

## Overview

CS Technologies controllers now have a wide range of alarm-related functions using the new Alarmpig firmware in the controller. The firmware supports up to 254 inputs grouped in up to 254 areas and also supports up to 84 outputs.

The inputs for the system can be:

- 16-way alarm input boards (up to 10)
- PIG-1 input boards
- PIG-2 input boards

The outputs for the system can be:

- the four on-board relays
- plus either up to 5 additional 16-way relay output boards
- or up to 3 additional 4-way relay output boards

This document describes the functionality of the system as well as its interface with PC3 and Portal software.

## Revisions

The firmware to which this document refers is designated APN0079.CST. It must be used in conjunction with PC3 version 77 or greater, and Portal version 1.01.06 or greater to provide all of the supported functionality. For access to all of the PIG buses a circuit board revision 2.3 or greater should be used; however the firmware will work in earlier revision boards (but not provide access to the PIG1 and PIG2 buses).

## Using PIGs

### Number of inputs

The firmware supports up to 254 inputs in any combination of PIG-1, PIG-2 and input boards. Thus if PIG-2's are used up to 127 PIG-2 devices (each with 2 inputs) can be used.

### Individual PIG buses

If using PIGs as the inputs with this firmware, up to 14 individual PIG buses are available. These PIG buses are connected between ground and:

IN1  
IN2  
IN3  
IN4  
IN5  
IN5  
IN7  
IN8  
PIG1  
PIG2  
OUT1  
OUT2  
OUT3  
OUT4

When a PIG is stored in the controller database the controller automatically scans the above buses until it finds the PIG and then records its location. Thus pigs can be changed from bus to bus without worrying about reprogramming; the controller will automatically find a PIG anywhere it is connected. Similarly the controller automatically detects the different PIG devices (PIG1 or PIG2) and thus there is no difference in the database programming for different PIG devices.

### Boosted PIG buses

Where PIGs are situated remotely from the controller we recommend the use of PIG boosters which reduce transmission line effects. PIG boosters are connected between two inputs, one of which is a designated PIG bus and

thus using boosters halves the number of buses. However the system can handle any combination of boosted and unboosted buses. When using pig boosters the inputs are paired together for connection of the booster as follows:

IN1/2  
IN3/4  
IN5/6  
IN7/8  
PIG1/2  
OUT1/2  
OUT3/4

Note that any combination of PIG boosters and non-boosted buses can be used. The location of PIG boosters is set up in the software so that the controller knows which buses are boosted and which are not.

## PIG power

It is important when connecting many PIGs to the controller to consider the power supply requirements. The controller can supply about 700mA at 5VDC to the PIG buses. The power consumption of PIGs is as follows:

- PIG-1 approximately 2mA
- PIG-2 (early style with bright LEDs) approximately 20mA
- PIG-2 (current style with dim LEDs) approximately 3mA

If insufficient power is available to power the PIGs this will cause intermittent problems with the controller and it may be necessary to provide a separate regulated 5VDC supply for the PIG bus.

Power for the PIGs must be +5V and the pullup voltage must also be +5V which means that LK21 should be DOWN and LK22 should be UP.

## PIG registration

Using PC3 software it is possible to register PIG numbers directly on the controller. When PIG registration is attempted a command is sent to the controller which makes it scan for a single PIG on any of its buses; the number in this PIG is returned as the value registered. Thus the controller automatically detects registration on any of its buses, but any single device attached to a bus will be returned when registration is attempted. It may thus be best to do registrations with all buses disconnected except for the one being used for registration to save confusion.

## Debugging tips

PIG buses have a theoretical limit of about 50 devices (i.e. 50 PIG-2's or PIG-1's) on each bus. They also have a distance limitation of about 250m. For reliable operation on buses which are long we recommend the use of PIG-boosters always.

PIG-2's have LEDs which indicate power and the status of each PIG input. PIGs require a good 5V supply; reading the voltage on the +5V line and also the bus line can provide an indication of the reliability of a bus. If the 0V line or +5V line is disconnected anywhere on the bus this will cause pigs in other places on the bus to have erratic communications.

When installed properly PIGs are very reliable and provide very fast response times even with large numbers of inputs.

When PIGs are disconnected from the bus or the controller has trouble communicating with them they go into tamper.

## Using input boards

CS Technologies 16-way input boards can be used as the alarm inputs with the system also. Currently the firmware drivers support up to 10 input boards i.e. 160 inputs. Input boards have their ID set with a rotary switch and numbering starts at 0 i.e. 0-9. Input boards can be configured to sense either dry contact inputs or voltages from 5-150V AC or DC.

When using input boards (or output boards) some of the ports which are available for PIG buses are used up by the input board connections. When input or output boards are used the only PIG buses which are available are those connected to

IN1  
IN2  
OUT1

and accordingly boosted buses are only available between IN1/2 if required.

If input or output boards are used LK3 must be UP.

## Using output boards

With a large number of relays available for each alarm area for reporting of alarms it is sometimes desired to send alarms via 16-way or 4-way output boards.

When using output boards some of the ports which are available for PIG buses are used up by the output board connections.

When 16-way output boards are used the only PIG buses available are

- IN1
- IN2
- OUT1

When 4-way output boards are used PIG buses which are removed from use i.e. NOT available are:

- Relays 5-8 removes IN3, OUT2, OUT3, OUT4
- Relays 9-12 removes IN5, IN6, IN7, IN8
- Relays 13-16 removes PIG1, PIG2 and IN4

LK3 must be up if using output expansion boards (4-way or 16-way).

If 4-way output boards are used, 16-way input boards cannot be used.

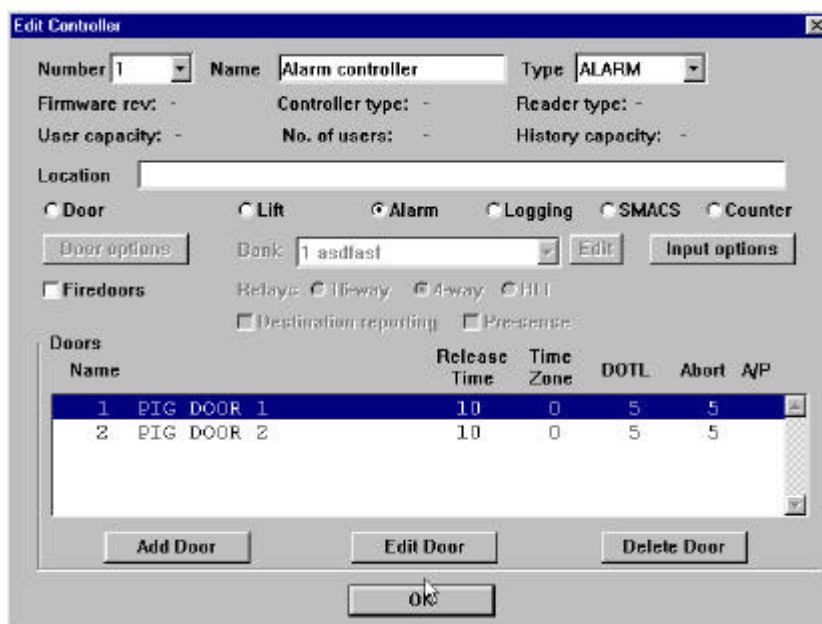
A summary of the possible combinations of inputs and outputs is tabulated below.

	PIG buses available	4-way outputs	16-way inputs	16-way outputs
<b>PIGs only</b>	IN1-8, PIG1-2, OUT1-4	NO	NO	NO
<b>16-way input boards</b>	IN1, IN2, OUT1	NO	YES	YES
<b>16-way output boards</b>	IN1, IN2, OUT1	NO	YES	YES
<b>4-way output boards</b>				
<b>RY5-8</b>	IN1, 2, 4-8, OUT1, PIG1, PIG2	YES	NO	NO
<b>RY5-12</b>	IN1, 2, 4, OUT1, PIG1, PIG2	YES	NO	NO
<b>RY5-16</b>	IN1, 2, OUT1	YES	NO	NO

When setting up the controller in PC3 the alarm options screen will set the appropriate options automatically.

## Setting up the controller in PC3

To set the system up in PC3 firstly add the controller to the database. It should be designated as an ALARM



controller.

The next thing to set up is the input options. Click on the Input Options button.

**No of readers** – set to 0 for alarm firmware.

**Pig tamper timeout**- if using PIGs this sets how long they are in tamper (offline) before reporting this to the screen.

**Pig tamper retries** – the number of times in succession that the system tries to read a PIG if it is going into tamper.

**Pig change retries** – in noisy environments, sets the number of successive reads which are done of a pig when it changes state to verify that it really did change state.

**16-way output boards** – if 16-way output boards are being used tick this box

**4-way output boards** – if 4-way output boards are being used tick this box, and tick the box for the number of relays being used (5-8, 9-12, 13-16)

**Input boards** – if 16-way input boards are being used tick this box

**Boosters fitted on** – indicate where boosters have been installed if applicable.

**Don't scan for pigs on** – indicate where PIGs are to be scanned for i.e. the buses which are used for other functions (readers, input boards etc) should be ticked here to disable scanning for pigs.

## Setting up alarm areas

Once the controller is set up as above menu options will appear in hardware for Alarms/Areas and Inputs. Selecting alarm areas and adding an area brings up the screen overleaf.

The options on this screen are as follows:

**Area number** – automatically set

**Name** – give the area a name

**Controller** – indicate which controller this area is part of. Areas can only monitor inputs and trigger outputs which are attached to this controller i.e. an input on one controller cannot trigger an output on another controller, and all inputs in an area must be connected to the same controller.

**Alarm relay A, B, C** – up to 3 alarm relays are supported. Enter the relay number here. Alarm relay mode can be:

**Latch** – when an alarm happens the relay turns on and stays on until the area is disarmed (like a strobelight)

**Pulse** – when an alarm happens the relay pulses for a certain time – set the time in the Time edit field – like a siren

**Follow** – when an alarm happens the relay follows the status of the alarm inputs – like a trigger for a dialler which is reporting alarms and restorals

**Pulse on arm** – if this is ticked then the relevant relay will give two short pulses when arming and one short pulse when disarming

**Armed relay** – when the area is armed this relay is on

**Disarmed relay** – when the area is disarmed this relay is on

**Abnormal relay** – when the area is not armed but unsealed this relay is on

**Buzzer relay** – when the area is in the process of arming this relay is on

**Buzzer time** – used in conjunction with the Buzzer relay. If this is set to a number, when the area arms instead of arming immediately the buzzer relay turns on for the buzzer time. This indicates to staff that the alarm is about to turn on and gives them time to leave or turn the alarm off.

**Status led** – OUT1-OUT4 can indicate the status of this alarm area. The led is ON if the area is disarmed, OFF if the area is armed, flashes slowly if the alarm is off but the area is unsealed and flashes fast if the area is in alarm.

**Timezone** – can be used in conjunction with the other fields to determine the after hours operation of the alarm. If a timezone is specified here the system can disarm at the start of the timezone or arm at the end of the timezone depending on the settings of the relevant check boxes. After hours (as determined by this timezone setting) the auto re-arm delay and rearm timer becomes active (see below).

**Auto re-arm delay** – when the timezone is not active the alarm will automatically try to arm whenever it is not armed. The delay time between the alarm being disarmed and auto re-arming is set by this time delay. The delay can be up to 18 hours. When the area is disarmed (by a timezone, PC operation, or input) and the timezone is not active, the re-arm timer starts. When the re-arm time expires the system will try to re-arm (turning on buzzer relay etc if programmed). The re-arm timer can also be retriggered by activity or by a read on a reader associated with this area, or by a read by a supervisor (someone with alarm arm/disarm access). Thus it is possible to set the system for say a

10 minute re-arm time but retrigger by activity, and thus after 10 minutes of inactivity the alarm will automatically turn on.

## Setting up alarm inputs

Selecting Hardware/Alarms/Inputs displays the screen below.

Give the input a name. The input number can be determined by clicking on the 'calculate' button which displays the calculator as follows:

The calculator is used to work out the number of the input, which can be on the main board (inputs 1-8 (1-8), outputs 1-4 (9-12), Pig1-2 (13-14), on an expansion board (board 0 input 1 is designated as input 33) or a PIG. If a pig is to be used it can be registered by clicking on the 'touch' button. When this is clicked all the ports on the designated registration controller (set under Technician/Site) are scanned for a single device to be touched. When a device is found it is inserted into the PIG ID field. If a PIG-2 is being registered you have to select either port A or port B.

Once the pig number is set the other options on the input screen are:

**Area** – sets the area which in turn sets the controller to which this input is connected.

**Delay** – the number of seconds that the input can be unsealed for before generating an alarm.

**Normally open/closed** –set the type of input

**Isolate** – this can be used to isolate the input

**Tamper bypass** – ignore tamperers on this input.

**Tamper timeout** – irrelevant – now set on the controller/input options screen for all inputs on the controller.

The input can be either a normal alarm input or can be used to trigger the arming and/or disarming of the area.

If the area is a normal alarm input the options are:

**Report status change** – if this is checked then even if the area is disarmed change of state messages will appear in the log. If this is not checked then the input status won't appear on the screen unless the area is armed.

**Allow forced arming** – if this input is unsealed can the area still be armed?

**Auto-isolate** – if forced arming is allowed, auto isolate will automatically isolate this input when the area is armed.

**Auto-include** – if forced arming is allowed and the input has been automatically isolated, when it returns to normal it will be automatically included in the alarm area i.e. de-isolated.

**Entry delay** – the number of seconds of entry delay

**Exit delay** – the number of seconds of exit delay

**Messages** – the messages which display for this input when it changes state or goes into alarm

If the input is an arming input it can be set to either arm the area, disarm the area or both.

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