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JINGLE2

4 melody JINGLE unit technical description

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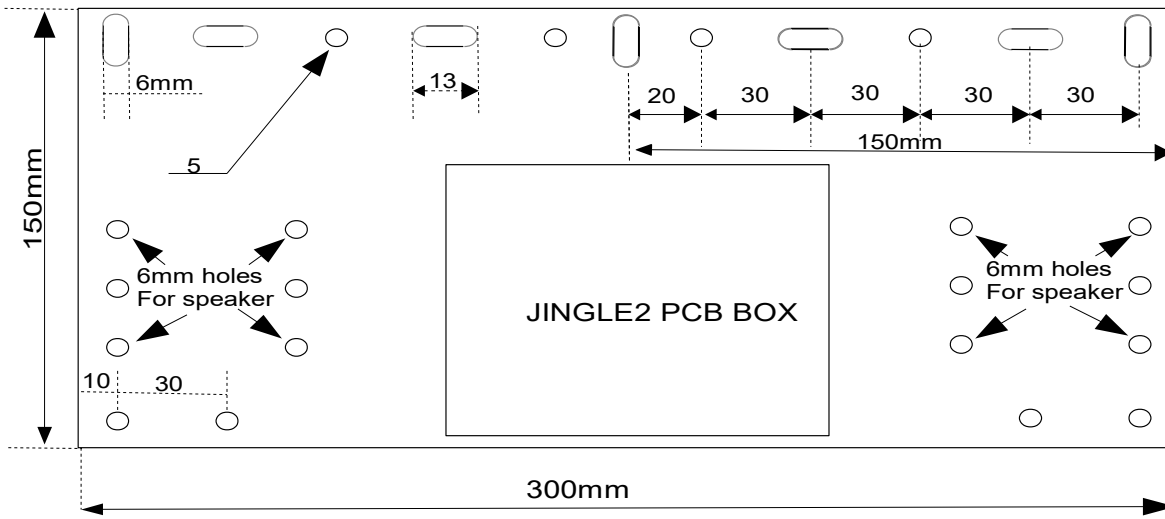
1 General Description

- The Jingle2 unit is used in and around large buildings (shop-floors, factories, warehouses) to announce time events to employees with a short musical jingle. It is used with CardWare's SL-62 Jingle2 controller or an SL-84 time&attendance controller with 3 free relay outputs. These generate the time signals to drive the jingle units. Other methods of driving the jingle units are also possible.
- The Jingle2 unit uses 12-13VDC @ 150mA max
- A combination of 4 melodies is supported
- The jingle is started by applying an active output pattern to the Jingle2 unit's **1, 2 and 3** screw terminals. The 'output patterns' are a 4 possible combinations of a 12VDC connected in two possible polarities between pins 1 and 2 and pin 3 either shorted with pin 1 or pin 2. A melody will start to play (selected from the 4 possible melodies by the pattern) for as long as the pattern is present. If the pattern is present longer than the duration of the jingle melody, the jingle melody will start over again. We recommend a jingle duration of around 15 sec. for noisy production halls.
- The jingle2 unit comprises the following elements
 1. carrier plate with fixing holes
 2. 10W horn loudspeaker
 3. jingle2 PCB with screw terminals
 4. Jingle2 PCB plastic case with rubber cable grommets

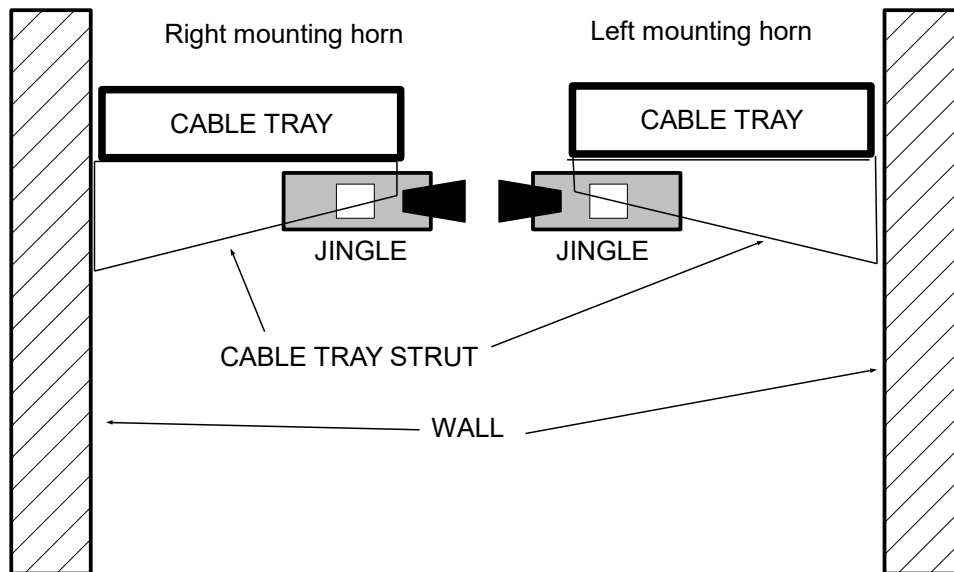


1.1 Carrier plate

The carrier plate is a 2mm thick, 300x150mm., light gray painted steel plate.

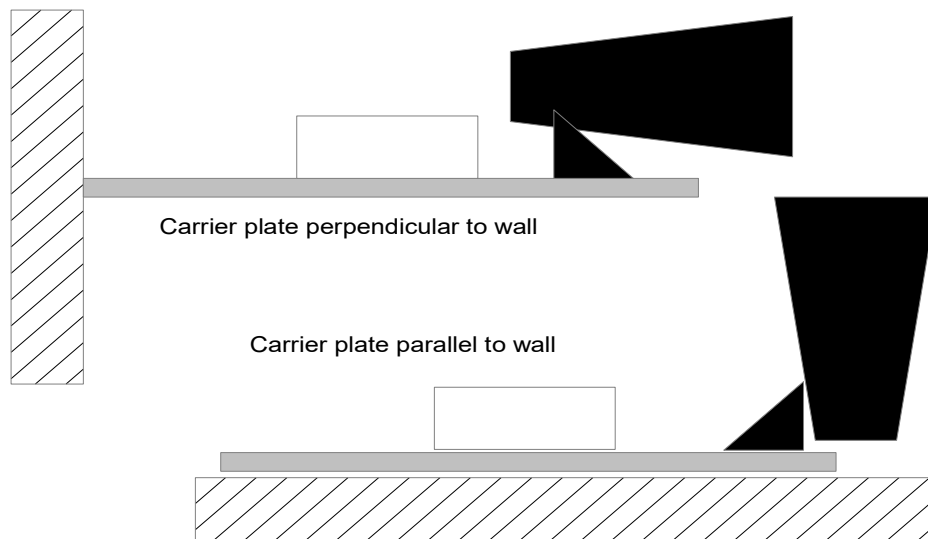


It has several round and elliptical mounting holes along the top and bottom sides and can be mounted onto cable-duct supporting struts which can usually be found going round factory production halls. Since the cable-ducts can be either side of the shop-floor, the horn-speaker can be mounted on either side of the carrier plate (with 3 screws and bolts).



With this type of mounting, the carrier plate is pointing in the direction of the shop floor, i.e.. the direction of the horn-speaker. If the plate must be mounted parallel to a wall, the horn should be mounted onto the plate pointing inwards (towards the PCB box) because it can then be rotated

to be perpendicular to the plate.



Below is a drawing of the mounting plate with the holes and ellipses for mounting. Note the six holes on each side of the PCB box. These are for mounting the horn speaker on either side and in either orientation. These holes are 6mm, all other mounting holes are 5mm.

1.2 Horn loudspeaker

The horn loudspeaker is rated at 10W/8 Ohms.

It is mounted on the carrier plate with 3pcs 5mm screws. The screw heads, which are flat, should go onto the back of the plate to keep this as flat as possible if parallel wall mounting is used.

The screws must be removed to enable the rotation of the speaker if mounting of the carrier plate is to be parallel. This is because the speaker can't be rotated to be perpendicular to the carrier plate if it is pointing away from the central PCB box.

It is possible to mount two horn speakers on one plate if this is necessary and if the horns are placed at 45 degree angles to the plate. This requires a JINGLE1 PCB with all SPK2 components mounted. Note that the current consumption of this JINGLE1 unit would be double i.e. 300mA max.

Please note that the horn loudspeaker is directional and the highest acoustic power is emitted up to 30 degrees around the central symmetry line of the speaker.

1.3 Jingle2 PCB

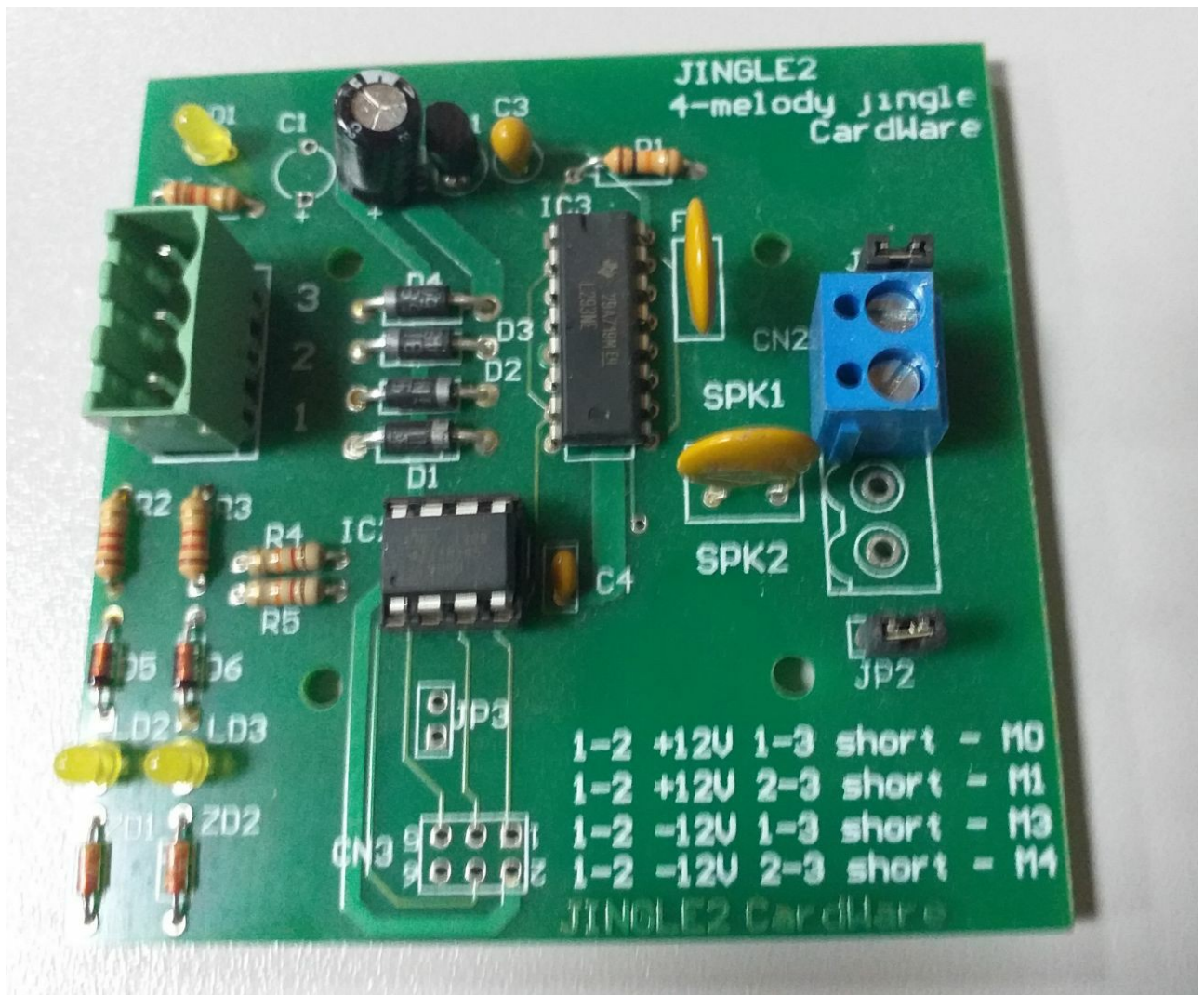
The Jingle2 PCB contains the electronics necessary for driving the horn loudspeaker.

It has the following screw terminals:

- **CON1 Pattern input** 3-pin input for operating voltage and melody selection (12-13VDC/ 150mA max)
- **CON2 Speaker output** 4-pin output for two horn speakers
 - **SPK1** speaker output, connected to horn loudspeaker #1
 - **SPK2** speaker output, connected to second horn loudspeaker if available

The PCB is fixed to the base of the box by 4 self-tapping screws. It may be easier to screw in the incoming and outgoing wires by taking the PCB out of the box and fixing it again after the wires have been attached to the screw terminals.

By applying an active pattern to the 3-pin input screw terminal (12V ..13VDC to pins 1-2, pin 3 shorted with either pin 1 or pin 2), the jingle unit will start to play the selected jingle.



- Jumpers JP1 and JP2 These jumpers should be set if only one horn loudspeaker is used. The two outputs SPK1 and SPK2 each have a separate driver. These two jumpers short the two driver outputs so they are paralleled in case only one speaker is used.
- Input combinations. As can be seen on the PCB silk screen (printed text) the following input patterns i.e. input combinations apply:

| Voltage: Pins 1 & 2 | Shorted pins | Melody selected |
|---------------------|--------------|-----------------|
| +12V | 1 & 3 | Melody 0 |
| +12V | 2 & 3 | Melody 1 |
| -12V | 1 & 3 | Melody 2 |
| -12V | 2 & 3 | Melody 3 |

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2 Mounting the JINGLE2 units

Satisfactory results can be achieved in average loudness factory floors by following these guidelines:

- the units should be mounted at a height of 2,5 - 3m
- spacing between units mounted on the walls, pointing into the factory should be 20-40m
- a jingle unit is audible to around 40m in the direction pointed to by the loudspeaker

Note that the duration of the jingle, which is defined by the controller, also has an impact on the number of jingle units that need to be installed. If the production noise is such that there are short bursts of very loud noise, then it may be more cost effective to prolong the jingle by 10s than to increase the number of jingles so that it may be audible at all times when it's playing.

A jingle duration of 10-15s is generally enough for a constant noise-level environment.

3 Connecting the JINGLE2 units

All a JINGLE unit needs to operate is a 12VDC voltage. This voltage is supplied via pins 1 and 2 of the 3-pin input screw terminal. The polarity can be either way and the polarity, coupled with which pin (1 or 2) pin 3 is shorted with, determine which of the 4 melodies will be played.

It is important to connect the numbered pins of the 3-pin terminals to the same numbers across the whole system, other wise the Jingle2 units may not work at all or they may play the wrong melody.

The cable resistance must also be taken into account, which with cable length causes voltage drop on the cables.

Three wire, 0.75mm² LIY cables give around 50mΩ/m total resistance.

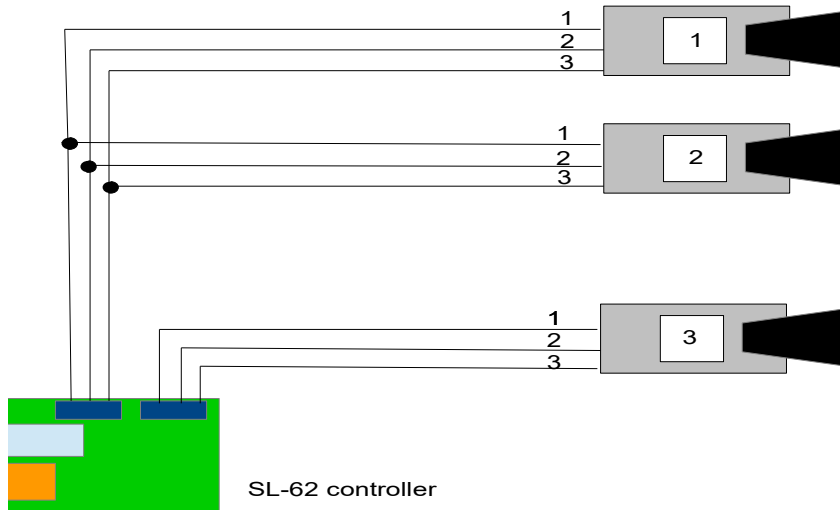
What does this mean? If you grouped 6 jingle units at the end of a 100m section of 0,75mm² cable, the voltage drop would be $0,15A * 6 * 0,05(\text{Ohm/m}) * 100m = 4,5V$.

This means that the jingle units would operate at a much lower voltage than the optimal 12V.

You could solve this by raising the 12V supply by 4,5V, but this is usually not practical and anyway, since the jingle units are never concentrated at the end of the cable, but usually distributed at equal distance, forming a chain, the first jingle in the chain would have a higher than 13V voltage, causing overheating and distortion.

This is why it is best to keep chain topologies as short and with as few jingles as possible. It is best to use star topologies i.e. connect jingle units directly to a 12V source with one cable section of max 30m.

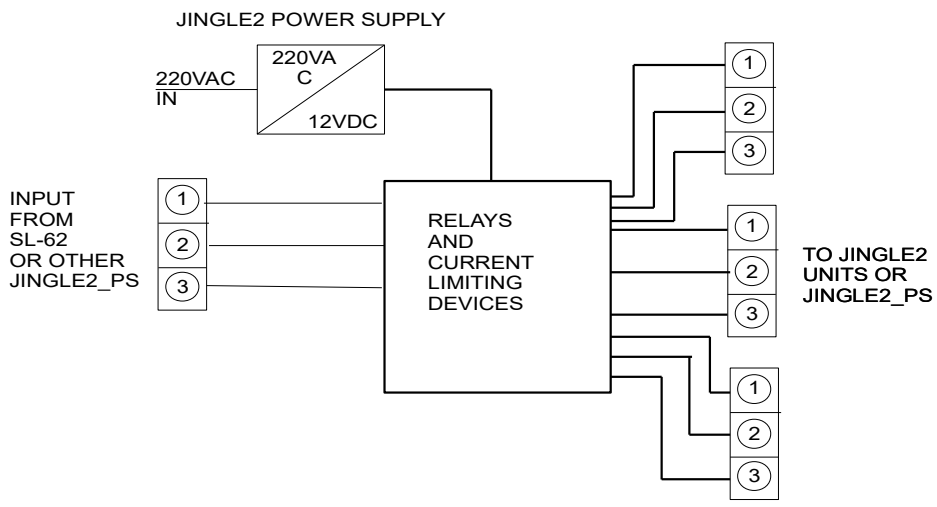
Using a controller like CardWare's SL-62, which has a relay output that provides up to 0.9A current at 12V is the simplest way to connect up to 6 jingle units. Taking into account the aforementioned cable voltage-drop issue, it is best to use a star topology and place the controller in the middle of the jingle units.

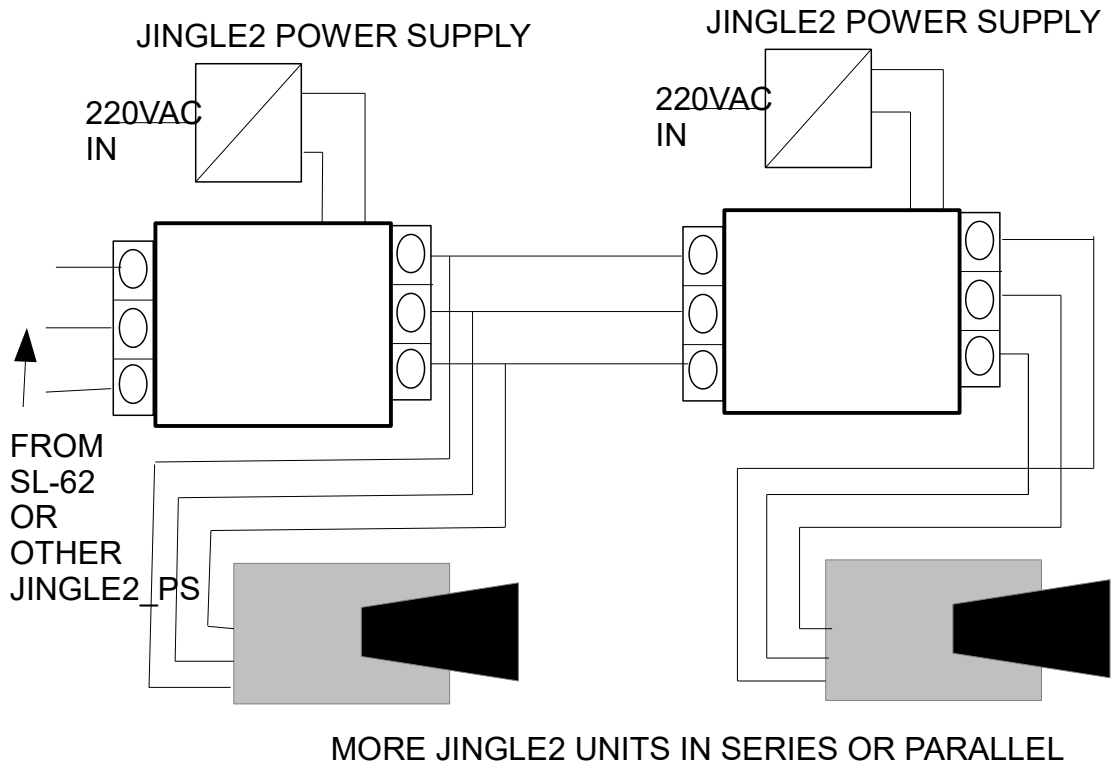


3.1 The JINGLE2 power supply

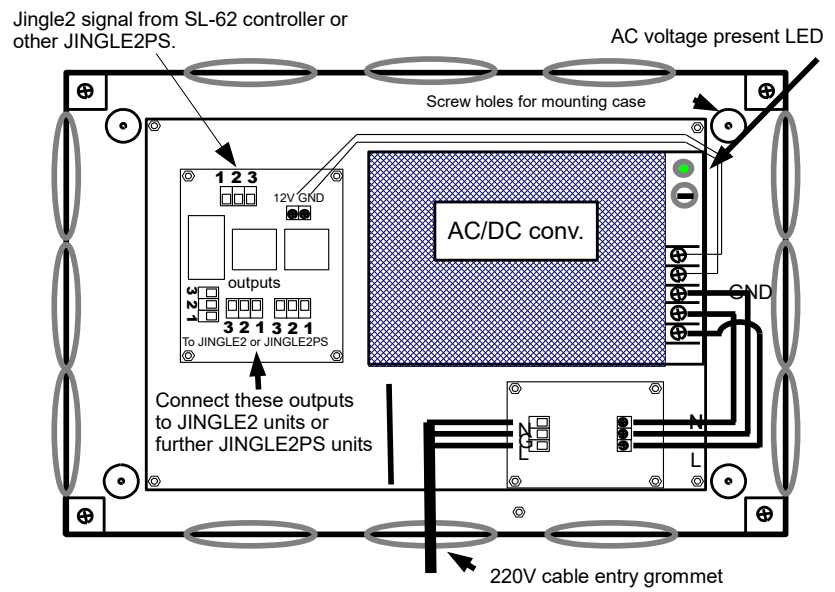
The JINGLE2 power supply (JINGLE2PS) is a box with a 220VAC/12-13VDC@3,4A supply and relays for driving JINGLE2 units. The 3,4A output allows around 20 JINGLE2 units to be powered, but this number is not practical due to wiring voltage-drop problems, as described earlier. The best use of the JINGLE2PS is to allow longer cable distances in a jingle system. Using JINGLE2PS units means you must have 220VAC power available, but the cable to the relay input (this is what switches on all the JINGLE2 units connected to the JINGLE1PS) carries a small current (<50mA) and can thus be longer and/or thinner than the 0,75mm² recommended for connection to JINGLE2 units. It is even possible to daisy-chain JINGLE2PS units.

The 3-way screw terminal on the left is the input from a controller (SL-62) or another JINGLE2PS.





The above example shows a JINGLE2PS connected to an SL-62. This JINGLE2PS has one or more JINGLE1 units (only one is shown, on the bottom right) and another JINGLE2PS. The second JINGLE2PS also has one or more JINGLE2 units connected to it, preferably in a star topology, as explained earlier.



As the above drawing shows, the JINGLE2PS unit is housed in a 25x19.5cm plastic case with rubber cable glands on all sides.

It contains the following elements:

- 50W AC/DC power supply with output voltage set to 12,5V. There is a green LED in the top right corner of the unit that shows availability of the input 220VAC voltage.
- small PCB under the AC/DC converter that serves to connect the input 220VAC
- relay PCB on the left that is connected to a controller signal (pluggable 3-way screw terminal on the top left) and to JINGLE2 units or further JINGLE2PS units (3-way pluggable screw terminals at the bottom and left)

4 Connecting units in a factory or large hall

As explained earlier, try to keep wires that carry current for multiple JINGLE2 units as short as possible, using a star topology to connect JINGLE2PS units to JINGLE2 units whenever

practical.

With halls that have a long dimension of up to 150m, you can use one JINGLE2PS in the middle (you need access to 220V nearby). Place a JINGLE2 right next to it and then place 2 JINGLE2 units on each side, at 25m distances. These two can be chained, i.e. you can use one cable to carry the current to the nearer JINGLE1 unit, then carry on with the same cable to farther one.

