AKG ACOUSTICS

C 414 B-XLS
C 414 B-XL II

1 Safety/Description

1.1 Safety

Please make sure that the piece of equipment your microphone will be connected to fulfills the safety regulations in force in your country and is fitted with a ground lead.

1.2 Unpacking

- **C 414B-XLS** or **C 414B-XL II**
- **H 85** shock mount
- **PF 80** pop screen
- **W 414X** foam windscreen
- **Original frequency response trace** with serial number and production date code
- **High quality carrying case** for microphone and standard accessories

- **C 414B-XLS/ST** or **C 414B-XL II/ST**
- **2 x H 85** shock mounts
- **2 x W 414X** foam windscreens
- **1 x H 50** stereo bar
- **Original frequency response trace** with serial number and production date code
- **High quality carrying case** for microphones and standard accessories

Check that the packaging contains all of the components listed for your model. Should anything be missing, please contact your AKG dealer.

1.3 Optional Accessories

- **MK 9/10:** 10-m (30-ft.) 2-conductor shielded microphone cable with male and female XLR connectors
- **B 18 + A 48V:** battery supply and DC/DC converter for location use
- **H 50:** stereo bar for mounting two microphones
- **SA 18/3B:** all-metal stand adapter
- **SA 60:** plastic stand adapter

1.4 C 414B-XLS

This large-diaphragm condenser microphone has been designed on the basis of feedback from sound engineers who have used the C 12A, C 12B, C 414comb, C 414EB-P 48, C 414B-ULS, and C 414B-TL II microphones in recording studios around the world for years. Using advanced, reliable components that provide more functions in the same space, the C 414B-XLS meets the highest professional standards and will withstand the typical tough handling in the recording studio for many years.
The electronic circuitry of the microphone has been redesigned to achieve completely linear transfer characteristics of all electrical parameters. Extremely low self-noise and high headroom add up to a dynamic range of approximately 134 dB (A-weighted) that is far superior to figures quoted for conventional condenser microphones and other studio equipment.

A dual-diaphragm transducer allows you to select one of several polar patterns. The diaphragm is made of a plastic foil that is gold-sputtered on one side only to prevent shorting to the back electrode even at extremely high sound pressure levels.
The all-metal body adds to the rejection of RF interference so you can use the microphone near transmitter stations, along with wireless microphones or other communications equipment.

1.4.1 Controls

Unlike earlier versions of the C 414, the C 414B-XLS / C 414B-XL II provides three separate dual pushbuttons for selecting the polar pattern, preattenuation pad, and bass cut filter, each with an LED bar indicating the selected setting. The selectors and indicator LEDs are only active as long as power (48 V phantom power) to the microphone is on.

- To select the desired value or polar pattern, press the desired arrow on the appropriate selector once or several times.
  A yellow/green LED above the appropriate value or symbol is lit to indicate the selected setting.
  To select a different setting after having reached the last position available, press the opposite arrow on the selector. (Pressing the same arrow again will not set the parameter back to its initial position.)
  When you switch phantom power to the microphone off, the last active settings of all three selectors will be saved in memory and automatically loaded as soon as you switch phantom power to the microphone back on.

Note:

- To prevent settings from being changed unintentionally, you can lock all three selectors:
  Press and hold one of the arrows on the polar pattern selector (1) for at least 3 seconds.
  To unlock the selectors, press and hold the polar pattern selector (1) for at least 3 seconds again or disconnect the microphone from power (48 V phantom power).

1 Polar Pattern Selector*)
Selector 1 on the microphone front panel (refer to fig. 1) lets you select one of five different polar patterns so you can use the microphone in the most diverse recording situations. All polar patterns are largely frequency-independent for realistic and uncolored off-axis sound.

Fig. 1: Polar pattern selector.

1 Description

Fig. 2:
Preattenuation selector.

2 Preattenuation Pad Selector*)
Selector 2 on the microphone rear panel (refer to fig. 2) lets you increase the headroom by 6 dB, 12 dB, or 18 dB for distortion-free close-in recording. The preattenuation pads prevent the microphone's output level, particularly at low frequencies, from overloading the miniature transformers used in mixer input stages, etc.

***) Note:**
To keep noise levels in the microphone input stage as low as possible, the entire transducer section uses extremely high-impedance circuitry. Therefore, the selected (changed) polar pattern or preattenuation setting will take about 10 to 15 seconds to become active.

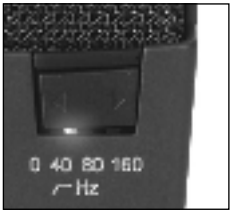


Fig. 3: Bass cut selector.

3 Bass Cut Selector
Selector 3 on the microphone rear panel (refer to fig. 3) further reduces low-end distortion caused by footfall or wind noise, etc. The filter slope is more than 12 dB/octave at the 40 Hz and 80 Hz settings and 6 dB/octave at the 160 Hz setting. The 160 Hz setting minimizes the strong proximity effect that may arise when close-in miking from less than 6 inches.

Overload Indication
The polar pattern indicator LEDs also provide an overload indication.
If the output level of the microphone equals or exceeds a value of approximately 2 dB below the overload limit, the currently active LED will change to red for about 0.3 seconds. If it does, we recommend increasing the preattenuation by one or more "notches" using Selector 2.

1.5 C 414B-XL II

The C 414B-XL II is identical to the C 414B-XLS except for a slight high-frequency peak above 3 kHz.

Note:

This section applies to both the C 414B-XLS and the C 414B-XL II.

The C 414B-XLS and C 414B-XL II provide extremely low self-noise yet high headroom. The only way to meet these strict engineering requirements was to limit the powering options for both microphones to 48 V phantom power to DIN/IEC only. This standard requires a positive voltage of 48 V with reference to the cable shield.

Important!

Do not connect the microphone to any power supply other than a phantom power source (input with phantom power or external phantom power supply) to DIN/IEC with a floating connector, using a balanced cable with studio grade connectors to IEC 268-12 only. This is the only way to ensure safe and reliable operation.

We recommend the following methods to add phantom power to microphone inputs:

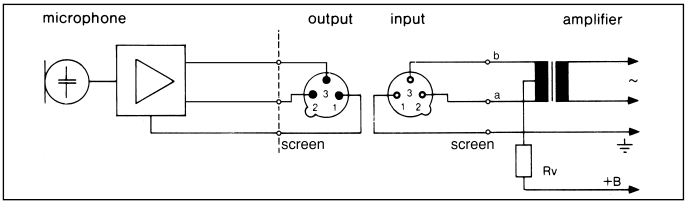


Fig. 4: Circuit using an input transformer **with a center tap** (floating).

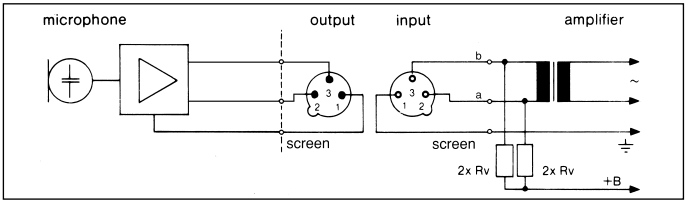


Fig. 5: Circuit using an input transformer **with no center tap** (floating).

Standard value for Rv (or 2 x Rv)		
V DC	Rv	2 x Rv
48 V ±4 V	3300 ohms	6800 ohms

Table 1: Feeding resistor to DIN/IEC

To satisfy the symmetry requirement, use resistors with 0.5% maximum tolerance for 2 x Rv.

2 Powering

When adding phantom power to a grounded or transformerless input, be sure to insert either capacitors or a transformer into the audio line to prevent current leakage into the input circuitry.

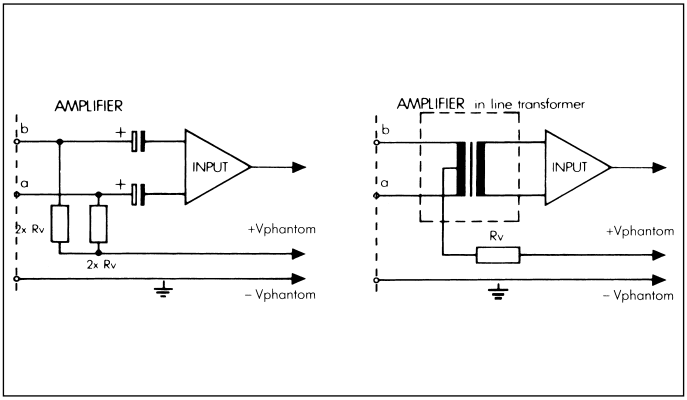


Fig. 6: Two ways to add phantom power to an unbalanced input.

3 Using the Microphone

3.1 Introduction

Besides offering high headroom, minimum distortion, as well as temperature and humidity resistant construction, the microphone is suited for a uniquely wide range of applications.
The standard version C 414B-XLS features a very smooth frequency response and the typical sound of AKG large-diaphragm microphones. This sound has hardly changed over the many years the C 414 has been in production, and the C 414 has become an "industry standard" against which most competitive or new products are compared.
You can use the C 414B-XLS for most musical instruments (see also sections 3.6 and 3.7). Selector 1 lets you optimally adjust the microphone's polar pattern to the instrument to be recorded and the recording environment.

3.2 Bass Cut Filters

The switchable bass cut filters at 40 Hz and 80 Hz will effectively cancel out any unwanted noise such as blower noise from air conditioning systems, etc., or low-frequency noise due to floor vibrations, handling noise, etc. without affecting the sound of the recorded voice or instrument on tape.

3.3 Preattenuation Pads

The switchable preattenuation pads allow you to increase the microphone's headroom. Remember to check that the equipment connected to the microphone (microphone preamp, mixer input, recorder input) can handle the maximum output level of the microphone without causing distortion.

3.4 C 414B-XL II

The C 414B-XL II has been designed as a sonic alternative to the standard C 414B-XLS. It is identical to the C 414B-XLS with the exception of a slight high-frequency rise at 3 kHz and above. This HF boost enhances the presence of vocals, so we specifically recommend the C 414B-XL II for miking up solo voices or solo instruments (see also sections 3.6 and 3.7). In addition, it is an excellent choice for distant miking, e.g. suspended from a concert hall ceiling.

3.5 Stand Mounting

- The supplied H 85 shock mount has a standard 3/8" thread insert so you can mount the microphone on almost every commercial stand or suspension with a 3/8" thread.
- To mount the H 85 on a stand with a 5/8" thread, remove the tread insert and screw the H 85 directly on the stand.
- To remove the H 85 from the microphone, rotate the bayonet-type lock at the lower end of the H 85 CCW to the point that the H 85 unlocks.

3.6 Application Areas

We recommend the C 414B-XLS and C 414B-XL II for the following recording studio applications:

Sound source	C 414B-XLS	C 414B-XL II
Lead/solo vocals	+	++
Backing vocals/choir	++	
Speech	+	++
Acoustic guitar	++	++
Electric guitar		+
Electric bass	+	
Double bass	++	
Violin	++	+
Cello	++	+
Zither	+	++
Grand piano (classical)	++	
Upright piano (rock & jazz)	++	++
Organ	++	+
Trumpet	++	++
Trombone	++	+
French horn	++	++
Tuba	++	+
Saxophone	++	++
Flute	++	++
Clarinet	++	++
Harmonica	+	++

Table 2: Recommended applications.

Sound source	C 414B-XLS	C 414B-XL II
Bass drum	++	
Toms	+	+
Cymbals	+	
Bongos, congas	+	

(Table 2)

++ Highly recommended
+ Recommended

3.7 Hints on Microphone Placement

As an introduction to the "secret science of making good recordings", the following sections describe some proven miking techniques.

3.7.1 Lead Vocals

Fig. 7: Solo vocalist.

- Working distance: 6 to 12 inches (15 to 30 cm)
- Polar pattern: cardioid
- Bass cut: ON (40 or 80 Hz)
- W 414X windscreen or PF 80 pop screen recommended
- To give the talent better control of their own voice, we recommend adding the talent's track to their headphone monitor signal.

3.7.2 Choir/ Backing Vocals

To record **large mixed choirs**, we recommend using one stereo microphone plus one spot microphone each for the soprano, alto, tenor, and bass sections.
In rooms with good acoustics, a single stereo microphone or two matched mono microphones will often do the trick.

Backing vocals/technique 1:
If you have enough tracks available, we recommend overdubbing each voice separately (refer to section 3.7.1 Lead Vocals above).

Backing vocals/technique 2:
If you use a separate microphone for each of several vocalists simultaneously, set each microphone to hypercardioid to pre-

vent crosstalk, particularly if the microphones are closely spaced.

Backing vocals/ technique 3:
If you use a single microphone for the entire group, select the cardioid or omni pattern and place the vocalists in a semicircle in front of the microphone.

Fig. 8: Backing vocalists sharing a single microphone.

3.7.3 Violin, Viola

Solo violin:
Direct the microphone to the f holes from a height of 6 to 8 feet (1.8 to 2.5 m) above the floor.

Large string sections:
Use a combination of a main microphone in an XY, MS, ORTF, or other stereo configuration and close-in spot microphones.

Viola:
Direct the microphone to the f holes from a height of 7 to 10 feet (2.2 to 3 m) above the floor.

Fig. 9: Violin.

3.7.4 Double Bass, Cello

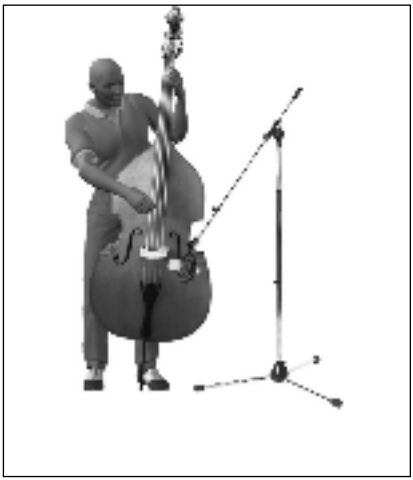


Fig. 10: Double bass.

Double bass:
Align the microphone with one of the f holes from a distance of about 16 inches (40 cm). If you need to record the double bass together with an ensemble, place the microphone closer to the instrument and set the polar pattern to hypercardioid to prevent leakage from other instruments into the bass microphone.

Cello/technique 1:
Refer to "Double bass" above.

Cello/technique 2:
Use a close-in microphone as in technique 1 above plus a distant microphone. Set the level of the close-in microphone approx. 20 dB lower than the distant mic level.

3.7.5 Acoustic Guitar

Fig. 11: Miking an acoustic guitar with a single C 414B.

We recommend using two microphones.
Place one C 414B 8 to 12 inches (20 to 30 cm) away from the guitar and aim at the sound hole. Aim a small-diaphragm microphone (e.g., a C 451B) at a point near the bridge from a distance of about 3 1/2 feet (1 m) or at the body from a point below and to the rear of the instrument.

3.7.6 Flute

We recommend using two microphones.
Place mic 1 above and to one side of the player (to reduce blowing noise) and align it with the player's mouth, and aim mic 2 at the instrument from the side.
If you prefer to use a single microphone, place the microphone as mic 1 above at a distance of about 7 to 8 1/2 feet (2 to 2.5 m) above the floor.

Fig. 12: Miking the flute with a single microphone.

3.7.7 Clarinet

Point the microphone at the lowest key. To minimize key noise, place the microphone a little ways to the side of the instrument.

Fig. 13: Clarinet.

3.7.8 Tenor and Soprano Saxophones

Aim the microphone at the middle of the instrument from a distance of about 2 to 3 1/2 feet (50 cm to 1 m).

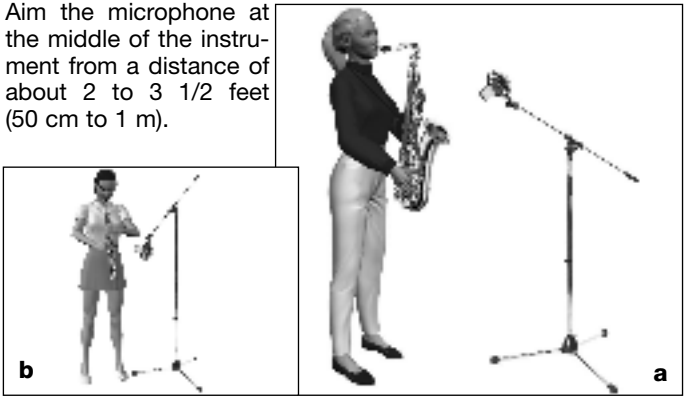


Fig. 14: Tenor saxophone (a), soprano saxophone (b).

3.7.9 Trumpet, Trombone

Place the microphone about 1 foot (30 cm) in front of the instrument, slightly off the bell axis. Switch in one of the preattenuation pads. Using the supplied windscreen will help reduce blowing noise.

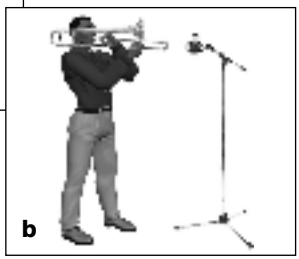


Fig. 15: Trumpet (a), trombone (b).

3.7.10 Grand and Upright Pianos

Grand piano:
Aim a single C 414B or an XY, MS, or ORTF pair of C 414Bs at the middle strings from a height of 5 to 7 feet (1.5 to 2 m).
For a rock/pop sound, place two C 414Bs roughly 8 to 16 inches (20 to 40 cm) above the strings. Align mic 1 with the treble strings and mic 2 with the bass strings, both at a point about 6 inches (15 cm) behind the dampers.

Fig. 16: Grand piano.

Upright piano:
Use the same technique as for the grand. Open the lid and have the microphones "peek into the instrument" from above.

Fig. 17: Upright piano.

3.7.11 Electric Guitar/Bass

Electric guitar:
Position the microphone 3 to 6 inches (8 to 15 cm) in front of the speaker, aiming at a point off the speaker diaphragm center. Use the bass cut and a preattenuation pad. You may want to use an additional distant microphone.

Fig. 18: Electric guitar.

Electric bass:
Use the same technique as for the electric guitar. You can use a DI box to add the direct signal of the line output on the bass amp to the microphone signal.

3.7.12 Drums

Overhead miking:
Place two C 414Bs in an AB or XY configuration about 2 3/4 to 4 feet (80 to 120 cm) above the drummer's head. This technique will pick up the entire kit, delivering a highly natural sound. Use little or no EQ!

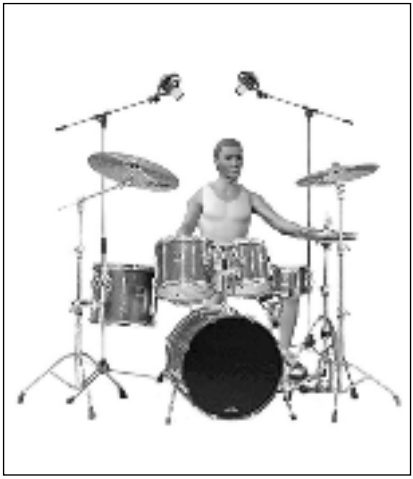


Fig. 19: Typical drum kit.

Hanging and floor toms:
Use one microphone for each tom or for every two toms, aligning the microphone with the rim of the top head. To reduce leakage from other instruments, attenuate the HF range above 10 kHz using the channel EQ(s).

Bass drum:
Remove the resonance head and place the microphone right inside the shell. Be sure to switch in the 18-dB preattenuation pad because sound pressure levels may rise to 160 dB.

4 Cleaning

4.1 Microphone You can clean all metal surfaces with (industrial grade) methylated spirits or alcohol.

4.2 Windscreen Wash the foam windscreen in mild sudsy water. Do not use the windscreen before it has dried completely.

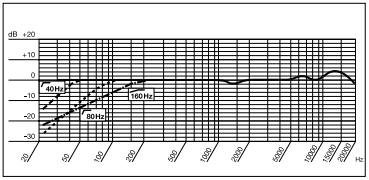
5 Specifications

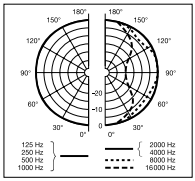
Type:	1-inch large-diaphragm pressure gradient microphone
Polar patterns:	omni, wide cardioid, cardioid, hyper cardioid , figure eight (selectable)
Open-circuit sensitivity:	23 mV/Pa (-33 dBV ± 0.5 dB)
Frequency range:	20 to 20,000 Hz (see frequency response traces)
Impedance:	≤ 200 ohms
Recommended load impedance:	≥ 2200 ohms
Bass cut filter slopes:	12 dB/octave at 40 Hz and 80 Hz; 6 dB/octave at 160 Hz
Preattenuation pads:	-6 dB, -12 dB, -18 dB (selectable)
Equivalent noise level to CCIR 468-2:	20 dB (0 dB preattenuation)
Equivalent noise level to DIN 45 412 (A-weighted):	6 dB-A (0 dB preattenuation)
Signal/noise ratio re 1 Pa (A-weighted):	88 dB
Max. SPL for 0.5% THD:	200/400/800/1600 Pa ≙ 140/146/152/158 dB SPL (0/-6/-12/-18 dB preattenuation)
Dynamic range:	134 dB min.
Max. output level:	5 V rms (+14 dBV)
Environment:	temperature: -10°C to +60°C R.H.: 95% (+20°C); 85% (+60°C)
Powering:	48 V phantom power to DIN/IEC
Current consumption:	approx. 4.5 mA
Connector:	3-pin XLR (pin 2 hot)
Dimensions:	50 x 38 x 160 mm / 2 x 1.5 x 6.3 in.
Net weight:	300 g / 10.6 oz.

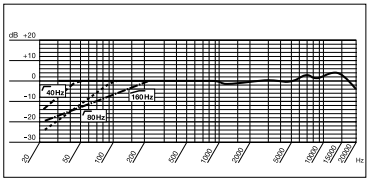
This product conforms to the standards listed in the Declaration of Conformity.
To order a free copy of the Declaration of Conformity, visit http://www.akg.com or contact sales@akg.com

Frequency Response C 414B-XLS	Polar Diagram C 414B-XLS / C 414B-XLII	Frequency Response C 414B-XLII

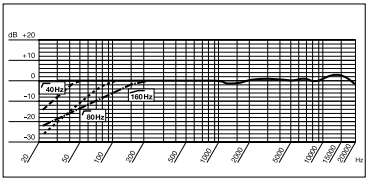
Omnidirectional

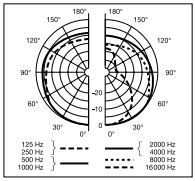


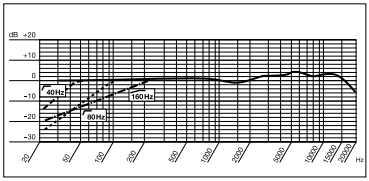




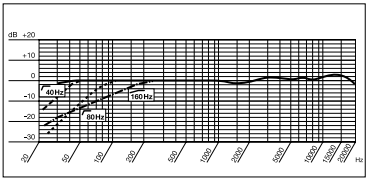
Wide Cardioid

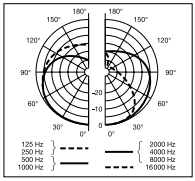


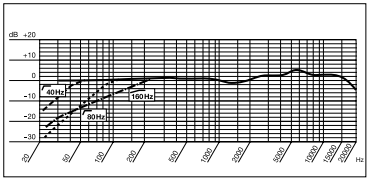




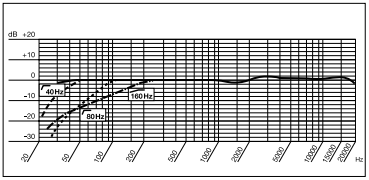
Cardioid

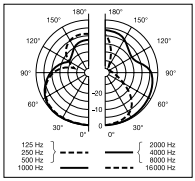






Hypercardioid





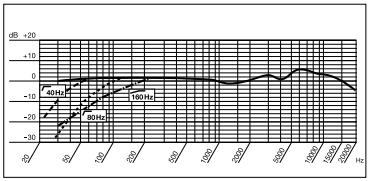


Figure Eight