

NXT-4x4 Elevator Control in NXT-MSK Controllers

Application Note

Doors.NET supports Elevator Control when using NXT Mercury Powered controllers and either NXT 4x4 modules or GIOX units. For many different sized elevator applications this can be an extremely cost-effective solution.

With one 4x4 module wired into each bus and using the four outputs on an NXT 4-door controller you can provide elevator control access for up to 20 floors per 4-door controller and 10 floors per 2-door controller.

One reader is situated in the elevator cab and this one reader is responsible for all access requests to all the floors. This Application Note describes the process for configuring elevator control for up to 20-floors.

It is important to follow these steps in the correct order to ensure proper operation of your elevator control system.

1.0 Hardware Wiring Requirements

1.1 Cab Reader

The reader situated inside the elevator cab **must be wired into bus 1** of the controller for proper operation.

1.2 2-Door Controller and 4x4s

For a 2-door controller handling up to 10 floors:

Table 1: Wiring Configuration for Up To 10 Floors

Floor	Device	Wiring Location	Terminal Block	Default Output Designator	Default Input Designator
1	2D-Controller	Port 1	TB1	Output 0.1	Input 0.1
2	2D-Controller	Port 2	TB3	Output 0.2	Input 0.2
3	4x4	Bus 1 - Port 1	TB22	Output 5.1	Input 5.1
4	4x4	Bus 1 - Port 2	TB23	Output 5.2	Input 5.2
5	4x4	Bus 1 - Port 3	TB24	Output 5.3	Input 5.3
6	4x4	Bus 1 - Port 4	TB25	Output 5.4	Input 5.4
7	4x4	Bus 2 - Port 1	TB22	Output 6.1	Input 6.1
8	4x4	Bus 2 - Port 2	TB23	Output 6.2	Input 6.2
9	4x4	Bus 2 - Port 3	TB24	Output 6.3	Input 6.3
10	4x4	Bus 2 - Port 4	TB25	Output 6.4	Input 6.4

- The Output is the Door Relay for each floor.
- The Input is the Cab Request for each floor. Cab Request Inputs are only used/wired if the cab reader is set to Elevator - With Floor Select.

Refer to the [2D Elevator Control Wiring](#) for a wiring configuration drawing (p/n: 01245-002).

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1.3 4-Door Controller and 4x4s

For a 4-door controller handling up to 20 floors:

Table 2: Wiring Configuration for Up To 20 Floors

Floor	Device	Wiring Location	Terminal Block	Default Output Designator	Default Input Designator
1	4D Controller	Port 1	TB1	Output 0.1	Input 0.1
2	4D Controller	Port 2	TB3	Output 0.2	Input 0.2
3	4D Controller	Port 3	TB5	Output 0.3	Input 0.3
4	4D Controller	Port 4	TB7	Output 0.4	Input 0.4
5	4x4	Bus 1 - Port 1	TB22	Output 5.1	Input 5.1
6	4x4	Bus 1 - Port 2	TB23	Output 5.2	Input 5.2
7	4x4	Bus 1 - Port 3	TB24	Output 5.3	Input 5.3
8	4x4	Bus 1 - Port 4	TB25	Output 5.4	Input 5.4
9	4x4	Bus 1 - Port 1	TB22	Output 6.1	Input 6.1
10	4x4	Bus 1 - Port 2	TB23	Output 6.2	Input 6.2
11	4x4	Bus 1 - Port 3	TB24	Output 6.3	Input 6.3
12	4x4	Bus 1 - Port 4	TB25	Output 6.4	Input 6.4
13	4x4	Bus 1 - Port 1	TB22	Output 7.1	Input 7.1
14	4x4	Bus 1 - Port 2	TB23	Output 7.2	Input 7.2
15	4x4	Bus 1 - Port 3	TB24	Output 7.3	Input 7.3
16	4x4	Bus 1 - Port 4	TB25	Output 7.4	Input 7.4
17	4x4	Bus 1 - Port 1	TB22	Output 8.1	Input 8.1
18	4x4	Bus 1 - Port 2	TB23	Output 8.2	Input 8.2
19	4x4	Bus 1 - Port 3	TB24	Output 8.3	Input 8.3
20	4x4	Bus 1 - Port 4	TB25	Output 8.4	Input 8.4

- The Output is the Door Relay for each floor.
- The Input is the Cab Request for each floor. Cab Request Inputs are only used/wired if the cab reader is set to Elevator - With Floor Select

Refer to the [4D Elevator Control Wiring](#) for a wiring configuration drawing (p/n: 01245-004).

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1.4 Floor Select Option

The Elevator - With Floor Select option is used when you need the software to report the floor that was selected by the cardholder. This is a different behavior than the default option of Elevator - No Floor Select which simply provides floor access as appropriate.

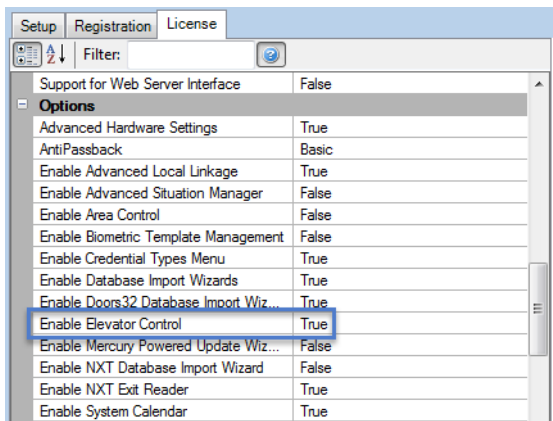
- *No Floor Select* means all outputs will activate for all floors to which a cardholder has access when they present and authenticate their credential to the elevator cab reader. So if a cardholder has total access, all twenty outputs will change state, which in effect will allow any of the floor selection buttons to be pressed in the cab in order to access any of the floors.
- *With Floor Select* does not activate any of the outputs until an input is pressed following a valid card read. Once input 1 has been pressed, output 1 will fire; input 2 will fire output 2, etc. This information is then stored in the system database so that at a later time reports can be run to see which floors cardholders have accessed.

Without the Floor Select option you are only using the 4x4 module outputs. When someone presents a card the floor buttons in the elevator cab will illuminate the floors to which the cardholder has access.

With the Floor Select option 4x4 module inputs and outputs are paired, one input for every output. This option provides transaction details regarding the floor the cardholder has selected after presenting a card.

2.0 Verify Your License

1. Begin by ensuring your Doors.NET Application Server license is configured with Elevator Control enabled. To check this, click on Start > All Programs > Doors.Net > License Manager. If it states False instead of True then you need to contact Keri Systems sales department to purchase an upgraded license.



3.0 Hardware Configuration

NOTE: Once a controller has been configured for elevator control, the process to restore it to be a standard controller is tedious. You must perform the following steps:

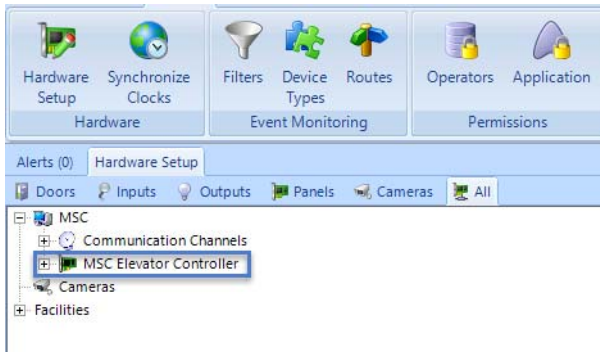
- *delete the elevator facility setting from the controller*
- *delete the controller from the database*
- *RAM reset the controller*
- *scan the system to rediscover the controller*
- *add it back to the database*

Please be sure you have selected the desired controller to use before configuring it for elevator control.

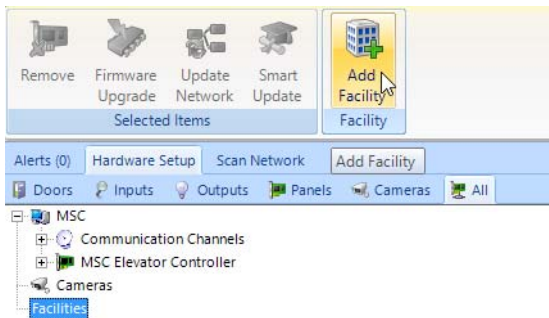
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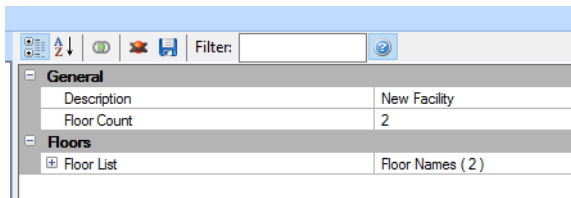
1. Log into your client and open Doors.NET.
2. Go to the Setup tab, click on Hardware Setup, and then the All tab. The hardware tree displays the hardware gateway and any NXT controllers. The image below shows one NXT 4-door controller listed.



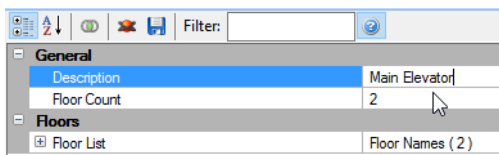
3. At the bottom of the hardware tree is a node labelled 'Facilities.' A Facility needs to be defined and this is where you specify how many floors will be controlled. Generally a facility, in the physical sense, is an elevator shaft.
4. Click on Facilities and then click the Add Facility button on the ribbon bar.



5. Click 'New Facility' and view the properties on the right.



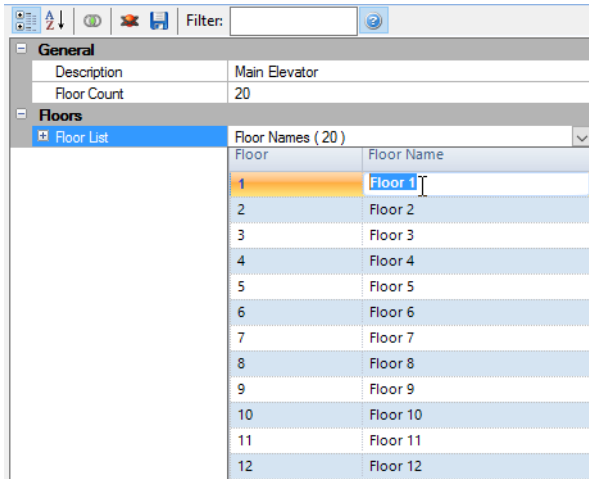
6. Change the description to something appropriate to your site.



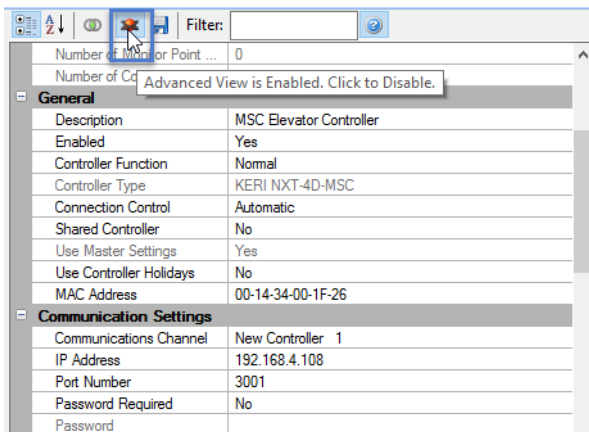
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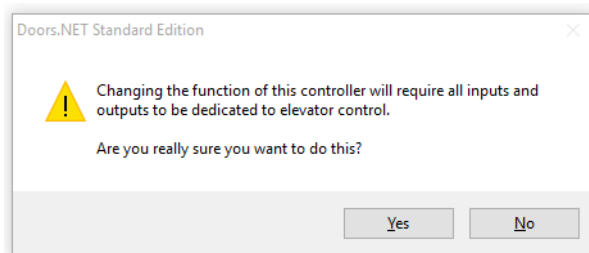
- The new facility defaults to having 2 floors. Change this count by overwriting it with the number of floors desired, in this case 20. The 'Floor List' automatically adjusts accordingly. At this time you may also name each of the floors by clicking on the drop down arrow then double-clicking any of the floor names listed.



- Next step is to configure the controller. Advanced view must be enabled to see all the relevant sections. Click on the desired controller in the Hardware tree and view its properties.



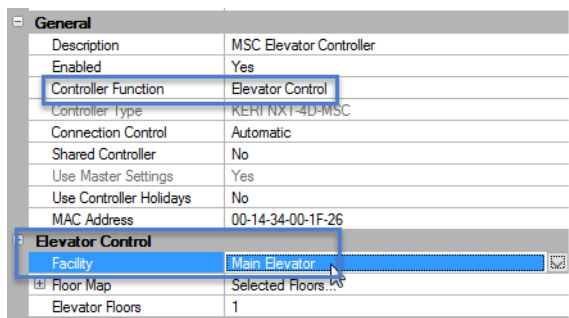
- In the General settings, change the controller function from Normal to Elevator Controller. A confirmation message box appears. Click Yes.



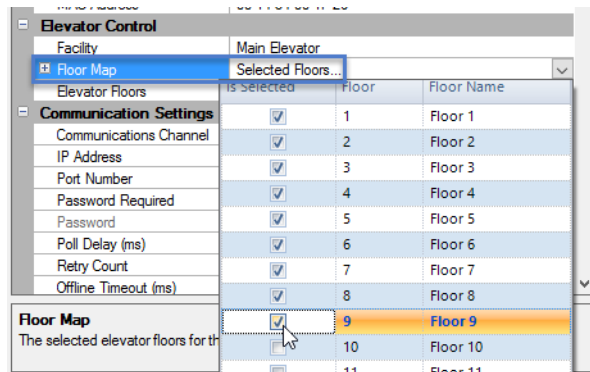
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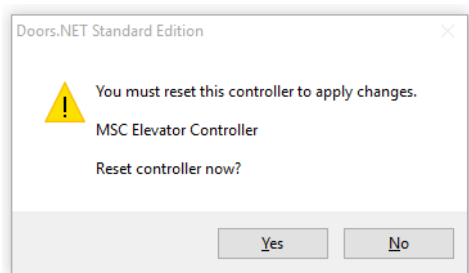
10. Further down the properties list are the Elevator Control settings. Select the facility you wish to assign to the controller.



11. Now assign the Floor Map to determine which floors this controller will be servicing.



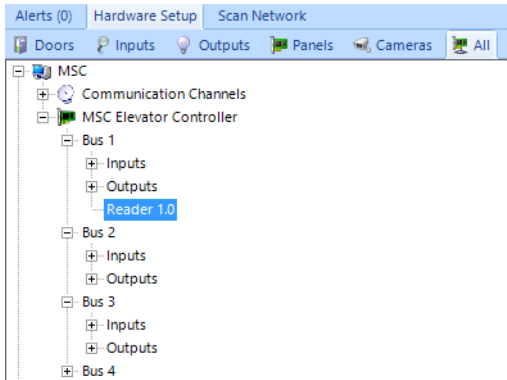
12. Save the controller settings. The Floor Count is automatically set according to the information in the Floor Map. The software generates an alert stating the controller needs to be reset. Click Yes to allow the reset.



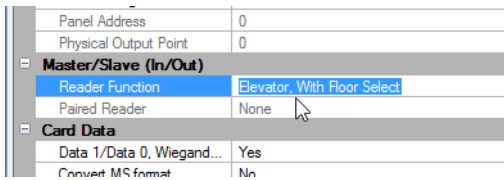
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Application Note

13. The controller now shows the reader on bus 1 is designated as the elevator reader, the other readers on the controller are removed from the hardware tree. The output relays for each of the buses are changed from Strike Outputs to Elevator Outputs and all are associated with the elevator reader.

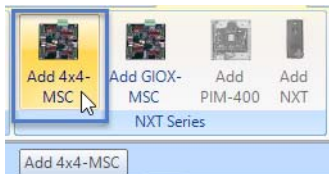


14. Now highlight the Elevator Reader located on bus 1. Reference the properties and look for the Master/Slave (In/Out) settings. Set the reader to 'Elevator, No Floor Select' or 'Elevator, With Floor Select' per your application.



15. Now add the 4x4 modules that will be used for the floor relays (and Floor Select inputs if the Floor Select option is being used).

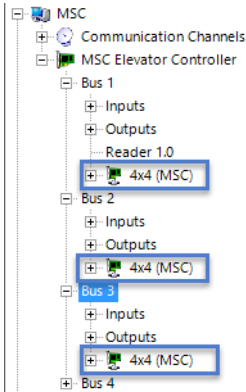
- On the bus tree shown in the above graphic, click on the Bus to which the 4x4 is wired.
- On the ribbon bar, click the Add 4x4-MSC icon.



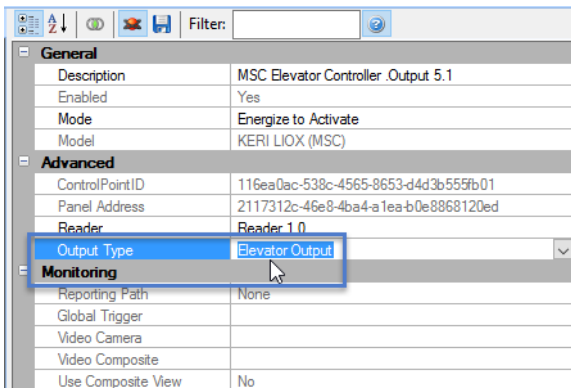
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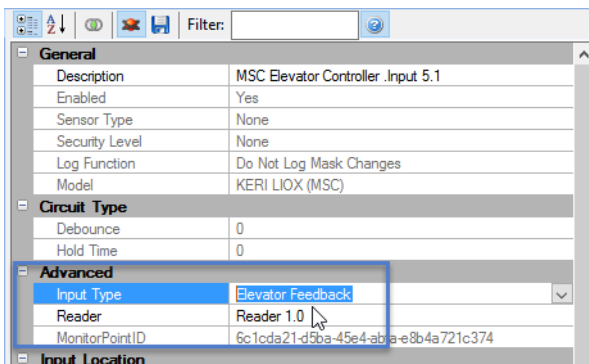
16. Repeat Step 14 for each 4x4 on the system.



17. Verify the outputs on the controller (and on the 4x4s if used) are configured correctly by expanding one of the buses then expanding the Outputs. Select any output and in its properties you should see it configured as an ‘Elevator Output.’



18. If you are using the “With Floor Select” feature, the Door Contacts (and 4x4 inputs, if used) will be assigned as ‘Elevator Feedback.’



NOTE: All other Readers are unavailable when a controller is configured for Elevator Control. This is because a controller configured for Elevator Control cannot be used for general access control.

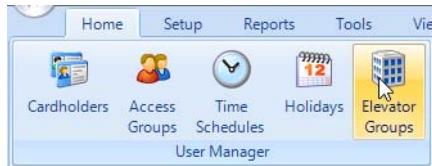
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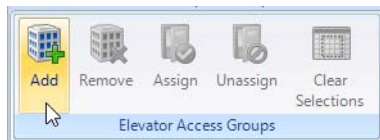
19. Perform a Temp Unlock (All Floors) and verify the controller configuration. When this command is performed all relays should activate for the Strike Time, then deactivate.
20. This confirms your controller has been successfully configured for Elevator Control.

4.0 Create the Access Groups

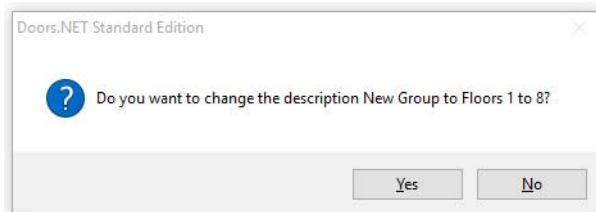
1. Next is to create the access groups; identifying to which floors the users will be allowed access. This Application Note will describe the process for creating an Elevator Group for Floors 1 to 8 following the Always time schedule.
2. Click the Home tab and then click Elevator Groups.



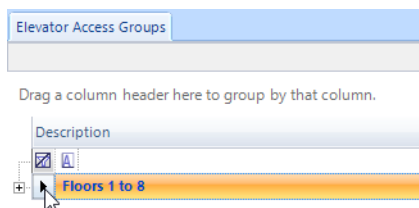
3. Click the Add icon on the ribbon.



4. Change the description to something appropriate to your site. Press Enter and click Yes to confirm the new description.



5. Highlight the new group.



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- In the Floors list in the properties section, highlight the floors you wish to add. Click on the first floor and then drag the mouse down to the last selection, or select the first, press the shift key, and then select the last.

Gateway	Controller	Panel Description	Description
MSC	MSC Elevator Controller	MSC Elevator Controller	Floor 1
MSC	MSC Elevator Controller	MSC Elevator Controller	Floor 2
MSC	MSC Elevator Controller	MSC Elevator Controller	Floor 3
MSC	MSC Elevator Controller	MSC Elevator Controller	Floor 4
MSC	MSC Elevator Controller	4x4 (MSC)	Floor 5
MSC	MSC Elevator Controller	4x4 (MSC)	Floor 6
MSC	MSC Elevator Controller	4x4 (MSC)	Floor 7
MSC	MSC Elevator Controller	4x4 (MSC)	Floor 8
MSC	MSC Elevator Controller	4x4 (MSC)	Floor 9
MSC	MSC Elevator Controller	4x4 (MSC)	Floor 10
MSC	MSC Elevator Controller	4x4 (MSC)	Floor 11

- Highlight a time schedule to assign to the group.

Description	Mode
Always	Always
Work Week	Scan
Never	Never

- When all the elements making up the access group are highlighted the Assign button on the ribbon becomes active.

Elevator Access Groups

Add Remove **Assign** Unassign Clear Selections

Elevator Access Groups

Drag a column header here to group by that column.

Description	Gateway	Controller
Floors 1 to 8	MSC	MSC Elevator Controller
	MSC	MSC Elevator Controller
	MSC	MSC Elevator Controller
	MSC	MSC Elevator Controller

- Click assign to create the elevator access group.

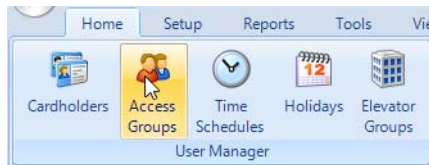
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Application Note

10. If a cardholder requires access to various floors at different times of day then these floors and time schedules would all be added to the same elevator access group. This is even the case if the floors exist in different facilities. As you can see in this image, multiple floors have been defined and each floor follows a certain time schedule. If you then need to restrict the time when access is allowed to a certain floor you would then merely need to adjust the associated time schedule which is associated with the floor.

Gateway	Controller	Floor	Schedule	Schedule Detail
MSC	MSC Elevator Controller	Floor 1	Always	Always
MSC	MSC Elevator Controller	Floor 2	Afternoon	M,T,W,TH,F (12:00 - 17:00)
MSC	MSC Elevator Controller	Floor 3	Morning	M,T,W,TH,F,SA,SU (07:00 - 12:00)
MSC	MSC Elevator Controller	Floor 4	Afternoon	M,T,W,TH,F (12:00 - 17:00)
MSC	MSC Elevator Controller	Floor 5	Working Day	M,T,W,TH,F,SA,SU (07:00 - 18:00)
MSC	MSC Elevator Controller	Floor 6	Working Day	M,T,W,TH,F,SA,SU (07:00 - 18:00)
MSC	MSC Elevator Controller	Floor 7	Morning	M,T,W,TH,F,SA,SU (07:00 - 12:00)
MSC	MSC Elevator Controller	Floor 8	Working Week	M,T,W,TH,F,H1 (08:00 - 17:00)

11. A cardholder cannot directly be assigned an ‘elevator access group,’ so this group will need to be added to the general system access groups. From the Home tab click Access Groups.

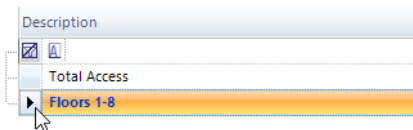


12. Click the Add button.



13. Give the new group an appropriate description and save it.

14. Select the new Elevator Access group.



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15. Select the elevator reader.

Gateway	Controller	Panel Description	Description	Detail	IP Address
MSC	MSC Elevator...	Reader 1	Elevator Cab Reader		

16. Select the Elevator Access Group. You do NOT need to highlight a time schedule on this page because it has already been defined in the Elevator Access Group setup page.

17. Click the assign button to finish creating the elevator access group.



18. Now you can assign access rights to cardholders. Open a cardholder record (Home > Cardholders). Click on the Access Rights tab.

Cardholder Edit Form - Fob 50, Reception New

General **Access Rights** Advanced Contact Company Photo ID User Groups

Last Name: Record First Name: New Middle Name: Cardholder Enroll From:

Activation Dates: Never Expire Temporary
Activation Date: 14/09/2015 12:00 AM Days: 2 days

Credentials: 537539786

19. Check the new Elevator Access Group. Then click Save. 

Cardholder Edit Form - Record, New Cardholder

General **Access Rights** Advanced Contact Company Photo ID User Groups

Assigned	Description
<input type="checkbox"/>	Total Access
<input checked="" type="checkbox"/>	Floors 1-8

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20. Verify the elevator control configuration. Present the card to the elevator cab reader. You should get access granted and green LED on the reader.
 - If you are using No Floor Select then all relays on the controller will activate plus the 4 relays on the 4x4 module wired into bus 1 of the controller.
 - If you are using With Floor Select you will have to present your card and then press one of the floor select buttons. The system will then know what floor the cardholder has requested to go to. This information will also be displayed in Live Events (in the Detail column).

Live Events				
Drag a column header here to group by that column.				
TimeStamp (Controller)	Location	Message	Detail	Cardnum
9/23/2015 12:33:29 PM	MSC Elevator Controller	Controller Configuration Saved to Flash Memory	AutoSave Configuration Complete	
9/23/2015 12:33:07 PM	Elevator Cab Reader	Access Granted	Floor 1	1177093
9/23/2015 12:31:27 PM	MSC Elevator Controller	Controller Configuration Saved to Flash Memory	AutoSave Configuration Complete	
9/23/2015 12:30:57 PM	Elevator Cab Reader	Access Granted		1177093

5.0 Contact Keri Systems

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