CR372 and CR374 cannot be connected in this mode. The CR374 is used only as a hand programmer. One EPROM exists for CR351/2/3/4 (included CR355, CR355A), selection is via hand programmer and is stored in EEPROM.

By changing EPROMs on the controller, the CR355 can be used as a **vending controller** and a **cash loader**. The cash and vending modes only function on-line with the PC. In these modes, the CR374 is used as a display. One EPROM exists for Cash loader, another for Vending.

The **Cash loader** functions as follows: Reading card displays the holder's name and value. While the name is displayed, a note reader is enabled and notes read are added to the cardholder's value. **PC translator type** is set as Cash.

Two vend modes are selectable via hand programmer (stored in EEPROM):

Key vend requires a key (1 to 9) to be selected on the keypad. If not proceeded by a card read, the charge for the item is displayed. A card read displays the cardholders name and available funds and if a key is selected while the name is displayed – a vend request is sent to the PC. Should the cardholder have sufficient funds for the vend request, the latch is activated and the selected items value is deducted from the holders remaining value. **PC translator type** is set as Vender.

Access vend: On reading a card read, an access request is sent to the PC (reader 1 is key 1 and reader 2 is key 2) and if the cardholder has sufficient funds for the selection, the appropriate latch contact is activated. On action complete (or immediately if no action complete is set), vended is reported and the value for item 1 or 2 is deducted from the holders remaining value. **PC translator type** is set as Access vend.

Should it be required that the holders funds be displayed after the vend has been completed, an appropriate event can be set on the PC (see vending help file).

5.2 CONTROLLER

5.2.1 Design and construction

Materials. Housing is a white powder coated metal enclosure. PCB is 1.6mm fibreglass.

Radiation. Radiation falls within the EU and UL requirements and causes no detrimental effect to the surroundings (requires correct earthing). See protection.

Identification and markings. Each PCB has a recorded unique serial number in permanent ink and has a PCB version number in white paint – B63x, where B63 indicates CR355 and x is a version number (0 to 9 or A to Z).

Interchange ability. PCBs are interchangeable. EPROMs are changed for vending and cash-loader options and for certain serial peripherals.

5.2.2 Protection

Power supply protection is limited to a mains line filter (Varistor, inductor and capacitor network), with a transzorb on the secondary winding. The LAN lines are protected with transzorb. The reader data is opto-coupled. Additional protection must be provided externally where required.

Reader supplies (pin 1 and 4 on the reader connector) that are short-circuit result in the PCBs fuse blowing, opening MAG latches. PCBs before version 637 have no protection on reader supply and if required, links E3 and E4 must be replaced with 100 ohm, 0.5 W resistor – ONLY ON 12V (5V require 50 ohm 1W). PCBs version 637 or later have supply link with resistor on-board.

All reader inputs have serial 100 ohm protection resistors. MAG and Wiegand Reader inputs are protected via opto-couplers. Touch readers have no protection and require additional protections (see Softcon touch readers).

Inputs have no protection other than an RC network for noise (only while input selected to multiplexer. Noisy inputs (e.g. MAG lock sense) require serial 1k ohm on the ground connection and serial 2k2 ohm in the input.

5.2.3 Power supplies

The controller requires a “clean” power supply. Two version of CRC are manufactured, a 110VAC and a 220VAC version (transformers wired differently). The specification calls for 110 or 220 volt AC with a tolerance of plus minus 10%. In installations where the power supply fluctuates regularly or dips below 100 or 200 volts AC an external UPS should be installed.

Connecting the CRC to the same remote mains power supply as a motor and control operating a boom or a roller shutter door, could cause problems because of the excessive mains variations as the motor switched “on” and “off”. Mains UPS or DC UPS (nominally 12VDC to 20VDC) can be utilized. The CRC is available with an integrated UPS option.

A “clean power supply” is generally available in buildings for computers. The CRC should be connected to that supply.

Signal ground must be isolated from earth, i.e. no links between ground and earth (the housing is earthed). Supplying DC to a CRC via long cables should be avoided and additional capacitance is generally required at the CRC when supplying DC.

The CRC generates a supply for loads (latches) and is a maximum supply of 14,2 VDC or 13,5 VAC (true RMS) at 2A.

These voltages assume that the primary winding connections of the transformer matches the supply, i.e. 110V or 220V. The 14,2 VDC is not regulated and is the 13,5VAC that has been rectified and smoothed. External supplies should be used if the requirements exceed these values. The relay contacts are rated at 3A 30VDC and 3A 250VAC.

The external 110/220VAC supply is fed though a line filter (reducing noise from and to the mains supply) to the transformer installed in the CRC housing. UPS mains supply is mounted externally or contained in the housing (UPS option).

Installations requiring DC main supplies, or latch/reader supplies not generated by the CRC must be installed externally. External DC supplies could be mounted in a matching CRC housing. DC supplies must be mounted in close proximity to the CRC, alternatively, suitable cables and voltages must be used.

When using mains supply (110/220VAC), the supply is connected to the “kettle” socket on the enclosure, with earth tied to the centre terminal and live and neutral to the outer terminals. When using mains UPS, it is connected to the same terminals.

5.2.4 External battery backup unit

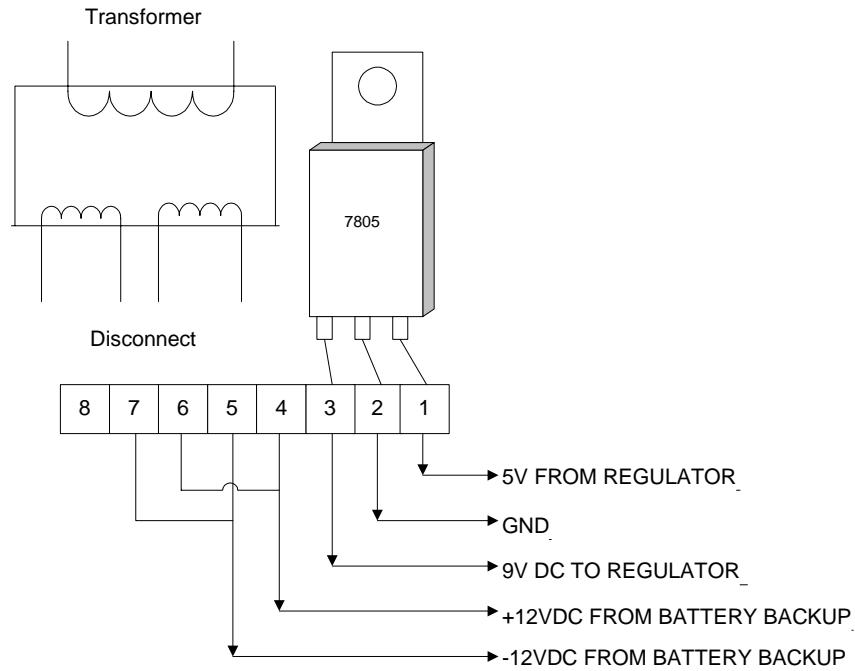
Disconnect live and neutral cables from the “mains” connector.

Disconnect the secondary from the transformer to the PCB (terminals 4, 5, 6 and 7).

Link terminals 4 and 6. Connect 12 volt + from battery backup unit to linked terminals 4 and 6.

Link terminals 5 and 7. Connect 12 volt - from battery backup unit to linked terminals 5 and 7.

Note that earth must remain connected via the mains connector or be connected to the earth terminal block provided in the housing.



5.2.5 Integrated UPS

A version of the CR355 controller has an integrated uninterruptible supply (UPS), with a 7 AH battery. This powers the CRC, readers and latches (only DC latches). The period that the CRC can be powered depends on the power consumption of the readers and latches and how often the latches are energized. The controller draws 800mA, proximity readers typically require 100mA each, and if the latch is not energized, the controller and readers can be sustained for 5 hours. Mains monitor relay on charger.

5.2.6 Communication

Communication with the controller via the serial port is RS232 (in terminal test mode, in modem applications or when in PC mode - connecting directly to PC COM) or RS485 (in LAN applications or when connected to HH programmer). Baud rate is generally 9600, one stop bit, 9 data bits (for LAN applications) or 8 bits (modem, PC or test), with no parity. Note that using the controller in 8 bit LAN mode requires the PC setting for comms type. On a LAN, all controllers must have the same baud and bit settings (that match that of the MUX card. The baud rate can be set via HH programmer in versions after 1.23, or in earlier version by editing the byte in EPROM at 0FFFFH as follows can change the baud rate:

19200 = FDH	9600 = FAH (default for LAN)	4800 = F4H
2400 = E8H (default for modem)	1200 = D0H	

In LAN applications, the communications is polled, with the Mux acting as the master and the controllers as slaves, i.e. the mux polls each controller for data. The data is sent in packages not exceeding 17 bytes, which includes address (matched to the address set in the NOVRAM with the hand programmer) the length byte and a checksum. Data not passing the checksum is re-sent. 3 consecutive failures result in the controller being set as off-line and a reconnect in communications is retried every 5 minutes. In modem applications, the PC dials the controller - presently the controller does not call the PC.

Communication with the readers is data/clock, Wiegand dual line, single line Dallas (touch) or serial RS232/RS485. Currently the serial baud rate is fixed at 2400 baud, no parity, 8 bits. Reader 1 serial automatically changes between reader/serial comms and HH programmer comms mode according to the HH link and front processor setting (is link in or front processor 0 or 1 is set to 1). If LAN type is set to HH, reader 1 comms defaults to serial reader. As serial readers are connected to the reader serial ports, front modules CR372 and CR374 cannot be used (hence no LCD or PIN). Should a serial reader 1 and the HH programmer be required at the same time, the HH must be moved to the main serial port. See jumpers below for serial HW options. Restart the controller after removing the HH.

By setting the Echo card number option, card entered events are sent as an ASCII sting to the serial R2 port at 2400 baud, 8 bit, no parity (TX on pin 8 of P2[10], GND pin 4 of P2[10]). The string format is fixed at 17 characters: "nnn r 1234567890" where nnn is the node address (1 to 250), followed by a space character, r is reader number 1 or 2, followed by a space character, followed by 10 characters are card number, most significant digit first (filled with zeros). The termination character is CR (0DH).

When requiring R1 serial to be RS485 (e.g. HH programmer), IC1 (RS485 driver) must be installed and IC7 (RS232 driver) must be removed – or pins 7 and 9 of IC7 must not be in the IC socket (IC7 installed for RS232 R2). For RS232, remove IC1 and links E6 and E7 and install IC 7.

When requiring R2 serial to be RS485, IC4 (RS485 driver) must be installed and IC7 (RS232 driver) must be removed – or pins 12 and 14 of IC7 must not be in the IC socket (IC7 installed for RS232 R1). For RS232, remove IC4 and links E8 and E9 and install IC 7.

5.2.7 Memory

On-board memory is fixed at 128k byte RAM and 64k byte EPROM. RAM allows for up to 64 000 card database (depending on database type) and a 950 or 2900 transaction buffer. Set-up parameters are kept in Electrically Erasable (EE) or Battery Backup (BB) memory and the card database is kept in BB. On power-up the BB memory is checked for a specific pattern and if incorrect the set-up is loaded with defaults, mostly from settings in EPROM as listed in the default set-up below (see HH set-up / default memory).

5.2.8 FW versions

The CRC program (referred to as FirmWare - FW) resides in the Erasable Programmable Read Only Memory (EPROM) device on the PCB at the location marked as ROM. The EPROM is marked with a sticker, indicating the type, version, checksum and date of programming as follows:

CR355
V1.09
EL
3456
00-03-31

The first line refers to the product CR355.

The second line indicates the version number. The version history is listed in the index below. The version is kept in the EPROM at address 0FFF0H.

The third line indicates the type of FW. Due to the size of the program, all types of FW cannot be kept in a single EPROM and are thus available in different type EPROMS. These letters are also kept in the EPROM at address 0FFF6H.

The 1st letter indicates the language used on LCD/terminal displays and on the printer. Options are:

E English, F French, D Dutch, S Spanish

The 2nd letter sets the communication protocol (if no letter, all options in the version):

L LAN, R Remote (dial-up via modem)

A possible 3rd letter indicates special functions:

V Vending, C Cash loader

The fourth line is the checksum of EPROM (a sum of all the data) and is always running HEX numbers.

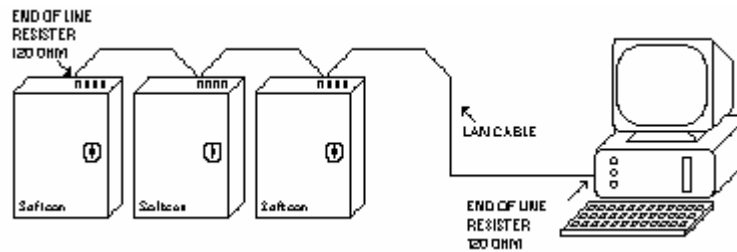
The fifth line is the date the EPROM was programmed, yy-mm-dd.

5.2.9 Reset

The controller has built-in power and time-out watchdog reset circuitry. When the 5V supply drops below 4.8V, the RAM closes to a battery backup state and the microprocessor resets. The time-out watchdog resets

the microprocessor if the SW does not perform the time-out clear every second – this reset occurs when the green tick LED flashes on the PCB. These functions are done automatically. A reset can be forced by powering up the controller or by short circuiting the reset pin on the PCB (masked as RESET, E14) until the PCB resets (green LED starts ticking).

5.2.10 LAN



When installing a LAN system, the software version in FW must be the LAN version (L) and the address of the PCB set in the NOVRAM must be set to the appropriate node address (see hand programmer below).

The running of the LAN cable must be such so as to avoid electrical interference. RS 485 Connections are:

Cable Colour	CRC	Mux D25
Yellow & Green	10	25
Red	11	10
Blue	12	1
		Connect 13 to 16

Each segment of the LAN must be earthed only at the controller furthest from the PC.

The ground of the CRCs are tied together to bring the potential to the same level. This is to prevent the transorb protection devices on the controllers (between signal and ground) from “firing” due to potential differences.

LAN cable stubs must be avoided, i.e. no T-joints must be made and the cable should be looped through each controller, i.e. only two ends to the cable. The two furthestmost ends of the cable must be terminated with the characteristic impedance of the cable, generally 120 ohm resistors between data and data not. Note that any unit can physically reside anywhere on the LAN, the PC mux does not need to be installed in the centre of the LAN or at the end.

5.2.11 Reader micro processors

ICs 2 and 4 are programmed uPs that interface to reader 1 and 2 respectively. The R1 uP controls outputs and the R2 uP monitors the supervised inputs. These uPs are marked with version numbers and could contain special versions for serial devices connected to the serial ports; typically special versions of the R2 uPs are required for cash loader and vending applications.

5.2.12 Durability and reliability

Ruggedization is limited to static use, i.e. not mobile. The mean time between failures is greater than 10 000 hours at 24 hour per day operation within the specified environmental and supply conditions.

5.2.13 Acceptance test procedure

During production, CRC is subjected to a variety of tests and checks. A built in test (BITE) EPROM is used to test all HW functions of PCB and once installed in housing, functional tests are performed.

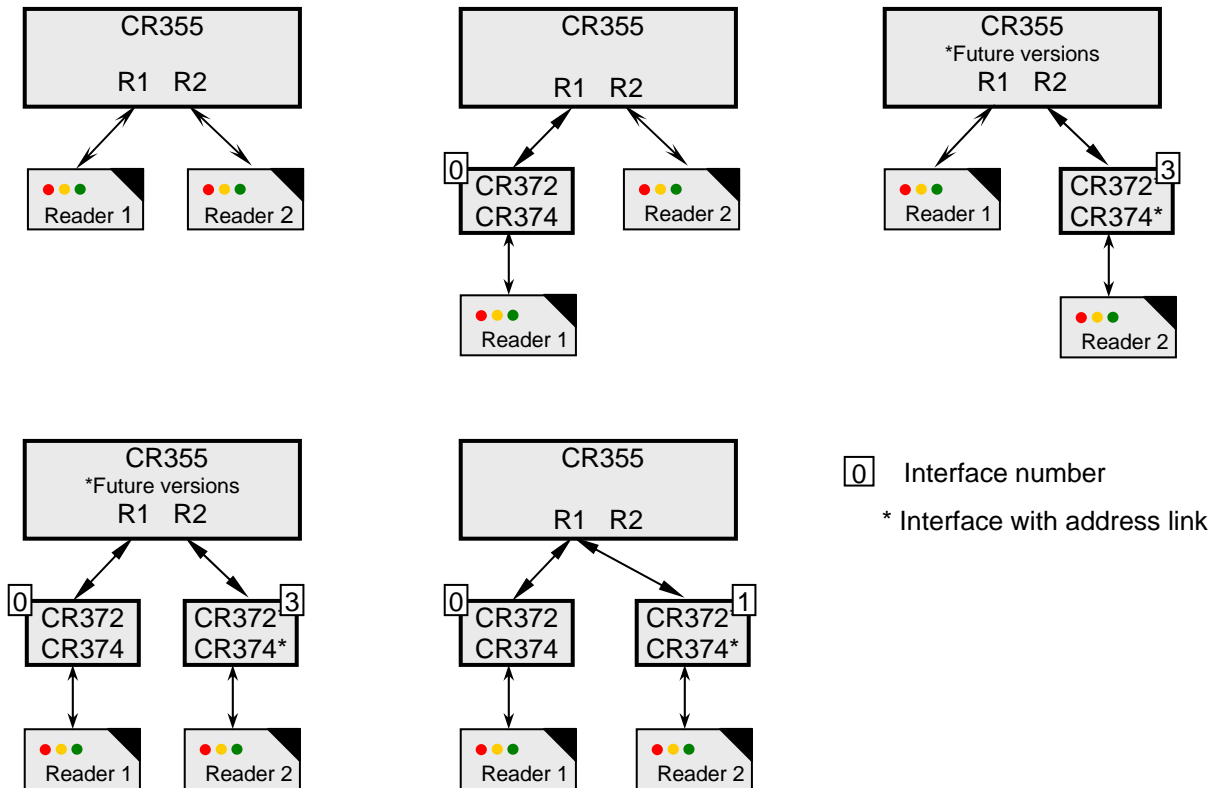
5.2.14 QA

All steps of production are monitored and logged to procedures recorded and monitored for ISO9002, ensuring accountability for each step of production and testing.

5.3 CONFIGURATION

The CRC is installed in as stand-alone unit or as part of a LAN system and is configured to control one door (with a reader in and reader out) or as a two door controller (reader in, free or egress exit). A bi-directional turnstile or booth (mantrap) is set as a two door controller.

Readers are connected directly to the PCB or via CR372 or CR372 front end modules connected to R1 serial port in RS485 mode.



2 * RS485 ControlSoft readers can be connected to R2, with the readers set with address 1 and 2. Card code type must be set to 22 and database type to 10.

5.4 ACCESS CONTROL

The general sequence of an access event is as follows:

Access is requested by swiping/presenting a card/tag at one of the readers or by entering a PIN code at one of the two PIN-pads. The PIN code is ended with a # or followed by the card.

Access is granted if the card is found in the database, enabled for the reader and the time group allocated to the card is active (see below).

When access is granted, the latch is opened for the set open latch time or until the door is opened (see action complete settings).

Access granted or denied is reported to the PC in on-line installations. If there is no communication with the PC, the transaction is stored in a 950 or 2900-event buffer. The message sent to the PC contains date (not in CR351 mode) hour, minute and second, card number and the event type:

Entered.

Out-of-area.

Out-of-time.

Captured.

Wrong PIN.

Duress.

Wrong format (checksum or number of bits error). Multi-errors only sent once, i.e. only sent if previous was not a format error.

Wrong facility (client or site code do not match).

If anti-pass back (APB) is set for the reader and the card is not set as a pass back card, the reader used becomes disabled for the card. If anti-time back (ATB) is set, the card is disabled for the reader for the set ATB period.

In on-line installations, the card may be en- or disabled by the PC in response to the card having moved at a reader (APB or "strictly from"), card expired, en-disabled by the PC operator or as a result of counters or events.

5.4.1 Database

The CRC uses a local battery backed up database of card holders which indicates if the card is enabled for each reader, the time group allocated to the card, if the card is a pass back card and a capture card. Database options available are listed below. When the dB type is changed, all data is lost.

In LAN systems, the PC updates the database and the local data is overwritten. No upload to the PC function is available. A batch load function is available for the hand programmer.

Type	Cards	PIN	Number	BCD	LAN	TG*	CR355A*
02	64000	No	No	No	2900	No	No
02	32000	No	No	No	2900	No	Yes
02	32000	No	No	No	2900	Yes	Yes
10	15000	No	Yes	Yes	950	Yes	Yes
10	10000	Yes	Yes	Yes	950	Yes	Yes
10	9000	No	Yes	Yes	2900	Yes	Yes
10	6500	Yes	Yes	Yes	2900	Yes	Yes

TG* indicates separate card access time groups per reader, e.g. reader 1 24 hours, reader 2 day only. CR355A* selection.

dB type 10 are 10 hex digit random cards.

Note that in vending and cash modes the type must be db 10.

5.4.2 Facility code

Cards that do not use random numbers have a section of the number that is fixed for the site and is referred to as the facility code. The remainder of the numbers run sequentially, generally starting at 1. The facility code is allocated and programmed in the card by the card manufacturer. Cards with a different facility code are read as an illegal card.

Depending on the card type, the facility code is equal to (client code * 256) + a site code. The site and client codes are set in the controller and if the card type does not use facility, both must be set to zero. Setting a client and site code of zero, ignores the facility section of the card number.

Setting a card type with odd number (one more than the normal setting), only uses facility code and ignores the card information.

The position of facility code and card number in the card data structure for card types is fixed. For ISO MAG cards or serial readers the position for facility and card number are configurable, but whereas facility code must be programmed at the set position, the programmed number could contain fewer digits (the controller stuffs in leading zeros).

5.4.3 APB

Anti-pass back is set per reader, and when a card gains access via an APB reader, the card is automatically disabled at that reader. A card set as pass back overrides APB, i.e. the card is not disabled.

The setting for APB are one of the following:

00 = Enable anti-passback ((1st digit = reader 1, 2nd digit = reader 2)

11 = Disable anti-passback (1st digit = reader 1, 2nd digit = reader 2)

22 = Logical anti-passback (aux input 3 enables for reader 1, aux input 4 for reader 2)

The logical option prevents a card holder from entering a car park with a vehicle, exiting on foot and re-entering with another vehicle. This is achieved by connecting metal loop detectors to the controller, with the APB effectively staying where the vehicle is. Note that if the reader disable option is used (when a vehicle is

present), this logical option need not be used (this is not possible when the card holder needs to exit the car park on foot using the card).

5.4.4 APB reset

If the APB reset option is set to 1 and the input that is set as APB reset input (CR355 mode, or input 11 for CR351) is pulled to ground (e.g. with a key switch), each card which is enabled for either reader, is enabled for both, i.e. the local database is changed when the input is pulled low.

If the option is set to 2, access is granted when the card is enabled for either reader while the LAN communication is off-line.

5.4.5 ATB

Anti-time back is used where APB cannot be used (no exit readers) and a value of 1 to 9 minutes is set. The last 20 cards per reader that gain access are counted out for ATB. Access will be denied at the reader until the time is counted out or the card uses the other reader of the controller. When the 21st card is used, the 1st card in the list is re-enabled. ATB is set per reader and readers can be set to clear a card from the other readers ATB list, i.e. a card entering through a reader is cleared from the other readers ATB time-out list.

5.4.6 Card type

The Softcon CRC can be set to use most card types available. The selections are tabled below. Note that the maximum characters that can be used for card numbers is 10 digits. Any type can be random cards (requires a random dB selection) or not. Type 14 effectively replaces type 12 and 16.

Serial Card types require certain R1 and R2 uP versions. Touch readers require specific link field settings and resistors (see links below) and must be db mode 10.

Setting a card type with odd number (one more than the normal setting), only uses facility code and ignores the card information.

Type	Card	Bits, chars	Client	Site
02	Wiegand	26,27,30,32,34,35,36,37,40, 44b	Yes	Yes
04	Wiegand	30b HID S, 32b old 1000, 34b Dutch, 36b Lenel, 44b Omnican	Yes	No
06	Wiegand	32b Aritech	Yes	No
08	Data/clock Softcon 11	9 or 24c, 32b P&G	Yes	Yes
10	Data/clock Softcon FE	9 or 24c	Yes	Yes
12	Data/clock ISO	6 or 7c	No	No
14	Data/clock ISO BCD	1 to 40c	Yes	Yes
16	Data/clock ISO	12c	Yes	Yes
18	Touch	12c	No	No
20	Wiegand	32b BCD,34b GSC	No	No
22	RS485 (ControlSoft)	32b serial	No	No
24	Wiegand	32b P&G	Yes	Yes

With the exception of 30, 32, 34, 36, 44 bit cards, any Wiegand selection (0,2,4,6,20) will detect the number of bits and decode accordingly. As there are 2 different 30 bit, 4 different 32 bit, 3 different 34 bit, 2 different 36 bit and 2 different 44 bit coding structures, the card type 2, 4, 6 or 20 must be set correctly for these cards. The Wiegand formats are:

- 44 bits: 8 bit client, 32 bit card, 4 bit parity. Impro.
- 44 bits: 8 bit client, 32 bit card, 4 bit parity. Omnican.
- 40 bits: 8 bit client, 8 site, 16 bit card, 4 bit issue (part of card), 4 bit checksum (ignored).
- 37 bits: 1 bit parity (ignored), 8 bit client, 27 bit card, 1 bit parity (ignored).
- 36 bits: 2 bit parity (ignored), 8 bit client, 4 bit site, 21 bit card, 1 bit parity (ignored).
Chubb/GuardAll Corporate 1000.
- 36 bits: Parity, 8 bit client, 8 bit site, 18 bit card, 1 bit parity. Lenel
- 35 bits: 2 bit parity, 8 bit client, 4 bit site, 20 bit card, 1 bit parity.
HID new Corporate 1000.
- 34 bits: Parity, 8 bit client, 4 bit site, 20 bit card, 1 bit parity. (Type 0,2,6).
- 34 bits: 0, 8 bit client, 19 bit card, 4 bit even parity, 11. (Type 4). Dutch.
- 34 bits: Parity, 32 bit card, 1 bit parity. (Type 20). GSC.
- 32 bits: Parity, 8 bit client, 4 bit site, 18 bit card, 1 bit parity. (Type 0 or 2).
- 32 bits: Parity, 8 bit client, 22 bit card, 1 bit parity. (Type 4).
Old HID Corporate 1000.
- 32 bits: Parity, 8 bit client, 5 bit site, 17 bit card, 1 bit parity. (Type 6). Aritech

32 bits: Parity, 2 bit client, 8 bit site, 20 bit card, 1 bit parity. (Type 24). P&G Mifare
32 bits: 32 bit BCD card. (Type 20). Must be dB 10.
30 bits: Parity, 8 bit client, 4 bit site, 16 bit card, 1 bit parity (parity half set in EPROM).
30 bits: Parity, 8 bit client, 4 bit site, 16 bit card, 1 bit parity (parities on whole card).
27 bits: 8 bit client, 16 bit card, 3 bit parity (ignored).
26 bits: Parity, 8 bit client, 16 bit card, 1 bit parity.

Parity / checksums ignored where calculation is unknown (can be added) and when LRC Parity check set >0.
New formats can be added on request.

For 30 bit cards (type 2), the bit location where the parity changes (generally at bit 15, i.e. bits 0 to 14 are even, 15 to 29 are odd) is set in EPROM at position 0FFFEH. Certain manufactures calculate the change from bit 14 or from 16. The byte at 0FFFEH can be changed to match the manufacturer accordingly. Setting the byte to 0, ignores parity, allowing the use of cards that differ on where parity is calculated. Note that data must be received in the correct order, i.e. the controller will not flip the data around if received the other way around (card swiped the other way). Not checking parity could allow misreads to pass as correct (only facility code must be correct, card number could be wrong).

Only dB mode 10 can be used for Wiegand BCD, Wiegand 44, Corporate 1000, Touch tags and where card numbers exceed 65,000.

Omiscan reader, 44 bit, type 4. In versions < 1.67 when PARITY_30 at 0FFFEH=0.

If hex 6x xx xx xx, add 04 6x xx xx xx

If hex 7x xx xx xx, add 30 7x xx xx xx

For serial readers (e.g. barcode readers) any of the Wiegand settings can be used when facility code is not used. When using facility code or card number at specific character locations, card type 14 must be used and the ISO start and end locations for facility and number are used (data start from position 2). Only numbers can be used on cards, no letters. See jumpers below for serial HW options.

2 * RS485 ControlSoft readers can be connected to R2, with the readers set with address 1 and 2. Card code type must be set to 22 and database type to 10. Install E8-E9 and IC3 (75176), remove IC 7 (MAX232).

Softcon MAG formats start with HEX 11 or FE, 8 bits client, 4 site, 20 bit card number, 8 bit x, 8 bit y, 8 bit card type, a, b, c, d, e. Bytes x and y only used in certain cards types (else ignored), For card type 2, a=2 byte sum, b to e do not exit. Other card types and use of x, y and a to e are proprietary to Softcon.

A time delay of approximately 100 msec is automatically started when data bits are received from a reader – and when timed-out, the data is processed. This mechanism allows for slow swiping of cards. Certain proximity reader can read multiple cards with typical delays of 25 msec between cards. To disable the time delay, the R1 and R2 uP firmware require changing of the byte at address 0FFFH to be equal to the number of bits received before processing. If the byte is set to 0 (default) or less bits are received, the time-out is set. Note that the value is in hex (26 bit=1AH, 30bit= 1EH).

5.4.7 Card offset

When using running number cards (with facility code, i.e. not random dB), the cards generally start at number 1. If cards start at a higher number, the offset can be set. For example if the cards start at 1001 and the offset is set to 1000, the card data is located at 1. Setting a negative number adds to the card number, e.g. with a setting of -10, sets card 50 to card 60. The controller does not use negative number as minus, to set negative deduct the number from 65536 (which is 0), thus -10 is set as 65526.

5.4.8 Card data location

ISO MAG cards can be programmed with the FACILITY CODE and card number at certain character positions on the card. Start and end positions are set, position 1 is reserved for the start character - the first start position for facility or card number is 2. Facility code can be before or after the card number.

The facility code must be programmed at the set position. The programmed card number could contain fewer digits (the controller stuffs in leading zeros).

Should an alternative card location be set (not 00 to 00), the facility code of the card is checked and if correct, the card number at the set card number location is used and if incorrect, the card number at the alternative location is sent to the PC as a special message. This option is used to pass non-staff cards to external linked systems.

5.4.9 LRC checksum

ISO MAG cards can be programmed with a Longitudinal Redundancy Checksum (LCR) which is an extra check byte at end of the card data. This minimizes misreads as being passed. For the CRC to check the LRC, the option must be set to 0. If the option is set to 1, the check is not done. LRC for cards with more than 20 characters must be set to off (cannot be calculated).

5.5 TIME AND ALARM FUNCTIONS

5.5.1 Time groups

For **non-CR355A** mode, 51 time groups kept by the controller and are as follows:

- Access control (15). One of the groups are allocated to each card and sets when access is granted (if the card is enabled).
- Reader must be used (2). A group per reader sets when the reader must be used to request access. If the time group is not active, the reader can be used optionally. When the group is active, the reader must be used.
- PIN must be used (2). A group per reader sets when the PIN-pad must be used to request access. If the time group is not active, the PIN can be used optionally. When the group is active, the PIN must be entered.

Note that if reader and PIN groups are active, both must be used (PIN followed by card), else a PIN error is reported.

- Door open (2). A group per latch sets when the door is automatically open (e.g. in the mornings from 7:00 to 8:00).
- Input time groups (15). Each of the action completes are set with any of the input groups, setting when the doors are monitored for illegally opened. When the inputs are used as input monitors, input time groups are set for when the inputs must be reported. Any of the input groups are selected for monitoring closed and for open (i.e. then the input is closed and when it opens).
- Output time groups (15). Each output is allocated a time group setting when the contact is closed automatically (level 1 on the PC). A time-group of 0 sets no control on time.

For **CR355A** mode, 60 time groups kept by the controller with 8 time groups per 15 groups and any group is selected for Access, Reader, PIN, Door open (Latch), input and output.

A time group is enabled for a time zone (row) with a 1 for the day of the week or Holiday as follows (the example group is active from 8:00 to 13:00 on holidays, 7:15 17:30 weekdays and Sundays and 24hrs on Saturdays):

Start	End	M	T	W	T	F	S	S	H
07:15	17:30	1	1	1	1	1	0	1	1
12:00	12:00	0	0	0	0	0	1	0	0
08:00	13:00	0	0	0	0	0	0	0	1
00:00	00:00	0	0	0	0	0	0	0	0
00:00	00:00	0	0	0	0	0	0	0	0
00:00	00:00	0	0	0	0	0	0	0	0
00:00	00:00	0	0	0	0	0	0	0	0

In **non-CR355A** mode, each of the 6 time group sets type as listed above, has its own set of 8 time zones consisting of a start and end time. When testing on whether a time group is active, the date is first checked against the 30 holidays set. If the day is a holiday, the holiday column is checked for all 1s and the day of week is ignored. The time group is active if the time is within (and including) any the start and end times set with a 1. If the day is not a holiday, the appropriate day of the week column is checked. Time zone of 00:00 to 00:00 are not checked and time zones with start and end times that are the same, are 24 hr zones (e.g. 12:00 to 12:00).

5.5.2 Holidays

Up to 30 holidays are set - date and month. Day of week setting for holidays are ignored by time groups, only the holiday settings are used.

5.5.3 Buzzer

An output can be configured (in CR351 mode relay 3) to control an external buzzer. This buzzer can be set to sound when the following is set:

0	Buzzer output disabled.
1	Buzz on alarm
2	Beep once for card accepted, twice for card rejected.
3	Option 1 and 2
4	Aux out for reader 2, as option 1.

The alarm conditions are card out of area (also ATB and APB errors), out of time, multiple illegal or door open too long or not opened. The buzzer sounds until the door error condition does not exist, i.e. the door is opened or closed legally.

The buzzer output can be switched on or off from the PC.

5.5.4 Door open too long

When action complete is used, the door can be monitored for being kept open too long. A setting of 1 to 99 seconds results in an alarm message being sent to the PC in on-line installation and the sounding of the buzzer if buzzer alarm is set. A zero setting for door open too long disables this function.

5.5.5 Latch time-out

The latch relay is activated closed (or opened if NC latch is set) when access is granted (via egress or successful card request), until the action complete is monitored as being opened (when using certain action complete settings), or until the latch time-out is reached. The time-out is set to 1 to 60 seconds. A time setting of 0 will result in the latch contact activated until the action complete is opened, i.e. no time-out. When the latch time is set to 1 second, the latch is energized for the set 250 msec multiplier (e.g. a setting of 5= 1.250 second).

5.5.6 Real time and date

The controller contains a battery backed-up real time clock and date. The battery lasts 10 years with the power to the controller switched off (no battery power is consumed while the power is switched on). Accuracy of the time is better than ± 1 minute per month. In PC based systems, the controller's time-date is synchronized with the PC clock every 60 minutes.

When reporting events to the LAN, date is not included with the time in the CR351 mode. The PC date is used for the event, unless the event time is more than 1 hour ahead of the PC time, then the previous date is used, i.e. a buffered message is assumed. The date is included by the controller in all other modes.

Monday is week day 1 and Sunday is day 7.

5.5.7 Multi-illegal attempts

A limit can be set on the number of illegal entry attempts at a reader as 1 to 9 attempts. When exceeded, an alarm condition is reported to the PC in PC based systems and the buzzer is sounded if the alarm option is set. The reader is also disabled if the option is set (see reader disable). An illegal attempts setting of zero, disables this option.

5.5.8 Multi-reads (delay before next card is read)

The delay between reading cards is defined by the EPROM value at address 0FFFDH. More than 1 is 250msec multiples. Data received within the delay is discarded. R1 and R2 micro-processors also have a delay latency – checking to see if more bits arrive from the reader. Byte at 0FFFH set fixed number of bits expected from the reader – resulting in no delay (typically 10msec), i.e. when the correct numbers of bits are received (typically 10msec), the data is sent to the main processor. Setting of 0 enables the delay latency (typically 25 msec). Thus setting EPROM 0FFFDH=0 and 0FFFH=xx (e.g. 1AH for 26 bit) in R1 and R2 uPs, the minimum delay between cards is 10msec (25msec if R1 and R2 0FFFH=0).

5.6 INPUT/OUTPUT FUNCTIONS

5.6.1 Inputs

In the CR351 mode, inputs are fixed and perform special functions, e.g. action complete. 4 aux inputs are available for monitoring contacts.

When the controller type is set to CR355, the input ports are configured. Each of the local 16, the front modules 1 and 2 (4 each) supervised inputs are set as **Aux inputs** (normal input) or as a special function input, linked to reader/door 1 or 2 (see default memory at end of document):

APB follow. The cards APB is only changed when this input is read as high (open).

APB reset. When the input is read as low, all cards that have access on either reader, are given access on both.

Action complete. Door monitor.

Boot occupied. In booth (mantrap) mode, a low input (closed contact) indicates that the booth is occupied.

Capture. When card capture is set, a low input (contact closed) indicates that a card has been entered in to the capture bin.

Egress. When the Egress or push button input is read as low, the door is opened.

Reader enable. The associated reader is enabled when the input is high (open) and the reader functions normally. When low, the reader is disabled and the red led indicates that data from the reader is ignored.

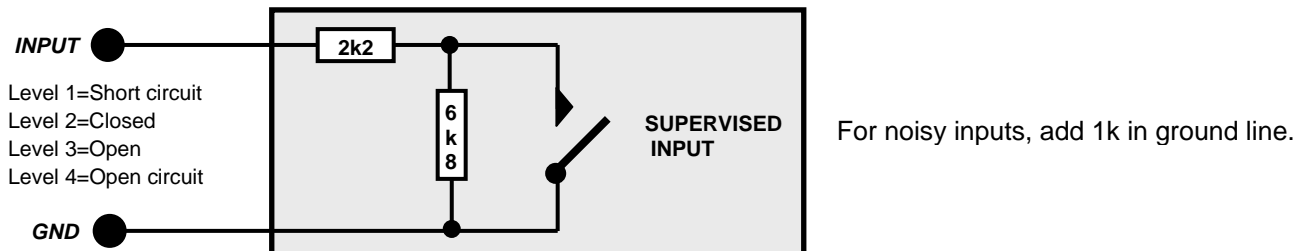
Reader tamper. The latch control (via reader or push button) is disabled when the tamper input is low. This input is connected to a micro switch mounted on the reader that is low when the reader is removed from its mounting.

Latch monitor. The latch is monitored and only when locked after door closed (action complete) is action complete. When action complete is till door closed, latch is controlled locked on door closed.

Each input is set to be a 2 level detection (not supervised) or 4 level (supervised). Level is changed by entering 2 or 4.

Noisy inputs (e.g. sense input on MAG readers) could require 1k ohm serial resistor on the ground line and 2k2 ohm on the input line.

Supervised inputs require resistors as follows:



5.6.2 Outputs

In the CR351 mode, outputs are fixed and perform dedicated functions, e.g. latch 1. 1 aux output is available that can be controlled by the PC or be set to activate on a time group.

When the controller type is set to CR355 mode, the output ports are configured. Each of the local 14 (outputs 13 and 14 are virtual), the front modules 1 and 2 (9 each, 9th output is virtual) outputs are set as **Aux outputs**, or as special function outputs linked to the reader/door (see default memory at end of document):

Latch. Control of the latch.

Capture. Control of the capture bin.

Buzzer. Audible alarm output.

Reader Isolate. Output driven by the PC when reader is isolated (data is ignored). When set to a **virtual** output, the reader isolate is controlled without an output being controlled.

LED Green, Red, Yellow. LEDs are controlled displaying green for access granted, yellow (set for flashing or steady on) for ready and red for access denied (out-of-area, out-of-time, ATB, wrong

PIN) or reader disabled. Yellow and red on indicate misread/format error (number of bit or checksum) or facility error (client or site code error). Flashing red indicates booth/interlock busy. 3-LED (default) or 2-LED (Red and Green on for Yellow) control can be set.

Booth/interlock busy. When booth sequence is in progress or interlock is set and a door is open or unlocked, the output is activated.

6 PERIPHERALS

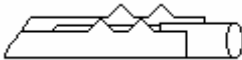
A variety of readers, displays, door monitors and input devices can be tied to the CRC. These are listed below:

6.1 CARD READER

Card readers should always be mounted within 50 meters of the controller utilizing an 8 core 0.2mm² mylar screened cable. Serial readers generally use a 2 pair screened cable. The screen must always be connected to mains earth terminal block in the controller. Always ensure that all metal-based equipment that the reader is mounted on (gooseneck, turnstile etc.) is well earthed to mains earth. Ideally the reader should be mounted \pm 1.2m above ground level. When using swipe readers ensure sufficient space to accommodate the swipe action from insert through to follow through is provided for. Special care must be taken when mounting proximity or hand-free readers. Problems are encountered with readers influencing one another. When mounting Prox reader on metal, the read distance decreases (typically by half). Mounting the readers on non-metal spacers e.g. wooden or plastic base plates of 1cm or more, resolves this problem. Detailed mounting instructions are available from the manufacturers of the readers.

Reader connections are by means of 9 pin molex plugs (these are supplied with the controllers). The reader connectors are marked on the CRC PCB as P1[9] (reader 1) and P2[10] (reader 2). Cables must never be soldered to the reader or CRC connector pins, use the crimp pins supplied.

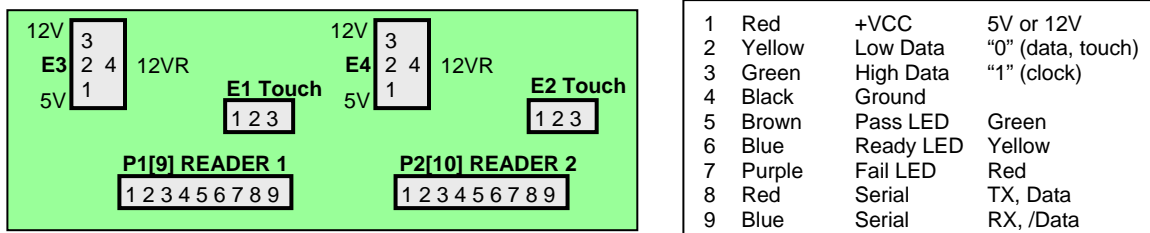
It is essential to use the correct crimp tool at the correct pressure for crimping the lugs to the reader cable. Note that the end section of the lug is crimped on to the cable sheath, while the front end is crimped on to bare strands of the cable. The strands must be twisted together before crimping to form a "single" wire, i.e. do not crimp loose separate strands. The crimped lugs, when pushed in to the lug casing, must clip in and not slide out when the cable is pulled gently.



Ample cable slack should be left at both sides of the cable, facilitating the removal of the reader from its mounting position while it remains connected, and allowing the two reader connections to be exchanged at the CRC end. Excess slack should not be coiled up inside the housing. Use the appropriate CRC housing knockout for the cable entry - see installation.

Before switching on the controller, links E3 (for reader 1) and E4 (for reader 2), must be set for the power required by the reader, namely 12 VDC or 5 VDC. Linking 12V for a 5V reader could permanently damage the reader. PCB versions 637 or later have pin 4 that provide 12V supply with a serial 90 ohm resistor, limiting the supply, preventing a short circuit to blow the supply fuse (link 2 to 4). Readers requiring other voltages, must be powered from an external power supply.

Reader connections are as follows (with colors suggested):

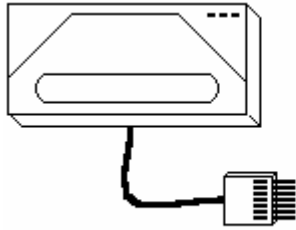


Generally **serial readers** only use pins 1, 4, 8 and 9 and non serial use 1 to 7 (the same pin-outs as the Softcon CR351/2/4 controller).

Current versions (1.23) allows for **serial readers** (e.g. barcode readers) that give card number terminated with carriage return (0DH). NOTE termination character is only 0DH (Enter is CR LF and will cause errors). Any of the Wiegand settings are required, with site and client codes set to zero. When facility is used or the position of the card number needs to be set, card type 14 must be used (ISO facility and card number location sets where facility code and card number start and end, with data starting at location 2). Any of the database types can be used. See communications above for serial settings.

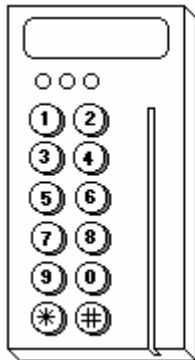
It is good practice to use an unused core as an additional ground, i.e. double up on the ground line with two cores, especially on long cable runs.

6.1.1 Infra red reader (moulded)



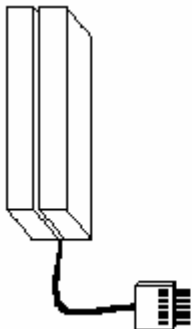
1	Brown	+ 12 VDC
2	Red	Low Data
3	Orange	High Data
4	Yellow	Ground
5	Green	Orange LED
6	Blue	Green LED
7	Purple	Red LED

6.1.2 Infra red (Softcon)



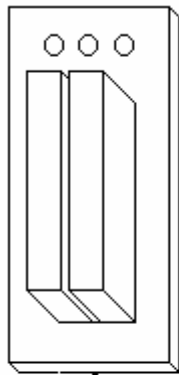
1	+ 12V
2	Low data
3	High data
4	Ground
5	Orange LED
6	Green LED
7	Red LED

6.1.3 MAG reader without LED's and back plates



1	Red	+ 5 VDC
2	Blue	Low data
3	Green	High data
4	Black	Ground
5	Yellow	Not used

6.1.4 MAG reader (Softcon) with back plate and LED's



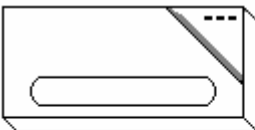
1	Red	+ 5 VDC
2	Blue	Low data
3	Green	High data
4	Black	Ground
5	Blue	Orange LED
6	Green	Green LED
7	Purple	Red LED

6.1.5 Proximity reader (Motorola)



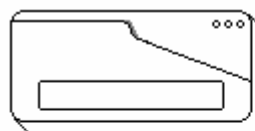
1	Red	+ 5V TO 12V
2	Green	Low Data
3	White	High data
4	Black	Ground
5		
6	Orange	Green LED out
7	Brown	Red LED out

6.1.6 Wiegand reader (Compuguard)



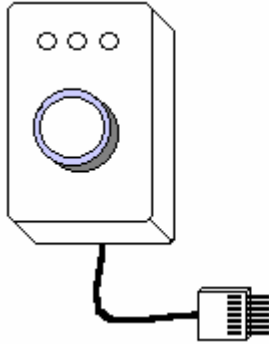
1	White + Grey	+ 5 volt DC
2	Green	Low Data
3	Red	High Data
4	Black	Ground
5	Blue	Yellow LED
6	Purple	Green LED
7	Brown	Red LED

6.1.7 Wiegand reader (Docuco)



1	Brown	+ 5 volt
2	Red	Low data
3	Orange	High data
4	Yellow	Ground
5	Green	Orange LED
6	Blue	Green LED
7	Purple	Red LED

6.1.8 Dallas touch housed with LED's (Softcon)



1	Orange	+ 5 volts
2	Grey	Data
3		
4	Black	Ground
5	Green	Yellow LED
6	Blue	Green LED
7	Purple	Red LED

Static problems have been encountered when using touch readers. Earthing of the metal base plates and addition of surge arrestors resolve the problem.

6.1.9 GSC reader

1	Red	+12VDC
2	Blue	Data
3	Green	'Clock
4	Black	Ground
	Yellow	Select

6.1.10 HID prox point, Prox point + reader

1	Red	+5 to 15VDC
2	Green	'0'
3	White	'1'
4	Black	Ground

6.1.11 IMPRO prox 44 bit reader

1	Red	+12VDC
2	White	'0'
3	Green	'1'
4	Black	Ground

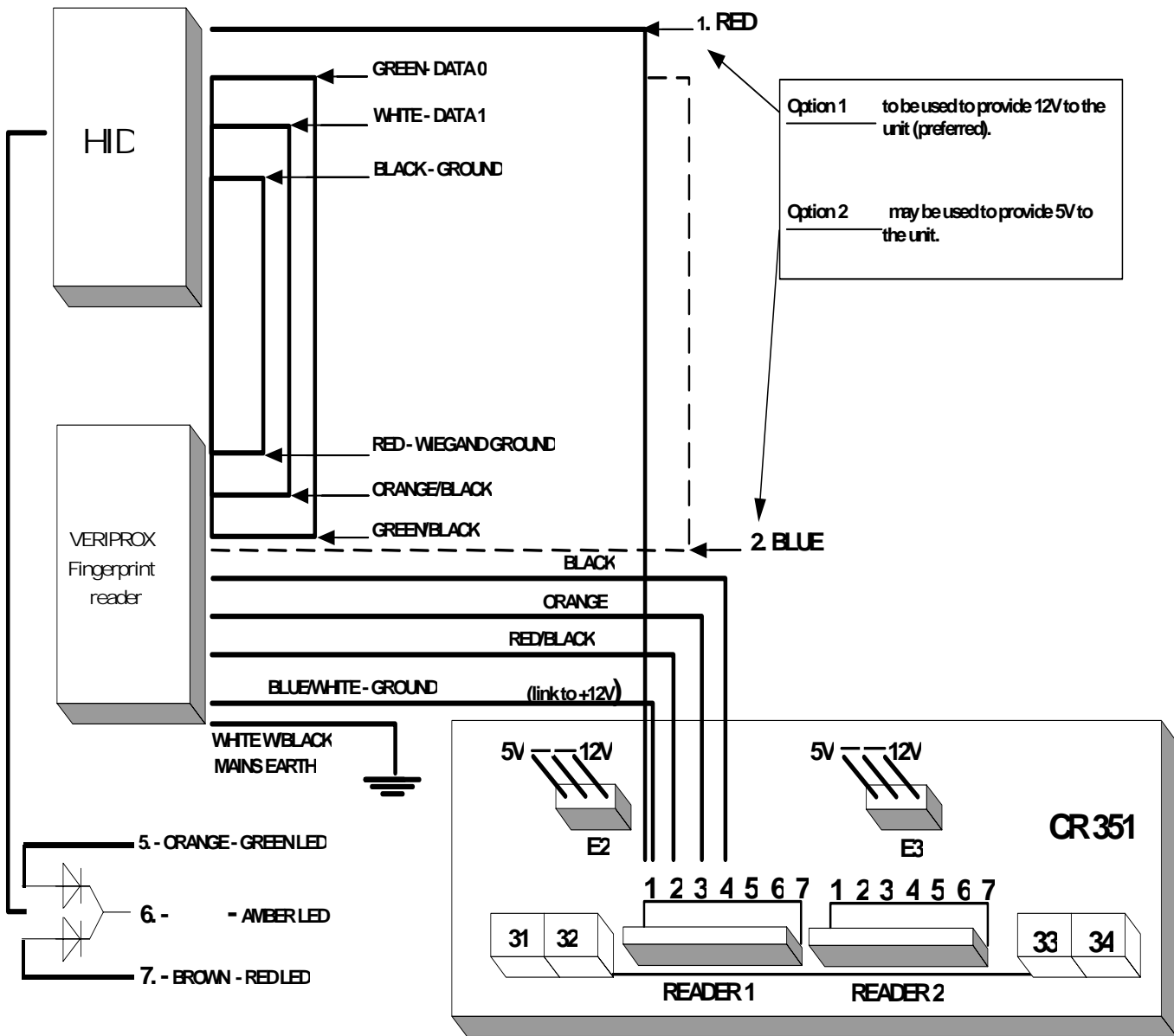
6.1.12 Barcode serial reader MT-412R

	Green	D9-2	TX	Reader serial links function at RS232 or RS485. Reader must be set to 2400 baud, 8 bit, no parity.
9	Black	D9-3	RX	
1	Brown/Rim	D9-5/Rim	Gnd	Set reader power links E4 and E9 to 5V
4	White/Inner	D9-9/Inner	+5V	

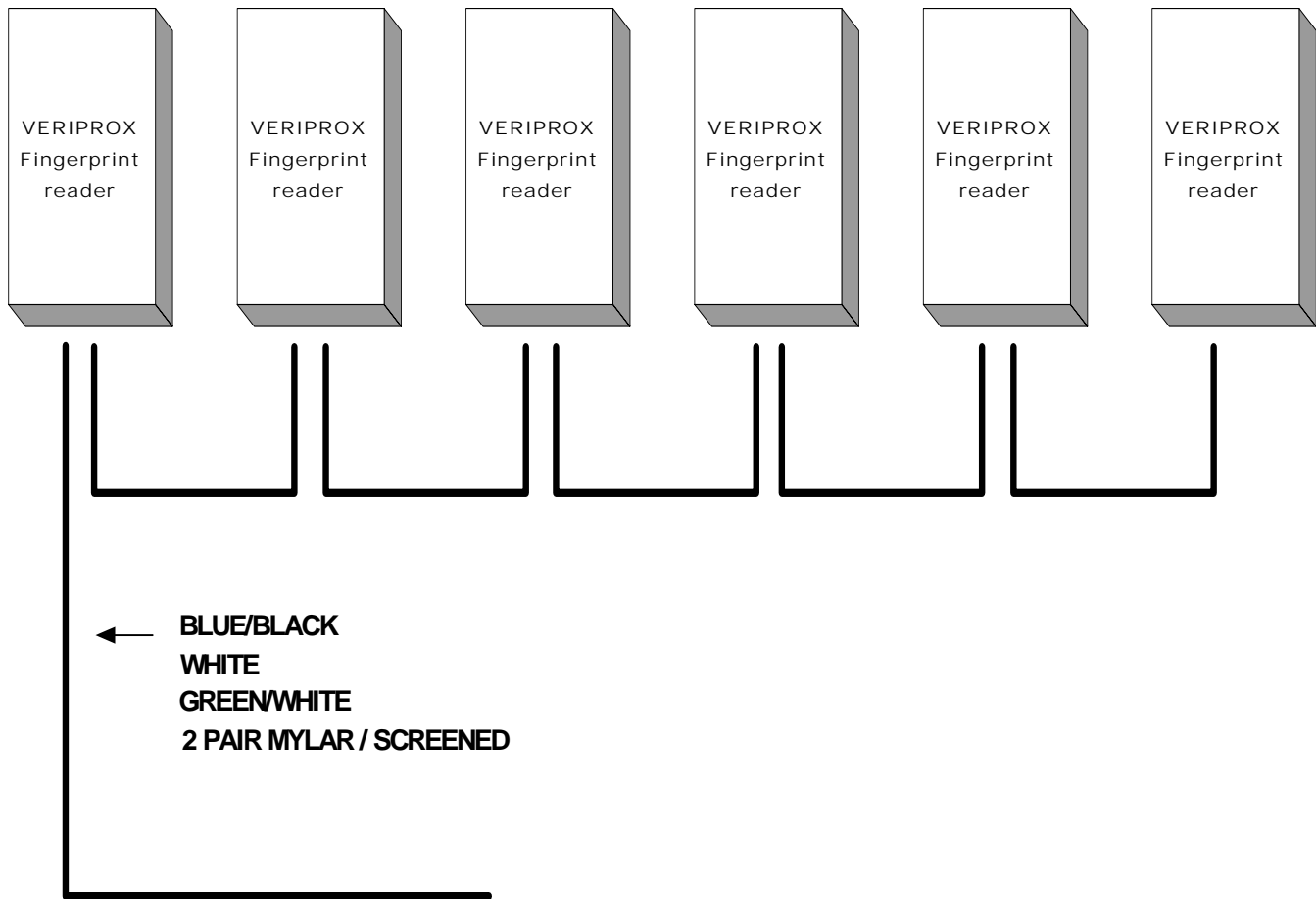
6.1.13 Biometric fingerprint reader



Eg STAND-ALONE SETUP
 (HID PROX POINT PLUS, VERIPROX VERIFLEX Fingerprint reader & Controller)



E.g. NETWORKING THE VERIPROX FINGERPRINT READER



6.1.14 Motorized reader

The CRC can interface to motorized MAG readers. These are often used when card capture is required. This requires a special EPROM and a special wiring jig. Please contact Softcon.

6.2 PIN-PADS

One or two PIN-pad readers can be tied to the CRC and function independently or in conjunction with the card readers. Softcon CR374(s) are connected to reader 1 serial port (RS485 mode) to PIN Pad(s). The CR355 **PIN used** setting enables the use of PIN. This setting is done via the hand programmer or received from the PC. The CR374 receives the keypad function from the CR355 as:

“**HH-mode**” when the hand programmer link is detected – keypad used for editing.

“**PIN-mode**” when no HH link and PIN used is set – keypad used as PIN pad.

“**Simulate-mode**” when neither of the above – keypad entries simulate Wiegand reader pulses. This is used in conjunction with fingerprint readers and is the **only mode displaying digits** selected.

In all functions, the ‘*’ key (bottom left) is cancel and the ‘#’ key (bottom right) is enter.

Using PIN requires a database setting that uses PIN (currently only db10). Time_groups set when the PIN-pads must be used. When the time groups are set that PIN and cards must be used, cards with a PIN of 0, only require card and not PIN. When PIN only is entered, the ‘#’ enters the PIN, when PIN and card, the PIN digits are entered, followed by the card (no ‘#’ key). The PIN entered is always checked, also when followed by card and PIN is not required.

Wrong PIN codes or no PIN code when required, are reported as "WRONG PIN" to the PC. A DURESS message is reported to the PC when a '0' is added to the front of the PIN code (the door opens normally if the PIN has access).

Two versions of HID PIN/PROX readers are available. The 'K' version uses the Wiegand data lines to transfer the PIN and the 'S' version uses a 4 by 3 matrix and is connected to the CR374. See CR374 for connections. When using the HH, PIN readers only function correctly after HH are removed and the controller is reset.

Data/clock readers with PIN that use the following format can be used with the same set-up for PIN readers: PIN digits in 8 bit bytes ASCII of the PIN (MSB first with odd parity), e.g. key 0 = binary 10110000; 1 = 00110001; 9 = 10111001; * = 00101010; # = 00100011.

6.3 READER DISABLE

The reader LEDs show red when disabled. No data is reported to the LAN when presenting a card to a disabled reader. Settings available for reader disable are for reader only, or reader and egress. See hand programmer.

Multiple illegal attempts:

The readers can be automatically disabled when the multiple illegal attempt setting is exceeded. The reader is disabled until the door opens or until the reader disable time-out is completed. The time-out is set to 1 to 9 minutes. A setting of zero disables this function.

Reader disable input:

Readers / PIN can be enable / disable by monitoring the inputs set as reader enable inputs (auxiliary inputs 3 for reader 1 and input 4 for reader 2 in the CR351 mode – in CR355 an input configured as reader enable input). When the input is low (closed contact between the input and signal ground), the reader is disabled. A typical implementation is the enabling of a reader at a barrier only when a vehicle is detected at the reader (via a metal loop detector in the road). When an input is not set as a reader enable input, the reader is enabled.

The set-up option 00 no/HI/P ena. R12 must be set to 1 (only reader en-disable on input) or 2 (reader and egress enabled on input). The setting is for reader 1 and reader 2 (e.g. 10=only reader 1 on input, 01=only reader 2 or 11=both reader 1 and 2).

In CR355 mode, the input is only monitored when the input time group is set to zero or when the set time group is active. When the time group is not active, the reader is enabled. Should the input be low (e.g. permanently linked to ground) and the time-group becomes active/not-active – the reader is disabled/enabled (note that as the input did not change, an input change is not reported). As permanently linking an reader enable input to ground to effect reader disable on time group is the loss of an input, the reader enable output should be used.

Reader disable output / PC control:

An output that is set for as a reader disable output will disable the reader when the allocated output time-group (level 1) is active or when controlled by the PC (level 3). Should no physical output be required, a virtual output should be used. For CR355 outputs 13 and 14 are virtual (i.e. does physically not exist).

In PC based systems, the readers can be en-/disabled via messages that are initiated automatically (time based) or on the occurrence of certain events, or on operator actions. By setting the reader enable output to level 3 (reader disabled permanently) or to level 4 (permanently enabled) – a local time-group or inputs will not change the status). Setting levels 1 (disabled) or level 2 (enabled) will be overwritten by local reader enable inputs or time-groups.

6.4 LCD

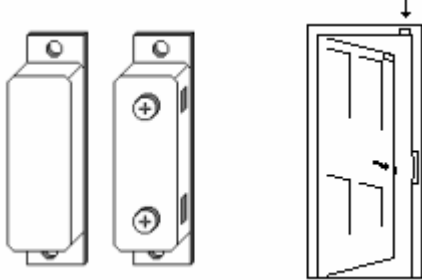
One or two LCD displays can be tied to the CRC and function in conjunction with the card readers. Softcon CR374(s) are connected to reader 1 serial port (RS485 mode) to PIN Pad(s).

6.5 ACTION COMPLETE

One or two action complete detectors can be tied to the CRC, indicating the status of the access point being controlled, i.e. whether the control has been effected. Monitoring of the action and the following additional features:

Action complete	card-holder has entered.
Illegal opening	the controller did not open.
Open too long	entry point is being kept open.
Entry closed	closed after being open.
Door not opened	door was not opened even though entry granted.

The CRC requires a potential free contact as an action complete indicator, which could be normally open or closed.



The action complete sensor is generally mounted on or in the doorframe. The sensor and cabling should be installed so as to prevent tampering. Cable tampering (open or short circuit) is not monitored.

In “one door” installations (one latch), the sensor is tied to action complete door 1. In two door installations, the second sensor (functioning in conjunction with latch 2), is tied to action complete door 2.

6.6 EGRESS (PUSH BUTTON)



One or two push buttons can be tied to the CRC, which request the opening of the latch. Push buttons are used in installations that have entry readers only (push button exit) and where push buttons are used as an overriding facility (e.g. used by the receptionist to allow visitors access). The push button action is monitored by the CRC, which then effects control, facilitating the reporting of the push button action and meaningful action complete monitoring.

The CRC requires a normally open, potential free contact, i.e. closing when the request is made. In the CR355 mode, the push button is only monitored when a zero time group is set for the input or when the set time group is active. In the CR351 mode, the push button is always monitored.

In booth or bi-directional turnstile installations, a push button per direction of access is installed.

When push buttons are used for exit (no reader for exit), they are mounted at a height of approximately 1.2 meters. In installations where push buttons are used as override buttons, key switches are used or the push buttons are installed where not accessible to persons who have to use a card to gain access.

In certain installations it may be required that key-switches be used as push buttons, e.g. by security personnel in positions where access to the push button cannot be limited.

Numerous push buttons could be tied in parallel (across the same terminals), with the supervised resistors (CR355 mode) installed at the furthest button. Push buttons for opening latch 1 (in one or two door installations) are tied to the input allocated as egress 1 and ground and those for latch 2 (in 2 door installations), to the input set as egress 2 and ground.

The push button can be disabled with the reader by setting disable reader on input, with the push button only being monitored when the reader is enabled on input.

6.7 LATCH

One or two control points can be tied to the CRC (described under “Access controllers” above). When access is granted, the output set as latch 1 or latch 2 (in 2 door configurations) is closed (or opened in normally closed

settings). The on board relays are generally used to switch latches, barrier, etc. Latches are installed in or on the door or booth frames.

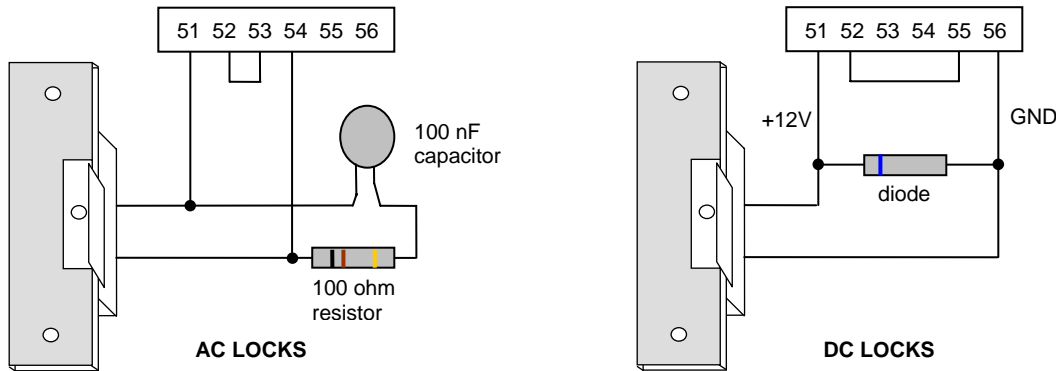
Two normally open and two normally closed relays are mounted on the CRC PCB and are rated at 3A 250V or 30 VDC. Inter-posing relays must be installed in installations when the specifications of the on board relay are exceeded. Due to noise generation, these relays should not be installed in the CRC housing.

The contacts can be changed from normally open to normally closed via the NO / NC set-up. It is suggested that the normally closed relays be used for latches requiring power to be locked (e.g. MAG locks) and normally open relays for latches that are locked with no power, i.e. the locked state requires no power on the relay. In CR351 mode, the latch relays are fixed as relay 1 (latch 1) and relay 4 (latch 2) – these are normally open.

The latch can be set to **Latch click** which results in the latch being momentarily pulsed to locked when it is unlocked. This is used when an audible sound is required at the latch to indicate that it is unlocked. This option is generally not used when switching AC (AC latches make a 50/60 Hz sound when powered).

The resistor/capacitor for AC and diodes for DC components reduce the “flash-over” of the relay contacts. The fly-back components should be installed at the load, i.e. at the lock or roller door/boom logic board. Fly-back relays must also be installed on inter-posing or other inductive loads being switched.

When switching DC loads, the ideal is to run the negative line (ground) to the load and switch the positive line (+12v) through the relay.



Unregulated 12VAC (terminals 53 and 54) and 12VDC (55 or 58 + and 56 or 57 ground) are available for feeding through the latch relays (see power supplies below). The latch supplies are derived from a separate winding of the 12V transformer installed within the CRC housing (the other winding generates the supply for the PCB). The 12 VAC is rectified and smoothed for the 12 VDC supply. AC supply to the primary winding of the transformer is set at 110 or 220V. Total current drawn by the latches should ideally not exceed 1A. Fuse F1 on the CRC has a 2A fuse (F1) installed in-line with the AC supply from the transformer.

6.8 BOOTH / MANTRAP / INTERLOCK

Booth mode (booth mode set to 0) – 2 doors with action complete, occupied optional, 2 reader

The CRC controls a booth (mantrap) without additional external electronics. Action complete is required. Presence detect in the booth is optional. The sequences of events are:

Access request by reader, and/or PIN pad or egress.

If access is granted, the door is unlocked.

Action complete is detected for door opening and closing.

The door is locked.

Presence detect must be active.

The second door is unlocked.

Action complete of second door is detected for opening and closing.

The second door is locked.

Access is reported to the PC.

While the sequence is taking place, the readers, PIN and push buttons are ignored, and the red LED on the readers flash RED. The presence contact is closed when presence is true. The presence detect input to the CRC must be permanently connected to signal ground when presence detect is not used.

Should the sequence not be completed, the doors are locked after a 10 sec time-out and door not opened is reported to the PC. Should the presence detect have changed after the first door was opened (not permanently connected to ground) and presence is active after the time-out (i.e. someone is inside), the first door is unlocked until presence is not active.

To eliminate the action complete problems caused by MAG locks, two additional inputs can be configured as latch monitors in the CR355 mode. On closing of a door, action complete is only after the action complete is active and the latch is locked. The lock monitor is ignored on door opening. The action complete settings must be set as "open till closed".

In the CR355 mode, an output can be configured as a "booth busy" signal. This output is active while the booth sequence is busy, i.e. while the red LEDs flash.

1-reader/door booth mode (booth mode set to 2) – 2 doors with action complete, reader 1
 The booth uses a 1 door, 1-reader configuration. The reader is accessed by sliding the door to the to-direction (open to the from-area, closed to the to-area). If the reader grants access, the door slides to the other side.

Interlock mode – 2 doors with action complete, 1 or readers
 With booth mode set to interlock, the doors function independently but prevent a door being unlocked (via reader or egress) while the other door is open or unlocked. Any booth mode is also an interlock.

1-reader booth mode – 2 reader-enable, 1 reader, 1 or 2 latch / action complete
 The 1-reader controller monitors reader-enable 1 and reader-enable 2 inputs. On receiving data from reader (connected to reader 1 port) and reader enable 1 is active (input low) - data is taken as from reader 1, else if reader enable 2 is active – data is taken as from reader 2. If neither is active, the reader LED is RED and data is discarded. All other functions of 1 (one latch relay) or 2 doors (2 latch relays) and action complete function (reporting not opened, opened too long, illegal open) as normal.

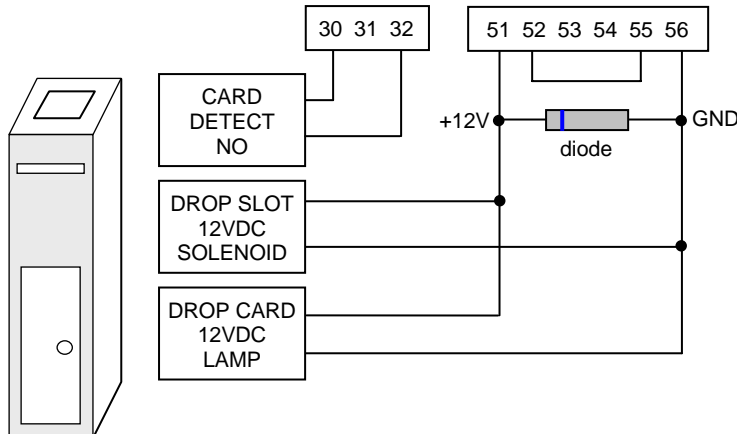
6.9 CARD CAPTURE BIN

A card capture unit is an enclosure in to which visitors must insert their cards before exit is permitted from the premises. After the card is presented to the exit reader, the card capture bin indicates a "DROP CARD" message. Only when the card is inserted into the capture bin will the door latch unlock.

Non-visitor (non-capture) cards are granted exit without the need to insert a card in to the capture bin. Each card is individually set.

In the CR351 mode, only reader 2 can function with a capture unit. In the CR355 mode, either or both readers can be configured as capture units by allocating the capture outputs and inputs for either or both readers.

The card capture bin is installed at the reader, with the card insert point into the bin in close proximity to the reader. The drop card sensor is a potential free normally open contact (micro switch or optical), grounding the input when the card is sensed.



The connections are as given above. Flash back diodes (1N4002 or better) must be installed at the relay contacts and coils in the card capture unit (see “Latch connections” above).

Settings for capture are: 0=No capture
1=Read has card capture
2=motor reader, not capture
3=motor reader, capture
4=capture, disable
5=if expired, capture & exit (special function)
6=if not expire, exit (special function)
7=Pulse capture bin to open

6.10 TERMINAL / TEST

A VT100 compatible terminal, with serial RS232 communications, can be tied to the CRC in the test mode and in BITE mode. The BITE mode requires a special EPROM and is used to test and repair PCBs. The test mode is enabled when the comms setting is set to test – set via hand programmer (1 LA/TE/MO/PC/HH).

Generally the baud rate of the terminal is required as 9600, 8 data bits, 1 stop and no parity. HW handshaking is not required, but X-on/off is used. The rate is set via hand programmer.

RS 232 connections for the terminal are:

CRC	Function	Cable Colour	Terminal D25
10	Ground	Green	7
13	RX data	Blue	2
14	TX data	Red	3
earth	Screen	Screen	none

Functions available in test mode are displayed by selecting ? on the terminal. An option is switched on/off by selecting the appropriate key (e.g. R selects reader debug). Options available are:

- A AtoD – inputs read.
- C Cards fr to Enter – displays enabled cards.
- D Debug – displays data received from uPs.
- L LAN comms – data that is sent on LAN.
- P Displays Port status changes.
- R Reader – HEX data received from readers (with number of bits) and after decoded (with site, client).

- I Initialize WaveTrend asset readers (special EPROM version).
- Q Query WaveTrend asset tag, Enter (special EPROM version).
- W Display WaveTrend status (special EPROM version).
- X Erase WaveTend tag, Enter (special EPROM version).

Note that the space key shifts the display up by 4 lines (carriage return and 4 line feeds).

6.11 MODEMS

Via the HH, the comms mode is set to type 2 (modem), baud is set to 9k6 and the bits set to 8. The node address must match the PC setting, generally node 1. The initialization string sent to the modem on power-up is editable via the hand programmer (stored in battery RAM). The modem must be set to auto answer and ignore HW and SW handshake (pass XON / XOFF through).

The controller ignores HW handshake (CTS / RTS) and does not generate Data Terminal Ready (DTR). Modem setting thus requires that DTR be ignored. Certain modems do not have such a setting, or does not function correctly. Such modems must be wired as a null modem as indicated below, else a connect command is not received.

CONTROLLER TERMINAL	MODEM PIN (9 WAY F)	MODEM PIN (25 WAY F)	NAME	MODEM DESCRIPTION
14 TX	3	2	RD	In: Receive data
13 RX	2	3	TD	Out: Transmit data
	7	4	RTS	In: Request to send
	8	5	CTS	Out: Clear to send
	6	6	DSR	Out: Data ready state
10 GND	5	7	SG	Signal ground
	1	8	DCD	Out: Data carrier detect
	4	20	DTR	In: Data terminal ready
	9	22	RI	Out: Ring indicator

For a null modem: Interconnect DTR, DCD and DSR.
Interconnect RTS and CTS.

The controllers use the basic Hayes communication and typically at 9600 baud, async with no flow control, error correction / detection or compaction. Set to auto answer. The initialization string sent to the modem on power-up is stored in battery backed-up RAM (copied from EPROM if battery is not detected, e.g. after RAM battery-drop). The EPROM string of 64 bytes is located at 0FFA0H to 0FFDFH. The RAM copy is editable via the HH (4 lines of display). Commands can be separated by spaces. Typical command strings (always start with AT):

AT E0M0Q0TV0X0 &C0&D0&K0 S0=1 &Q0 \N1\Q0\V0 %C0 S37=9 -V90=0 N0 &W	Mercer
AT E0M0Q0TV0X0 &C0&D0&K0 S0=1 &G0&I0 S8=0 &W0	Zoltrix
AT E0M0Q0TV0X0 &C0&D0&K0 S0=1 &A0&G0&I0&M0&N6 S8=0 &W0	US Robotics
AT E0M0Q0TV0X0 &C0&D0&K0 S0=1 &Q0 \N1\V0 %C0 S37=9 N0 &W	Compac
AT E0M0Q0TV0X0 &C0&D0&K0 S0=1 &Q0 \N1\V0 %C0 S37=9 &W	Creative

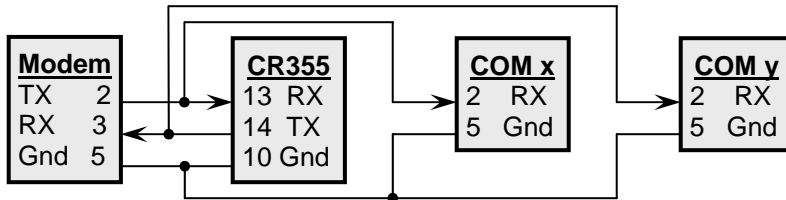
Depending on the LCD used on the HH, the \ character might be displayed as ¥ (the character between [and]). Note that the up / down arrow scroll though the ASCII character set – uppercase only (digit keys function as normal).

The following AT HAYES setting is the minimum requirements (upper or lower case):

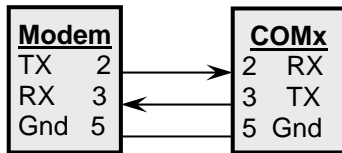
- E0 Echo disabled.
- M0 Speaker always off (else very irritating).
- N0 Handshake at baud of S37 register, no fallback.
- Q0 Result codes enabled.
- T Enable tone dialing.
- V0 Result codes numeric.
- X0 Result code 1 for all connection speeds.
- &A0 ARQ result codes disabled.
- &C0 State of carrier from remote modem is ignored. DCD circuit is always on.
- &D0 DTR ignored.
- &G0 No V.22bis guard tone.
- &I0 Disable flow control.
- &K0 Disable flow control.
- &M0 Async, no flow control
- &N6 9k6 speed
- &Q0 Async mode.
- &W Store active configuration into modems NVRAM (must be last command).
- %C0 No data compression.
- \N1 Direct mode, no error control (no flow control is allowed).

\Q0 Disable flow control.
 \V0 Disable protocol result appended to DCE speed.
 S0=1 Set the number of the rings required before the modem automatically answers to 1.
 S8=0 Set the time, in seconds, that the modem must pause when the “,” dial modifier is encountered in the dial string
 S37=9 Attempt a 9k6 baud connection.
 -v90=0 Disable V.90
 +MS=10,0,9600,9600 V32bis, not auto baud, min baud, max baud.

To monitor communication between controller and modem, connect as follows to the PC:



Using a program such as Windows Hyper-terminal (set to 9k6, 8 bit, no parity, no flow control) COMx displays data from modem and COMy the data to modem (open two instances of hyper terminal). The initialization string can be seen on COMy when the controller is powered up, the modem must respond with 0 (COMx). Reply of 4 is error and a command in the initialization string is unknown. Edit the string (overwrite each command with spaces to find the illegal command). Note that when data is transferred between PC and controller, the data is in hex and hyper-terminal displays 'funny characters'. Using a program such as Listen32 (www.win-tech.com), the hex is displayed.



Alternatively, connect the modem to a PC, using hyper-terminal to obtain the correct initialization string. Setting Hyper-terminal \file\settings\ASCII setup Line Feed and Echo On, help the display of the data. It is suggested that AT&F be sent to reset to factory default.

With HH connected, a change of modem status (Ms) and modem activity (a) are displayed momentarily. Modem status is:

OK
 Connec
 Ring
 NoCarr
 Error
 Connec
 NoDial
 Busy
 NoAnsw
 Connec
 Unknow

Activity is:

Off
 Connect
 Call
 Transfr
 PassIN
 PassOUT

After initialisation on power-up, the LCD should flash MsOK aOFF.

7 TRANSPORT AND STORAGE

Limited protection is provided against mechanical damage, but the CRC is transportable if not manhandled. Protection against electrical damage, as well as against effects of static electricity is sufficient.

8 UNPACKING

All controllers are generally delivered mounted within steel enclosures and are wrapped in plastic. The terminals, PCs and printer are delivered in polystyrene protection.

The serial number of the units and the version of software provided (where applicable) is written on to the plastic wrapping. A small plastic packet containing diodes, resistors, capacitors, molex plugs and pins are supplied inside the CR enclosure. The keys to the CR enclosure lock are strapped onto the locking lever within the CRC enclosure.

9 INITIAL INSPECTION

A visual inspection of all units is done before and after unpacking. Defects must be reported immediately, and no defective units should be installed.

10 ASSEMBLY

All **Softcon** manufactured units are workshop assembled, fully tested.

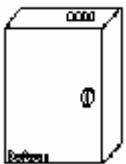
11 INSTALLATION

GOLDEN RULES TO SUCCESSFUL INSTALLATIONS ARE:

- READ THE MANUAL
- AVOID ELECTRICALLY "NOISY" ENVIRONMENTS.
- KEEP CABLE LENGTHS AS SHORT AS POSSIBLE.
- USE SCREENED CABLES.
- EARTH CONTROLLERS, CABLES SCREENS and METAL ON TO WHICH READERS ARE MOUNTED.
- USE "CLEAN" AND STABLE MAINS SUPPLY.
- SUPPRESS "FLY-BACK" AT INDUCTIVE LOADS.
- SWITCH THE SUPPLY TO LOADS (not the ground return).
- USE COMMON SENSE.

The installation of the controller and peripherals are described for each item below.

12 MOUNTING



The CRC enclosure has four 5mm holes in the back plate of the enclosure for easy mounting. Ideally the CRC is mounted at a height of 1.5m to the bottom of the housing and central to the card readers connected to it. When selecting the physical position to mount the controller, take care to avoid mounting the controller within close proximity to equipment generating electromagnetic fields (EMF). Typical EMF or noise generators are: radio transmitters, lift shafts, electric motor, electric solenoids, transformers, distribution boxes etc. Mount the CRC so that the diagnostic light emitting diodes, (LED's) are easily visible. Utilise the 20mm knockouts on the side of the enclosure for cable entries. Power to the controller is normally via 110 / 220 VAC supply. This supply should be connected onto the 3 way terminal plug or block. If a battery back up unit is being used refer to the Battery Backup.

An optional housing is the controller PCB, transformer, line filter and regulator mounted on a metal plate of 18 x 27 cm. Three 5 mm mounting holes are provided on the plate.

Mounting of each item is described below.

13 CABLING

Cables should not be run in close proximity to other cables or across equipment generating noise. Where cables have to run close to or along noise generators, it is imperative to physically separate the cables from the noisy equipment and cables. A 10cm separation reduces the noise factor tremendously.

Maximum cable lengths and cable types are listed below.

Reader, LCD/keypad and PIN-pad cables must be screened cables, with the screen being tied to earth at the CRC. The LAN cable must be screened and tied to earth at one point only, preferably at the master controller (PC).

Note that the LAN screen must be continuous, i.e. looped through at each controller.

Cables must not lie over the PCB, this prevents noise from being induced in to the electronic circuitry. Routing cables through the housing knockout that is closest to the appropriate connector on the PCB ensures minimum cables within the housing. Use the following knockouts (1 on the top, the mains connector):

- Mains
- comms (LAN, terminal or printer)
- LCD / PIN
- Readers, push button, action complete, aux inputs
- Latch, aux output

Using the suggested cable colors simplifies maintenance.

Location	Cable	Max m
Card reader to CRC	8 Core, m/s 0,2mm mylar screened	50
CR372/4 to CRC	2 Pr twisted m/s 0,2mm mylar screen	2000
CRC to terminal	3 Core, m/s 0,2mm mylar screened	10
CRC to LAN controller	2 Pr twisted m/s 0,2mm mylar screen	2000
CRC to PC MUX	2 Pr twisted m/s 0,2mm mylar screen	2000
CRC to latch	2 Core, m/s	50
CRC to action complete	2 Core, m/s	50
CRC to push button	2 Core, m/s	50
CRC to card capture	4 Core, m/s	50

The maximum lengths tabled above could be exceeded in certain instances, and depends on cable resistance, electrical noise, etc., this can only be ascertained when installed.

14 CONNECTIONS

Connections to the CRC are via screw and lugged connectors. The connectors are removable from the PCB, keeping the cables connected to the connectors. The screw terminal connectors are grouped as follows:

Terminals 1 to 8	Power supply (factory connected).
Terminals 9 to 16	Communication.
Terminals 17 to 24	IIC, outputs.
Terminals 25 to 44	Inputs (each input has one leg connected to ground).
Terminals 45 to 58	Outputs, user supply

Nr.	Function	I/O Port
1	5V from regulator.	
2	Ground.	
3	12V to regulator.	
4	AC 12V.	
5	AC 12V.	
6	AC 9.7.	
7	AC 9.7.	
8	Ground.	
9	RTS (RS232).	
10	Ground.	
11	Data (RS485).	
12	/Data.	
13	RX (RS232).	
14	TX (RS232).	
15	RTS (RS485).	
16	/RTS (RS485).	
17	SCL.	
18	SDA.	
19	Ground.	
20	1 Wire.	
21	Ground.	
22	Aux output 2.	O6
23	Aux output 1.	O5
24	12V.	
25	Ground.	
26	Input 1 (Egress 1).	I1
27	Input 2 (Action complete 1).	I2
28	Input 3 (Egress 2).	I3

Nr.	Function	I/O Port
29	Input 4 (Action complete 2).	I4
30	Ground.	
31	Input 5 (Booth occupied).	I5
32	Input 6 (Capture monitor).	I6
33	Input 7 (Reader 1 enable).	I7
34	Input 8 (Reader 2 enable).	I8
35	Ground.	
36	Input 9 (Input for CR355 mode).	I9
37	Input 10 (Input for CR355 mode).	I10
38	Input 11 (Input for CR355 mode).	I11
39	Input 12 (Input for CR355 mode).	I12
40	Ground.	
41	Input 13 (Aux input 1).	I13
42	Input 14 (Aux input 2).	I14
43	Input 15 (Aux input 3).	I15
44	Input 16 (Aux input 4).	I16
45	Relay 4 (Capture 2).	O4
46	Relay 4.	
47	Relay 3 (Buzzer 1).	O3
48	Relay 3.	
49	Relay 2 (Latch 2).	O2
50	Relay 2.	
51	Relay 1 (Latch 1).	O1
52	Relay 1.	
53	12VAC.	
54	12VAC.	
55	12V.	
56	Ground.	

Reader connections are:

1	Power 5V (link E3 1-2), 12V (E4 2-3) or 12VR (E4 2-4).
2	Data/LO/Touch.
3	Clock/HI.
4	Ground.
5	Green LED.
6	Yellow LED.
7	Red LED.
8	Data – TX.
9	/Data – RX.

Connections for each peripheral tied to the CRC are listed in the appropriate sections above. Suggested cable colors to be used are also given. Diagrammatic representations of the connections are given in the appendixes.

15 JUMPER AND DIP SWITCHES

There are 14 sets of jumpers on the CRC, they are marked on the PCB as E1- E14. Note that the links below are for PCB version B027 and after. See the lid inserts for earlier versions.

Jumpers E1 – E14

Link	Position 1-2	Position 2-3	Position 2-4
E1	Reader 1 Touch	R1Wiegand/ data clock	
E2	Reader 2 Touch	R2 Wiegand/ data clock	
E3	Reader 1 5V	R1 12V	R1 12V via 90 ohm
E4	Reader 2 5V	R2 12V	R2 12V via 90 ohm
E5	1-wire	1-wire	
E6	Reader 1 Data pull-up		
E7	Reader 1 /Data pull-up		
E8	Reader 2 Data pull-up		
E9	Reader 2 /Data pull-up		
E10	1-wire	1-wire	
E11	Hand programmer enable	out when HH not used	
E12	RS 232	RS 485	
E13	Battery		
E14	Reset		

For touch, remove ICs OPT1, OPT2. R24 (R13 PCBs < B633) and R29 (R19 PCBs < B633)=4k7 (normally 560 ohm).

For serial RS232 readers, remove E6-E9 and ICs 1 and 3 (75176), install IC 7 (MAX232).
For serial RS485 readers, install E6-E9 and ICs 1 and 3 (75176), remove IC 7 (MAX232).

No DIP-switches are available for the CRC **node address**. The address is kept in NOVRAM and is set with the hand programmer.

16 STARTING UP

The power is simply switched on.

17 PRE-START CHECKS

Before starting up, all wiring must be checked. Note that faulty wiring could permanently damage the equipment. Ensure that the power-supply selection to the readers (12V or 5V) is set according to the readers used (links E3 and E4).

In LAN installations, all node addresses on the CRCs must be pre-set to the appropriate address. No two units on LAN may have the same address. CRC addresses start at 01 and run consecutively. In LAN mode, the comms option must be set to 0 (LAN) and the baud rate must be 9600 (set via hand programmer).

The front module setting (via hand programmer) must be set to match the installation. Should a front module be set and the module is not present, the speed of the reader function slows down.

The connection information provided within the lids of the controllers indicates the node address and terminal information.

Link field E11 must be removed if the CRC is not connected. The battery link E13 must be installed.

The mode the CRC function must be set with the hand programmer in stand-alone applications – updated from the PC: CR351 / CR355 (standard EPROM), Cash-loader (special EPROM) or Vending (special EPROM) controller.

18 PROGRAMMING

All set-ups are kept in the CRC battery backed-up memory. Set-up is by using the hand programmer or by sending set-up information via the LAN.

18.1 HAND PROGRAMMER

A Softcon CR374 with LCD/keypad can be connected to the CRC as a programmer (link E11 in), facilitating the setting or altering of configuration parameters and card codes/statuses. LCD/keypads can also be used to request and indicate certain information. See **CR374** .

18.2 LAN PROGRAMMING

Programming via the LAN overwrites the set-up in the CRC. See the appropriate PC SW manual or the LAN master controller.

19 IN OPERATION

In the terminal test mode, the CRC transmits test data to/from the terminal. This mode is set with comms mode 1 (via hand programmer). Comms mode 0 is LAN mode, 2 is modem, 3 is directly to PC COM port, 4 is when hand programmer is connected to the comms port.

The terminal test mode operation is self-explanatory and functions are added as required. This is an advanced function – see terminal / test mode above.

The CRC functions as a CR351 / CR355 (standard EPROM), Cash-loader (special EPROM) or Vending controller (special EPROM).

20 CLOSING DOWN

Should it be required to switch off a CRC, the power switch (if installed) within the unit is simply turned off, or the power cable is pulled out of the socket.

Note that when controllers are powered-down the outputs are not active, resulting in non-control (e.g. doors may be locked or unlocked permanently, depending on the lock type used. The latch relay contact is open when the controller is powered off.

21 MAINTENANCE

21.1 USER

Error detection is limited to the observation that the controller is not functioning “normally”, i.e. one of the following is not correct:

21.1.1 Functional indicators

The “RUNNING” LED on the controller housings flashes approximately every second, indicates that the unit is functional. An off or steady-on LED indicates an error.

The “COMMS” LED on the enclosure indicates the status of the serial communications. In LAN installations, a steady-on LED indicates that comms is correct, while a flashing or off LED indicates that COMMS is intermittent or “DOWN”. In the terminal mode, the LED flashes every second, when the time on display is updated. The LED flashes whenever data is received or transmitted (from / to the terminal).

The “ENTRY” LED’s flash whenever valid data is received from a reader. The “ENTRY” LED remains on for a misread or wrong card type and goes off when a correct card is read. When communication between the main processor on the CRC and the on-board R1 and R2 processors fail, the corresponding R1 or R2 entry LED flashes with run LED. The CRC resets when the communication fails for more than 3 seconds.

21.1.2 Card reader

The “Ready” (YELLOW) LED flashed when the door is closed. Access denied is indicated with a red LED. Access granted is indicated with a GREEN LED. Misreads, wrong card type or facility error (card not belonging to the site) results in the red and yellow LEDs being on.

Entry of a code (swiping of a card, selection of a PIN-pad key) results in an indication of the entry LED on the reader LED on the CRC housing. A legal code entered at the reader results in the door latch being opened.

Multiple illegal code entry attempts results in the reader being disabled (all LED's of the reader off). The number of attempts and the period, for which the reader is disabled, is pre-configured. The disabled reader is re-enabled when the door is opened legally, i.e. via push button control, when a legal code is entered via the other reader.

When the reader is disabled on input or by the PC, the RED LED is on. The green LED is on while the door is open.

21.1.3 Door control

Door control errors are detected by the user if any of the following do not occur:

- On entry of a legal code, the door latch is opened until the door is opened, or until a pre-set time-out has expired (door not opened). See action complete.
- Doors opened too long (pre-set time-out) or doors opened illegally (i.e. not opened by the CRC after a legal code is entered or a push button is selected), result in the error buzzer being sounded (if set).
- Selection of a push button results in the door latch being opened.

REPAIR

Repair actions taken by the operator are limited to ensuring that the power to the CRC is switched on, and the door is closed. The re-enabling of a reader disabled after multiple illegal codes were entered is by opening the door legally (via other reader or via push button).

21.2 INSTALLER

If reader errors occur, swap the readers by swapping P1[9] and P2[10]. The power need not be switched off (ensure that both readers require the same voltage supply). If the error stays with the reader, replace the PCB, else replace the faulty reader after checking the cabling.

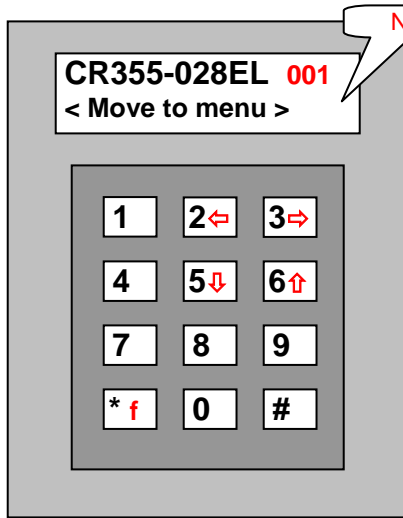
21.3 WORKSHOP

The mean time to repair is 20 minutes or less and is aided with a BITE option. A PCB repair schedule is listed as an appendix.

A debug / test mode can be set via the hand programmer, with data displayed on a serial RS232 terminal connected. See terminal / test mode above.

APPENDIXES

22 SOFTCON CR374 HAND HELD TERMINAL



Introduction

The CR374 hand held terminal provides the means to program the CR355 Controller as stand-alone units and to check of temporary change set-up. Note that in LAN installations, the PC set-up overwrites the set-up done by the programmer. Editing / adding cards for random databases, could cause unknown results (when database locations differ in PC and in controller). The controller should be reset from the PC when cards have been entered via the CR374.

The CR374 is plugged it into the Reader 1 (P1[9] 8,9) connector on the controller for serial communication and to P1[9] (1,4) or E5 (1,3) for power, connections are given above. Pressing the CLEAR button enables the programmer; the display should appear as shown below. The link E11 on the controller must be in for the programmer to work. The address link E3 of the CR374 must be removed. FrontP enable for the interface 0 need not be set to 1. When the main serial port is set to HH (see comms settings), the CR374 is connected to data /data on the main comms port, linked as RS485, baud rate 19200.

key is Enter

* key is Clear or a **function** key, and when kept in, the arrow keys **2←**, **3→**, **5↓** and **6↑** move the cursor as indicated.

Keeping down a key, the selection runs, i.e. as if multiple selections are being made.

22.1 FUNCTION KEYS

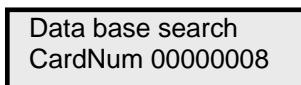
The left and right arrow keys moves to the required menu.

C355-028 EL 001 < Move to Menu >	Data Base Search Data Base edit Card enter reader 1 Card enter reader 2 Cards batch load Rest APB Set-up Versions
-------------------------------------	--

Selecting the down key moves in to the menu. The arrow keys move the cursor to the data to be edited or to the next/previous page of the option. The clear key moves the display to the top menu.

22.2 MENUS

22.2.1 Data Base Search



Search for an individual card. It sets the database pointer to a selected card.

The required card number is entered, followed the CLEAR or ENTER key. The CR374 returns to the main menu. When selecting "Data base edit" card entered will be displayed. Note that when a card is presented at either reader, the pointer is set to that card (unless in the dB edit mode).

22.2.2 Data Base Edit

Xref e12 T1T2 CP
00001 11 0101 00

Change the status of an individual card.

Xref = card number

e1 = reader one (1 = card valid for reader (enabled), 0 = card not valid)

e2 = reader two (1 = card valid for reader, 0 = card not valid)

Time = **time group** (01-15 or 01-60 for CR355A), T1 for reader and T2 for reader 2 (T1 is also used for reader 2 if set own TG option is not set).

C = **capture** card (1 = capture, 0 = do not capture)

P = **passback** (1 = ignore any programmed anti-passback)

The up arrow moves to the previous card. The down arrow moves to the next card. CLEAR key exits to main menu, having stored the new settings.

The following displays are available for certain database selections.

CardNo	PIN Code
12345678	1234

Databases with PIN code, dB6 or 10.

22.2.3 Card Enter Reader 1/2

Card enter rd 1
Enter card rd 1

Displays the number of the cards as they are presented to the selected reader.

Note: The Controller must be set for the correct card format, client-code and site-code for this function to work. If any of these are wrong then card 65535 is displayed. The card is automatically enabled for both readers and set with time group 1, not capture, not passback.

22.2.4 Cards Batch Load

R1e	R2e	Time	Cap	Pas
1	1	01	1	1

Change the status of a batch of cards, e.g. enable cards 1 to 500 for both readers.

The initial display would be:-

Reader 1 and 2 enabled with 1, disabled with 0. Time group 01 to 15 or 01 to 60 for CR355A. Capture and pass-back enabled with 1, disabled with 0.

Use the right arrow key to move to the second display:-

Cards batch load
00001 to 00500 Enter

Press the ENTER key to store the new settings:

Note: You MUST be on the second page when you press the ENTER key. If not use the right arrow to get back to the second page and then press ENTER.

22.2.5 Nr Cards Enabled

Displays the number of cards enabled for reader 1, reader 2, for both reader 1 and 2 and for either reader.

22.2.6 Reset APB

Clears anti-pass back, giving each card one free movement. This is useful where a reader may have been down for a time and people have entered or exited without presenting their cards. Enables the card for both readers if it is enabled for either.

22.2.7 Display Card HEX

The card number and number of bits read are displayed in HEX code. This option is used for debugging purposes.

22.2.8 Set-up

Configures the CRC Controller. The values displayed below are the default values that are set when the RAM is 'dropped', i.e. the link E13. The arrow keys are used to move the cursor position and the data is overwritten. The value options are listed below. An illegal value entered prevents the LCD moving to another display and must be corrected to a legal value. Set-up marked with ***sw3** only set by SoftWin3 version 0.46 or later.

001 Node address

*** Not set by PC**

The node address on the RS485 LAN. No two controllers may have the same address on a LAN.

0000 FrontP 3210

***sw3 Only set by PC when type CR355**

As indicated in the installation options, front end RS484 interfaces connected to the reader ports, provide inputs, outputs and readers remotely. Reader 1 and its I/O are connected to the controller reader 1, or on an interface connected to reader 1.

Reader 1 can have interface 0 (no link on the interface address link) and interface 1 (link on the interface address link). Reader 2 can have interfaces 3 (link on the interface address link). Interface 2 to be included in future versions. To enable an interface, set a 1, e.g. interface 0 and 3, set 1001. Although the programmer is an interface 0, interface 0 need not be set for the programmer (the test link E11 acts as an enable for interface 0).

0 351-4/5/C/kV/aV/A

***sw3**

The CR355 can function in modes that emulate other Softcon controllers. When set to type 0, CR351/2/4 controllers are emulated. 1 sets CR355, that have configurable inputs and outputs and additional features. Type 2 sets cash loader (requires special EPROM) and type 3 sets key Vender, 4 sets Access vender (requires special EPROM), 5 selects CR355A. Type 2 to 4 require database mode 10.

0 192/96/48

*** Not set by PC**

The communication baud rate speed (bits per second) of the main serial port is set at:

0 = 19k2 1 = 9k6
2 = 4k8 3 = 2k4

When the RAM is 'dropped' (power off and battery link removed), the option defaults to 9k6.

0 LA/TE/MO/PC/HH

*** Not set by PC**

The communication type of the main serial port is set at:

0 = LAN in 9 bit mode (preferred) 1 = Test mode
2 = Dial-up modem 3 = Directly to PC COM port, or LAN in 8 bit mode
4 = Hand programmer

When the RAM is 'dropped' (power off and battery link removed), the option defaults to LAN.

0 db10 Size

dB10 size 0 = 950 LAN, 10k with PIN, 15k no PIN. (default)
1 = 2900 LAN, 6k5 with PIN, 9k no PIN.

0 Not/ser echo card

0 = None

1 = Echo card entered to serial port R2: nnn r 0123456789 nnn=address, r=reader, 10 card number, CR

0 Not/Display Card

0 = Not Display

1 = Display card number swiped on LCD

1 Latch click en/dis

Causes DC door latches to click, giving the user an audible indication when the latch opens.

0 = Output relay pulses once per second. 1 = Do not pulse.

1 AC O/N/C/Ot/Ct

Action complete is the **Softcon** term for Door Monitoring.

0 = Normally open contact

1 = No door contact - i.e. disable door monitoring

2 = Normally closed contact

3 = Normally open contact with time-out

4 = Normally closed contact with time-out

5 = Normally open contact till closed

6 = Normally closed contact till closed

1 Booth/n/1rd/ln

Booth is **Softcon's** term for "air-lock", "inter-lock" or mantrap, i.e. if a pair of doors is set for booth then they are inter-locked, only one may be opened at any time, the second door opening after the first has closed.

0 = Booth mode

1 = Normal mode (no booth/interlock)

2 = One reader booth (special for a sliding door booth)

3 = Interlock, doors are independent (second not opening after first closed) – a door cannot be opened (via egress or reader) while other is open or unlocked.

4 = One reader controller (reader=active reader enable input)

2 Nr.doors 0,1,2

Number of doors controlled by the CRC.

0 = No doors (no relay output)

1 = One door (output on latch 1 only)

2 = Two doors (output on latch 1 for door 1, latch 2 for door 2)

00 no/Cap/m/mC/Cd,

Cards capture type (reader 1, reader 2).

0 = Normal card reader (not motorized or capture)

1 = Reader in conjunction with a capture bin.

2 = Motorized reader (not capture)

3 = Motorized read (with capture capabilities)

4 = Capture reader (disable card after capture)

5=if expired, capture & exit (special function)

6=if not expire, exit (special function)

7=Pulse capture bin to open

000 10ms CapPulse

When capture is pulse, sets the pulse length in 10msec multiples. Max is 255 = 2.55 seconds.

0 or 1 is 10msec, any other setting has a resolution of 10msec (e.g. 10 = 90 to 110msec).

00 NO / NC Latch L12

Latch type. 00 = Latch 1 and 2 normally open
10 = Latch 1 normally closed, latch 2 normally open
01 = Latch 1 normally open, latch 2 normally closed.
11 = Latch 1 and 2 normally closed.

00 LED12 3,f/2,f

Reader LED type.
00 = 3-LED normal (1st digit = reader 1, 2nd digit = reader 2)
11 = 3_LED flash yellow (1st digit = reader 1, 2nd digit = reader 2)
22 = 2-LED normal (1st digit = reader 1, 2nd digit = reader 2)
33 = 2_LED flash yellow (1st digit = reader 1, 2nd digit = reader 2)

00 no/HI/P ena. R12

Reader disable option.
00 = Disable arming input for reader (1st digit = reader 1, 2nd digit = reader 2)
11 = Enable arming input for reader (1st digit = reader 1, 2nd digit = reader 2)
22 = Enable arming input for both reader and free exit button.
Input 7 - closed disables reader 1
Input 8 - closed disables reader 2

0 not/LO/LAN APB res

APB reset. 0 = Normal operation (hard-wired anti-passback disabled)
1 = Auxiliary input 2 resets anti-passback
2 = If LAN comms off, card granted access if enabled for wither reader. Not applicable in stand-alone mode

02 db 2C,10 ran

dB mode. 02 = 64,000 card number capacity, no keypads. (default)
10 = Random number cards, with (6k5 / 10k cards) or without PIN (9k / 15k cards).

0 not/PIN used

***sw3**

In data mode 10, PIN pads can be used. If used, the database size is 10 000 card, if not the size is 15 000 cards. Using PIN readers (e.g. prox combinations) requires that HH be removed and controller reset before the PIN readers function correctly.

0 One/each RD Tg

***sw3**

Cards can use one time group or have different time groups per zone. When using different time groups per zone, the database is smaller for database 2, namely 32 000 cards (64 000 if one time group).

0239 Client Code

Four figure number. Together with the site-code identify the cards as belonging to a particular site/installation. Ignored if client and site codes set to zero.

000 Site Code

Three figure number. Together with the client-code identify the cards as belonging to a particular site/installation. Ignored if client and site codes set to zero.

11 APB en/dis/hi R12

00 = Enable anti-passback (1st digit = reader 1, 2nd digit = reader 2)
11 = Disable anti-passback (1st digit = reader 1, 2nd digit = reader 2)

22 = Logical anti-passback (aux input 3 enables for reader 1, aux input 4 for reader 2)

< Time zone, Groups >

Use the right or left arrow keys to enter the time group options.

T1 Group 02 MTWTFSSH
00:00-00:00 1 1 1 1 1 1 1

The up and down arrows move between the time-zones.

The right and left arrows move between the time-groups.

T1 = Card time-zone 1 Group 01 = Card time-group 1

Time-zone of 00:00-00:00 = Never valid.

Time-zone of 10:00-10:00 = Always valid. (24 hours per day)

Time-zone of 08:30-17:15 = Valid from 8:30am to 5:15pm.

There are time-zones and time-groups for when Reader 1, Reader 2, PIN-pad 1, PIN-pad 2, Door 1 open, Door 2 open, inputs and outputs are active.

00-00 Holiday 01

30 holidays in the year, in the format DD-MM. Right and left off the month or date, displays the next, previous holiday.

< Input time gr >

***For CR351-4 mode only reserved inputs function**

Input time group for inputs, closed time group – open time group. If door tg also for illegal, not opened, too long.

< Output time gr >

***For CR351-4 mode only reserved outputs function**

Output time group for level 1.

16-17 Reader Tg

18-19 PIN Tg

20-21 Latch Tg

Time groups for when Reader 1-2, PIN 1-2 required and Latch 1-2 open.

***For CR355A mode only**

02-02b Card type

Reader and card type.

00 = 40 bit Wiegand card format.

02 = 44,40,36,35(corporate 1000),34,32,30,26 bit Wiegand card format.

04 = 26 bit Wiegand card format, 32 bit corporate 1000.

06 = 32 bit Wiegand card format (Aritech).

08 = **Softcon** mag-stripe card format (not ISO).

12 = Mag-stripe card format. ISO standard 7 characters

14 = Mag-stripe card format. ISO standard 8 characters

16 = Mag-stripe card format. ISO standard 1-12 characters

18 = Touch tags, random numbers (must be db10).

20 = 32 bit BCD, 34 bit GSC cards (no facility, 32 bit card number).

22 = Serial RS485 (Controlsoft).

0 LRC parity check/not

0 = Check the LRC character on ISO mag-stripe cards, check Wiegand parity.

1 = Do not check the LRC character on ISO mag-stripe cards, ignore Wiegand parity.

00 FormErr R12 n/y

0 = Not report reader format errors. 1 = Report reader format errors.

00000 Card offset

Five digit number that adds an offset to the card number. e.g. If the lowest card number to be used in the system is 6,001 then by setting an offset of 06000 card 6,001 becomes card number 1.

00-00 Nr Location

Location of card number data on the mag-stripe card. (start character = 01)

00-00 Facility location

Location of facility code data on the MAG-stripe card. (start character = 01)

For type 12 MAG-stripe cards:-

Client-code = facility-code / 256 Site-code = remainder.

e.g.. If facility = 1122, Client = 1122 / 256 = 4, Site = 1122 - (4 x 256) = 98.

00-00 Alt Nr location

Location of card number data on MAG-stripe card (start character = 01), if the facility number does not match.

0 dis/BEEP/al/B+a,aux

0 = Buzzer output disabled. 1 = Buzzer once for card accepted, twice for card rejected.

2 = Buzzer on alarm condition. e.g. door left open, invalid card etc.

0 sec open time-out

Number of seconds the door may be left open after being opened with a card or free exit request before a "door left open" alarm occurs.

04 sec. Lock time

Number of seconds the door output relays will operate for. If action complete is enabled then it will over-ride the latch time.

4 *250msec 1sec

250 msec latch time multiplier when lock time set to 1 second.

00 Illegal attempts

After X number of illegal attempts (invalid card or PIN) the reader / PIN-pad will be disabled for XX minutes.

00 min reader dis

On multiple illegal entry attempts, the time period for which the reader will be ignored.

00 R12 min ATB

Minutes a card is anti-timeback, per reader.

00 R12 ATB clr/n

0=Clear card from other readers ATB list, 1=not.

0000 Password

Not implemented – future use.

hhmmss DDMMYY w

Sets the real time (24 hour clock), date (dd-mm-yy) and day of week (Monday = day 1, Sunday = 7). The enter key must be used to accept this data.

< Modem Init >

Sets the data sent to the modem on power-up. The string is a maximum of 64 characters and is terminated when a 0FFH character (displayed as an underscore _) is encountered in the string. Carriage return (0DH) is automatically added. Characters are edited by moving to the characters with the right or left keys and entering 0 to 7 or scrolling through the characters via the up and down keys. The \ character is displayed as ¥.

< Input Port type >

***CR355 mode**

When the controller type is set to CR355 (setting above), the input ports are configured. Each of the local 16, the front modules 1 and 2 (4 each) supervised inputs are set as **Aux inputs** (normal input) or as a special function input, linked to reader/door 1 or 2:

APB follow. The cards APB is only changed when this input is read as high (open).

APB reset. When the input is read as low, all cards that have access on either reader, are given access on both.

Action complete. Door monitor.

Boot occupied. In booth (mantrap) mode, a low input (closed contact) indicates that the booth is occupied.

Capture. When card capture is set, a low input (contact closed) indicates that a card has been entered in to the capture bin.

Egress. When the Egress or push button input is read as low, the door is opened.

Reader enable. The associated reader is enabled when the input is high (open) and the reader functions normally. When low, the reader is disabled and the red led indicates that data from the reader is ignored.

Reader tamper. The latch control (via reader or push button) is disabled when the tamper input is low. This input is connected to a micro switch mounted on the reader that is low when the reader is removed from its mounting.

Latch monitor. The latch is monitored and only when locked after door closed (action complete) is action complete. When action complete is till door closed, latch is controlled locked on door closed.

Each input is set to be a 2 level detection (not supervised) or 4 level (supervised). Level is changed by entering 2 or 4.

< Output Port type >

***CR355 mode**

When the controller type is set to CR355 (setting above), the output ports are configured.

Each of the local 14 (outputs 13 and 14 are virtual), the front modules 1 and 2 (9 each, 9th output is virtual) outputs are set as **Aux outputs**, or as special function outputs linked to the reader/door:

Latch. Control of the latch.

Capture. Control of the capture bin.

Buzzer. Audible alarm output.

Reader Isolate. Output driven by the PC when reader is isolated (data is ignored). When set to a virtual output, the reader isolate is controlled without an output being controlled.

LED Green, Red, Yellow. LEDs are controlled displaying green for access granted, yellow flashing/steady for ready and red for access denied (out-area, out-time, ATB) or reader disabled. Yellow and red indicate facility error (Client or site code incorrect) or format error (number of bits or parity error). Flashing red indicates booth/interlock busy.

Interlock busy. When booth sequence is in progress or a door is open or unlocked in interlock mode, the output is activated.

22.2.9 Versions

Displays the Firmware (FW) or Software (SW) versions of the controller processor and the connected interfaces and the electronic ID of the controller and interfaces. These are:

CR355. The main program (IC 16) and ID of the controller PCB.

R1. The program of the R1 processor (IC 1).

- R2. The program of the R2 processor (IC 4).
- u0. The program and the ID of the interface 0 (connected to P1[9], no address link on interface).
- u1. The program and the ID of the interface 1 (connected to P1[9], address link on interface).
- u2. The program and the ID of the interface 2 – future option (connected to P2[10], no address link on interface).
- u3. The program and the ID of the interface 3 (connected to P2[10],address link on interface).

Unknown or not connected interfaces display version ???? and ID 0000.

23 HAND HELD SET-UP / DEFAULT MEMORY

SITE _____ LOCATION _____

RAM (used)	DESCRIPTION	EPROM*	SHIP
	Node address		
	FrontP 3210		
	351-4/ 355/Cash loader/ Vending		
	Baud 19k2/9k6/4k8/2k4		
	Serial type LAN/Test/Modem/PC/HH	FF00H	0
	dB10 size 0=LAN 950, dB 10k & 15k / 1=LAN 2k9, dB 6k5 & 9k	FF01H	0
	Not/echo card number to serial port R2	FF64H	0
	Latch click en/disable	FF02H	1
	Action Complete Open/ None/ Closed/ O till closed/ C till open	FF03H	1
	Booth/None/1 reader/ Interlock	FF04H	1
	Number or doors 0,1,2	FF05H	2
	None/Capture/Motor/Motor Capture/Capture disable R12	FF06H	0
	Latch NO/NC L12	FF07H	0
	LEDs 3-Normal/ 3-Flash/ 2-Normal/ 2-Flash R12	FF08H	0
	Reader enable None/ Hi/ Reader+PB R12	FF09H	0
	APB reset None/ Lo/ LAN	FF0AH	0
	dB Mode 2=Running/ 10=Random	FF0BH	10
	PIN Not/ used	FF0CH	0
	One / Each reader time group	FF0DH	0
	Client code	FF0EH*	0
	Site code	FF10H	0
	APB enable/ disable/ Hi R12	FF11H	11H
	Reader TG (only CR355A) R12	FF12H*	0,0
	PIN TG (only CR355A) R12	FF14H*	0,0
	Latch TG (only CR355A) R12	FF16H*	0,0
	Card type 40/ 30/ 26/ R12	FF18H*	2,2
	MAG LRC, Wiegand check do/not	FF1AH	0
	Report reader framing errors y/n R12	FF1BH	0
	Card offset	FF1CH*	0
	ISO MAG Number location	FF1EH*	2,9
	ISO MAG Facility location	FF20H*	0,0
	ISO MAG alternate number location	FF22H*	0,0
	Buzzer mode disable/ BEEP/ alarm/ BEEP+alarm	FF24H	0
	Door open too lone time-out (seconds)	FF25H*	0
	Lock time (seconds)	FF27H	4
	*250 msec latch time for 1sec lock	FF65H	4
	Illegal attempts	FF28H	0
	Reader disable after illegal attempts (minutes)	FF29H	0
	Anti-time back (minutes) R12	FF2AH	0
	Anti-time back clear/not other reader R12	FF2BH	0

Default values (as shipped shown) at EPROM locations are copied to battery back-up RAM (the setting used) when on power-up this RAM detected as not battery back-up. * indicates 2 bytes, with the first byte the MS value (word/256).

Where byte is setting for R12 or L12, the MS nibble is for R1 or L1, LS nibble for R2 or L2 (e.g. 12 is 12H).

Access, Reader, Pin, Action complete and Input Time Zones default to 6:00 to 6:00.

Access and Input Group 1, Readers-, Pins-, Action completes- Input groups default to enable all days.

INPUT TYPES

INPUT	RAM (used)	EPROM*	SHIP
1		FF2C	10
2		FF2D	5
3		FF2E	11
4		FF2F	6
5		FF30	7
6		FF31	9
7		FF32	12
8		FF33	13
9		FF34	2
10		FF35	3
11		FF36	4
12		FF37	1
13		FF38	1
14		FF39	1
15		FF3A	1
16		FF3B	1
17 #1		FF3C	1
18 #1		FF3D	1
19 #1		FF3E	1
20 #1		FF3F	1
21 #2		FF40	1
22 #2		FF41	1
23 #2		FF42	1
24 #2		FF43	1

Input Type	Setting
Auxiliary	1
APB 1	2
APB 2	3
APB reset	4
AC 1	5
AC 2	6
Booth occupied	7
Capture 1	8
Capture 2	9
Egress 1	10
Egress 2	11
RD 1 enable	12
RD 2 enable	13
RD 1Tamper	14
RD 2 Tamper	15
Latch 1 monitor	16
Latch 2 monitor	17

#1 Front module 1
#2 Front module 2

OUTPUT TYPES

OUTPUT	RAM (used)	EPROM*	SHIP
1		FF44	6
2		FF45	7
3		FF46	2
4		FF47	5
5		FF48	1
6		FF49	1
7		FF4A	10
8		FF4B	14
9		FF4C	12
10		FF4D	11
11		FF4E	15
12		FF4F	13
13 \$		FF50	8
14 \$		FF51	9
15 #1		FF52	1
16 #1		FF53	1
17 #1		FF54	1
18 #1		FF55	1
19 #1		FF56	1
20 #1		FF57	10
21 #1		FF58	14
22 #1		FF59	12
23 \$ #1		FF5A	1
24 #2		FF5B	1
25 #2		FF5C	1
26 #2		FF5D	1
27 #2		FF5E	1
28 #2		FF5F	1
29 #2		FF60	11
30 #2		FF61	15
31 #2		FF62	12
32 \$ #2		FF63	1

Output Type	Setting
Auxiliary	1
Buzzer 1	2
Buzzer 2	3
Capture 1	4
Capture 2	5
Latch 1	6
Latch 2	7
Enable 1	8
Enable 2	9
RD 1 Green	10
RD 2 Green	11
RD 1 Red	12
RD 2 Red	13
RD 1 Yellow	14
RD 2 Yellow	15
Interlock busy	16

\$ Reader enable are virtual ports.

LED port fixed (settable in future versions)

24 FW REVISION HISTORY (PCB B02)

MAIN FW (IC16 27512)

V0.00	2001-SEP-02	Proto-type.
V0.10	2002-JAN-09	Unlock again on reader/PIN, even if door is open (CRRD). LCD more friendly.
V0.11	2002-JAN-11	RTC change.
V0.12	2002-JAN-16	Correct off-line LED.
V0.13	2002-JAN-21	BCD cards, DB10 8 digits.
V0.14	2002-FEB-07	Cash loader.
V0.20	2002-MAR-03	Card decoding in main uP. ISO.
V0.21	2002-MAR-12	LCD messages from PC. HH link not need reset when removed (test mode is start-up with link in).
V0.22	2002-MAR-15	Check card 0. LCD corrections. Status uses own array (not limited to 3000 cards).
V0.23	2002-MAR-25	Set which fron processors to poll. Repeat messages to uPs and reset if local uP not respond.
V0.24	2002-APR-0	Correct DB10 error.
V0.25	2002-APR-11	Out area not send again. Repeat 15 times to on-board uP, then discard (not reset). Correct card capture.
V0.26	2002-MAY-03	ISO mag corrected.
V0.27	2002-MAY-13	Vend keypad.
V0.28	2002-JUN-10	15000 Random cards. Coporate 1000 cards.
V0.29	2002-JUL-13	Reset when comms error to R1, R2. R1, R2 LEDs on if misread. 10 digit cards.
V0.30	2002-JUL-15	Send init to uPs when card error.
V0.31	2002-JUL-25	Correct reader 2 card 0 on door not opened.
V0.32	2002-AUG-22	Correct MAG errors, missing data.
V0.33	2002-AUG-29	Booth mode.
V0.34	2002-SEP-06	Correct error on door 2 unlock timing.
V0.35	2002-SEP-11	Correct Send init to uPs when card error. Controller type, CR355 sends date.
V0.36	2002-SEP-15	PC CARD mode (Alt card location).
V0.37	2002-OCT-05	Cash load corrections. Configurable inputs.
V0.38	2002-OCT-07	Cash load with PIN only. Configurable outputs.
V0.39	2002-OCT-14	Correct error on MAG, ALT card.
V0.40	2002-OCT-17	Cash and access in same EPROM.
V0.41	2002-OCT-20	Touch.
V0.42	2002-NOV-05	Time groups on inputs.
V0.43	2002-NOV-08	Time groups on outputs.
V0.44	2002-NOV-22	Correct error on CR351 control latch. Correct output time groups.
V0.45	2002-DEC-10	Softcon MAG.
V0.46	2002-DEC-28	Card dump in test mode.
V0.47	2003-JAN-08	Correct editing of TG 2, Capture, Batch load.
V0.48	2003-JAN-30	Number of Alt chars sent as ALT setting (5 minimum).
V0.49	2003-FEB-18	32 bit BCD. All uP Versions and IDs.
V0.50	2003-MAR-17	Correct touch error. Not lock door if TG open, door open, PB.
V0.51	2003-MAR-20	Again - Not lock door if TG open, door open, PB.
V1.00	2003-APR-10	Counting inputs (only aux inputs, levels 1 to 4). CR355 4 levels EOL: SS, Closed, Open, OC, Ill open, too long, not opened. 2 levels or CR351: Closed, Open, Ill open, too long, not opened. Front uP only CR355. CR355 TG on not opened (2 levels=level 5, 4 levels=level 7. Motor readers.
V1.01	2003-APR-25	Display card option in HH.
V1.02	2003-MAY-20	If no buzz 2 set, use buzz 1. Defauly CR351 buzz 1 to port 3, no buzz 2. Send set-up to on-board uP when they power-up (message bit type 0).
V1.03	2003-MAY-29	Correct duliclate out of area reporting.
V1.04	2003-JUN-27	ISO special UCT, if 5 digits card number read, add 00 to back.
V1.05	2003-JUN-29	Correct booth error with AC NO, open till close. Flash reader LEDs red when booth busy. Output for booth busy. Latch monitor. Flash reader yellow LEDs.
V1.06	2003-JUL-24	Change cash loader. Change power up, HH link.
V1.07	2003-JUL-26	Longer disable note reader before clear display.

		Correct RD 2 capture, not drop card - disabled reader 1.
V1.08	2003-AUG-12	Not report entered if capture. Not set front processors to 1 on power-up (error 1.07).
V1.09	2003-AUG-18	Time-out out of area. Correct input time group.
V1.10	2003-SEP-04	Correct RTC on power-up (error 1.08).
V1.11	2003-SEP-19	CR355 mode, PC latch control to match CR351.
V1.12	2003-SEP-26	Capture always reported, entered always reported, regardless of capture(thus both). Need PC 01.01.12.
V1.13	2003-OCT-01	Editing of capture options. Initialize ports correctly.
V1.14	2003-OCT-14	WaveTrend Asset track.
V1.15	2003-OCT-30	Check Wiegand DB10 only BCD (not HEX). Correct too few characters ISO card. Ignore invalid RTC from PC.
V1.16	2003-NOV-11	Clear other reader card ATB. Correct loosing card data.
V1.17	2003-DEC-11	Correct too few characters ISO card.
V1.18	2003-DEC-12	44 bit Wiegand. LEDs setting 0=3-LED, 1=3-LED flash yellow, 2=2-LED, 3=3-LED flash yellow.
V1.19	2003-DEC-22	Wiegand keypad (4 bit data).
V1.20	2004-JAN-14	Comms set option (LAN, TEST, MODEM, PC). Correct ISO Mag too few characters.
V1.21	2004-JAN-22	Set 30bit Wiegand parity change bit at 0FFFEH (HID faulty cards). Display HEX digits correctly on read card at reader. Reader LED red on power-up, then ready.
V1.22	2004-JAN-26	LAN and Modem in one. Baud set in EE_RAM via HH.
V1.23	2004-FEB-11	Comms LED corrected (error in 1.22). Barcode readers. Latch click corrected. Set HH on LAN port.
V1.24	2004-FEB-23	Speed faster even if HH link in.
V1.25	2004-MAR-01	Correct PIN edit. DB6 PIN 6 digits. DB10 PIN 5 (set as 2 byte word by PC) or 6 digits (sent as 3 bytes BCD). Correct LAN off-line problems on start-up. Allow barcode with less than set digits. Allow ISO MAG characters :<>
V1.25	2004-MAR-18	Cash loader, sends 12 character card number (6 bytes), ms 2 bytes were 00.
V1.26	2004-MAR-25	LCD display hex shows number of bits. Correct LCD position error sometimes. 36-bit HID Corporate 1000 Chubb without checks.
V1.27	2004-APR-05	Correct loss of node on battery off. uP not reset on too much data from reader. Not sent multi-wrong format to PC.
V1.29	2004-MAY-11	Not wait reader error time-out before reading card again (ignore wrong format if LED red).
V1.30	2004-MAY-11	Option to set if reader must clear other ATB, ATB set per reader (0 to 9). Format and facility error display red, yellow. Other errors red led, also ATB.
V1.31	2004-MAY-14	Out-area busy can read new card, same card ignored.
V1.32	2004-MAY-15	PCB reader led stretch after search (ignore rubbish from reader).
V1.33	2004-MAY-31	Booth type interlock. 2 doors independent doors cannot open at the same time. Reader type 22. Longer delay before reset on uPs no answer. Shorter delay to ignore data from reader (1.32).
V1.34	2004-JUL-01	Correct R2 isolate from PC.
V1.35	2004-JUL-12	Correct reporting of output change on TG. Report wrong PIN if bad PIN followed by card, even if PIN not required. 32-bit cards: Type 2=standard 32, Type 4=old HID corporate 1000, Type 4=Aritech, Type 20=BCD. 34-bit cards: Type 2=standard 34, Type 20=GSC.
V1.36	2004-JUL-26	Correct Aritech. Universal card decode SW. EOL Illegal open level 5, not 6.
V1.37	2004-AUG-24	Modem init data editable.
V1.38	2004-AUG-24	Ignore errors from reader when notes enabled. Disable note reader while waiting for PC to give display message after note read. Repeat last note read if display time-out. Clear last note read when message from PC.
V1.39	2004-SEP-11	Report framing errors set-up.
V1.40	2004-OCT-04	Correct en-disable readers on input, isolated (was wrong way round). Read date only if seconds read 0. Better comms, Send R1 version to HH (HH version 0.17+). Ignore site code if no site code found for wiegand, ISO start end not set (found=set). If wrong facility, send facility and card read to LAN. Each reader has own card type. Facility same for both.
V1.41	2004-DEC-23	Correct Wiegand PIN reader, PIN faster.

V1.42	2005-JAN-26	37 bit Wiegand.
V1.43	2005-JAN-26	Comms 8 bit (PC) correction. Correct power-up message from front ends.
V1.44	2005-MAR-17	34 bit Wiegand - Dutch.
V1.45	2005-APR-13	Not poll front ends when HH (only HH). HH display of LED out type fixed. Order front ends I/O CR372 V0.04, CR374 V0.23. Report not capture card. When receiving input type for input 0, default inputs; output 0, default outputs.
V1.46	2005-JUL-25	Correct display of input time-groups. Report captured when sensing card drop, entered on door opened.
V1.47	2005-AUG-01	1-reader controller (reader=active reader enable input).
V1.48	2005-AUG-16	Correct LAN overwriting dB (1.46)
V1.49	2005-AUG-17	Check array bound for counter input levels. Correct send all versions and IDs.
V1.50	2005-AUG-25	44 bit cards only LSB if 1st byte = 0 Delay between cards in ROM FFFD. More than 1 is 250msec multiples
V1.51	2005-SEP-25	Reader LEDs show green when door open (even ill open) - same as CR351 APB off-line - enabled for either opens door (opened regardless)
V1.52	2005-OCT-10	Out-area updated from PC, with action complete or capture did not report entered
V1.53	2005-OCT-13	Correct 1 door error created 1.51
V1.54	2005-OCT-16	Push button not clear card waiting to open door Access vend (mode 4): swipe sends request item 1, on do vend open, on AC send vended
V1.54	2005-DEC-06	Correct HH edit of digits ??xx?????? when random, no PIN
V1.55	2005-DEC-06	Omniscan reader (44 bit) when PARITY_30 AT 0FFFEH=0. 5 bytes HEX to BCD. Correct edit display of random card digits when not PIN ??xx?????? (xx had error)
V1.56	2005-DEC-10	Booth / interlock reader and PB disabled if other door open
V1.57	2006-JAN-16	Any of 60 time groups (15 groups per 8 time zones). Needs PC translator and type CR355A Display 12 chars card number. ROM default RAM at specific location.
V1.58	2006-MAR-13	Add port number to vend, auto funds request after vended.
V1.59	2006-APR-10	Change to 37 bit cards.
V1.60	2006-APR-15	Add 27 bit Indala. Correct overwriting MAG ALT location if not received from PC.
V1.61	2006-MAY-25	Latch NOC EPROM setting changed to MS nibble L1, LS nibble L2.
V1.62	2006-JUL-28	Add 36 bit Lenel cards (type 4). New unique ID device component. Correct reporting of level 1 or 2 (was reporting 25) on control of outputs on time-group. Output set as reader enable disables reader on time-group. If not virtual, output also closed.
V1.63	2006-AUG-06	Echo card read to serial port R2 (set-up option) "NNN R 1234567890"CR. Change to modem connect commands
V1.64	2006-SEP-11	Allow hex for random Wiegand
V1.65	2006-SEP-30	Set 250msec latch time length when latch time is 1 second
V1.66	2006-NOV-10	Correct control of output when no latch output set and reader swiped
V2.00	2006-DEC-01	New decode: 44 bit cards: IMPRO type 2, Omniscan type 4 (was 0 at 0FFFEH) Type 2=30 bit with parity change at 0FFFEH, type 4=30 bit with parity on full card Ignore parity when LRC>0
V2.01	2007-JAN-01	Correct error on output control from PC, caused V1.67
V2.02	2007-FEB-06	P&G Mifare reader - 32 bit type 8
V2.03	2007-MAR-07	DB change from PC - if not 2 or 10, change to 2 or 10 (not what is now). If 0, was ignoring
V2.04	2007-APR-07	Correct control of aux out 2
V2.05	2007-APR-19	Output type settable for LEDs. New Card decoding. 46 bit Deister
V2.06	2007-MAY-29	Display card number on LCD (set-up option)
V2.07	2007-AUG-05	Not control aux out output on TG is Pulse busy
V2.08	2007-OCT-25	Motor readers, PC control capture output
V2.09	2007-NOV-15	Capture pulse set to 10msec multiples (1 fixed, thereafter resolution of 10)
V2.10	2007-NOV-15	Permanent PB, not lock and not open too long. Correct Access vend.
V2.11	2008-JAN-29	French dd-mm-yyyy. Reorganize Modem init strings
V2.12	2008-MAR-10	44 bit no client. LAN never discard message (did after a repeat).
V2.13	2008-MAY-02	34 bit BCD
V2.14	2008-JUN-17	Cash loader 16 notes
V2.15	2008-JUL-04	Check In, output time groups not exceed limit, set default by PC commands Correct corporate 1000 parity
V2.16	2008-JUL-31	Cash loader not enable note reader on unknown, busy, reduce time from 15 to 10sec HH display number of cards enabled

R1 FW (IC2 AT89C4051)

V0.00	2001-SEP-02	Proto-type
V0.01	2002-JAN-21	37 bit cards (HEX)
V0.02	2002-FEB-15	ISO cards
V0.10	2002-MAR-03	Card decoding not in uP
V0.11	2002-MAR-20	Poll front if enabled
V0.12	2002-APR-04	Always poll front ends
V0.13	2002-MAY-04	Clear IIC interrupts (Corrects MAG delay now and then)
V0.14	2002-JUN-14	Send version to main uP
V0.15		Sync to R2
V0.16	2002-AUG-22	Service master RX when waiting to send data
V0.17		Sync to R2
V0.18	2002-OCT-16	Touch
V0.19	2002-NOV-12	Default outputs off
V0.20	2003-APR-01	Ignore data bits < 4
V0.21	2003-MAY-21	Tell top we power-up with bits type 0
V0.22	2003-JUN-03	Because of static, default to touch
V0.23	2003-OCT-24	Match R2
V0.24	2003-NOV-11	Correct loosing card data when receiving commands
V0.25	2004-JAN-23	Reader errors to main uP (Touch errors)
V0.26	2004-FEB-11	Serial comms set from above (enables barcode)
V0.27	2004-APR-06	Correct serial comms error
V0.28	2004-APR-19	Match R2
V0.29	2004-JUN-14	Abort too many reader bits so top can service
V0.30	2004-JUN-23	HH comms, delay after ACK
V0.31	2004-JUL-01	HH comms, ACK not need poll. Requires CR374 1.16 (else slow)
V0.32	2004-OCT-04	Better comms - Needs CR374 1.17
V0.33	2004-DEC-23	Only send reader bytes with data (not all)
V0.34	2005-JAN-25	Correct touch error in V0.33
V0.35	2005-FEB-22	Parity on serial comms. CS reader LED port to match order in CR355 1.45
V0.36	2005-JUL-25	Byte at FFFH set fixed number of bits - no delay (0=not used)
V0.37	2006-OCT-03	Re-init reader interrupts on interrupt and on reader type set

R2 FW (IC4 AT89C4051)

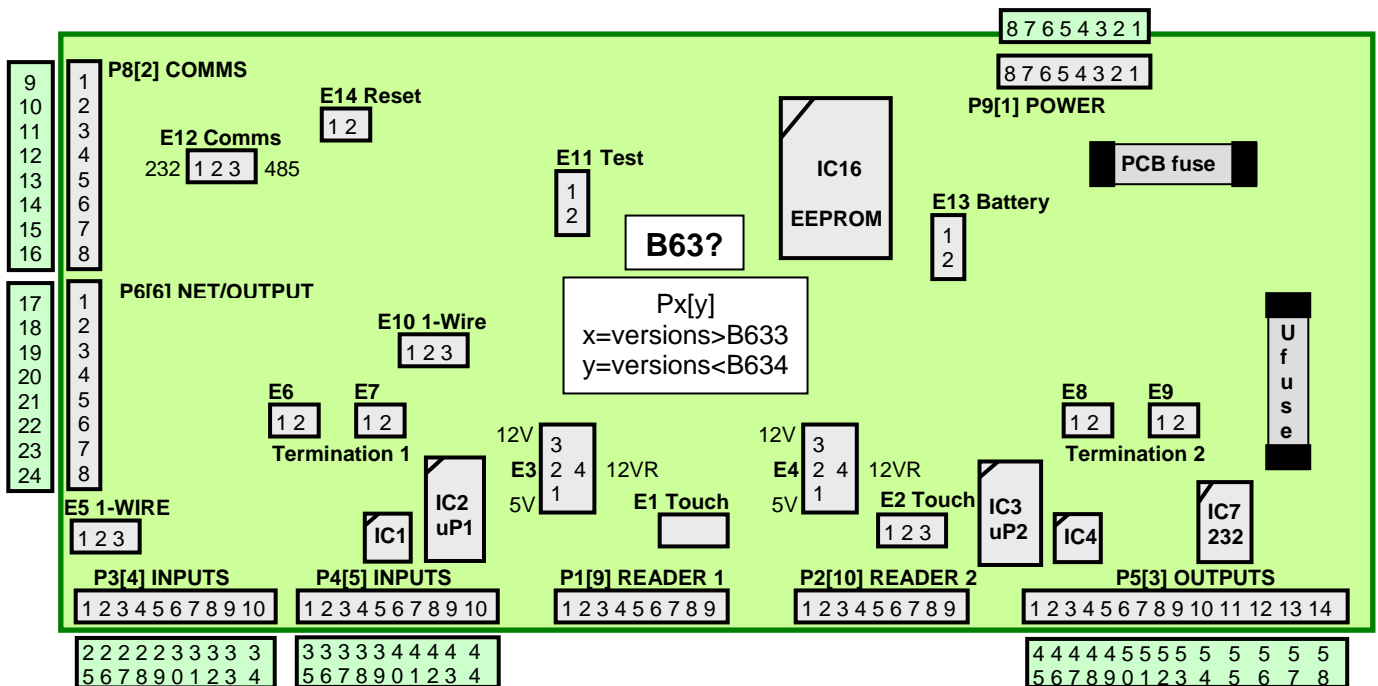
V0.00	2001-SEP-02	Proto-type
V0.03	2002-JAN-21	37 bit cards (HEX)
V0.04	2002-FEB-08	Variable baud rate, character structure
V0.10	2002-MAR-02	Reader not decoded, sent to the top
V0.11	2002-MAR-04	Read A/D 3 times
V0.12	2002-APR-04	Always poll front 2
V0.13	2002-MAY-04	Clear IIC interrupt (Corrects MAG delay now and then)
V0.14	2002-JUN-14	Send version to top
V0.15	2002-JUL-24	Remove front ends
V0.16	2002-AUG-22	Check master RX when having reader data
V0.17	2002-SEP-12	Not do AD while receiving reader data. Literal comments for CASH loader / reader
V0.18	2002-OCT-16	Touch
V0.19	2002-NOV-12	Sync with R1
V0.20	2003-APR-01	Ignore reader < 4 bits
V0.21	2003-MAY-21	Tell top we power-up with bits type 0
V0.22	2003-JUN-03	Because of static, default to touch
V0.23	2003-OCT-13	Read serial type and poll front from main uP A/D rate faster, requires changed R32 from 270k to 68k
V0.24	2003-NOV-12	Sync with R1
V0.25	2004-JAN-23	Reader errors to main uP (Touch errors)
V0.26	2004-FEB-11	Serial comms set from above (enables barcode)
V0.27	2004-APR-06	Correct serial comms error
V0.28	2004-APR-19	Improve on AD levels
V0.29	2004-JUN-23	Reader type 22. Cash / reader one FW (one does all).

- Abort too many reader bits so top can service
 Improve misreads by aborting A/D when reader busy
 Cash reader all one
- V0.30 2004-JUN-30
 V0.31 2004-JUL-12 AtoD stops IIC – faster speed when 2 front ends (max baud on serial??)
 V0.32 2004-OCY-08 Correct serial number of bit - now cash, std all in one
 V0.33 2004-DEC-23 Only send reader bytes with data (not all)
 V0.34 2005-JAN-25 Correct touch error in V0.33
 V0.35 2005-FEB-22 Parity on serial comms.
 V0.36 2005-JUL-25 Byte at FFFH set fixed number of bits - no delay (0=not used)
 V0.37 2006-OCT-03 Re-init reader interrupts on interrupt and on reader type set

25 PCB REVISION HISTORY

- B631. 2001-09-17. CR 355 Concept release.
 B632. 2001-10-18. Add 4k7 pull-up to the inputs if IC 5 (ULN 2803)
 Link in series with battery.
 B633. 2002-02-21. 100nF cap across battery positive and GND.
 Change battery footprint to accept various vendors.
 B634. 2004-03-04. New layout.
 Add 8 tantalum 33uF caps on 5V supply, 5V and ground planes.
 B635. 2004-04-16. General corrections on B634.
 B636. 2004-04-21. Swap RS232 TX and RX connector pins.
 B637. 2004-08-15. Swap R1 red and yellow LED pins on P1.
 Add pin 4 to E3 and E4 (12V via 90 ohm).
 B638. 2007-08-11. Move uP close together to reduce noise..
 B639. 2007-11-30. Correct ?.

26 CARD READER CONTROLLER P.C. BOARD



CR355 INSTALLATION CHEKLIST



SOFTWARE CONTROL SERVICES (PTY) LTD
Control by micro processor is our business "You name it, we'll control it"

475 King's Highway, Lynnwood
 P.O. Box 36675, MENLO PARK
 Pretoria, South Africa, 0102

Tel : (+27 12) 3487301
 Fax : (+27 12) 3481129
 Email : softcon@softconserv.com
www.softconserv.com

CR355 INSTALLATION CHECKLIST Date

Site	<input type="text"/>	Client	<input type="text"/>
Installer	<input type="text"/>	Person	<input type="text"/>
Checked	<input type="text"/>	Signature	<input type="text"/>

1 HARDWARE.

1.1 CABLE TYPES (used in sections below)

1	2 core mylar	2	3 core mylar	3	4 core mylar
4	2 core, 0.2mm mylar screened	5	4 core, 0.2mm mylar screened	6	8 core, 0.2mm mylar screened
7	16 core, 0.2mm mylar screened	8	20 core, 0.2mm mylar screened	9	24 core, 0.2mm mylar screened
10	2 twist pair, 0.2mm mylar screened	11	4 twist pair, 0.2mm mylar screened	12	8 twist pair, 0.2mm mylar screened

1.2 CONTROLLER

ID	<input type="text"/> Number	<input type="text"/> Name	<input type="text"/> Node
	<input type="text"/> Location		
Devices	<input type="text"/> EPROM	<input type="text"/> PAL	
Links (to 1 or 3)	<input type="checkbox"/> E1(Rd1)	<input type="checkbox"/> E2(R1v)	<input type="checkbox"/> E3(R2v) <input type="checkbox"/> E4(Rd2) <input type="checkbox"/> E5(Rd1) <input type="checkbox"/> E6(Rx) <input type="checkbox"/> E7(Rd2)
Mounting	<input type="checkbox"/> Away from noisy devices (lifts, DB's, Motors, etc.).		<input type="checkbox"/> Housing to earth.
	<input type="checkbox"/> On safe side.	<input type="checkbox"/> Fixed to wall.	<input type="checkbox"/> LED's visible.
<i>Outside units</i>	<input type="checkbox"/> <i>Weather proof.</i>	<input type="checkbox"/> <i>Cooled or aired.</i>	<input type="checkbox"/> <i>Light color or in shade.</i>
Power supply	<input type="checkbox"/> 220VAC.	<input type="checkbox"/> <i>Ah UPS.</i>	<input type="checkbox"/> Via line filter.
General	<input type="checkbox"/> Cable lugs.	<input type="checkbox"/> Reader connectors correctly crimped.	
	<input type="checkbox"/> No wiring over PCB.	<input type="checkbox"/> No additional devices in housing (relays, bridge rectifiers, etc.).	
	<input type="checkbox"/> <i>Lightning protection.</i>	<input type="checkbox"/> <i>Physical separation of "clean" and "field" sides.</i>	

1.3 READERS, LCD and PIN

Qty, types	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Mounting	<input type="checkbox"/> Correct screws, straight.	<input type="checkbox"/> Smaller than frame.	<input type="checkbox"/> Weather protected.	
	<input type="checkbox"/> Metal earthed.	<input type="checkbox"/> Prox readers not back to back.		
LED's	<input type="checkbox"/> Amber (power), Green (access granted), Red (access denied).			
	<input type="checkbox"/> Other.	<input type="text"/>		
Cable Readers	<input type="checkbox"/> Type.	<input type="checkbox"/> Concealed at secure side.	<input type="checkbox"/> Screen to controller earth.	
	<input type="text"/> m length.	<input type="checkbox"/> Knockout 4 with gland.		
<i>Cable LCD</i>	<input type="checkbox"/> Type.	<input type="checkbox"/> <i>Concealed at secure side.</i>	<input type="checkbox"/> <i>Screen to controller, LCD earth.</i>	
	<input type="text"/> m length.	<input type="checkbox"/> <i>Knockout 3 with gland.</i>		
<i>Cable PIN</i>	<input type="checkbox"/> Type.	<input type="checkbox"/> <i>Concealed at secure side.</i>	<input type="checkbox"/> <i>Screen to controller, PIN earth.</i>	
	<input type="text"/> m length.	<input type="checkbox"/> <i>Knockout 3 with gland.</i>		

1.4 CONTROLLED DEVICE (DOOR, TURNSTILE, BOOTH, BOOM, ETC)

Fly back diodes	<input type="checkbox"/> Fitted correctly at load – including at load relays			
Latch	<input type="checkbox"/> Mounted correctly, secure side.	<input type="checkbox"/> Cable type	<input type="checkbox"/> knockout 5 with gland	<input type="checkbox"/> concealed, secure side.
<i>Door sensor</i>	<input type="checkbox"/> <i>Mounted correctly, secure side.</i>	<input type="checkbox"/> <i>Cable type</i>	<input type="checkbox"/> <i>knockout 4 with gland</i>	<input type="checkbox"/> <i>concealed, secure side.</i>
<i>Push button</i>	<input type="checkbox"/> <i>Mounted correctly, secure side.</i>	<input type="checkbox"/> <i>Cable type</i>	<input type="checkbox"/> <i>knockout 4 with gland</i>	<input type="checkbox"/> <i>concealed, secure side.</i>
<i>Break glass</i>	<input type="checkbox"/> <i>In series with latch.</i>	<input type="checkbox"/> <i>Cable type</i>	<input type="checkbox"/> <i>knockout 5 with gland</i>	<input type="checkbox"/> <i>concealed, secure side.</i>
<i>Aux inputs</i>	<input type="checkbox"/> <i>Numbered cables.</i>	<input type="checkbox"/> <i>Cable type</i>	<input type="checkbox"/> <i>knockout 4 with gland.</i>	
<i>Aux outputs</i>	<input type="checkbox"/> <i>Numbered cables.</i>	<input type="checkbox"/> <i>Cable type</i>	<input type="checkbox"/> <i>knockout 5 with gland.</i>	

1.5 LAN

Cable	<input type="checkbox"/> Type.	<input type="checkbox"/> Screen to cr earth.	<input type="checkbox"/> Screen thru.
	<input type="checkbox"/> No T's.	<input type="checkbox"/> Data/data R/B, Gnd Y&G.	
Position	<input type="checkbox"/> Mux.	<input type="text"/> Previous CR <input type="text"/> m	<input type="text"/> Next CR <input type="text"/> m <input type="checkbox"/> Knockout 2 with gland.
End of Line	<input type="checkbox"/> Ohms resistor.		

1.6 CONTROLLED DEVICE (DOOR, TURNSTILE, BOOTH, BOOM, ETC)

Fly back diodes Fitted correctly at load – including at load relays

Latch Mounted correctly, secure side. Cable type knockout 5 with gland concealed, secure side.

Door sensor *Mounted correctly, secure side.* *Cable type* *knockout 4 with gland* *concealed, secure side.*

Push button *Mounted correctly, secure side.* *Cable type* *knockout 4 with gland* *concealed, secure side.*

Break glass *In series with latch.* *Cable type* *knockout 5 with gland* *concealed, secure side.*

Aux inputs *Numbered cables.* *Cable type* *knockout 4 with gland.*

Aux outputs *Numbered cables.* *Cable type* *knockout 5 with gland.*

1.7 LAN

Cable Type. No T's. Screen to controller earth. Data/Data R/B, Gnd Y&G.

Total length m Mux 1. m Mux 2. m Mux 3. m Mux 4. Knockout 2 with gland.

End of Line Both ends (data /data). Ohms resistor.

Mux connector Back shell. Screwed to connector.

2 PC and SOFTWARE.

2.1 PC

CPU Pentium type. MHz. Mbytes RAM (64M or more).

Mbytes Hdisk free. CD drive. Stiffy drive.

Operating system Type. Edition / service pack. Functions disabled.

Network *Type.* *PCs.* *On-line.*

Power saving BIOS disabled.

2.2 SOFTWARE

General Version. Auto boot on power-up. Back-up.

Set-up Simulator. Password. No illegal characters.

Training Installer. Administrator. Operator.

27 INSTALLATION CHECKLIST



SOFTWARE CONTROL SERVICES (PTY) LTD

Control by micro processor is our business "You name it, we'll control it"

475 King's Highway, Lynnwood
P.O. Box 36675, MENLO PARK
Pretoria, South Africa, 0102

Tel : (+27 12) 3487301
Fax : (+27 12) 3481129
Email : softcon@softconserv.com
www.softconserv.com

INSTALLATION CHECKLIST

Date

Items in italics (blue) are site dependent. Softcon will only support sites that have completed this checklist, with all items checked or filled in. SW keys are only provided when the checklist, site installation lists have been received and accounts are not overdue.

Site	<input type="text"/>	Client	<input type="text"/>
Installer	<input type="text"/>	Person	<input type="text"/>
Checked	<input type="text"/>	Signature	<input type="text"/>

1 DOCUMENTATION.

Drawing/table Indicating controller location on LAN, node address and MUX.

2 HARDWARE.

2.1 CABLE TYPES (used in sections below)

1	2 core mylar	2	3 core mylar	3	4 core mylar
4	2 core, 0.2mm mylar screened	5	4 core, 0.2mm mylar screened	6	8 core, 0.2mm mylar screened
7	16 core, 0.2mm mylar screened	8	20 core, 0.2mm mylar screened	9	24 core, 0.2mm mylar screened
10	2 twist pair, 0.2mm mylar screened	11	4 twist pair, 0.2mm mylar screened	12	8 twist pair, 0.2mm mylar screened

2.2 CONTROLLERS

Qty, types, EPROM

Mounting Away from noisy devices (lifts, DB's, Motors, etc.). Housing to earth.
 On safe side. Fixed to wall. LED's visible.

Outside units *Weather proof.* *Cooled or aired.* *Light color or in shade.*

Power supply 220VAC. *Ah UPS.* *Via line filter.*

General Cable lugs. Reader connectors correctly crimped.
 No wiring over PCB. No additional devices in housing (relays, bridge rectifiers, etc.).
 Lightning protection. *Physical separation of "clean" and "field" sides.*

2.3 READERS, LCD and PIN

Qty, types

Mounting Correct screws, straight. Smaller than frame. Weather protected.
 Metal earthed. Prox readers not back to back.

LED's Amber (power), Green (access granted), Red (access denied).
 Other.

Cable Readers Type. Concealed at secure side. Screen to controller earth.
 m maximum length. Knockout 4 with gland.

Cable LCD *Type.* *Concealed at secure side.* *Screen to controller, LCD earth.*
 m maximum length. *Knockout 3 with gland.*

Cable PIN *Type.* *Concealed at secure side.* *Screen to controller, PIN earth.*
 m maximum length. *Knockout 3 with gland.*

2.4 CONTROLLED DEVICE (DOOR, TURNSTILE, BOOTH, BOOM, ETC)

Fly back diodes Fitted correctly at load – including at load relays

Latch Mounted correctly, secure side. Cable type knockout 5 with gland concealed, secure side.

Door sensor *Mounted correctly, secure side.* *Cable type* *knockout 4 with gland* *concealed, secure side.*

Push button *Mounted correctly, secure side.* *Cable type* *knockout 4 with gland* *concealed, secure side.*

Break glass *In series with latch.* *Cable type* *knockout 5 with gland* *concealed, secure side.*

Aux inputs *Numbered cables.* *Cable type* *knockout 4 with gland.*

Aux outputs *Numbered cables.* *Cable type* *knockout 5 with gland.*

2.5 LAN

Cable Type. No T's. Screen to controller earth. Data/Data R/B, Gnd Y&G.

Total length m Mux 1. m Mux 2 m Mux 3. m Mux 4. Knockout 2 with gland.

End of Line Both ends (data /data). Ohms resistor.

Mux connector Back shell. Screwed to connector.

3 PC and SOFTWARE.

3.1 PC

CPU Pentium type. MHz. Mbytes RAM (64M or more).

Mbytes Hdisk free. CD drive. Stiffy drive.

Operating system Type. Edition / service pack. Functions disabled.

Network *Type.* *PCs.* *On-line.*

Power saving BIOS disabled.

3.2 SOFTWARE

General Version. Auto boot on power-up. Back-up.

Set-up Simulator. Password. No illegal characters.

Training Installer. Administrator. Operator.

28 REPAIR GUIDE

In the following, T refers to screw terminal numbers.

	SYMPTOM	REMEDY
1	PCB dead (Green LED not ticking)	Check mains power supply. Check P6 plugged in. Check fuse F2. Check 5V regulator mounted in housing (12V between T2-3, 5V between T2-1).
2	No user voltage (AC/DC T40-43)	Check fuse F1.
3	Reader 1 or 2 not working	Check link E3 E4 for correct reader voltage selection. Check link E1 E2 for reader type selection. Replace IC3. Check PAL IC13 for correct reader type. Replace IC13. Replace IC17 (A791). Replace IC7.
4	Latch 1 or 2 not working	Replace IC4.
5	Aux relay not working	Replace IC13.
6	Push button 1 or 2 not working	Replace IC1. Replace IC8.
7	Action complete 1 or 2 not working	Replace IC1. Replace IC8.
8	Aux inputs 1 to 4 not working	Replace IC2. Replace IC8.
9	Booth input not working	Replace IC16.
10	Hand programmer not working	Replace IC6. Replace IC13.
11	Printer (stand-alone) not working	Check EPROM for terminal version. Check link E6 for RS232. Replace IC15. Replace IC7. Test R45 and R46 for 10 ohm.
12	RS485 LAN problems (D,/D)	Check EPROM for Lan version. Check link E6 for RS485. Replace IC14. Test R32 and R37 for 10 ohm. Check tranzorbs TR6 and TR7. Check DIL address switch for node selection. Replace IC8.
13	RS485 LAN problems (R,/R)	Replace IC9. Test R38 and R44 for 10 ohm. Check tranzorbs TR8 and TR9.
14	Date or time error	Replace IC10 base (DALLAS DS1216C).

29 ABRIVIATIONS AND TERMS

AC	Action complete (door status monitor).
Ah	Amp hour.
AMP	Measurement of electrical current.
APB	Anti-pass back (card cannot re-enter an area without exit).
ASCII	Data that can be displayed as text.
ATB	Anti-time back (card cannot be used at a the same reader for a set time-out).
Barrier	Vehicle boom.
Baud	Rate of bits per second of serial data on a communication line.
Bit	One bit of data, a logical zero or one.
Booth	A two door cubicle (mantrap), allowing access of only one person.
Byte	A character of data (8 bits).
CR351	Softcon 2 reader controller (Data/clock).
CR354	Softcon 2 reader controller (Wiegand).
CRC	Softcon CR351 or CR354 card reader controller.
Darlington	Type of integrated circuit (electronic component) for driving outputs.
DC	Direct current.
DB	Data base of card information.
DIP	Dual-in-line plug switches (on the PCB for address selection).
EC	European commission (standards for electrical emission and susceptibility, etc).
EPROM	Erasable Programmable Read Only Memory (component containing the program).
FW	Firmware (PCB program, in EPROM).
IC	Integrated circuit (electronic component).
LAN	Local Area Network (communication network linking a CRCs to the PC).
LED	Light emitting diode.
LSB	Least significant bit of a byte.
MAG	Magnetic tripe reader / card.
Mantrap	A two door cubicle (booth), allowing access of only one person.
MSB	Least significant bit of a byte.
NC	Normally closed.
NO	Normally open.
Node	LAN unit.
On-line	Connected to a PC.
Open collector	Type of integrated circuit (electronic component) for driving outputs.
PAL	Programmable Array Logic (an electronic component).
PC	Personal Computer (IBM compatible).
PCB	Printed Circuit Board.
PIN	Personal Identification Number.
RAM	Random Access Memory (parameters and card set-up).
ROM	Read Only Memory (FW).
SW	Software - PC program.
TTL	Transistor, Transistor Logic (digital IC).
UL	Underwriters Lab (standards for electrical emission and susceptibility, etc).
UPS	Un-Interruptible Power Supply.
VAC	Volt AC.
VDC	Volt DC.