SYMPHONY

FOUNTAIN SPECIFICATIONS

- Schematic of the fountain that will be used for this contest is shown in fig 1. A photograph of the fountain shall be posted shortly.

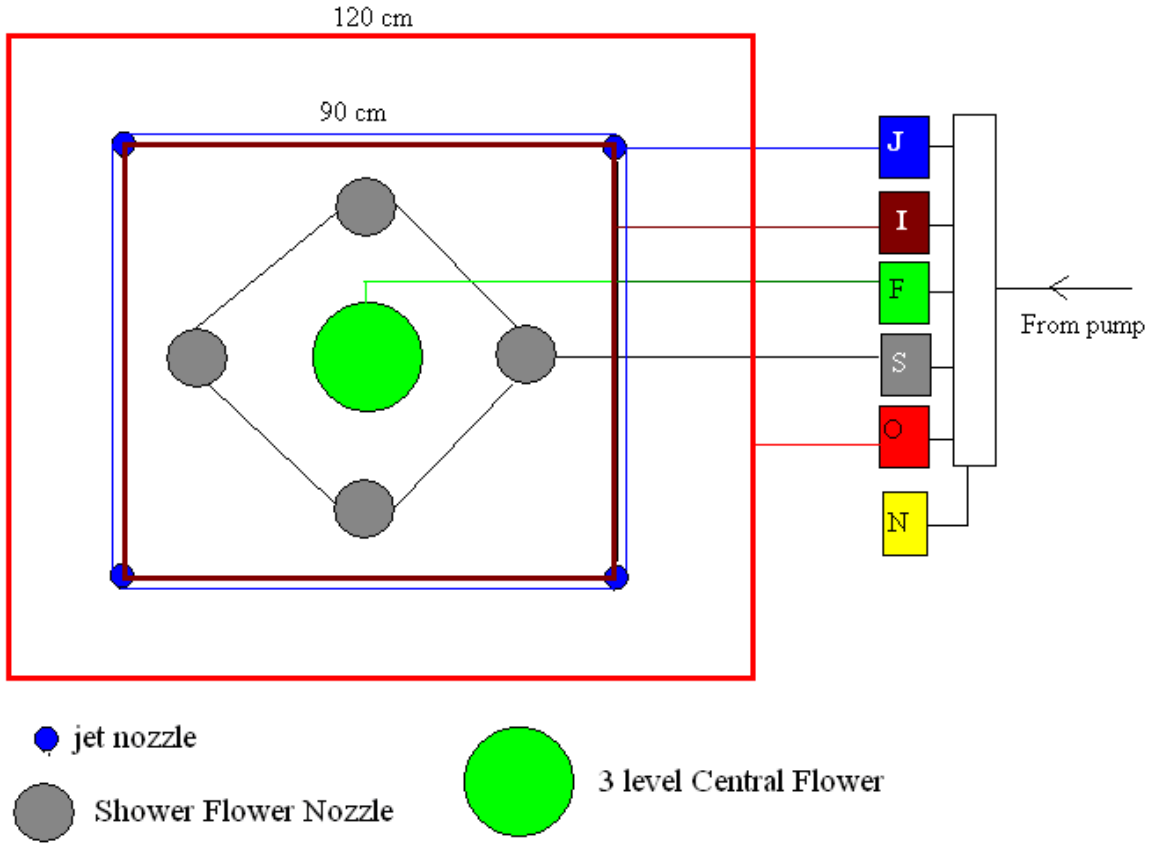

Fig 1: Fountain schematic

- Rings shown in red and brown are the outer (O) and inner (I) rings on the fountain.

- There are four jet nozzles on the corners of the inner ring (shown in blue). All the four jet nozzles have a single control.
- There are four shower flower nozzles (shown in grey). There is a single control for all the shower flower nozzles.
- The fountain also has a 3 level central flower (shown in green).
- The rings are square in shape and the nozzles on each ring are distributed equally on four sides of the ring.
- The dimensions of each ring and the total number of nozzles in each ring are given in the table below.

Component	Dimension (cm)	No. of nozzles / components
Outer ring (Red)	120 x 120	48
Inner ring (Brown)	90 x 90	32
Jet Nozzles (Blue)	-	4
Shower Flower Nozzles (Gray)	-	4
Central Flower (Green)	-	1

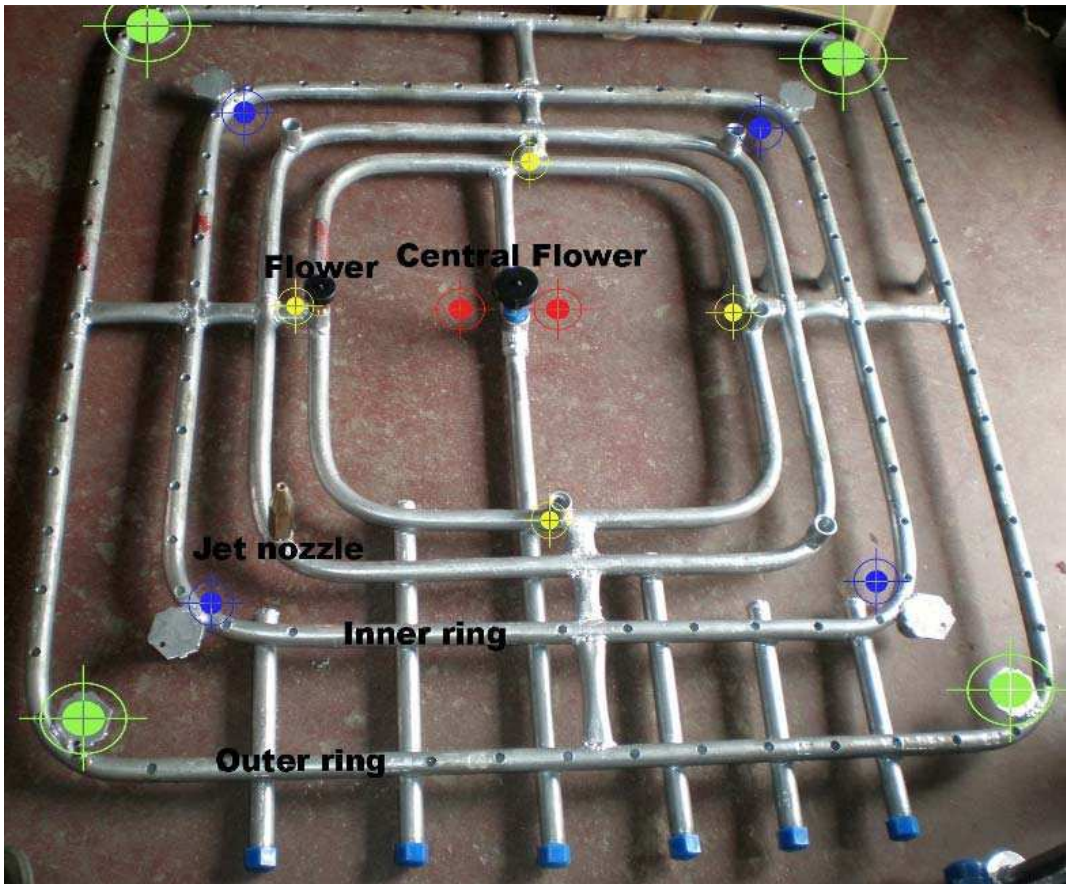

Fig 2: The fountain which will be used for the competition.

WATER CONTROL

- There are 5 solenoid valves (shown as O, I, J, S, F in the figure) independently controlling the flow of water into the outer and inner rings, the jet nozzles, the shower flower nozzles and the central flower. There is also a solenoid valve (shown as N in the figure) which acts as a return valve when there is no ring switched on. This valve will be referred to as the NOR valve. The NOR valve will be controlled by the organizers and activated when all five solenoid valves are signaled to be switched off (NOR of all the five solenoid valve input), as a precautionary measure.
- The solenoid valves are activated by electronic SPST switch, which in turn has to be controlled by the signals from your circuit. The interfacing has been provided as shown in Fig 3.

LIGHTS CONTROL

- There are also 4 sets of lights (red, green, blue and yellow) around the fountain. Each set can be illuminated independently by similar electronic switches that will be provided.
- The interfacing will be similar to that of fig 3, the solenoid valves being replaced by the lamps and the supply being AC mains.

Summarizing, there are 9 switches (5 for the fountain jet control valves, 4 for the lights) which can be independently controlled, and a final NOR switch which will be controlled by the organizers. Participants can use any combination of these switches by providing suitable signals to them through their circuit. It is not necessary that you have to use all the relays provided.

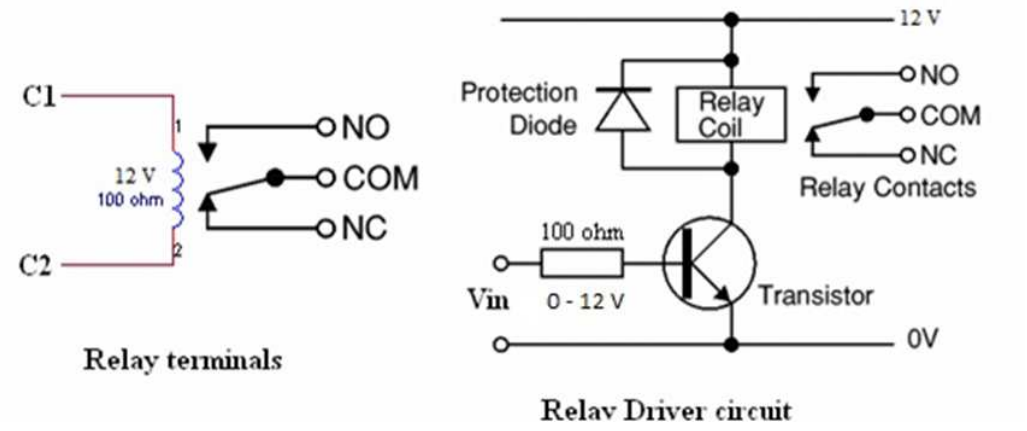

Fig 3: Interfacing circuits

WHAT WE PROVIDE:

- The fountain and lights arrangement around it with the necessary interfacing between the switches, and solenoid valves and lights.
- Power supply provided: (+/- 12 V dual supply), with a sourcing capacity of approx. 3A, and (+5 V single supply) with a sourcing capacity of approx. 2A.
- Both left and right channels of the stereo will be made available to the participants through a 3.5 mm TRS audio jack (male).
- Three tunes will be played for every participant. Each tune will be for an approximately duration of 120 seconds. The first tune is common to all participants and is made available for download on the website. The second tune will be randomly selected during the competition. And the third tune will be the choice of the participant. Participants have to get the third tune on a CD or a flash disk before the competition, failing which a random tune will be played for the third tune as well.
- Interfacing: All circuits have to be interfaced with the fountain with an inline bus with the pin configuration mentioned in the next section.

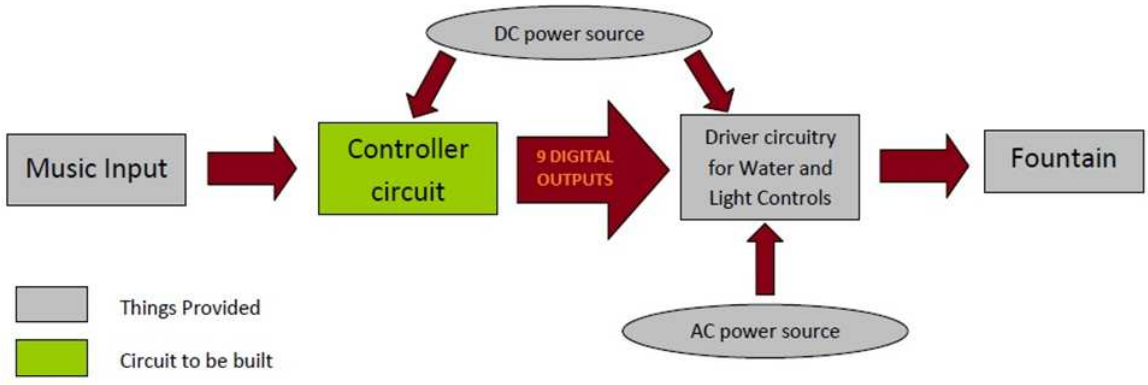

Fig 4: Schematic of the musical fountain system.

CIRCUIT SPECIFICATIONS

- The solenoid valves and lights are activated by electronics switches, which in turn are controlled by signals provided by the participant's circuits. Given below are signal thresholds:

  0 – 2 V would be considered as **OFF**.

  4 – 12 V would be considered as **ON**.

  The output of the circuit is unpredictable for all other voltage range.

  Note: All signal voltages are with reference to GND.

- All the signals need to be terminated to a 10 pin berg strip (typical 2.54 mm /0.1 inch between pins).

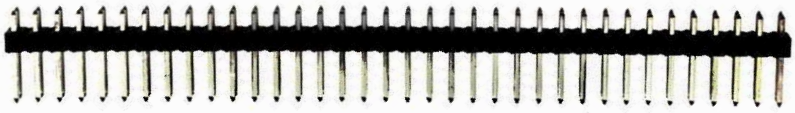

Fig 5: Typical berg strip

These terminals will be tapped through a 10-pin inline bus, which will be provided by the organizers. The pin configuration is specified below:

Signal interface:

Pin no	**Connection**
1	F (central flower)
2	S (shower flowers)
3	I (Inner ring)
4	J (jet nozzles)
5	O (Outer ring)
6	1st set of lamps (tied around central flower)
7	2nd set of lamps (tied around shower flowers)
8	3rd set of lamps (tied around inner ring)
9	4th set of lamps (tied around outer ring)
10	Not connected

Note that the longer edge of the berg strip has to be provided for the bus connection.

Input resistance ≥ 10 KΩ.

- The power supply input will be proved through a similar 4-pin inline bus, with the pin configuration shown below:

Power supply interface:

Pin no	**Connection**
1	+12 V
2	-12 V
3	GND
4	+5 V

An equivalent 4-pin berg strip has to be included in your design to receive power to your circuit.

- To summarize, all participant have to include a 10-pin berg strip for signal interface, and a 4-pin berg strip for power interface. **No other means of interfacing will be accepted.**
- The audio input will be provided through a 3.5 mm TRS jack (male). Thus the controller circuit must have a complementary 3.5 mm TRS jack (female) to take the input.

- The audio signal provided is of approximately 1V peak to peak amplitude with zero bias. However, participants are advised to have adjustable front end gain at the input to suit their circuit requirements. The same audio signal will be given as input to the speaker system.
- The controller box with some cover to prevent water spillage into it.

PLEASE NOTE

- Ready-made IC's that control the fountain will not be allowed. You can use microcontrollers but the cost factor must be taken into account.
- While designing the circuit take care of the delays involved. Since the fountain is a mechanical system, there will be some delay from the time when the relay will be activated to the time when a change can be noticed in the fountain. Hence the relays, if switched fast, a noticeable response cannot be seen in the fountain.

TEAMS

Each team can consist of a maximum of **three** members. The teams have to be registered in advance. They should explain their algorithm to the judges before the event starts and submit the write up.

CHANGING OF RULES

The judges' decision will be final. The organizers reserve the right to modify any of the rules and regulations from time to time in order to maintain the healthy spirit of the competition. Participating teams are expected to check this space for the latest updates.