

Pistons Bourdon

For 13 Players

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Instrumentation

13 Players (any abilities)

- Player 1: Fan Operator
- Players 2–5: Stopper Operators
- Players 6–9: Percussionists
- Players 10–13: Windway Manipulators

A conductor is not required.

Equipment

The list of equipment below is a suggestion of what is required for a performance of *Pistons Bourdon*. However, as the behaviour of each setup will be unique, quantities and types of items may be altered in order to achieve a working mechanism.

- 4 Bourdon organ pipes (any lengths between 4–8'; 4 different pitches; stoppers removed)
- 4 Bourdon organ pipe stoppers (select 4 sizes that *almost* fit tightly inside the 4 bourdon pipes selected)
- 8+ Principal rank organ pipes (10" or shorter)

- 20+ Percussion beaters (select a variety)
- 10+ Sheets of A4 paper
- 4 Wooden blocks (~1x5x5")

- 1 Inline duct fan (4"; with wired-in mains plug)*
- 3 Ducting Y pieces (4")
- 4 Ducting adapters (4" to ~2")
- 1 Ducting hose (4"; length ~10m)

- 4 Wooden broom handles (~50")
- 4 Dust cloths

- 2 Large tables (~6' long; without wheels or with brakes ON)
- 2 Small tables (~4' long; without wheels or with brakes ON)

- 1 Roll of duct tape
- 2+ Rolls of electrical tape
- 30+ Cable ties

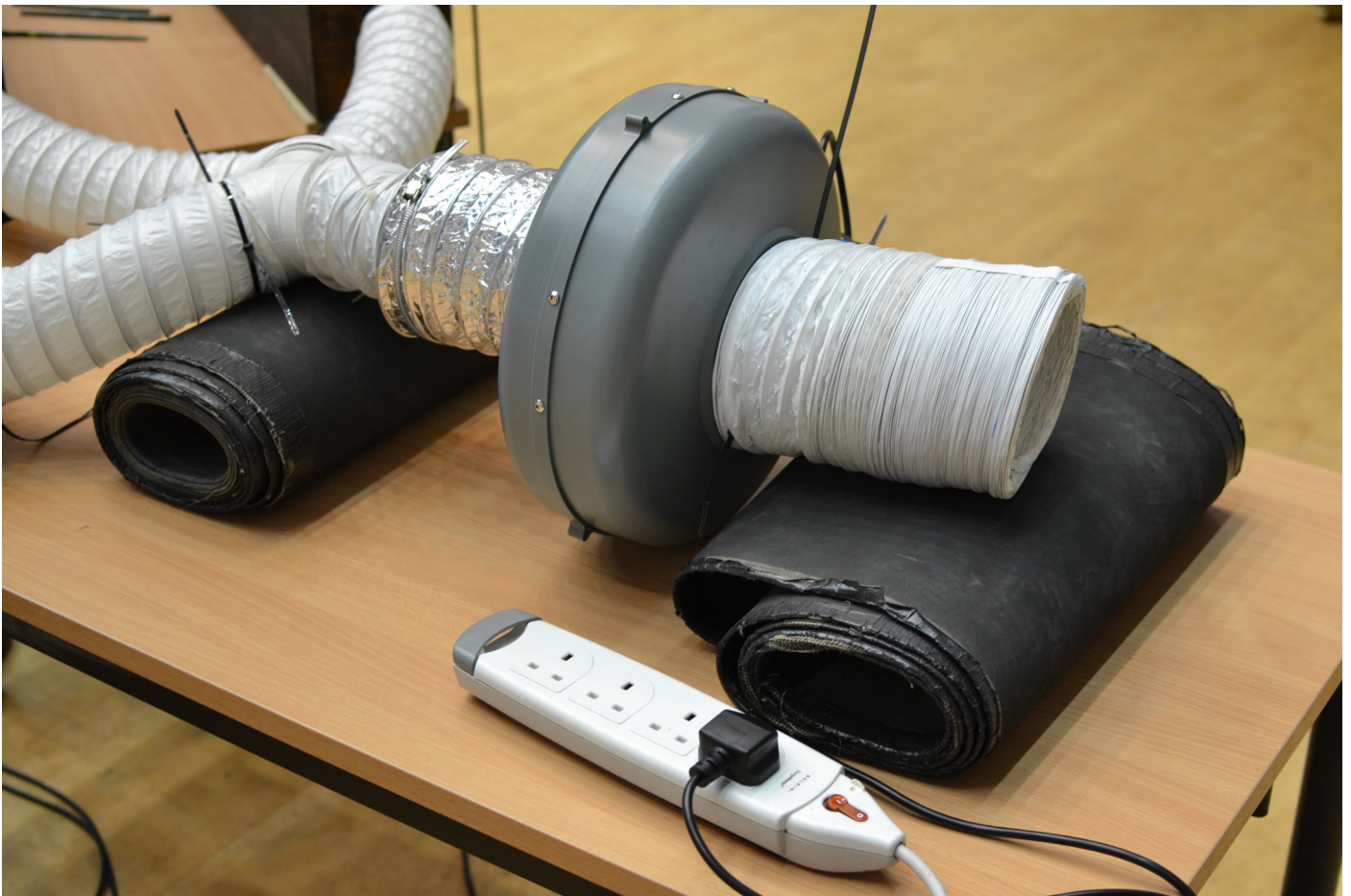
- 4 Dynamic microphones (SM57 or equivalent; with clips)
- 4 Microphone stands
- 6 XLR cables
- 1 Mixing desk (minimum 4 channels)
- 2 Loudspeakers (good bass response recommended)
- 4 Power extension leads (ensure 1 is switched)

*While you may substitute the fan and ducting pieces for 5" or 6" models if these are easier to attain, the air flow rate of the fan should be ~500m³/hr.

Assembly

Arrange the four pipes on the two large tables following the spatialisation diagram provided (see Spatialisation, p. 4), placing the wooden blocks in between the ends of pipes and the tables. Ensure there is enough space in between the large tables for players 11 and 12.

Place the fan and ducting pieces on the small table. Connect the fan's outtake to the four organ pipes using ducting Y pieces, sections of the ducting hose and cable ties. Connect a section of the ducting hose (approximately 3m in length) to the fan's intake. Where necessary, use duct tape or additional cable ties to ensure air-tight seals between all pieces. In addition, you may need to position something underneath the ducting pieces either side of the fan, in order to reduce strain on the joints (see photograph below). Plug the fan into the switched power extension lead, positioning the lead so that the Fan Operator may easily operate the switch.



In order to achieve an air-tight seal between the sections of ducting hose and each pipe, you will require ducting adapters to allow the 4" hose to connect to the foot (air intake nozzle) of each pipe. Alternatively, you may remove the foot of each pipe, and insert ducting adapters directly into each pipe — remember to use electrical tape and duct tape where necessary to achieve air-tight seals (see photograph on next page).

Within the foot of some bourdon organ pipes, there may be a cylindrical, wooden block protruding from the inside wall. It is essential that this is removed from the foot and the exposed hole is sealed using duct tape — this will allow maximum air flow through the pipe by reducing air leakage.

Scatter the percussion beaters across the large tables between the bourdon organ pipes (see Spatialisation, p. 4). Place the principal rank pipes so that they can be easily reached by the Windway Manipulators.

Assembly (cont.)

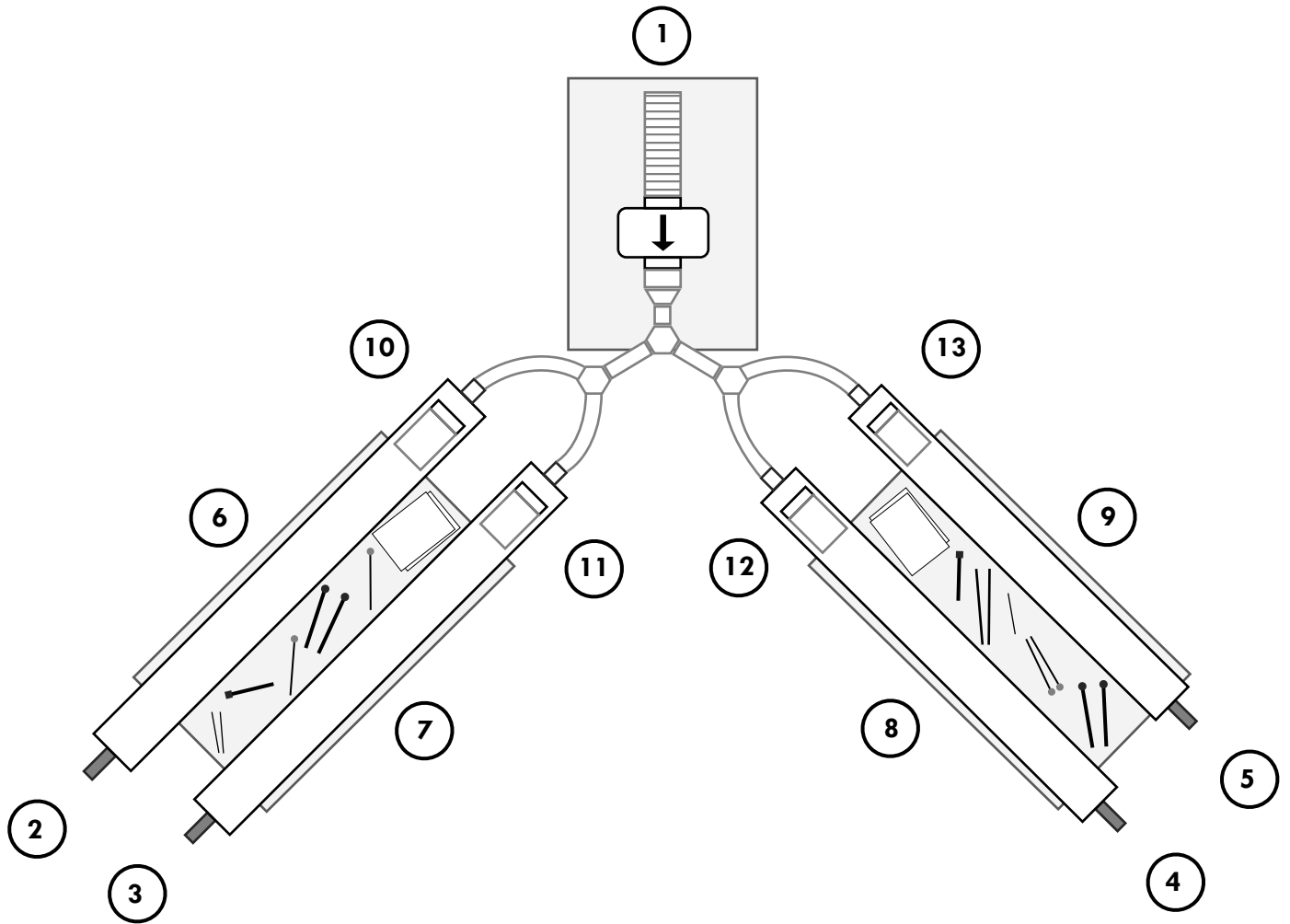


Pull the leather cover over the end of each stopper to reveal the wooden body. Wrap a few layers of electrical tape around the outside (narrow edge) of the wood and replace the leather cover over the wood. Repeat this process until the stop fits tightly enough to block the flow of air through the pipe and produce a pitched sound, while remaining loose enough to slide within the pipe with minimal force. Instead of using electrical tape to increase the size of the stopper, you may also tightly wrap a dust cloth over the stopper and fasten it around the broom handle (see photographs below). Once this has been achieved, securely attach the wooden handle of the stopper to the broom handle using a generous amount of duct tape — ensure it will not detach while inside the pipe.



Spatialisation

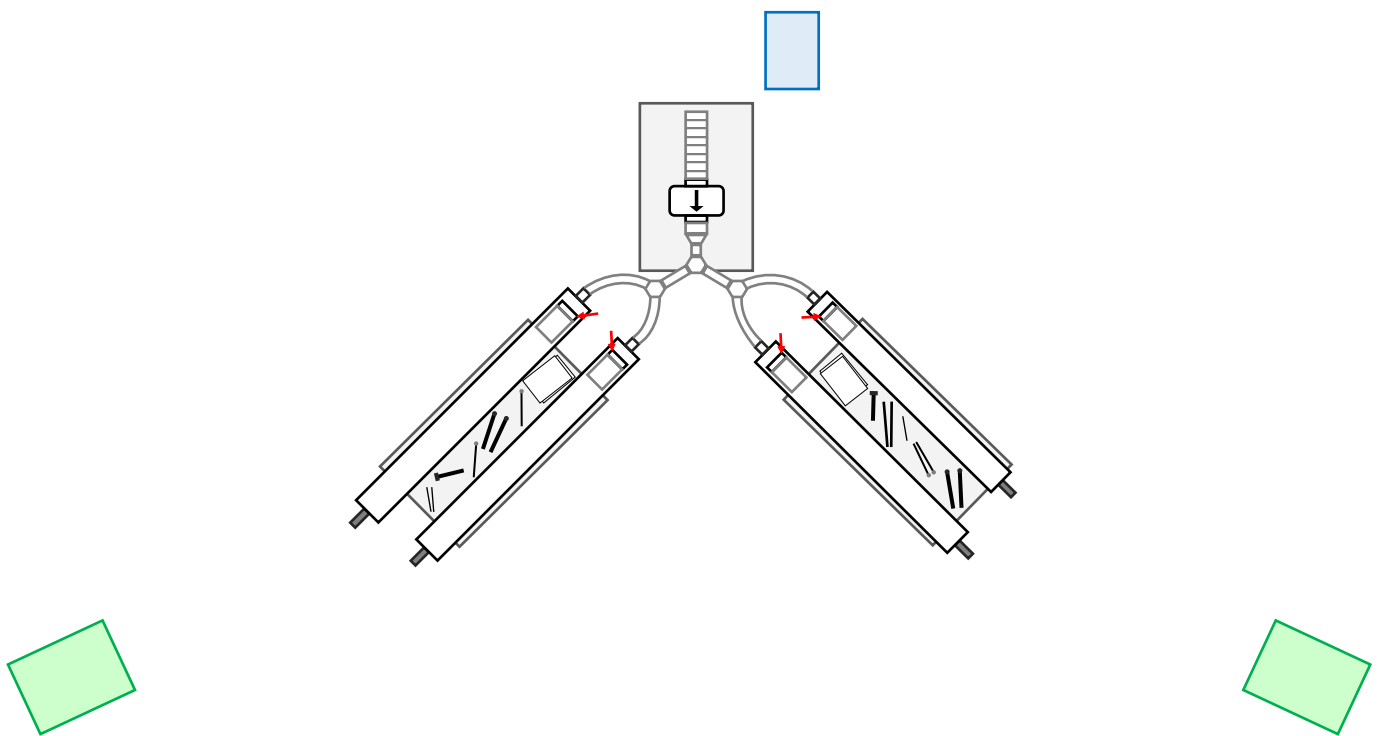
The diagram below shows how the equipment and players should be positioned in relationship to the audience:



AUDIENCE

Setup of Electronic Equipment

Position each microphone close to the windway (small rectangular opening) of each pipe (see red arrows on diagram below). Ensure the microphones are at least 4" away from the windways — this will allow the Windway Manipulators to closely interact with the windways without making contact with the microphones. Position the mixing desk to either side of the Fan Operator's position, so that they may easily operate the controls (see blue rectangle). Position the loudspeakers either side of the setup, in front of the performance space (see green rectangles). Ensure each microphone is connected to the mixing desk inputs and the main "left" and "right" outputs of the mixing desk are connected to the respective loudspeakers inputs.



AUDIENCE

Performance Notes

It is essential that **ALL** players read the performance notes below:

Pistons Bourdon may be performed in concert for an audience or workshopped by players with or without an audience.

If performing in concert, players should agree on the duration for the performance during rehearsal — between 5 and 15 minutes is a suggestion — and the Fan Operator should keep time using a silent stopwatch. It is essential that the players agree on a visual or aural cue that the Fan Operator may use to start and stop the performance. Players' roles and positions are fixed.

If exploring *Pistons Bourdon* in a workshop context, performance guidelines may be altered. The duration of the performance may be undetermined, the number of players may be altered, players' roles and positions may be fluid (e.g. the Fan Operator may switch role and position with a Percussionist mid-performance).

For either performance context, players should consider the following questions:

How will you divide your time between playing and resting?

What will you do while resting?

How may you imitate or contrast other players' actions?

How may your actions affect other players' actions?

How may other players' actions affect your actions?

How many different actions will you explore?

During rehearsal, the Fan Operator should alter the gain levels of the four microphones so that they are balanced and prominent for the audience, without being so loud that they are at risk of feeding back. Bass frequencies may be boosted using the desk's EQ controls, otherwise the overall frequency response should be left neutral. During performance, the Fan Operator may experiment with panning the sound from the microphones across the room, but should not be required to alter gain and EQ settings.

Pistons Bourdon

Parts

Player 1: Fan Operator

Your task is to switch the fan ON and OFF.

The exact timing and number of switches is at your discretion.

You may experiment with panning the sound from the microphones across the room using the mixing desk 'pan' controls.

Players 2–5: Stop Operators

Your task is to operate the stopper in one of the bourdon organ pipes. To do this, you will use a broom handle to slide the stopper inside the pipe in a variety of ways.

The following is a list of actions you may wish to explore:

Remove stop from pipe

Insert stop into pipe

Slide to random position and hold

Slide to predetermined position and hold*

Slide until pitches produced by your pipe and another pipe are the same

Slide until pitches produced by your pipe and another pipe are different

Continuously slide between two positions

Continuously slide about a position with small movements

The speed, frequency and timing of your actions is at your discretion.

*Consider using pieces of tape or a pen to mark positions along the broom handle.

Players 6–9: Percussionists

Your task is to explore the acoustical properties of the bourdon organ pipe closest to you (see Spatialisation, p. 4) by striking and rubbing it with a variety of beaters.

While the way you approach this task is at your discretion, your exploration of the pipe as a percussive instrument should be extensive.

Players 10–13: Windway Manipulators

Your tasks are as follows:

1. Use your hands and pieces of paper to explore how partially and fully covering the windway (small rectangular opening) of a bourdon organ pipe can affect the sound it produces. You should only manipulate the windway on the pipe closest to you (see Spatialisation, p. 4).
2. Use pieces of paper to create ad-hoc reeds which may be sounded by positioning them close to the windway so that air flows across them. To do this, use your fingers and thumbs to hold a piece of paper taught across the windway (see photograph below). Feel free to tear the paper provided into smaller pieces. Explore what types of sounds you can create using this technique.
3. Use the small, principal rank organ pipes provided to produce continuous, high-pitched sounds. To do this, hold the principal rank pipes close to the windway so that they are sounded by the flow of air. Explore how changing the angle and distance between the principal rank pipes and the windway affects the sounds produced.

