

Microphone choice for professional recording is a highly personal and very expensive affair, as no one microphone can successfully cover the entire range of recording situations satisfactorily. For those entering the professional recording field, we therefore suggest their first two microphones be medium priced, and of greatly differing design. Our unusual suggestions for the first two starter microphones are the **Audio Technica AT849**, and the **Studio Projects C4**.

**Audio Technica AT849** - Boundary cardioid microphones are preferred for use when reflective surfaces are within close proximity to an audio source. This electret stereo mic is therefore a good choice for recording sources whose sounds emanate from close to a floor or travels across table tops. This is often the best mic for recording stage performances, church choirs, and discussion panels. Although the mic is normally used at the zero degree axis for unadjustable coincident X/Y stereo or L+R mono imaging at a horizontal coverage of 220 degrees (60 degrees in a vertical angle from the capsule), it can also be used at the 60 degree axis to function as a one element PCC boundary mic with a narrower 120 degree horizontal coverage.

**Studio Projects C4** - This condenser mic has a removable capsule, allowing you to configure it as either omnidirectional or cardioid. The omnidirectional pattern is extremely flat, and this combined with the small diaphragm makes it an exceptional mic for recording high frequency and sharp pulse instruments. A pair are commendable for stereo use in an OSS (headphone stereo), ORTF (speaker stereo), or X/Y (mono speaker compatible) configuration.

### Capturing Performances

There are many ways to capture a performance with microphones. Because each method produces a slightly different sounding recording, it is important that the recordist know the ways we ourselves have successfully deployed these microphones for various performances.

Note that two mic stereo can be achieved in multiple ways. X/Y, which should be avoided with large capsule microphones, works extremely well with small capsule microphones. Indoors, ORTF is preferable to A/B. OSS with a Jecklin disk is ideal for headphone users (who in this new millennium constitute the majority of stereo listeners).

We are strong proponents of distant positioned "minimal mic" techniques. Be cognizant that while each of the following example layouts are known to produce a pleasing recording in a good acoustic environment, a recordist should be open to trying other established or even experimental alternatives, including the use of "multiple mic" or "close mic" techniques, if a unique situation warrants.

### INDOOR LIVE PERFORMANCE RECORDING:

*In many cases the microphone placement in a live performance falls secondary to the needs of the performers to move about or be seen clearly by their audience.*

**Actors performing opera, theater, and vaudeville:**  
(Does not include theater in the round)

We place the **AT849** directly on the stage floor, in front of the performance and facing the dominant acting area. Starting near the stage edge, the microphone is shifted inboards until a good compromise between coincident X/Y stereo imaging and sound clarity is achieved.

**Actors performing theater in the round:**

With theater in the round the audience completely encircles the performers. Although in theory the actors will speak in all directions nearly equally, the performance will almost always have a dominant performance direction.

We place the **AT849** directly on the stage floor, in front of the performance in the most dominant speaking direction, centered on and facing the actors. Hanging from the ceiling in the center of the stage facing downwards we place an omni configured **C4** to provide any necessary fill sound.

**Panel discussions, anchor desk reporting, and alter chanting:**  
(Does not include conferences, podium speaking, or stand-up)

In these performances the performer speaks or chants across a desk, table, or alter. With two or more performers, the **AT849** is placed on the table directly between, and facing between, the two most center performers. The microphone is adjusted forwards or back to a point where the vectors of the two 90 degree splayed cardioid capsules point directly at each left/right performer group, or alternatively to where it only captures direct sound.

With one performer, the **AT849** is placed directly in front of and facing the performer. We adjust the mic so that the microphones front mono axis is at a distance to where it only captures direct sound.

**Conferences:**

The participants sit spaced around a large table. If the participants can be grouped in an arc at one end of the table, we place the **AT849** centered down the table, facing the group. If the participants must sit in a circle, we instead use an omni configured **C4** hung over the center of the table.

**Podium speaking:**

We place a **C4** in a shock mounting on a microphone stand centered just in front of the podium. The capsule is set at the speaker's chin level, facing towards the speaker's mouth (the traditional "CMV3" position). If the speaker is exceptionally sibilant or his view by the audience would be too obscured, we will shift the mike slightly towards one side of the podium.

### **Entertainers performing stand-up:**

If we want to capture both the comedian and his audiences reactions, we use the **C4** configured as an omnidirectional microphone. If we want only to capture the comedian, we use the **C4** with a cardioid capsule. With either capsule, the mic is mounted directly on a microphone stand in front of and slightly to the side of the entertainer. The capsule is set at the speakers collar bone level, facing towards the entertainers mouth. Although it is highly discouraged, the entertainer could touch the microphone stand during their performance.

### **Face to face interviews and duets:**

This is best achieved with a figure-8 pattern microphone. However in lieu of such a microphone, a single **C4** can be hand held by each performer (the omnidirectional capsule will pickup less handling noise) and pointed where needed to capture the sound.

### **Choir and backup singers:**

A large choir singing in an arc is best captured using the **AT849** centrally on the floor or low ceiling. A choir singing in a line is more difficult to capture, and is usually done using a pair of hanging omnidirectional capsuled **C4** microphones in wide spaced (phase decouple using the 4 to 1 separation rule) A/B configuration. Backup singers, or a small choir singing in an arc, are best be captured using a central mounted pair of omnidirectional capsuled **C4** mics in an OSS Jecklin disk configuration. If monophonic is acceptable, substitute with a single shock mounted **C4** microphone on a tall stand.

### **STUDIO (controlled situation) RECORDING:**

*In all cases, it is always an advantage in the studio to get the instrument/performer to sound their best naturally (through placement, room acoustics, etceteras) prior to determining microphone placement.*

### **Sacred Harp, learning pods, and other "non-audience" performances:**

In these performances the participants sit facing inwards in a square or circle around a leader. We hang an omnidirectional configured **C4** from the ceiling facing downwards in the center of the circle above the leader. This monophonically captures the entire performance, without inappropriately emphasizing any particular performer.

Stereo recording is *not* recommended, as there really is no reference point from which to consistently establish a right/left stereo image. If however an artificial stereo image absolutely must be produced, we suggest that the performers arrange themselves so that the tenor/treble singers appear in the center, and the alto/bass singers appear to the sides, in the artificial stereo image. How this is actually accomplished, we leave to your own cleverness.

**Grouped acoustic instrument performance, from quartet to full orchestra:**  
(Does not include solo drum kits)

In a good acoustic environment, the performers are arranged in an arc as they would like to appear in either left, right, or center of a stereo image. In a shock mount in stereo OSS Jecklin disk configuration we place two omnidirectional capsuled **C4** microphones. The OSS disk front axis is centered on and faces the performers, and is adjusted far enough away from the performers so as to produce the right mix of direct sound and room acoustics.

**Instruments whose sound emanates from close to the floor:**

Cello, Didgeridoo, and similar instruments produce their sound so close to the floor that reflections from the floor become problematic. We record using a monophonically configured **AT849** on the floor (hard surfaces are best) adjusted so that the microphones front mono axis faces the instrument. With multiple instruments of this type performing as a group, we place the performers in an arc, and use the **AT849** in X/Y stereo mode.

**Solo drum kit:**

Drum kits are assemblages of multiple instruments intended to be played by one performer in one-man-band fashion. The drum kit instrument layout is what determines left, right, or center stereo placement of each instrument. The entire kit is stationed near the edge of a slightly raised performance platform. For monophonic recording, mount a **C4** in a shock mount on a short microphone stand (be cognizant of boundary interference from the floor), in front of and facing the lower third of the kick drum head. Note that if for some reason the drum kit cannot be placed on a raised performance platform, we will substitute the **C4** with the monophonic configured **AT849** mounted on the floor.

For stereo recording, we place two cardioid **C4** microphones in a shock mount in an ORTF configuration (a 110 degree angle with a 6-3/4" [17 cm] separation). We position the ORTF stereo axis centered somewhat above and forward of the drum kit, with the mic facing angled downwards (at an angle of 30 to 60 degrees being typical) towards (typically the outer third edge of) the drum heads. Note that because the standard ORTF spacing causes sounds at frequencies of approximately 500 Hz and down to become monophonic, when recording lower pitched drums, a modified ORTF spacing of a 90 degree angle with a 11-3/4" [30 cm] separation could be used to slightly lower the frequency point at which the sound becomes monophonic (but at a cost in slightly reducing the stereo sound stage cone, and slightly increasing the phasing problems inherent in any spaced mic technique).

### **Solo grand piano:**

Although sporting multiple strings, the piano, like a harp, is a nearly point-source instrument. Recording is best achieved monophonically using a monophonic Pressure Zone Microphone mounted on the underside of the lid in the middle, with the lid set on the long stick. However in lieu of such a microphone, a monophonically configured **AT849** can be substituted. If an artificial stereo image absolutely must be produced, use a pair of **C4** microphones, possibly mounted over the strings in A/B configuration with the lid completely removed. Actual positioning is purely a matter of personal taste.

### **Solo voice:**

The **C4** has a neutral tone, which not all singers find exciting. The singer can use the **C4** configured in either the omnidirectional (preferred) or cardioid pattern. Mount the microphone in a shock mount on a microphone stand at shoulder blade height, with the capsule facing the singers mouth. In front of the mic place a good pop filter (which also helps keep untrained vocalists from getting too close to the mic).

### **Solo acoustic instrument:**

Just too many situations to list. In most cases each instrument is captured with one microphone and then panned into its stereo image placement afterwards. Typically the **C4** is used on a microphone stand. For all acoustic instruments, the mic must be positioned far enough away that the sound wave can develop, yet not too far that the instrument starts to sound thin or becomes lost in room acoustics.

For string instruments, particularly acoustic guitar and other necked instruments, the mic is typically placed so it faces the neck just above the sound hole.

For low belled instruments like saxophones or clarinets, the mic is typically placed above and in front of the bell facing downwards towards the lower keys. For high belled instruments like trumpets, the mic is typically placed slightly below and in front of the bell, facing straight at the performer.

For wind instruments such as flute, the microphone is typically placed level with the instrument, near the embouchure hole, facing the players cheek.

For a single drum, the microphone is typically placed above and to the far side of the instrument, and the mic is angled downwards to face the outer periphery of the drumhead. Most other percussion instruments are played directly in front of the microphone in a similar manner as when capturing the solo human voice.

### **Solo electronic instrument:**

The sound of an electronic instrument is determined by both its loudspeaker and its speaker cabinet. Good results are often achieved by placing an omnidirectional **C4** microphone close to, parallel with, and facing the center of, the instruments moderately amplified primary speaker cone.