

1.0 Introduction

The PC4204CX is a Power Supply / Relay Output / Combus Repeater Module. The PC4204CX provides a power output for system devices, 4 programmable relay outputs and an output to regenerate the Combus data signal to allow for longer wire runs.

NOTE: Do not use any power supply other than the PC4204CX to repower the Combus. If a power supply other than the PC4204CX is used, the Combus repower function will not operate as intended. See the control panel *Installation Manual* for details regarding this feature.

2.0 Specifications

- Transformer 16V_{AC}- 40V_A to 80V_A may be used to power the PC4204CX
- Backup battery 4Ah to 38Ah (not provided)
- Connects to control panel via 4-wire Combus
- Current draw from Combus: 30mA
- Four programmable relay contacts rated 2A, 30V_{DC}
- Selectable battery charging current (800mA or 1.2A)
- AUX current: 2.2A max., with 800mA battery charge current and 80VA transformer
- Tamper connection

3.0 Installing the PC4204CX

The PC4204CX should be located inside a compatible cabinet, mounted in a dry, secure location.

NOTE: The PC4204CX must be installed within a fire enclosure, as defined in EN60950. The cabinet must comply with the battery manufacturer's installation instructions.

NOTE: The cabinet should be mounted in a safe and reliable manner. A safety factor of 4 or higher must be provided.

Perform the following steps to mount the unit:

1. Press the five plastic standoffs through the mounting holes at the back of the cabinet.
2. Secure the cabinet to the wall in the desired location. Use appropriate wall anchors when securing the cabinet to drywall, plaster, concrete, brick or other surfaces.
3. Press the circuit board onto the plastic standoffs to secure the module to the cabinet.

Once the unit is mounted, wiring may be completed.

3.3 Installation and Wiring

NOTE: The PC4204CX is intended to be PERMANENTLY CONNECTED and should be installed by service personnel only.

Before beginning to wire the unit, ensure that all power (AC transformer and battery) is disconnected from the control panel.

Perform the following steps to complete wiring:

1. Connect the four panel-originating Combus wires to the PC4204CX. Connect the red, black, yellow and green Combus wires to the RED, BLK, YEL and GRN Combus In terminals, respectively.

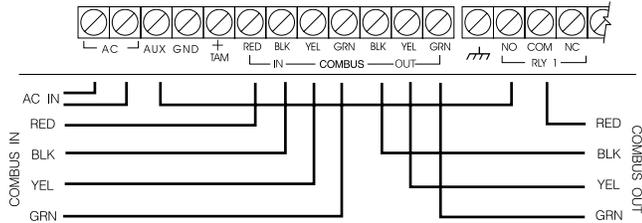
If Relay 1 is being used for Combus power, connect the Combus wires according to the diagram below. Note that for this option, jumper Con3 must also be set for "Repower Relay 1."

Additional modules repowered by the PC4204CX should have the black, yellow and green Combus wires connected to the BLK, YEL and GRN Combus Out terminals respectively.

2. Complete all output wiring.
3. Connect the external tamper switch, if used.

Consult the wiring diagrams for further information.

Wiring for Combus Repower and Regeneration



Current Ratings

In order for the system to operate properly, the power output of the PC4204CX module cannot be exceeded. The maximum available AUX supply current is dependent on the size of the transformer used as well as the selected battery charge current. Use the following chart to determine the maximum AUX supply current:

Maximum AUX Supply Current

BATTERY CHARGE CURRENT	40VA TRANSFORMER	80VA TRANSFORMER
HI-CHRG (800mA) OFF	700mA	2.2A
HI-CHRG (1.2A) ON	300mA	1.8A

NOTE: When using the PC4204CX to repower additional Combus modules, current calculations must be made to ensure that the maximum AUX supply current is not exceeded.

Module Ratings

The current draw of compatible modules is listed below:

Device	Current Draw (mA)
Keypad (LCD45XX)	50
PC4108A Zone Expander	30
PC4116 Zone Expander	30
PC4164 Wireless Receiver	110
PC4701 Fire Module	35
PC4702BP Dual Bell Output Module	75
PC4204CX Relay Output Module	30
PC4216 Low Current Output Module	15
ESCORT4580 Audio Assistant	150
PC4400 Printer Module	30
PC4820 Access Control Module	35
PC4936 Audio Interface Module	65
PC4401 Serial Interface Module	35
PC4850 Telephone Entry Module	135

Calculating Total Current Requirement

Once you have determined which modules will draw power from the main panel, use the following chart to calculate the Combus current.

Combus Current Calculation Chart

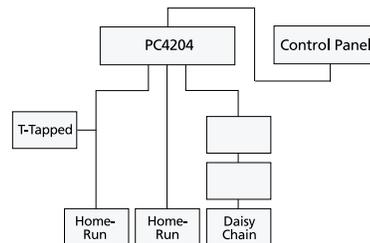
Item	Current (mA)	x	Quantity	Total (mA)
Keypad	50	x		
PC4108A*	30	x		
Current required for connected devices =				
PC4116*	30	x		
Current required for connected devices =				
PC4164	110	x		
PC4701	35			
PC4702BP	75	x		
PC4204CX	30	x		
PC4216*	15	x		
Current required for connected devices =				
Escort4580	150			
PC4400/4401	30/35	x		
PC4820	35	x		
PC4850	135	x		
PC4936*	65			
Alt. Comm.				
				Total Combus Current =

NOTE: * These modules draw current from the Combus to power devices external to the module. This current must be added to the total Combus current. See manufacturer's specifications for the current draw of each device. Each LED assembly draws up to 20mA of current.

Combus Operation and Wiring

The Combus is used by the control panel and the modules to communicate with each other. When the PC4204CX is used to repower and extend the Combus, please refer to the wiring diagram for the exact wiring procedure. **NOTE:** Please follow the diagram exactly.

Modules can be home-run, connected in a daisy chain or T-tapped anywhere on the Combus.



The following rules **MUST** be followed when wiring the Combus:

1. The Combus must be run in minimum 22-gauge wire.
2. No module can be more than 1000' (305m) in cable length from the PC4204CX.
3. Shielded wire should only be used in areas that present excessive RF noise or electromagnetic interference. If shielded wire is used, the maximum distance a module can be located from the PC4204CX is significantly reduced. Check the capacitance rating of the wire to calculate the maximum distance (see "Capacitance Limits"). **NOTE: Shielded wire is not recommended.**
4. The total capacitance of the Combus wiring must not exceed 80nF between the control panel and PC4204CX module or between two PC4204CX modules (see "Capacitance Limits" below).

Long Distance Combus Extensions

The length of Combus from a PC4204CX Combus Regenerator can be extended beyond 1000ft (305m), providing the following conditions are met:

- Combus must be regenerated and repowered at both ends of the wire run using the PC4204CX.
- No other modules are to be connected along the long distance wire run.
- A maximum distance of 4000ft (1220m) can be achieved between two PC4204CX devices. To extend further, additional PC4204CX devices should be used.

NOTE: The wiring used to connect this equipment must be insulated with PVC, TFE, PTFE, FEP, neoprene or polyimide.

When extending Combus long distances, use the following chart to determine what gauge of wire is necessary:

Maximum Length	AWG
2000ft (600m)	22
3000ft (900m)	21
4000ft (1200m)	20

Line Loss

When current is drawn through a piece of wire, voltage will be lost due to the wire's resistance. This voltage loss must be considered for all installations.

To ensure proper operation, at least 12.5V_{DC} must be applied to all modules on the system (when AC is applied and the battery is fully charged). If less than 12.5V_{DC} is applied, system operation will be adversely affected.

To correct the problem, try any or all of the following:

1. Connect another PC4204CX power supply near the module to provide power to the Combus.
2. Reduce the length of the Combus run to the module.
3. Increase the gauge of wire.

Capacitance Limits

An increase in capacitance on the Combus will affect data transmission and will cause the system to slow down. Capacitance will increase for every foot of wire added to the Combus. The capacitance rating of the wire used will determine the maximum length of the Combus, between two PC4204CX Combus Repower/ Regenerator modules.

For example, 22-gauge, non-shielded, 4-conductor wire has a typical capacitance rating of 20 picofarads per foot (which is 20nF/1000'). For every 1000' of wire added – regardless of where it is run – the capacitance of the Combus will increase by 20nF.

The following chart indicates the total Combus wire allowed depending on the capacitance rating of the wire used:

Wire Capacitance per 1000'(300m)	TOTAL Combus Wire Length
15nF	5300'/1616m
20nF	4000'/1220m
25nF	3200'/976m
30nF	2666'/810m
35nF	2280'/693m
40nF	2000'/608m

Wires run in parallel also increase Combus capacitance. For example, when using 20nF wire, the following would be some of the combinations allowed:

- Four wire runs at 1000' /305m each
- Six wire runs at 666' /203m each

- Eight wire runs at 500' /152m each
- 10 wire runs at 400' /122m each etc...

Contact the wire manufacturer for the capacitance ratings of the wire being used.

3.4 Regenerating Combus

This module will regenerate the Combus signal as it passes from one side to the other. The LEDs on the module will illuminate whenever there is activity on either side of the input or output of the module.

LED 1 illuminates when the module transmits data on 'Combus In'

LED 2 illuminates when the module transmits data on 'Combus Out'

The PC4204CX module will isolate 'Combus In' from any short circuit problems on 'Combus Out'. In the event of a problem, the PC4204CX module will generate a module fault along with the modules on the disabled Combus. This information can be used to determine which section of Combus is disabled on the system.

When connecting the PC4204CX to the Combus, care must be taken to ensure that the 'Combus In' terminals are connected to the wires originating from the control panel (or a module that may be situated between the PC4204CX and the control panel).

3.5 Applying Power

NOTE: Do not connect power until all wiring is complete.

After all wiring is completed, apply power to the control panel. Connect the battery leads to the battery, then connect the AC transformer. Then, connect power to the PC4204CX: first connect the battery leads, then the AC transformer.

For more information on control panel power specifications, see the control panel *Installation Manual*.

NOTE: It is the installer's responsibility to provide adequate protection for the transformer used in the primary and secondary circuit according to the rated current of the transformer. The transformer used must be Class 2, Fail Safe as defined within EN61558-1 and must meet the applicable requirements of the EN60950 Standard. A readily accessible disconnect device must be incorporated into the fixed wiring and must disconnect both poles simultaneously. The wiring connected to the PC4204CX must be mechanically protected, routed, supported, clamped or secured in a manner that prevents excessive strain on wire and terminal connections, loosening of terminal connections and conductor insulation damage.

NOTE: Do not connect fully discharged (less than 10V) or damaged batteries to the PC4204CX.

4. Enrolling the Module

Once connected, the module must be enrolled on the system. To enroll the module, perform the following:

1. Enter installer's programming by pressing [*] [8] [Installer's Code].
2. Scroll to "Module Hardware" and press the [*] key.
3. Scroll to "Enroll Module" and press the [*] key.
4. Scroll through the different modules until "PC4204" is displayed. Press the [*] key.
5. The message "Create Tamper on Desired Unit" will be displayed. To create the required tamper, secure the tamper zone on the module and then open it. The transition from secure to violated enrolls the module. After this is done, the keypad will display the module number and will confirm enrollment (e.g., "PC4204 Mod 01 Enrolled").

For more information regarding module enrollment, see the control panel *Installation Manual*.

5. Programming the Module

To access PC4010/4020 programming, enter [*][8] followed by the Installer's Code. Each relay output must be programmed. Please see the control panel *Installation Manual* and *Programming Worksheets* for a detailed list of output options.

NOTE: Relay 1 must not be programmed if used for Combustion power. Ensure that jumper CON3 is set to "Repower Relay1."

PC4204CX Outputs

Module Number: PC4204CX # (1-16 = XX)

Output	PC4204CX Relay	Partition								Zone	Schedule#	Pulse Timer
		1	2	3	4	5	6	7	8			
[000702XX01]	PC4204CX Relay 1	<input type="text"/>										
[000702XX02]	PC4204CX Relay 2	<input type="text"/>										
[000702XX03]	PC4204CX Relay 3	<input type="text"/>										
[000702XX04]	PC4204CX Relay 4	<input type="text"/>										

FCC COMPLIANCE STATEMENT

CAUTION: Changes or modifications not expressly approved by Digital Security Controls Ltd. could void your authority to use this equipment.

This equipment generates and uses radio frequency energy and if not installed and used properly, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for Class B device in accordance with the specifications in Subpart "B" of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in any residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to television or radio reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the receiving antenna
- Relocate the alarm control with respect to the receiver
- Move the alarm control away from the receiver
- Connect the alarm control into a different outlet so that alarm control and receiver are on different circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the FCC helpful: "How to Identify and Resolve Radio/Television Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock # 004-000-00345-4.

