INSTALLATION INSTRUCTIONS

MicroComm DXL

Page Zone Expander

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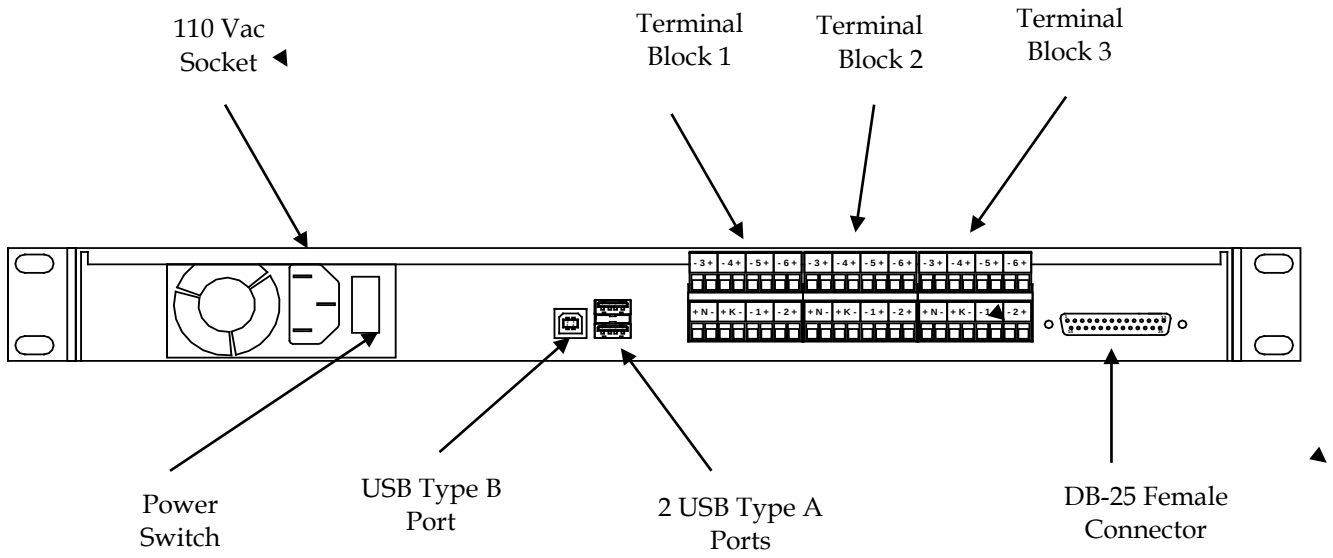
1. Intent & Scope

This document describes the installation procedures for the MicroComm DXL PZE-110 Page Zone Expander.

2. Description

The PZE-110 Page Zone Expander offers a flexible means for adding page zones to a DXL system. The unit allows for 3 separate page inputs with each input connected to 6 individually selectable relay controlled outputs. Each input has a relay, controlled by the DXL that can be used to key an amplifier. Sixteen status inputs are provided through a DB-25 connector. The 1U 19" rack mount enclosure connects to a DXL exchange via a USB cable. The back view of the PZE-110 is shown below.



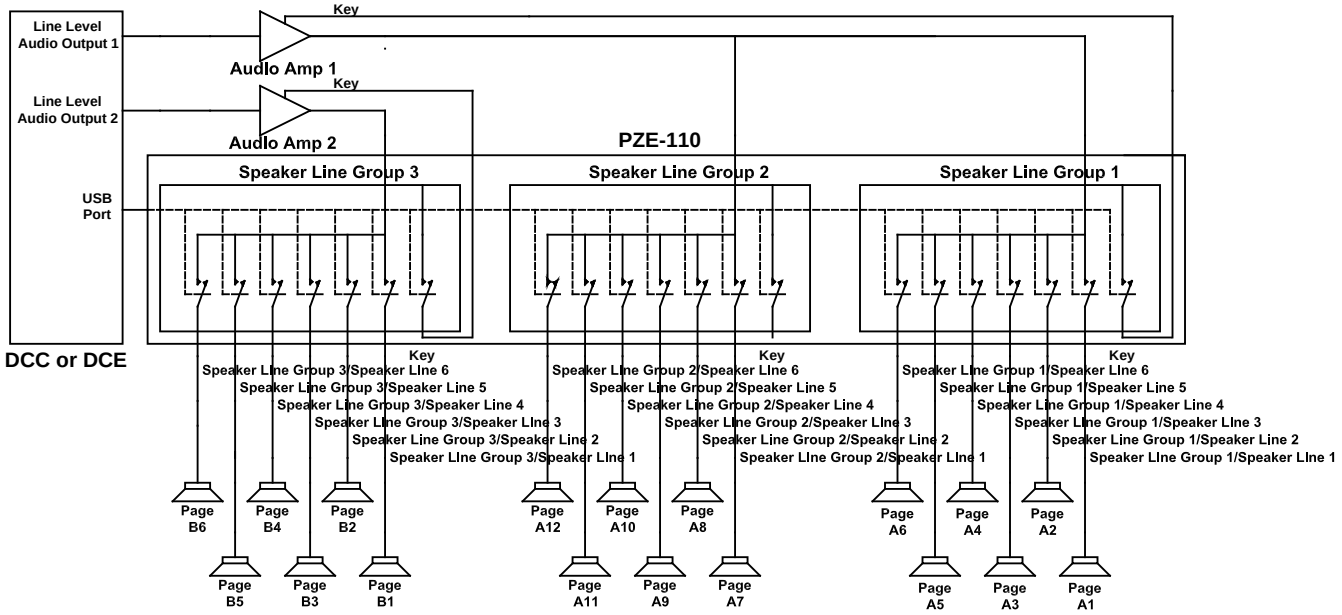
Rear View of PZE-110

Up to 12 PZE-110s can be connected to each DXL exchange. The maximum input power to a PZE input is 100 watts (at either 70 Vrms or 25 Vrms) while the maximum power output is 50 watts per channel. The unit is powered from a standard 110 Vac (150 mA max) supply. The AC socket outlet shall be installed near the equipment and shall be easily accessible. This equipment relies upon building installation overcurrent protection.

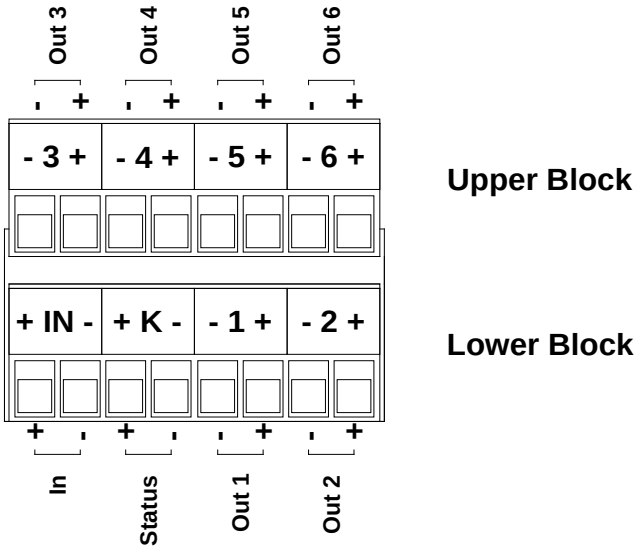
3. Zone Select Groups

The following simplified diagram shows an example application. Speaker Line Groups 1 and 2 are connected to Audio Amp A while Speaker Line Group 3 is connected to Audio Amp B. In a page zone call which uses a page output to supply audio to Audio Amp A, any combination of the 12 speakers A1 … A12 connected to Speaker Line Groups 1 and 2 can be assigned to the page zone. Similarly, in a page call which includes the page output that supplies audio to Audio Amp B, any combination of the speakers B1 … B6 connected to Speaker Line Group 3 can be activated. Note that for simplicity we have shown only a single speaker connected to each speaker line

output. In practice, several speakers could be connected in parallel to each of the speaker line outputs, providing that the 50 W max power output per channel is not exceeded.



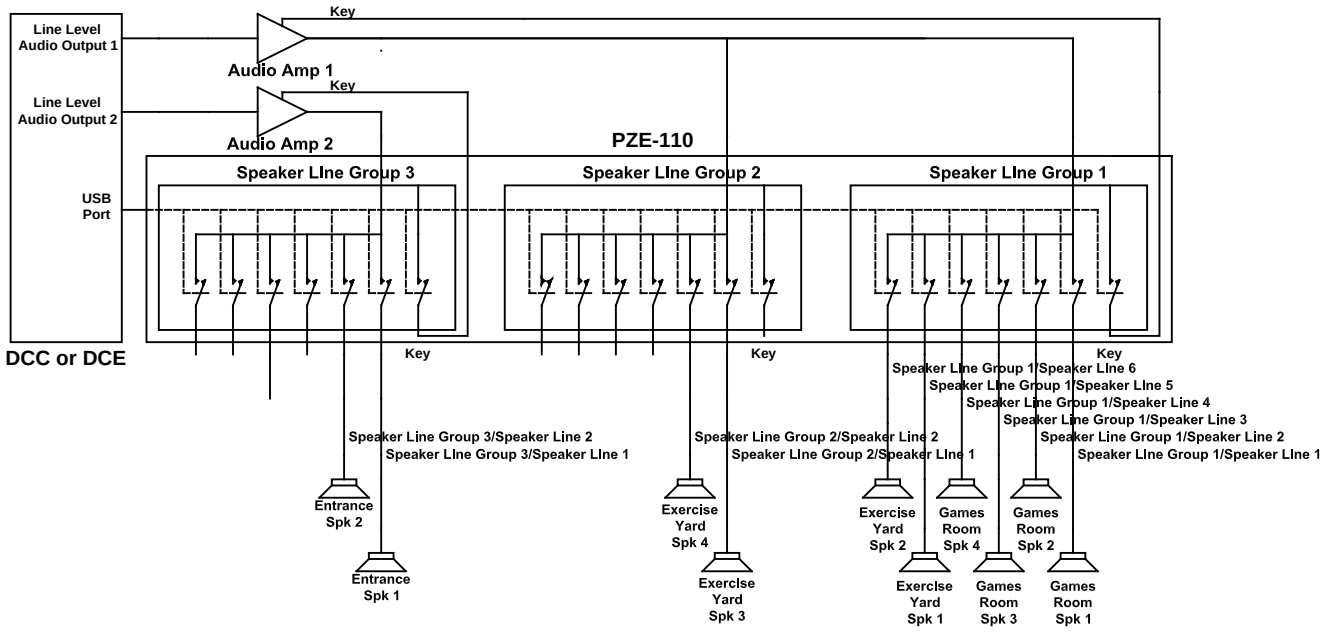
The terminal assignments for one of the three screw terminal blocks are shown below. The output from an audio amplifier is connected to input terminals 1 and 2. The 6 terminal pairs 4-5, 6-7, 8-9, 10-11, 12-13, 14-16 provide the connection terminals for up to six page zone speaker lines. Terminal 3-4 provide a normally open status output which is controlled by the DXL and can be used to key the audio amplifier.



Terminal Block showing Terminal Assignments

4. Using the Administrator to include PZE Speaker Line Outputs

In the following example a PZE will be used in 4 different Page Zones in an example Housing Unit 1. The PZE is wired as follows.



The four page zones are to consist of,

1) Page zone named ‘Games Room’ uses audio amplifier 1 and transmits audio to four speaker lines in the Games Room. The mute control for amplifier 1 uses the Key relay associated with Speaker Group 1. In addition two other status output relays are to be operated when this page zone is activated. The master station ‘Unit Control’ is permitted to make pages to this page zone.

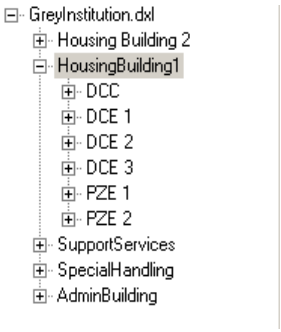
2) Page zone named ‘Exercise Yard’ uses audio amplifier 1 and transmits audio to the four speaker lines in the Exercise Yard. The mute control for amplifier 1 uses the Key relay associated with Speaker Group 1. In addition two other status output relays are to be operated when this page zone is selected. The master station ‘Unit Control’ has permission to make pages to this page zone.

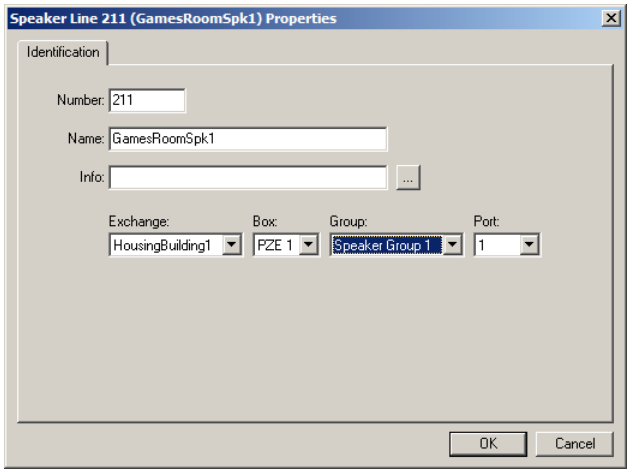
3) Page zone named ‘Entrance’ uses audio amplifier 2 and transmits audio to the two speaker lines in the Entrance area. The mute control for audio amplifier 2 uses the Key relay associated with Speaker Group 3. The master station ‘Unit Control’ has permission to make pages to this page zone.

4) Page zone named ‘Unit Page’ sends audio to all the PZE speaker lines associated with the above three page zones as well as stations Cell 101 through Cell 125 and Cell 201 through Cell 225. The operators at master stations ‘Unit Control’ and ‘Housing1Super’ have permission to make pages to this page zone.

4.1 Defining the Speaker Lines

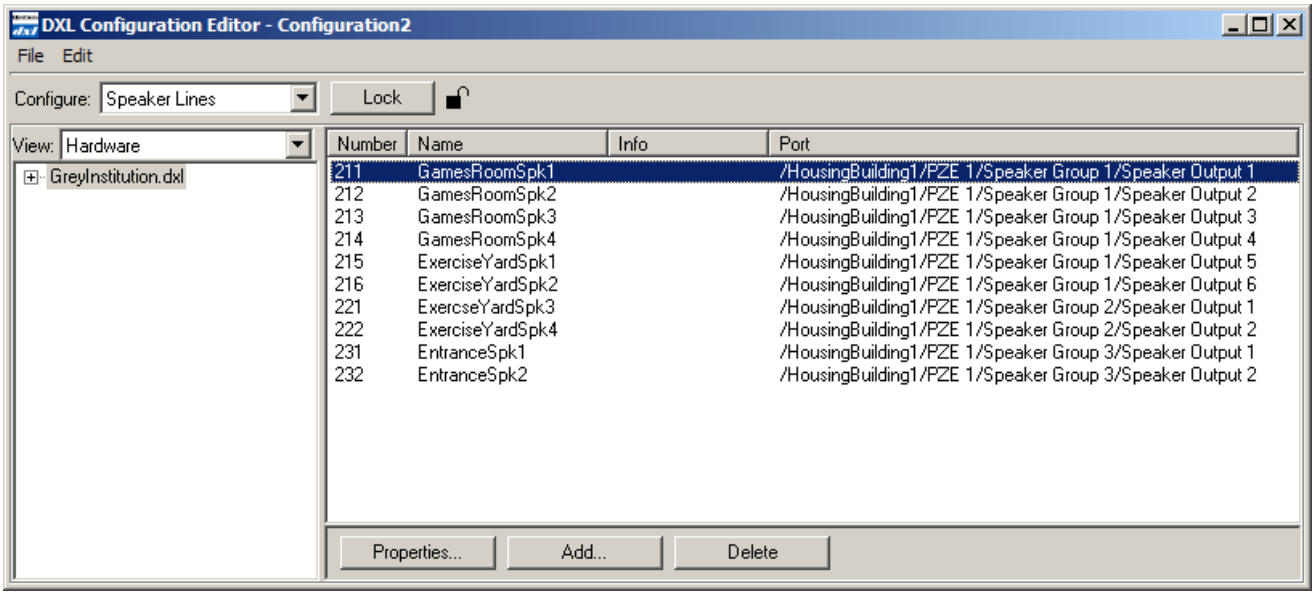
Once a PZE has been added to an Exchange the tree view of the hardware configuration will display the PZE entries in an exchange.





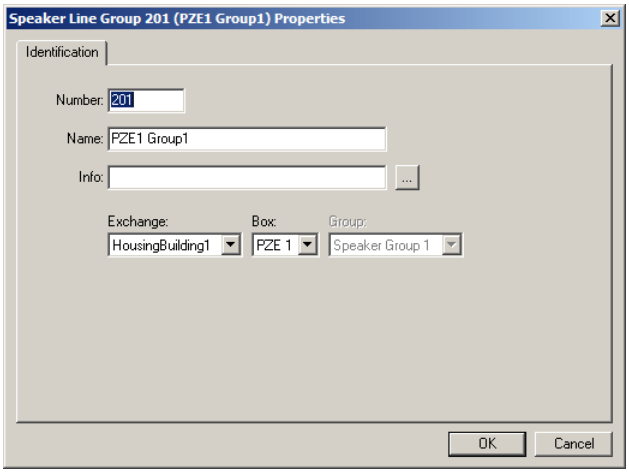
The first step in configuring a PZE is to identify and name each of the speaker lines that will be used. Different Page Zones can use different combinations of speaker lines and we must be able to identify which speaker line relays are to be activated for the different Page Zones. Setting the **Configure:** entry in the **DXL Configuration Editor** to **Speaker Lines** allows us to **Add…**, **Delet**e or select **Properties** of each speaker line. The **Properties** entry allows us to view and edit a speaker line. The **Speaker Line Properties** dialog box appears when you click the **Add…** button. You need to identify the speaker line with an ID **Number**, **Name** and the PZE **Port** that it is connected to.

Once you have specified the speaker lines, the **DXL Configuration Editor** List Pane will display the speaker lines (in this picture only the speaker lines for PZE 1 are displayed).

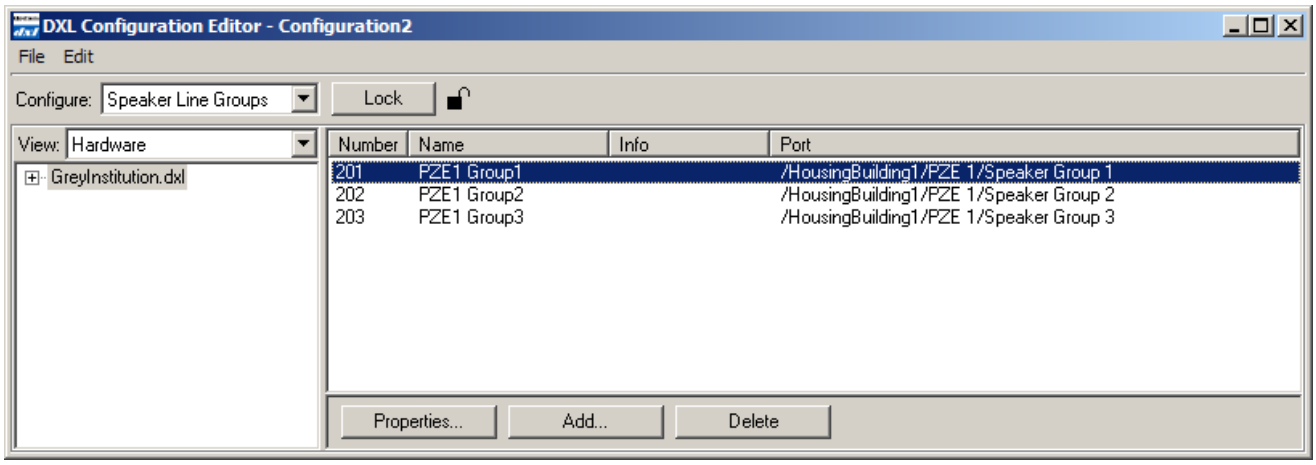


4.2 Speaker Line Groups

Once the speaker lines are configured the next step is to specify the PZE Speaker Line Groups used in the configuration. Selecting **Speaker Line Groups** in the **Configure:** entry of the DXL C**onfiguration Editor** allows us to **Add…** Speaker Line Groups to the configuration. Speaker Line Groups will be associated with the line level audio from paging outputs or stations (with an SPA-120). The audio will be connected to the input of an audio amplifier and its output will in turn be connected to one or more speaker line groups.

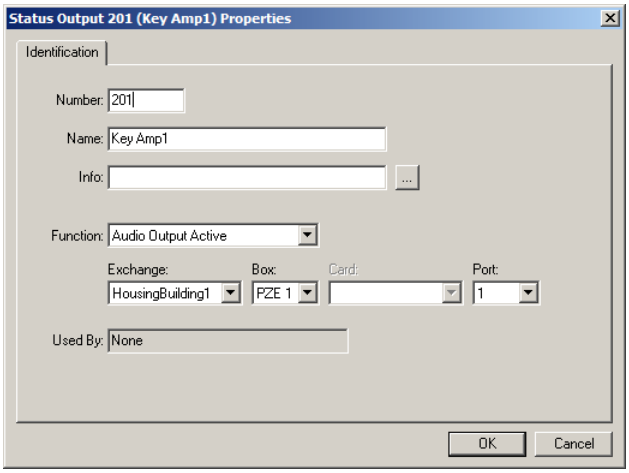


Click **Add…** to add a new speaker line group. After you have defined one speaker line group the **DXL Configuration Editor** will also allow you to **Delete** an existing speaker line group, or view or edit the **Properties...** of a speaker line group. In our example we require 3 speaker line groups.



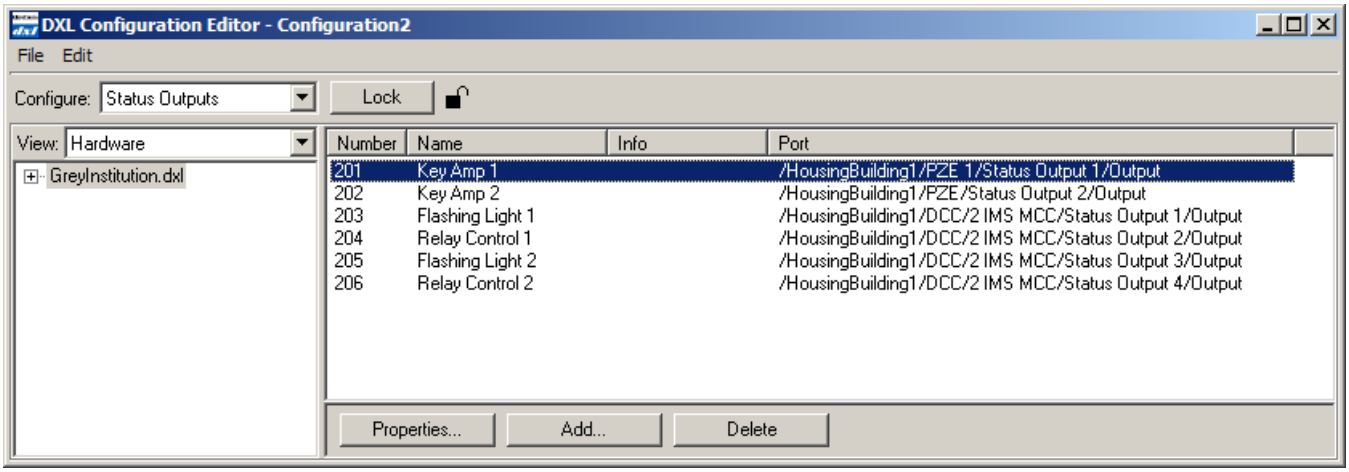
4.3 Status Outputs

Status outputs are relay outputs that can be assigned one of the following functions:



For example the **Page Zone Selected** outputs are used to control relays that will be activated for some page zones but not for others. You could configure a relay network that could perform the same functions as a PZE-110 but with the added complexity of having to wire it up. In our example we have configured six status outputs, two using the PZE and four using the status outputs of the DCC.

The two outputs associated with the PZE are used to key the mute control of the amplifiers and are assigned the **Audio Output Active** function. The other 4 status outputs will be activated when a page zone is selected and are assigned the **Page Zone Selected** function. The list pane of the **Configuration Editor** displays the status outputs.



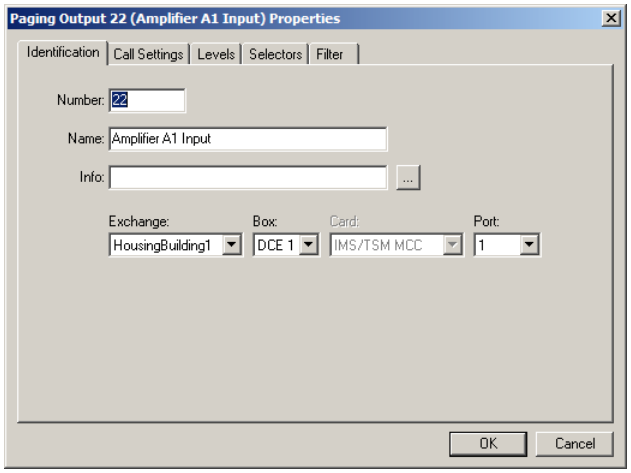
4.4 Paging Outputs

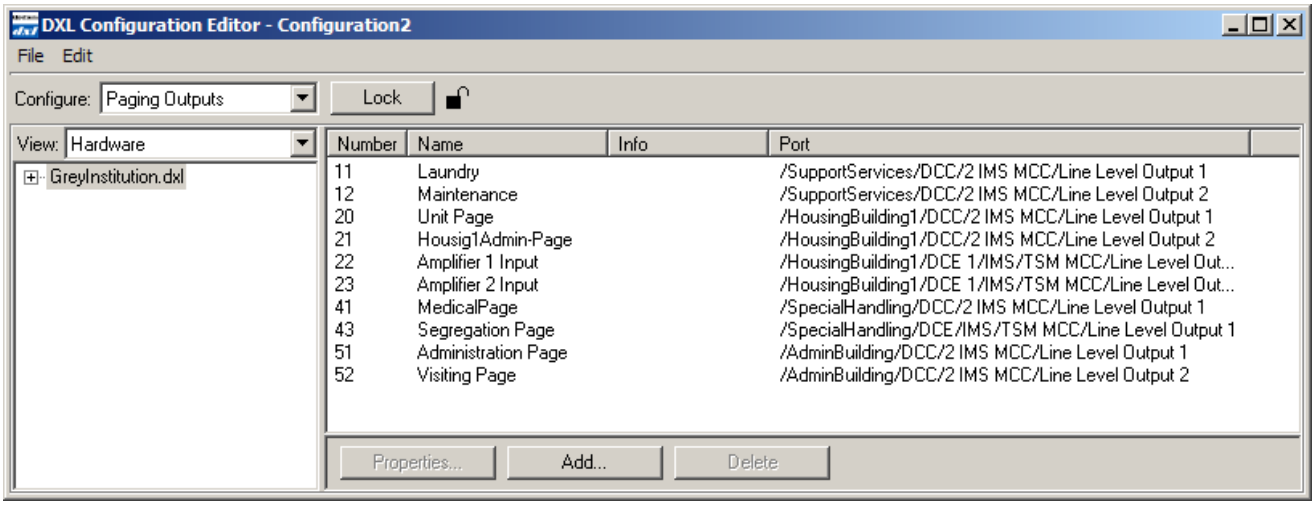
Paging outputs are line level audio outputs used as inputs to audio amplifiers and their associated selectors. The amplifier outputs are connected to external speakers (in this case via the PZE). Each DCC or DCE has two line level audio outputs. In our example the two amplifiers require two line level outputs from a DCC or DCE. Selecting **Paging Output** in the **Configure:** entry of the **DXL Configuration Editor** allows us to add paging outputs to the configuration.

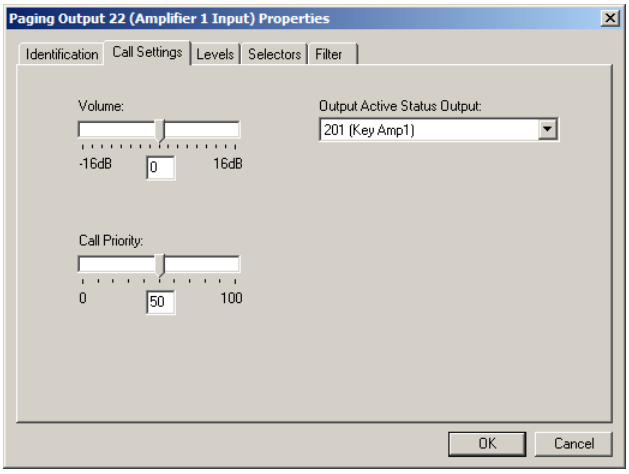
4.4.1 Paging Output - Identification

The **Paging Output Properties** dialog box contains 5 tabs: **Identification**, **Call Settings**, **Levels**, **Outputs** and **Filter**. The **Identification** tab requires an ID **Number**, **Name** and the location of the audio line level output **Port**.

The picture below shows the list pane of the **DXL Configuration Editor** with **Configure**: set to **Paging Outputs.** All the paging outputs for Housing Building 1 are displayed.





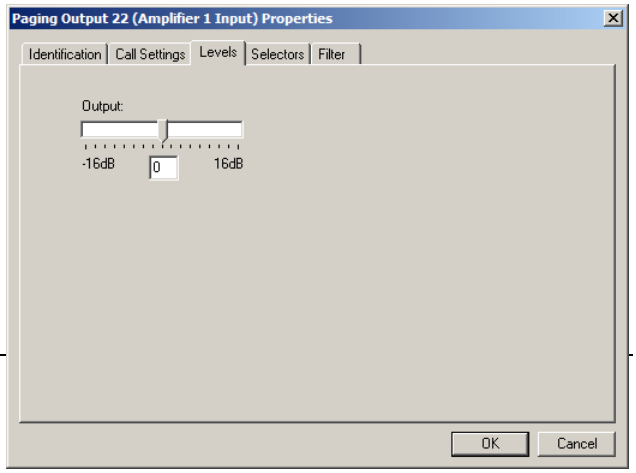


4.4.2 Paging Output - Call Settings

The **Call Settings** tab has slider adjustments to set **Volume** (it can be set from -16dB to +16dB in 1 dB increments) and **Call Priority** (it can be set from 0 to 100). Initially the default values are set to 0 dB and 50, respectively. The **Output Active Status Output** pull-down will display all the available status output entries of type **Audio Output Active**. It lets you select an output which will be activated when this page output is used. This status output is normally used to key the audio amplifier.

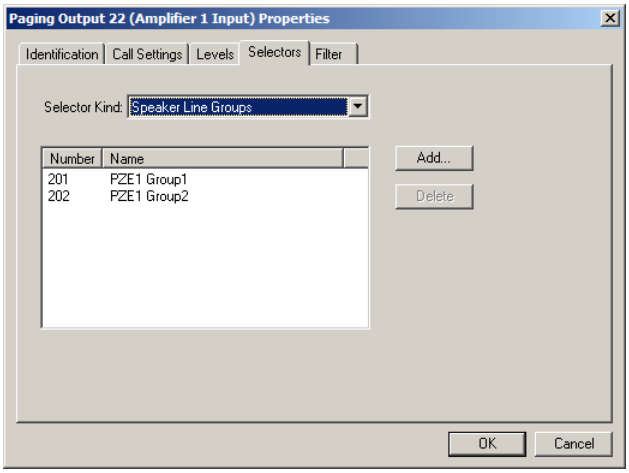
4.4.3 Paging Output - Levels

The **Levels** tab has one slider adjustment for **Output,** which can be set from -16 dB to +16 dB. The level adjustment is set for a particular configuration and cannot be changed, whereas the volume adjustment can be changed by an operator while the system is running. Level

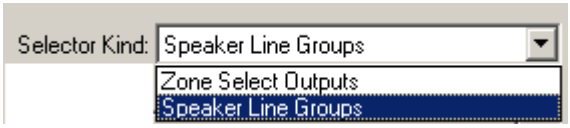


adjustments are used to compensate for the acoustic properties of different spaces so as to provide a uniform level of sound volume through out a facility. Volume adjustments can be used to compensate for voice characteristics of different personnel and can be carried out while the system is operating.

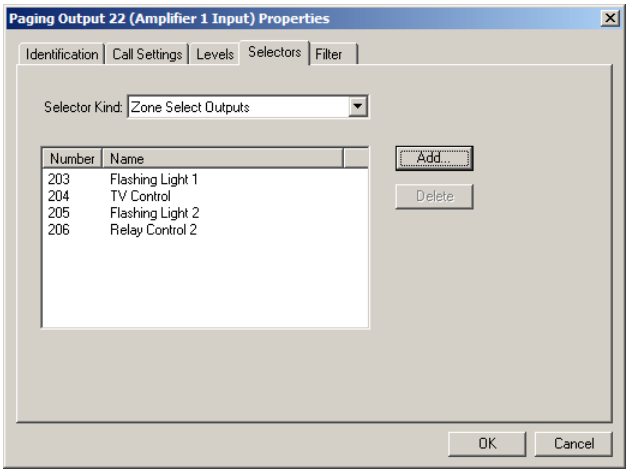
4.4.4 Paging Output - Selectors



The **Selectors** tab is used to specify which outputs may be activated when a paging output is activated. The **Selector Kind** pull-down menu is used to select the kind of selector to add.

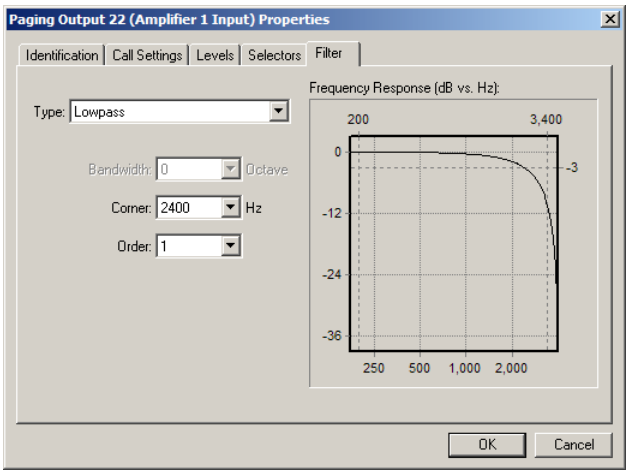


If we select **Speaker Line Groups** then click the **Add…** button all the available speaker line groups are displayed. From this list of groups you can select the groups that will be driven by the audio from this paging output. (You can visualize these group inputs as being driven directly from the paging output even though in practice they are connected to the output of an amplifier that has this paging output as its input.) Once a group has been associated with a paging output it will no longer be available for other paging outputs i.e. it will not show up when the **Add…** button is clicked. In our example Amp 1 is connected to both PZE 1 Speaker Line Group 1 and PZE 1 Speaker Line Group 2.



If we select **Zone Select Outputs** then click the **Add…** button a list of all the available status outputs with the **Zone Select Outputs** functions are displayed. In this example we have defined four status outputs, two of which are to be used for page zone 'Games Room' (Flashing Light 1 and TV Control) while the other two are used with the page zone 'Exercise Yard'. All four must be added to this Page Output.

4.4.5 Paging Output - Filter



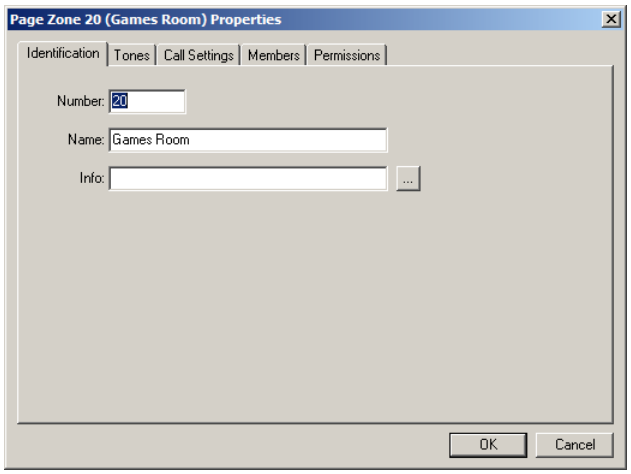
The **Filter** tab allows us to add a frequency shaping characteristic to the audio output channel. A filter is not normally required and the default is none. Filters may be useful if there is noise or room acoustics are poor.

4.5 Page Zones

Page zones are groups of loudspeakers connected to speaker lines, stations, master stations and other page zones that can be connected in a single paging announcement. Paging output and status output relays can also be activated when a page zone is selected. When the **Configure:** entry is set to **Paging Zones** in the **DXL Configuration Editor** you can **Add…**, **Delete** or examine the **Properties** of a Page Zone.

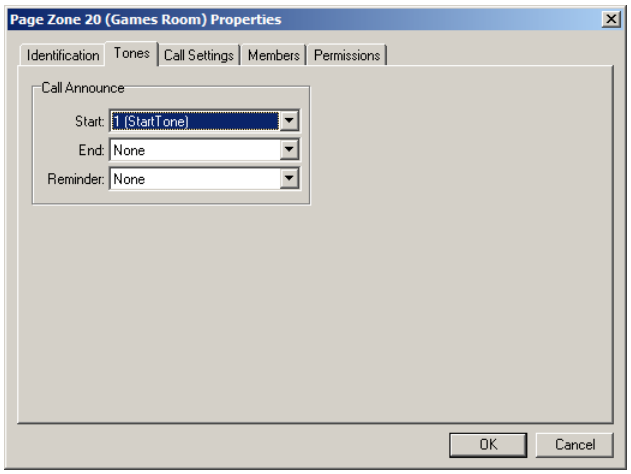
4.5.1 Page Zone - Identification

Selecting **Page Zone** in the **Configure:** entry of the **DXL Configuration Editor** allows us to add page zones to the configuration. Clicking the **Add…** button brings up a window with 5 tabs; **Identification**, **Tones**, **Call Settings**, **Members** and **Permissions**. The **Identification** tab requires that you assign an ID **Number** and **Name** to the page zone. In this case the page zone is named 'Games Room'.



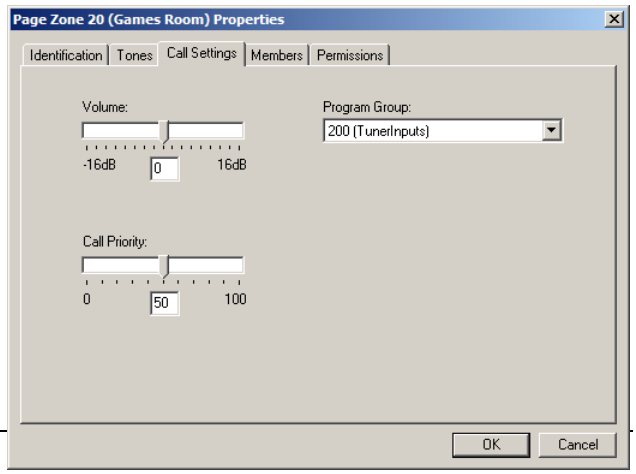
4.5.2 Page Zone - Tones

The **Tones** tab has entries for defining **Start**, **End,** and periodic **Reminder** tones when a page announcement is being made. Configuration tones are created using the **Tones** entry in the Co**nfigure:** box of the **Configuration Editor**.

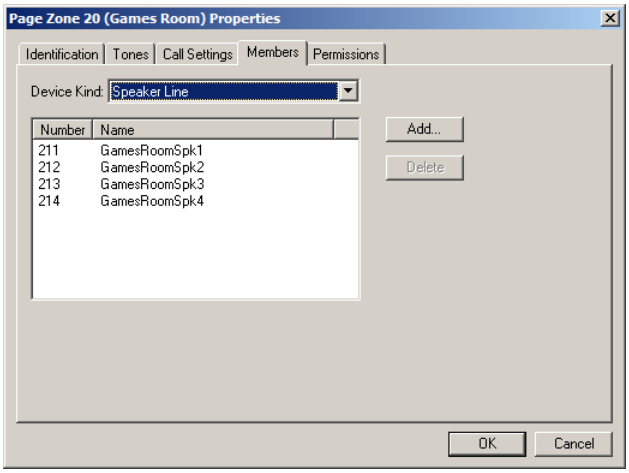


4.5.3 Page Zone - Call Settings

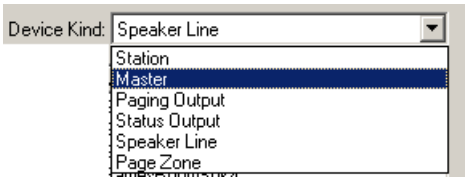
The **Call Settings** tab has entries for **Volume**, **Call Priority** and **Program Group**. **Program Group** is a set of music sources that can be transmitted over the page zone. An operator at a master station with permission for program control can select one of the music sources when the DXL is operating.



4.5.4 Page Zone - Members



The **Members** tab is used to specify the devices that will be connected or activated when this page zone is paged. The **Device Kind** pull-down menu allows us to make the appropriate selections.



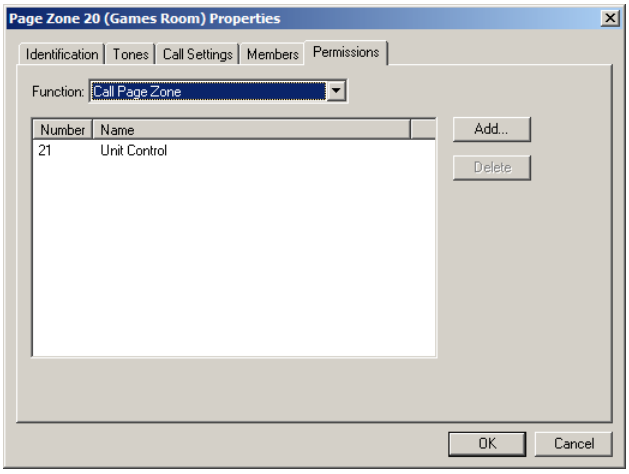
The Speaker Line entry will only be displayed after you have added a paging output that includes one or more speaker line groups. Similarly, the Status Output entry will only be displayed after adding a paging output that includes one or more Zone Select Outputs.

Clicking **Add…** after selecting the **Station** entry will bring up a list of all the stations in the facility. From this list select any stations you wish to include in the page zone. Selecting **Masters** will allow you to select any masters in the system.

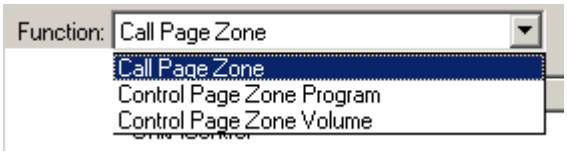
Clicking **Add…** after selecting **Paging Output** will bring up a list of all the paging outputs. Select the paging outputs that you want to include in this page zone. In this example only audio amplifier 1 is selected.

When you click **Add…** after selecting **Status Output** only the status outputs associated with current paging output members will be displayed. Similarly, only the speaker lines in the speaker line groups associated with the included paging output members will be displayed after you select speaker line as the device kind. You must add paging outputs to a page zone before you can add any of the selectors associated with that page output to a page zone.

4.5.5 Page Zone - Permissions



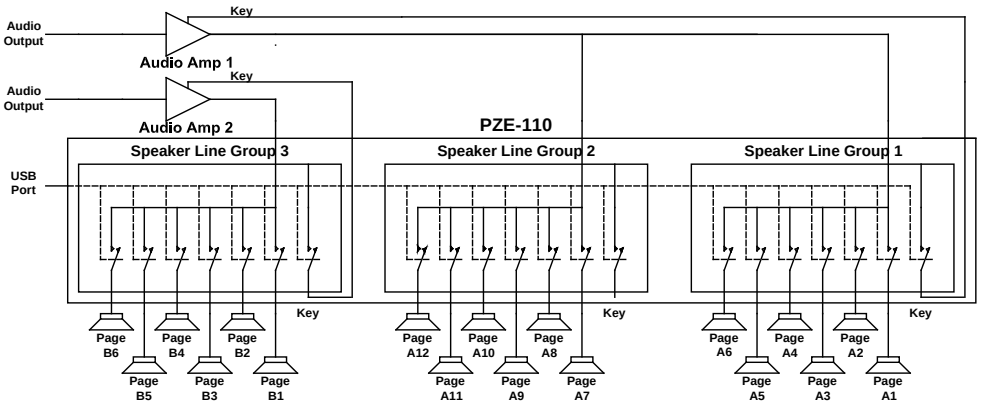
The **Permissions** tab specifies which master stations can make an announcement over the page zone, which masters can change the volume and which masters can control page zone programming, i.e. transmitting background music over the page zone. The **Function:** pull-down menu offers the following selections.



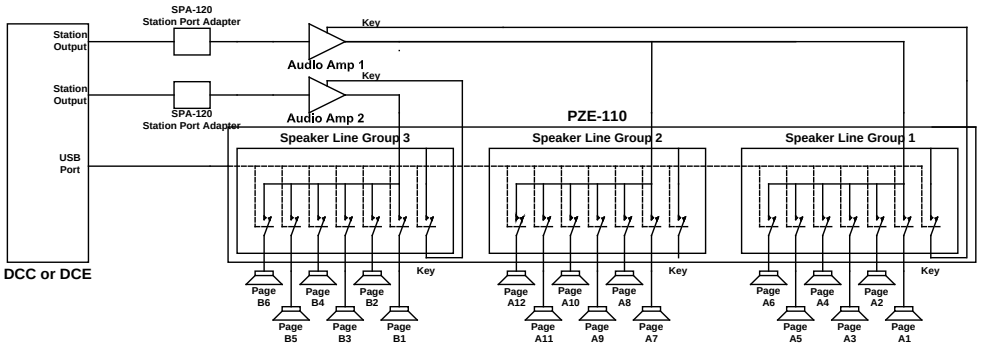
In this example only Unit Control is allowed to make pages to the Games Room.

5. Other Possible PZE Configurations

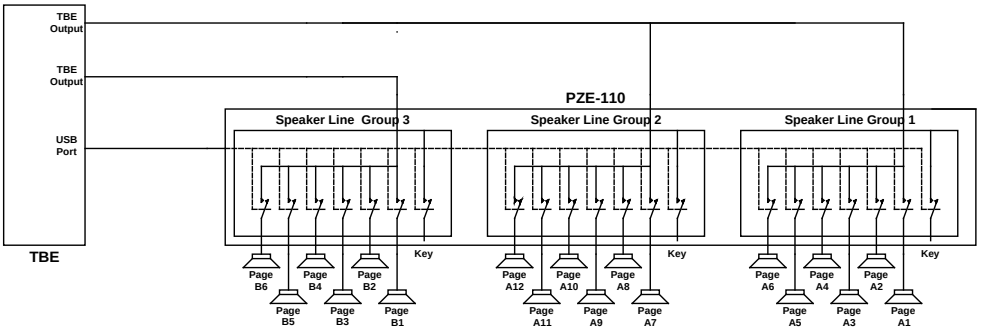
The example detailed in Section 4 used a PZE connection to a DXL system using line level outputs to drive an external amplifier. The simplified block diagram is shown below.



An alternate method of using a PZE is to use a station output (from a SCC-400, SCC-401 or SCC-300 station control card) to provide an audio input to the external audio amplifiers. In this case the station output audio must be changed to a line level output. This is achieved using a SPA-120 Station Port Adapter, as shown in the following diagram.



A third possible method of connecting the PZE to a DXL system is to use the high power audio output of a TBE to connect directly into the inputs of the PZE. The TBE outputs can be bridged to provide output power levels in 5 watt increments. A possible block diagram is shown below.



6. Status Inputs

6.1 Switch Connections

Sixteen status inputs are available via a 25 pin DB-25 female connector on the PZE-110. A CBL-SWT-A cable can be used to connect the status switches to the female DB-25 connector.

Male DB-25 Connector Female DB-25 Connector

DB-25 Connector Pin Outs

6.1.1 Using a CBL-SWT-A

The following table gives a suggested connection scheme showing pin numbers, wire colors, and terminal block positions for the station switches. The scheme shown does not make efficient use of terminal block terminals but corresponds to 3 row terminal blocks used for connection up audio ports. Note that all the 'Switch – 'terminals are connected to a common digital signal ground.

Table 1 Pin Allocations for a CBL-SWT-A cable

DB-25 Pin Number	Signal	CBL-SWT Wire Color	Terminal Block Pin Number
1	Switch 1 +	Red	1
2	Switch 1 -	Black	2
14	Switch 2 +	White	4
2	Switch 2 -	Black	5
15	Switch 3 +	Green	7
16	Switch 3 -	Black	8
3	Switch 4 +	Blue	10
16	Switch 4 -	Black	11
4	Switch 5 +	Yellow	13
5	Switch 5 -	Black	14
17	Switch 6 +	Brown	16
5	Switch 6 -	Black	17
18	Switch 7 +	Orange	19
19	Switch 7 -	Black	20
6	Switch 8 +	White	22
19	Switch 8 -	Red	23
7	Switch 9 +	Green	25
8	Switch 9 -	Red	26
20	Switch 10 +	Blue	28
8	Switch 10 -	Red	29
21	Switch 11 +	Yellow	31
22	Switch 11 -	Red	32
9	Switch 12 +	Brown	34
22	Switch 12 -	Red	35
10	Switch 13 +	Orange	37
11	Switch 13 -	Red	38
23	Switch 14 +	White	40
11	Switch 14 -	Green	41
24	Switch 15 +	Blue	43
25	Switch 15 -	Green	44
12	Switch 16 +	Yellow	46
13	Switch 16-	Green	47

6.1.2 Alternate Termination using a CBL-SWQ-A cable and QCB-120-2

Using a double ended factory supplied cable (a CBL-SWQ-A) and a Quick Connect Board (QCB-120-2) provides a second means of connecting the field status inputs to the DB-25 connector.

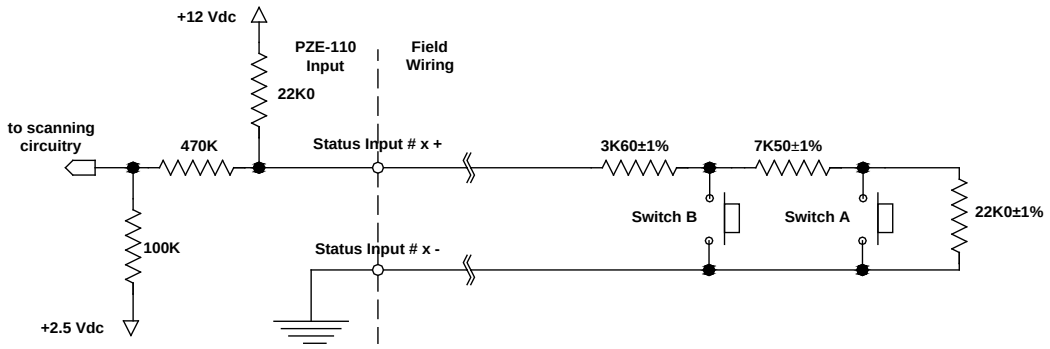
6.2 Status Input Switch Terminations

6.2.1 Supervised switches

Using a resistor network the PZE-110 is capable of reading the switch closures for up to two status input switches for each switch input, as well as identifying open or short circuit faults. The following sections give terminating networks for both supervised and unsupervised switches.

6.2.1.1 Supervised 2 Switch Network

The switches may have terminating resistors, which allows the DXL system to detect which one of the two switches is closed; as well it allows the system to monitor for either open or shorted faults. The following schematic shows the necessary switch wiring.



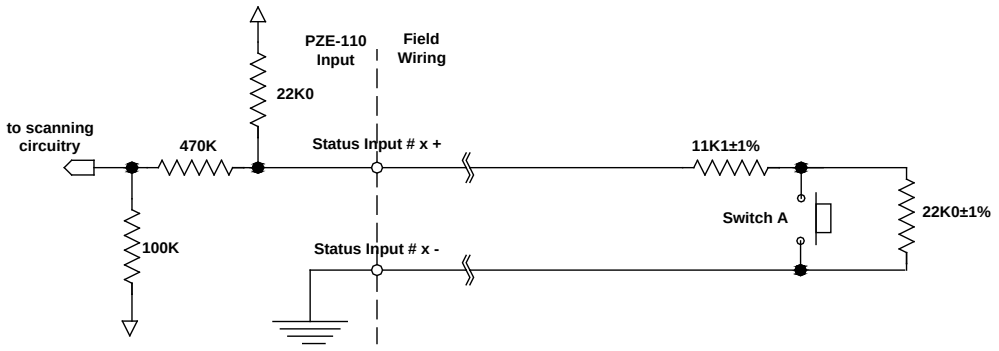
Supervised 2 Switches

Each input can be in one of five states. The voltage at the PZE-110 output terminals determines the states. The actual voltage measured will be slightly different than those given in the table due to component tolerances and the resistance of the field wiring.

Input State	Wiring	Switch A	Switch B	Voltage
Open Fault	Open Circuit	N/A	N/A	11.65
Idle	Normal	Not Pushed	Not Pushed	7.10
Switch A Pressed	Normal	Pushed	Not Pushed	4.00
Switch B Pressed	Normal	N/A	Pushed	1.69
Short Fault	Short Circuit	N/A	N/A	0

6.2.1.2 Supervised 1 Switch Network

A single switch with a terminating resistor network can be used to detect switch closure, as well as monitor open and short faults. Either Switch A or Switch B can be used with the appropriate terminating resistors.

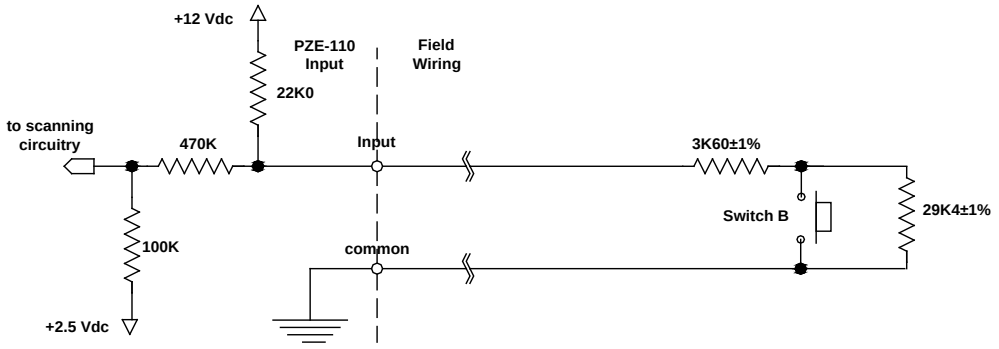


Supervised 1 Switch (Switch A)

Each input can be in one of four states. The voltage at the PZE-110 input terminals determines the states. (The actual voltages will vary slightly due to component tolerances and the resistance of the wiring to the switch.)

Input State	Wiring	Switch A	Voltage
Open Fault	Open Circuit	N/A	11.65
Idle	Normal	Not Pushed	7.10
Switch A Pressed	Normal	Pushed	4.00
Short Fault	Short Circuit	N/A	0

If Switch B is used, the input can be in one of four states. The voltage at the PZE-110 input terminals determines the state. (The actual voltages will vary slightly due to component tolerances and the resistance of the wiring to the switch).

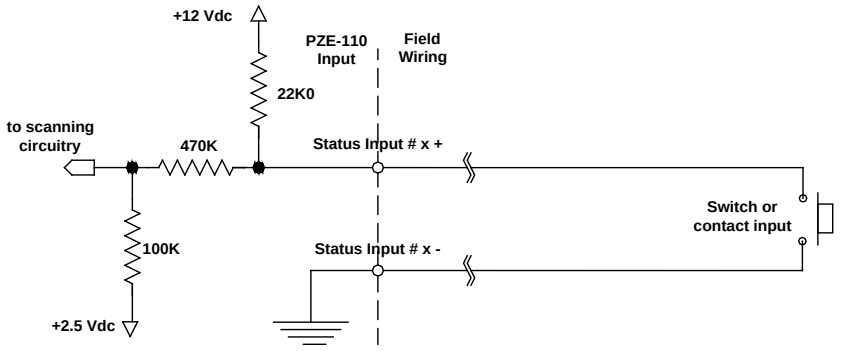


Supervised 1 Switch (Switch B)

Input State	Wiring	Switch B	Voltage
Open Fault	Open Circuit	N/A	11.65
Idle	Normal	Not Pushed	7.10
Switch B Pressed	Normal	Pushed	1.69
Short Fault	Short Circuit	N/A	0

6.2.1.3 Non-Supervised 1 Switch

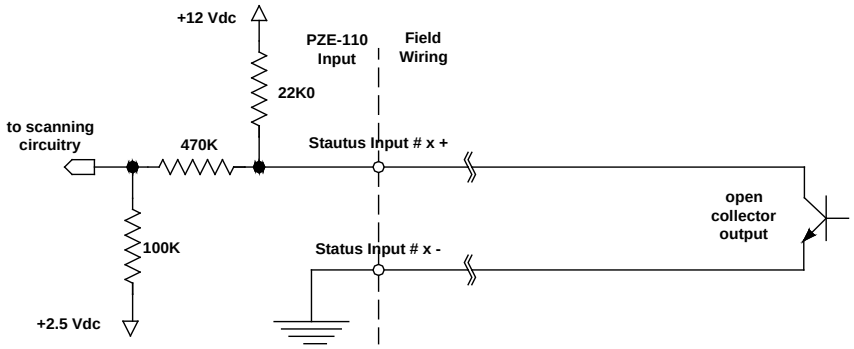
The following switch configuration allows the system to detect a single switch contact closure.



Non-Supervised 1 Switch Output

6.2.1.4 Solid State Switch

The following schematic shows the connection for an open collector switch non-supervised switch. The open collector must be capable of sinking 0.6 mA.



Solid State Switch Output

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.