MicroComm DXL

DXL ALA Settings Guide

April, 2010

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1 Introduction

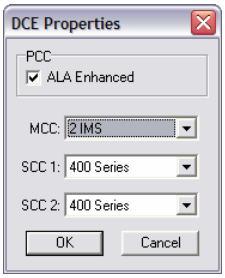
This application note gives you basic information on how to set up the DXL system to use Audio Level Alarms (ALAs), how to adjust the settings to trigger on alarms and minimize the number of false alarms.

You should have some knowledge of the DXL Administrator Software before using this guide.

2 Configuring Audio Level Alarms

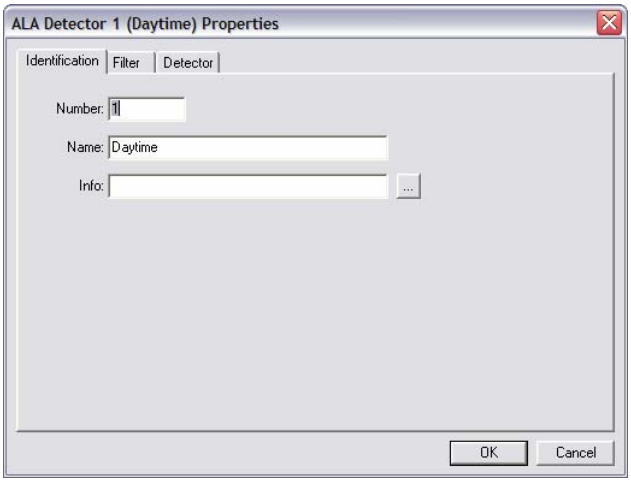
2.1 Creating the Hardware

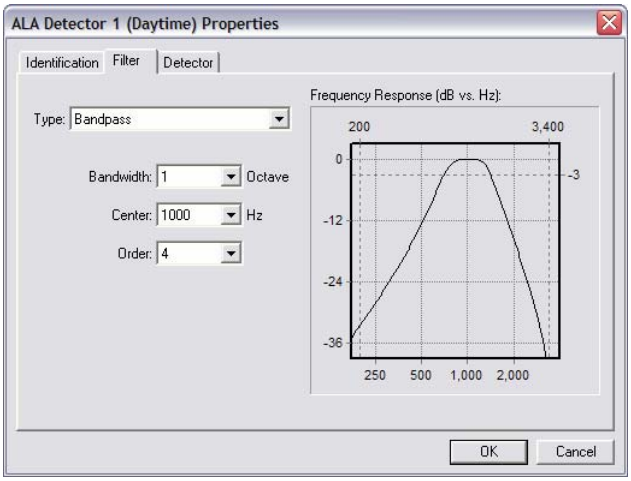
When configuring your system with the Administrator Software all DCCs and DCEs should have the ALA Enhanced box checked. All the DCCs and DCEs ordered for a system that requires ALA operation should be ordered with the Enhanced PCC.



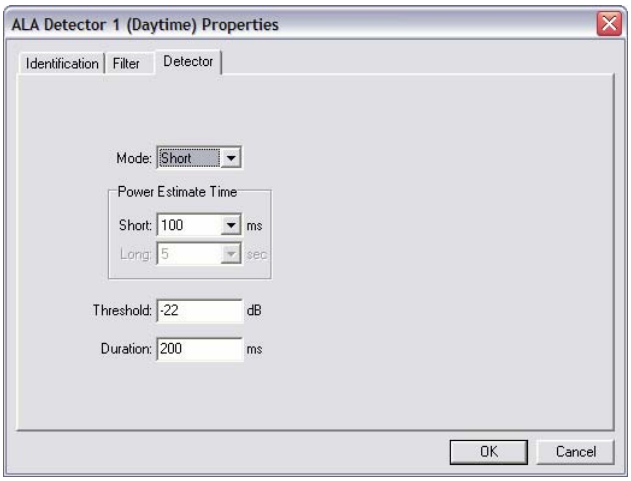
2.2 Creating ALA Detectors

The settings that determine the type and loudness of sounds that trigger the Audio Level Alarms are configured in the **ALA Detector Properties** dialog box. In the **DXL Configuration Editor** select **ALA Detectors** in the **Configure:** pull down menu to bring up a list of ALA detectors. Click the **Add…** button to create a new ALA detector. The **ALA Detector Properties** dialog box has three tabs; **Identification**, **Filter** and **Detector**. The **Identification** tab is used to assign an ID **Number** and **Name** for the detector. The **Filter** and **Detector** tabs are used to set the parameters that will determine the trigger conditions for the ALA detector.



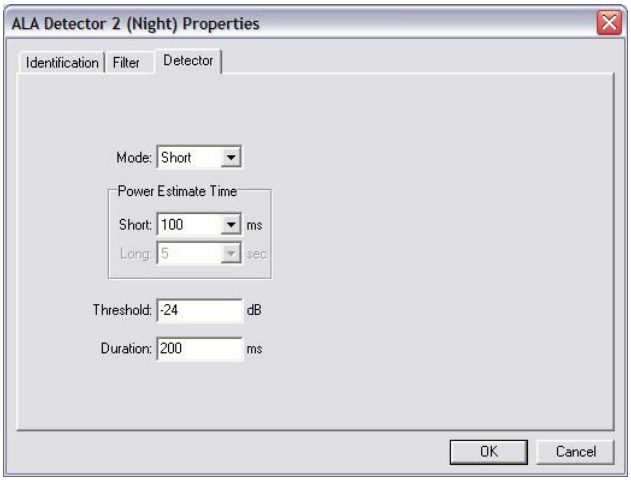


In the **Detector** tab the **Threshold** sets the sound level value required to trigger the alarm. A smaller value (more negative) will trigger easier (i.e. on quieter sounds). The **Duration** setting specifies how long the sound must exceed the threshold to trigger the alarm.



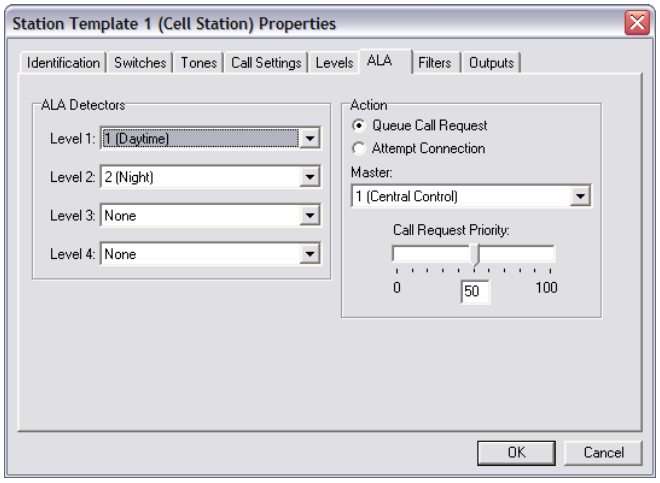
If you want to have multiple settings, for example for a day time and night time setting, you can create another detector with identical parameters for everything except the threshold. To trigger easier, make the **Threshold** value a smaller value (i.e. –24 db as shown below). Note that since the threshold value is in negative db, i.e. -24 db is smaller than -22 db and a setting of -24 db will trigger easier than a setting of -22 db.

For speakers or intercoms in similar settings, you can use the same detector settings. For example cells that have approximately the same dimensions with same interior furnishings can use the same ALA Detector to determine trigger levels. Areas with different acoustic characteristics (for example, a padded cell, a gymnasium, or a long hallway) may require different ALA Detectors with separate sets of trigger settings.



2.3 Assign ALA Detectors to station templates or stations

Once you have created the ALA Detectors for each unique type of room and for each sensitivity level, you assign these settings to the related stations or talk-back speakers.



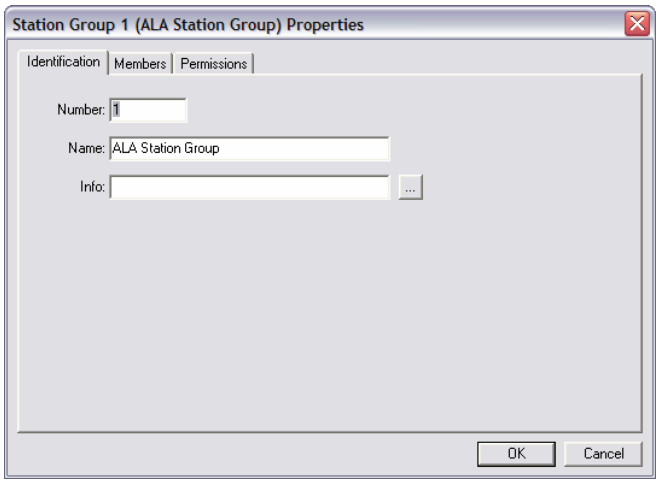
You need to assign the detector or detectors to the station template (or stations) that require audio threshold alarms. In the **DXL Configuration Editor** select **Station Template** (or **Stations**) in the **Configure:** pull down menu. From the list of station templates (or stations) select the station template (or station) and from the **Station Template Properties** (or **Station Properties**) box select the **ALA** tab.

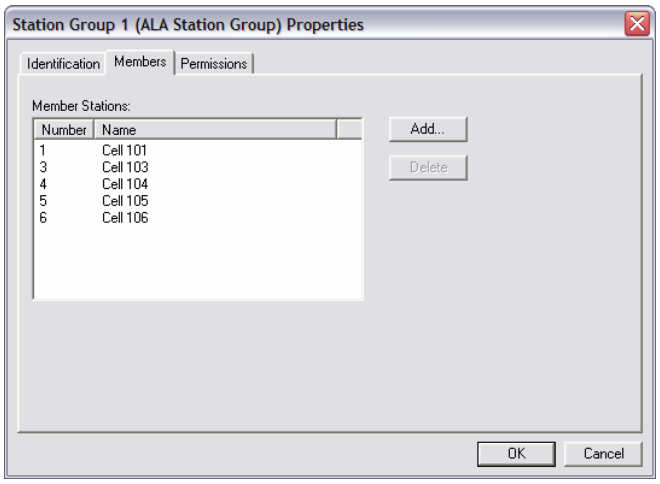
You can have up to 4 levels per station (plus "Off"). Assign the appropriate detectors to the different levels. In the example

shown on the right cells are being monitored with two ALA Detectors. There is a "daytime" setting that only triggers on loud noises and a "night" setting that will trigger on quieter noises. If you only have "On" and "Off" then you only need to assign one detector for Level 1. The master (or master group) that is to receive the audio alarms is specified in ALA tab. Normally these alarms queue up as **Alvl** audio level alarms which are similar to call requests when "Queue Call Request" is selected, but if you want to automatically listen when the alarm goes off (if the master is not otherwise in a call) you can select "Attempt Connection".

2.4 Creating Station Groups

Normally to activate the audio level alarms you would need to select one station at a time. You can however create a station group so that multiple stations can be activated at once. In the **DXL Configuration Editor** select **Station Groups** in the **Configure:** pull down menu to bring up a list of Station Groups. Click on the **Add…** button to create a new station group. The **Station Group Properties** box has three tabs: **Identification**, **Members** and **Permission**

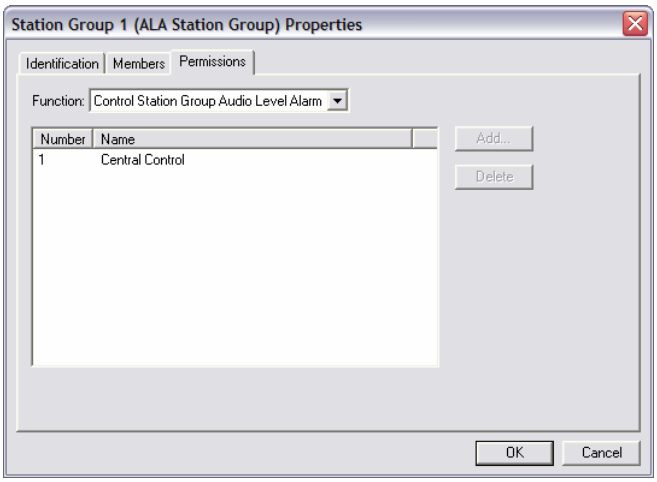




On the **Members** tab use the **Add…** button to add all of the stations with ALA to the group.

In a larger system, you may want to activate audio level alarms grouped by dayroom/pod in which case you may have more than one station group (one per dayroom/pod for example).

If you have stand alone masters and have not disabled permission checks, make sure you assign the masters permission to change the audio level alarm settings using the **Permissions** tab.



Setting Audio Level Alarms to Start Monitoring Automatically

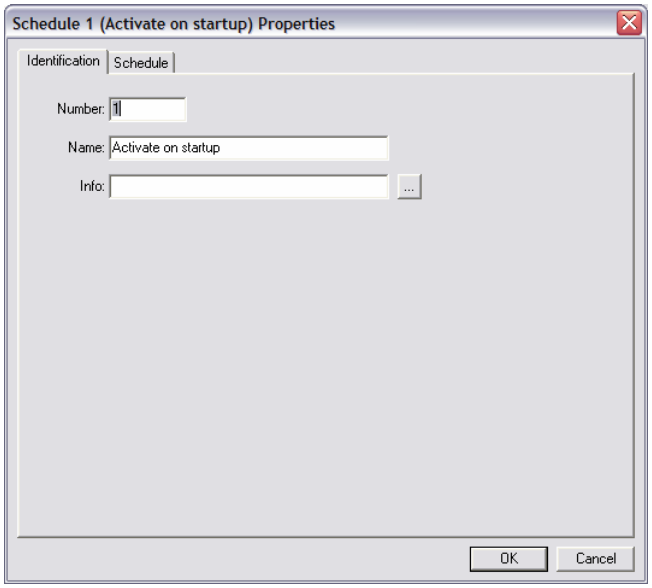
Note that the audio level alarms are not activated by default and either the PLC or touch screen software will have to change the level on start-up or the stand-alone masters will have to activate the alarms when you want them turned on.

You can activate the Audio Level Alarm monitoring on start-up (or change the settings automatically based on time of day) by creating a schedule and a scheduled operation. The following methods can be used to automatically start the monitoring process.

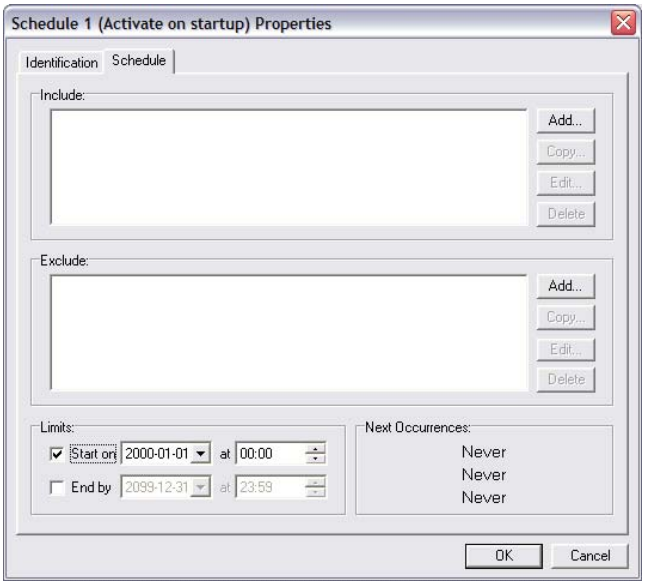
2.4.1 Option 1: To activate one setting on start-up:

To automatically turn on the Audio Level Alarms on system start-up, you need to create a schedule that activates on start-up.

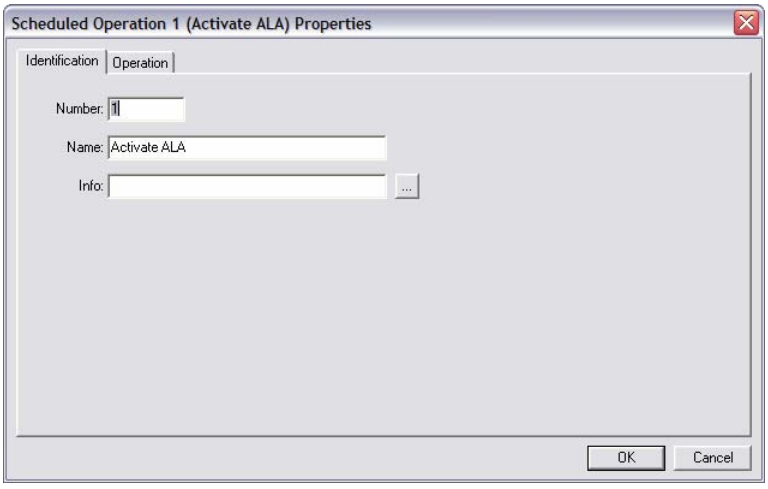
In the **Configure:** pull down select **Schedules**. Then click on the **Add…** button to create a new a new Schedule in the system configuration. In the I**dentification** tab specify the **Number:** and **Name**: of the schedule. In this example we have named the schedule Activate on startup.



In the **Schedule** tab set a time that will be activated on **Start-on** i.e. by setting a start on time that has already occurred. The default time is 2002-01-01 at 00:00

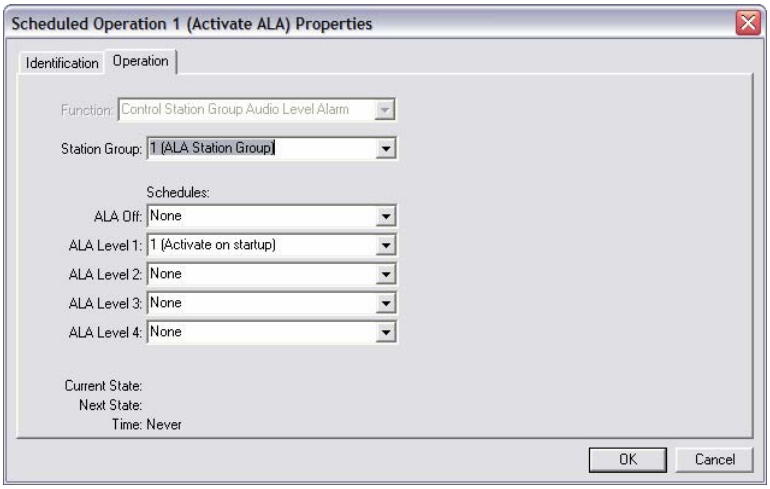


Next we need to tell the system what to do on start up by opening a **Scheduled Operations** dialog box. Using the **Configure:** pull down menu select **Scheduled Operations** and by clicking on the **Add…** button you can create a new scheduled operation. In this example using the **Identification** tab we have named the scheduled operation **Activate ALA**.



Next you must tell the system what operation is to be carried out, what group is to be effected and what schedule is to be followed. In the **Scheduled Operations** dialog box select the **Operation** tab. In the **Operation** tab using the pull down in the **Station Group** select the station group that you want to be ALA monitored. Select the ALA Level 1 that you want to be applied.

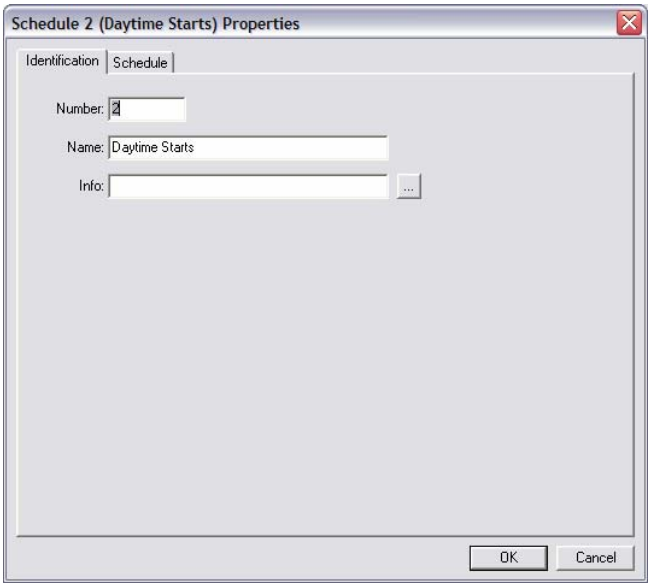
With these settings, each time the DXL system resets, the Audio Level Alarms will automatically start monitoring the ALA Station Group.



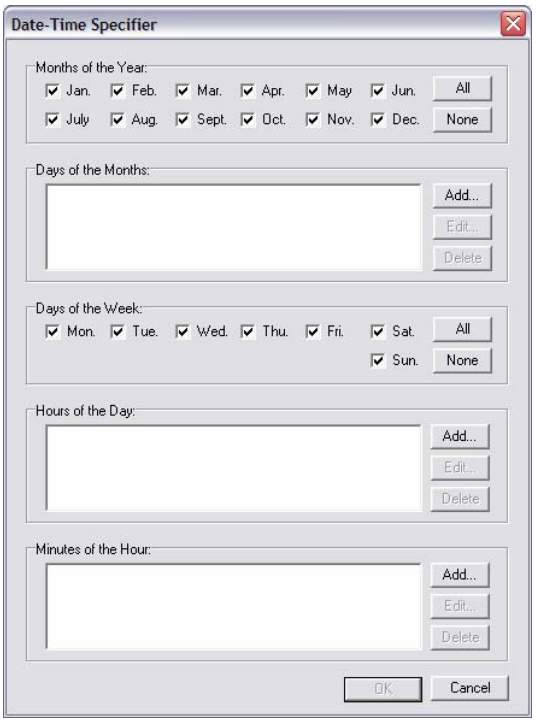
2.4.2 Option 2: Settings that change on a time schedule

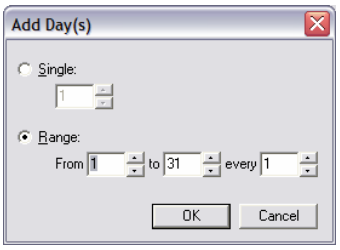
The ALA sensitivity can be change automatically at different times of the day by setting up an appropriate schedule.

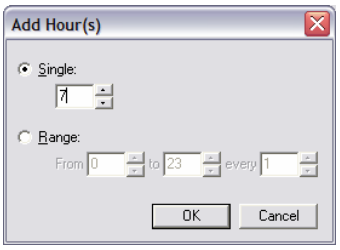
In the **Configure:** pull down menu select **Schedules** and create a schedule for activating the first setting. For example the daytime settings should be configured to start at 07:00 in the morning.

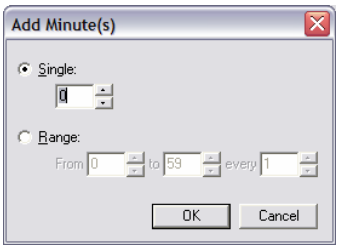


In the **Schedule** tab click **Add…** button to bring up the **Date-Time Specifier** pop up window. Click **All** for Months of the Year and **All** for Days of the Week, then click the **Add…** buttons to set the Days, Hours, and Minutes for the event to occur. In this case, every month, day, weekday of the year at 07:00 in the morning.

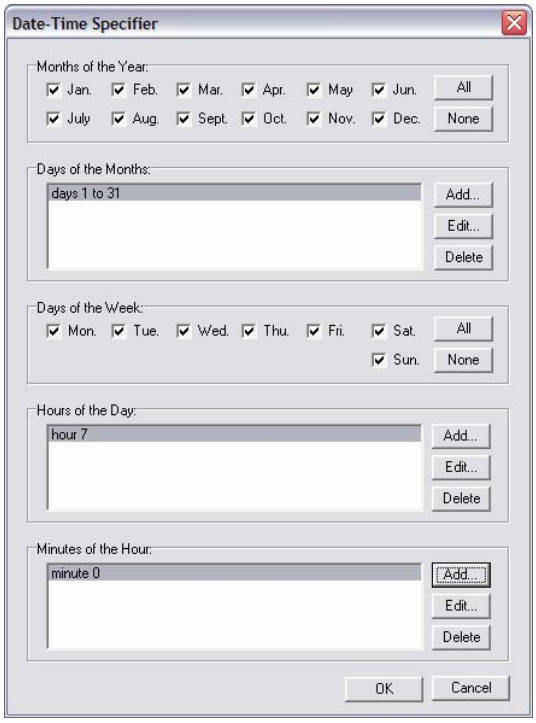


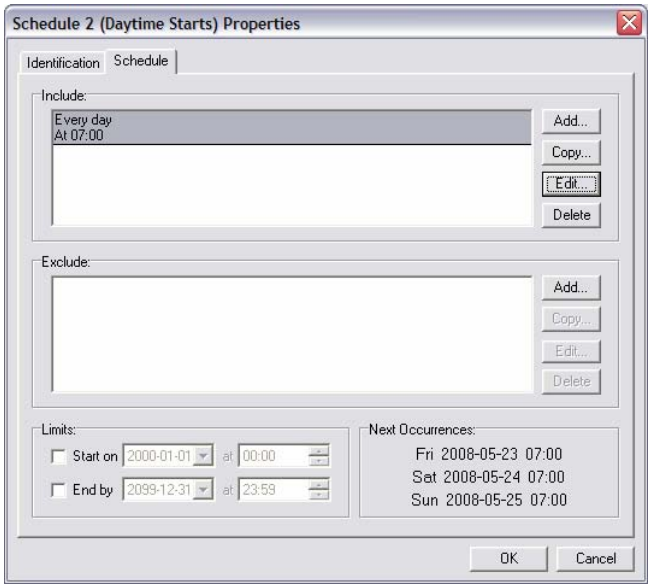




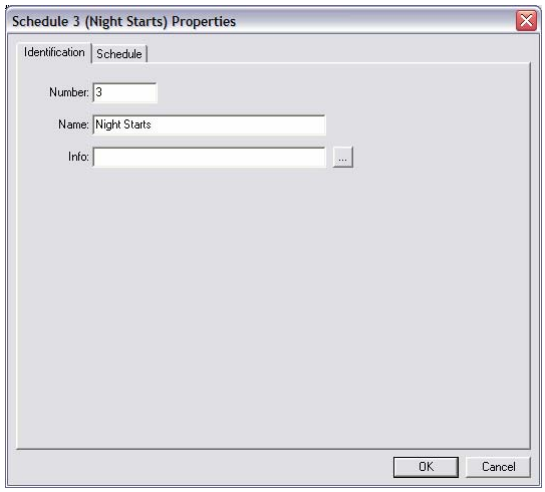


Th1s creates a schedule that appears as follows:

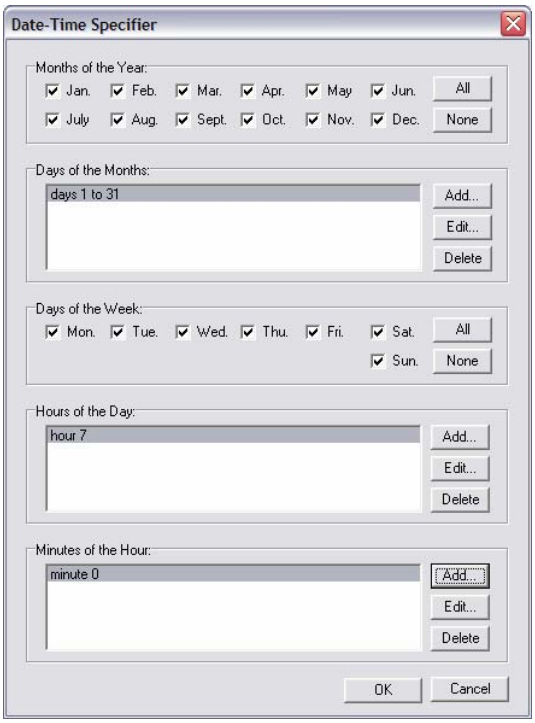


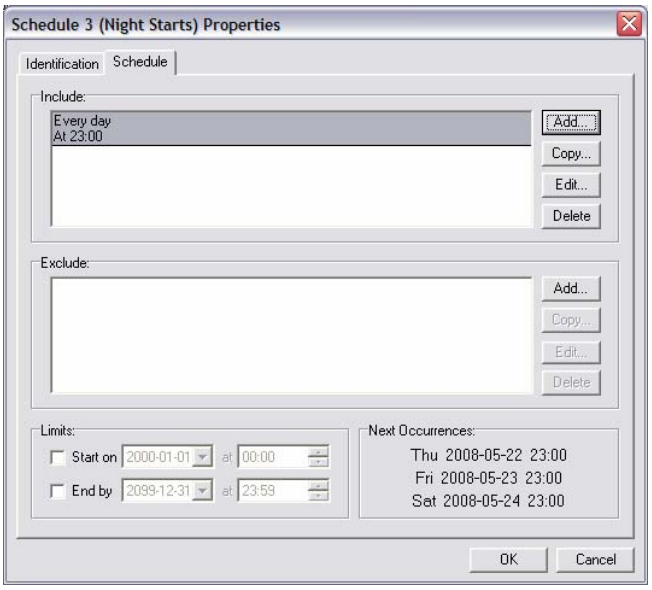


Following the same procedure create a second schedule that specifies the start of the night time ALA settings. In this example the Night Start is to occur at 11:00 PM (23:00 hours).

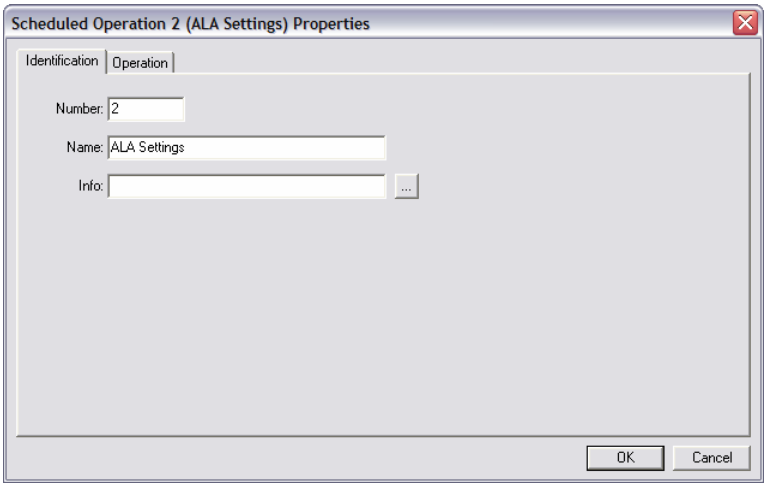


The **Date-Time Specifier** is set up as follows and the corresponding Schedule tab is shown on the right.

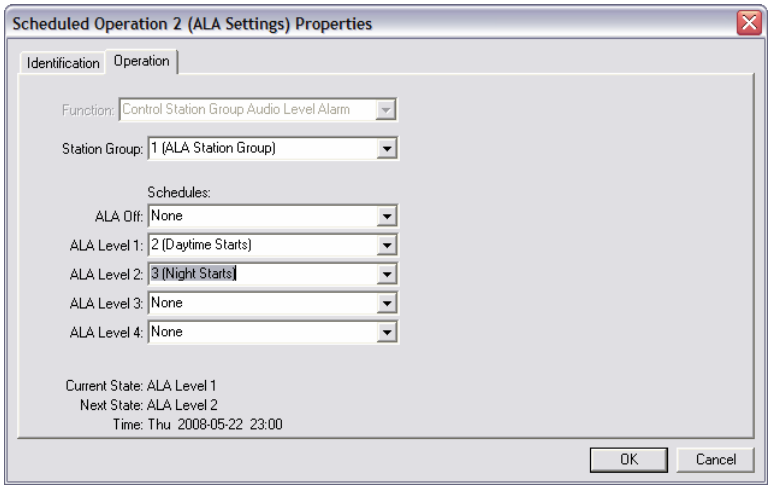




The next step is to create a new **Scheduled Operations**. Using the **Configure:** pull down menu select **Scheduled Operations** and by clicking on the **Add…** button you can create a new scheduled operation. The **Scheduled Operations** dialog box has 2 tabs; **Identification** and **Operation**. The **Identification** tab allows you to specify the **Number:** and **Name:** of the scheduled operation.



The **Operation** tab allows you to specify the operations to be performed, the Station Group that is to be effected and the schedules that are to be followed. In this example the **ALA Level 1** is set to **Daytime Start** (7:00 AM) while the **ALA Level 2** is set to **Night Start** (11:00 PM).



3 Fine Tuning Audio Level Alarms

3.1 Overview of Audio Level Alarm Tuning

The previous section represents a first pass for setting up the sound level that will trigger the Audio Level Alarms. However, each type of room and speaker is acoustically different, and the type of noise (and its loudness) that it is desired to trigger on will vary. From the initial settings you will likely need to fine tune the trigger level so that the alarms will trigger when desired with minimal false alarms.

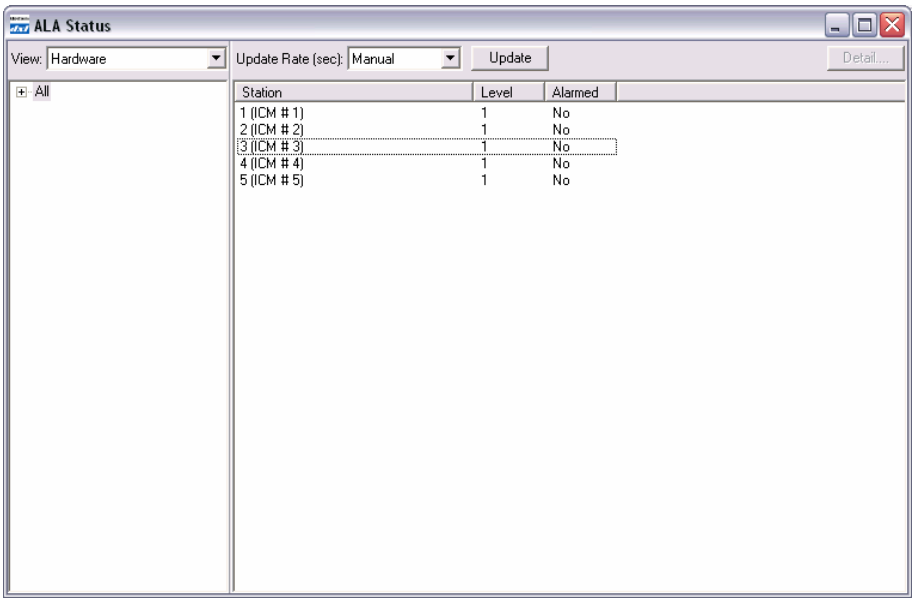
For Audio Level Alarms, the threshold (sensitivity) setting affects how easy it triggers (i.e. how loud a noise has to be to trigger the alarm). Lower values (higher negatives) will be easier to trigger (lower threshold above which the alarm triggers) while higher values (lower negatives) will be harder to trigger.

3.2 Using the DXL Administrator ALA Diagnostics Function

The easiest approach to set threshold values is to go into the **DXL Administrator, Diagnostics** window click on the **Select View** menu then select **ALA Status…**

You will then get an overview screen on all of the stations that have an ALA detector assigned, indicating whether ALA is on (and what it's level setting is) and whether it is alarmed (i.e. that it has recently triggered).

Double clicking a station here will show you a Detailed ALA Analysis Graph for that station, which can assist you with setting ALA sensitivity values.



3.2.1 Detailed ALA Analysis Graph

The Detailed ALA Analysis Graph is a graph of the audio signal power received by that station over time.

You can use the graph to determine what levels to set the sensitivity value at to trigger on desired sounds, while not triggering on normal activity in that area.

First, set the sample period and history so that you get an adequate indication of the noises you are going to make. A sample period of 100 ms and a history of 5 seconds gives you an overview of most common sounds you may be interested in (screams, door slams, conversation, etc.). The **Run** button is a "Run/Pause" button, once you have a good sound then pause it to examine the graph closely so that you can pick some settings.

You can make some sounds, and pick a trigger level that is above the background noise, but somewhat below the loudest noise that you make. Note that another factor is time; it sound has to be above the trigger level for the time in set in the **Duration** box. Make sure that in your tests you pick a value that is at least your chosen threshold for your chosen time.

The following shows an example initiated by a scream near an intercom station. Look at the red line on the top graph. That is the short window (the trigger settings equivalent to the settings configured above). The blue line is the long term window - basically the equivalent of the averaged background noise in the room.

Note that the yellow, green, and cyan boxes indicate some possible threshold/time settings for this example and are not part of the DXL Administrator software.

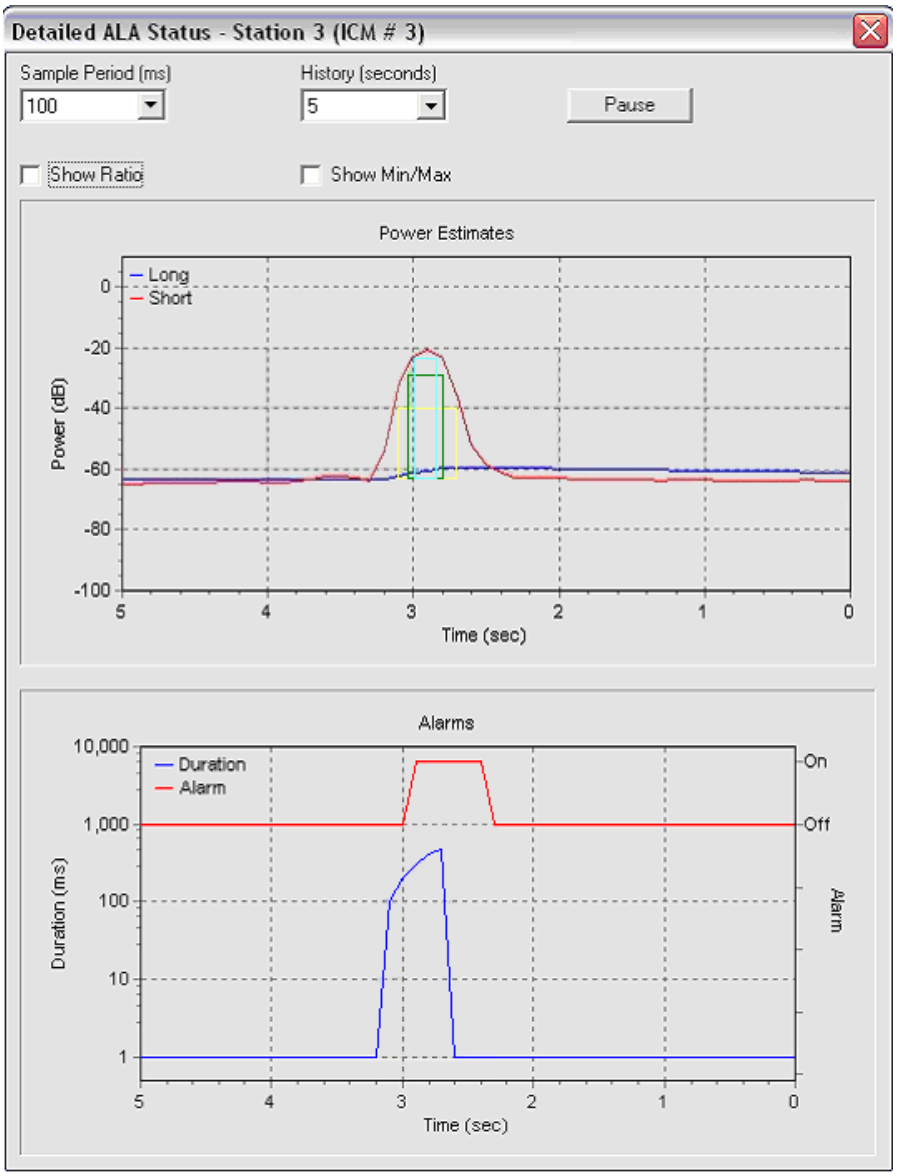
In this graph, background noise is about -62 to -64 db. If the sensitivity is lower than this it will always trigger. You want a combination of sensitivity and duration that will trigger on the hump of the graph.

Setting the settings equivalent to the yellow box will trigger on a medium sensitivity value but with these settings, it has to be triggered for a long time. Estimating from the graph this looks like a sensitivity of -40 db for 400 ms

The settings for the green box needs to be a louder sound but doesn't have to be held as long.

From the graph, this is estimated to be about -30 db for 200 ms

The settings for the cyan box will trigger only on a really loud sound but it doesn't have to be there long. That setting is about -25 db for 100 ms.



Different rooms and different buildings sound different. Settings similar to the yellow and green settings tend to work better and be easier to adjust for, but it depends on the conditions of the area. To fine tune settings, set up the Detailed ALA Status Window, go into a room, and make a noise you want to detect. Look at the graph and pick some sensitivity and duration settings from the graph using some of the above estimations. Then make some noises you don't want to trigger on. Talk loudly, kick the tables if in a dayroom, turn on TV at full volume, turn on the showers, open and close doors, flush the toilet, etc. If it would trigger on the settings you pick, examine the graph to determine how to exclude these while triggering on your desired sound. Is the false trigger a loud noise

for a short time? Then gravitate towards the yellow box settings and make the trigger duration longer (and maybe the sensitivity lower) so it still picks up the real alarm but is too long for the false alarm to trigger. Is the false alarm a low noise but for a long time? (i.e. a toilet flush) If so, make the trigger point higher, probably also forcing a lower duration.

The bottom half of this graph is only of use once you have set up your desired threshold in the configuration and uploaded and activated the configuration. The blue line starts increasing once the received power is above the threshold. Once the blue line starts going up it has to reach the duration settings before the trigger. The red line indicates when the alarm is triggered (the sound is above the sensitivity threshold for at least the duration). This example looks like the trigger level was set approximately at the “yellow” box settings it's about where the "yellow" settings are judging by how long the alarm was on.