HARMAN C414 XLII Reference Multipattern Condenser Microphone User Manual

Contents

HARMAN

HARMAN C414 XLII Reference Multipattern Condenser Microphone

Specifications

- Product Name: C414 XLS / C414 XLII
- Type: Reference Multipattern Condenser Microphones
- Power Supply: 48V Phantom Power

Safety and environment

Risk of damage
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.

Environment

- In case of scrapping the equipment, separate the housing, electronics and cables and dispose all the components in accordance with the appropriate waste disposal regulations.
- The packaging is recyclable. Dispose of the packaging via an appropriate collection system provided for this purpose.

Description

Introduction
Thank you for your decision to buy an AKG product. Please read the user instructions carefully, before using the unit and keep them in a safe place so that you can refer to them in the future at any time. We wish you a lot of fun!

Package content

- C414 XLS or C414 XLII

- H85: Shock mount
- PF80: pop screen
- W414 X: foam windscreen
- Original frequency response trace with serial number and production date code
- High quality carrying case

Stereo-Sets

- 2 x C414 XLS orC414 XLII
- 2 x SA60: Stand adapter
- 2 x H85: Shock mounts
- 2 x W414 X: foam windscreens
- 1 x H50: stereo bar
- Original frequency response trace with serial number and production date code
- High quality carrying case

Check that the package contains all the parts given above. If anything is missing, please contact your AKG dealer.

Optional Accessories
Optional accessories can be found at **www.akg.com**. Your dealer will be happy to advise you.

C414 XLS

- This large diaphragm condenser microphone has been designed on the basis of feedback from sound engineers who have used the C12, C12 A, C12 B, C414 comb, C414 EB-P 48, C414 B-ULS, C414 B-TL II and C414 B-XLII microphones in recording studios around the world for years.
- Using advanced, reliable components that provide more functions in the same space, the C414 XLS meets the highest professional standards and will withstand the tough handling typically encountered in the recording studio and on stage 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 ensures efficient rejection of RF interference so you can use the microphone near transmitter stations, along with wireless microphones or other communications equipment.

Controls
Unlike earlier versions of the C414, the C414 XLS / C414 XLII provides three separate bidirectional 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 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 and back on later, the currently selected settings of all three selectors will be restored automatically as soon as you switch phantom power back on.
  All settings are saved in memory about 500 msecs. after you last pressed any of the three selectors. Thus, your latest settings will be available again even if phantom power has been interrupted (e.g., if you disconnected the microphone and connected it again later).
- Live-sound engineers as well as engineers for theater, opera, or musical productions often use the same microphones for the same purposes every night, and may even install some microphones permanently. In Lock Mode, all controls on the microphone are disabled so the settings you selected for a specific application (polar pattern, preattenuation pad, bass cut filter) cannot be changed unintentionally.
- Press and hold one of the arrows on the polar pattern selector (1) for at least 2 seconds.
  All controls are disabled and remain disabled even if phantom power has been interrupted (e.g., if you disconnected the microphone and connected it again later).
- To indicate that the microphone is in Lock Mode, the LED(s) above the currently selected polar pattern will be lit red momentarily when you press any key.
- To unlock the selectors, press and hold the polar pattern selector (1) for at least 2 seconds again.

Polar pattern selector

Figure 1: Polar pattern selector

Selector 1 on the microphone front panel (refer to fig. 1) lets you select one of nine carefully designed polar patterns similar to those of the legendary C12 and C12 VR studio microphones from AKG, providing the optimum polar pattern for best possible results in the most diverse miking situations. All polar patterns are largely frequency-independent for realistic and uncolored off-axis sound.

The LEDs below the selector indicate the selected polar pattern as shown below:

Omnidirectional	•				
Intermediate	•	•			
Wide cardioid		•			
Intermediate		•	•		
cardioid			•		
Intermediate			•	•	
Hypercardioid				•	
Intermediate				•	•
Figure eight					•

Approximately 500 msecs. after you changed a polar pattern, preattenuation, or bass cut setting, your settings will be saved automatically. If you switch phantom power off and back on later, these settings will be restored automatically.

Preattenuation Pad

Figure 2: Preattenuation Pad

- 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 pad prevents the microphone's ouptut level, particularly at low frequencies, to overload the mixer input.
- 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 fully active.

Bass Cut Filter

Figure 3: Bass Cut Filter

- Selector 3 on the microphone rear panel (refer to fig. 3) reduces low-end distortion caused by footfall or wind noise, etc.
- The filter takes effect under 160 Hz and filters 6 dB/octave. The bass cut also minimizes the proximity effect that may arise in close-miking applications (less than 6 inches (15 cm)).

Overload indication

Overload Indication with Peak Hold Function

- The polar pattern indicator LEDs also provide an overload indication.
- With conventional peak indicators, overload peaks lasting only for a fraction of a second may easily escape your attention.
- The new peak hold function of the C414 XLS and C414 XLII, however, makes sure you will notice even the shortest overload peak:
- If the output level of the microphone equals or exceeds a value of approximately 2 dB below the overload limit, the currently active polar pattern LED will change to red for about 3 seconds.
- If this happens, we recommend increasing the preattenuation by one or more “notches” using Selector 2.

C414 XLII

- The C414 XLII has been designed as a sonic alternative to the standard C414 XLS, and closely approximates the sound of the legendary AKG C12. It is identical to the C414 XLS with the exception of a completely different acoustic resistor that provides a slight high-frequency rise at 3 kHz and above.
- This HF boost enhances the presence of vocals, so we specifically recommend the C414 XLII for miking up solo voices or solo instruments (see also sections 4.5 and 4.6). In addition, it is an excellent choice for distant miking, e.g. suspended from a concert hall ceiling.

Stereo Pairs

- Realistic stereo recordings require microphones with outstanding performance and excellent quality.
- They also require consistent performance and accurate localization throughout the entire frequency range from the pair of microphones.

- Therefore, every factory-matched pair of C414 is created from thousands of individual microphones selected by AKG’s sophisticated computer-aided matching method.
- The C414 XLS and C414 XLII matched stereo pairs thus provide the highest possible correlation over the microphones’ entire frequency range and virtually identical sensitivity for stunning, three-dimensional recordings.

Power supply
The C414 XLS and C414 XLII 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 IEC 61938 only. This standard requires a positive voltage of 48 V with reference to the cable shield.

Risk of damage
Do not connect the microphone to any power supply other than a phantom power source (input with phantom power or external IEC 61938 standard phantom power supply) 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.

Using the microphone

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 C414 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 C414 has been in production, and the C414 has become an “industry standard” against which most competitive or new products are compared.
- You can use the C414 XLS for most musical instruments. Selector 1 lets you optimally adjust the microphone’s polar pattern to the instrument to be recorded and the recording environment.

Bass Cut Filter
The selectable bass cut filters at 40 Hz, 80 Hz, and 160 Hz will effectively cancel out any unwanted noise such as fan 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.

Preattenuation Pad
The selectable preattenuation pads allow you to increase the microphone’s headroom. Remember to check that the equipment connected to the microphone (microphone pre-amp, mixer input, recorder input) can handle the maximum output level of the microphone without causing distortion.

Stand Mounting

- The supplied H85 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 fix the shock mount on a stand with a 5/8″ thread, remove the thread insert and screw the shock mount directly on the stand.
- To remove the shock mount from the microphone, rotate the bayonet-type lock at the lower end of the shock mount CCW to the point that the shock mount unlocks.

Application Area
We recommend the C414 XLS and C414 XLII for the following applications:

Sound source	C414 XLS	C414 XLII
Lead/solo vocals	●	● ●
Backing vocals/choir	● ●	
Speech	●	● ●
Acoustic guitar	● ●	● ●
Electric guitar		●
Electric bass	●	
Double bass	● ●	
Violin	● ●	●
Cello	● ●	●
Zither	●	● ●
Grand piano (classical music)	● ●	
Piano (rock & jazz)	● ●	● ●
Organ	● ●	●
Trumpet	● ●	● ●
Trombone	● ●	●
French horn	● ●	● ●
Tuba	● ●	●
Saxophone	● ●	● ●
Flute	● ●	● ●
Clarinet	● ●	● ●
Harmonica	●	● ●
Sound source	**C414 XLS**	**C414 XLII**
Kick drum	● ●	
Toms	●	●
Cymbals	●	
Bongos, congas	●	

● Recommended

● ● Highly recommended

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

Hints on Microphone Placement

Lead Vocals

Figure 4: Solo vocalist

- Working distance: 6 to 12 in. (15 to 30 cm)
- Polar pattern: cardioid
- Bass cut: ON (40 or 80 Hz)
- W414 X windscreen or PF80 pop screen recommended

To give the talent better control of their own voice, we recommend adding the talent’s audio track to their headphone monitor signal.

Choir/Backing Vocals

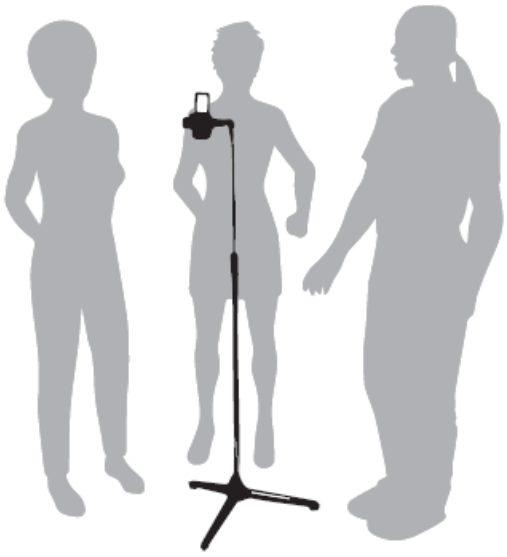


Figure 5: Backing vocalists sharing a single microphone

To mic up a large mixed choir 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 micro-phones will often do the trick.

- **Backing vocals/technique 1:**
  If enough tracks are available, we recommend overdubbing each voice separately. (See 4.6.1 Lead Vocals).
- **Backing vocals/technique 2:**
  If you use a separate microphone for each of several vocalists simultaneously, set each microphone to hypercardioid to prevent 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.

Violin, Viola

Figure 6: Violin

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 pair of microphones 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.

Double bass/Cello

Figure 7: Double bass

Double bass:
Align the microphone with one of the f holes from a distance of about 16 in. (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 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.

Acoustic Guitar

Figure 8: Miking an acoustic guitar with a single C414

We recommend using two microphones.
Place one C414 8 to 12 inches (20 to 30 cm) away from the guitar and aim at the sound hole. Aim a smalldiaphragm microphone (e.g., a C451 B) 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.

Flute

Figure 9: Miking the flute with a single microphone

- We recommend using two microphones.
  Direct Microphone 1 toward the player's mouth at an angle from above (little breath noise), and Microphone 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 ft. (2 to 2.5 m) above the floor.

Clarinet

Figure 10: Clarinet

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

Tenor Saxophone / Soprano Saxophone

Figure 11: Tenor Saxophone

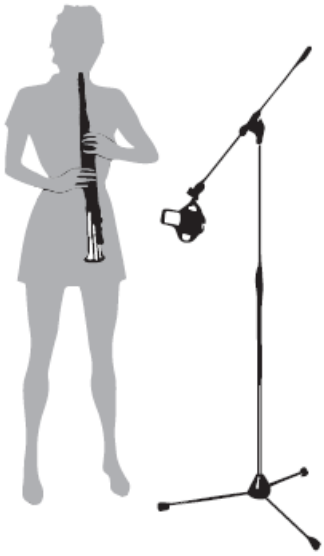


Figure 12: Soprano Saxophone

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

Trumpet/Trombone

Figure 13: Trumpet

Figure 14: Trombone

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

Grand and Upright Pianos

Figure 15: Grand piano

Grand piano:
Aim a single C414 or an XY, MS or ORTF pair of C414s at the middle strings from a height of 5 to 7 ft. (1.5 to 2 m).
For a rock/pop sound, place two C414s roughly 8 to 16 in. (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 in. (15 cm) behind the dampers.

Figure 16: Upright piano

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

Electric Guitar/Bass

Figure 17: Electric guitar

Electric guitar:
Position the microphone 3 to 6 in. (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.

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.

Drums

Figure 18: Drums

Overhead miking:
Place two C414s in an AB or XY configuration about 2 3/4 to 4 ft. (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!

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 at a distance of 2 to 4 in. (5 to 10 cm).
To reduce leakage from other instruments, attenuate the HF range above 10 kHz using the channel EQ(s).

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

Cleaning

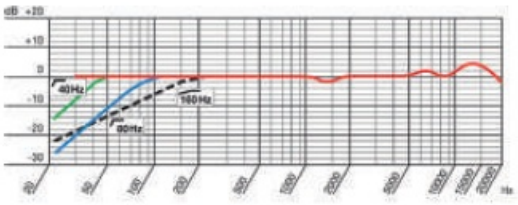
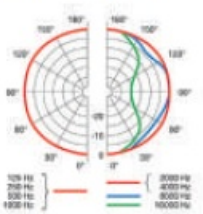
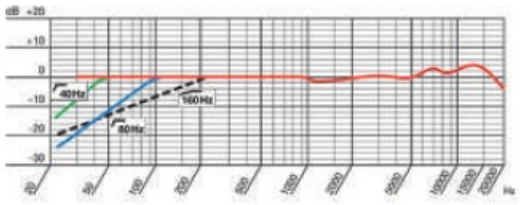
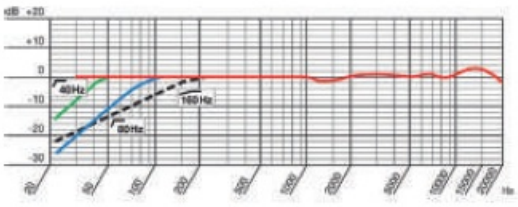
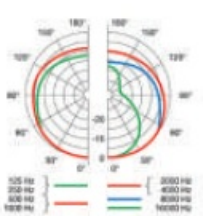
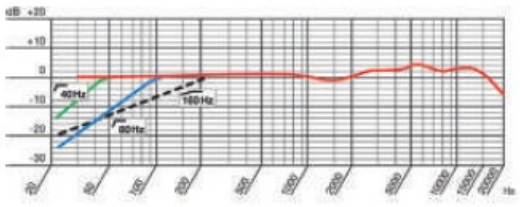
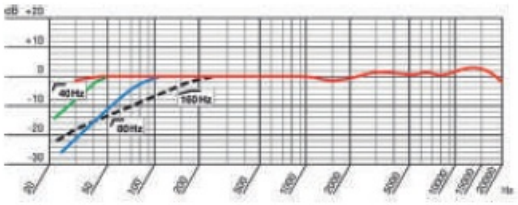
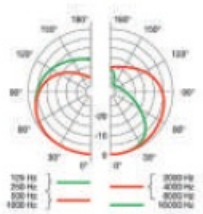
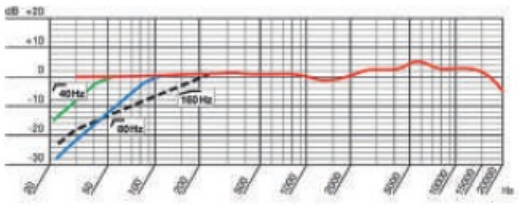
Microphone
Use a soft cloth moistened with water to clean the surface of the microphone body.

Wind screen
Wash the foam wind screen in soap suds. Do not use the wind screen before it has dried completely.

Technical data

- **Type:** 1-inch large diaphragm pressure gradient microphone
- **Palar patterns:** 9, selectable
- **Open-circuit sensitivity:** 23 mV/Pa (-33 dBV ± 0.5 dB)
- **Frequency range:** 20 to 20,000 Hz (see frequency response graphs)
- **Impedance:** ≤ 200 ohms
- **Recommended load impedance:** ≥2200 ohms
- **Bass cut filter slope:** 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 IEC 60268-4: 20 dB (0 dB preattenuation)
- **Equivalent noise level** to IEC 60268-4 (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** (A-weighted): 134 dB min.
- **Max. output level** (A-weighted): 5 V rms (+14 dBV) (+14 dBV)
- **Environment: temperature:** -10°C to +60°C
- **R. H.:** 95% (+20°C), 85% (+60°C)
- **Powering:** 48 V phantom power to IEC 61938
- **Current consumption:** approx. 4.5 mA
- **Connector:** IEC standard 3-pin XLR
- **Dimensions:** 50 x 38 x 160 mm / 2.1 x 1.7 x 6.3 in.
- **Net weight:** 300 g / 10.2 oz.
- **Patents:** Electrostatic transducer (patents nos. AT 395.225, DE 4.103.784, JP 2.815.488, US 7,356,151)

This product conforms to the standards listed in the Declaration of Conformity. You can request the Declaration of Conformity by e-mail from **sales@akg.com**.

Frequency response C414 XLS	Polar diagram C414 XLS / C414 XLII	Frequency response C414 XLII
Omnidirectional		
		
Wide cardioid		
		
Cardioid		
		
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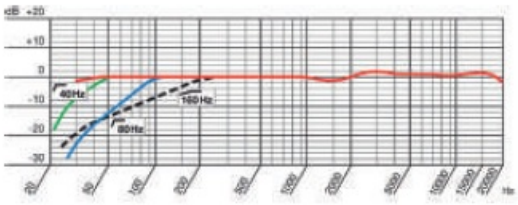
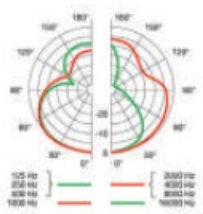
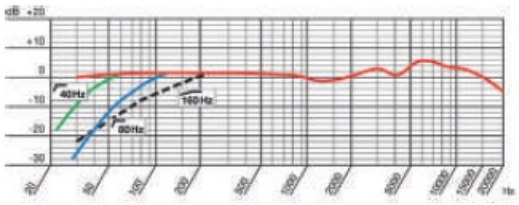
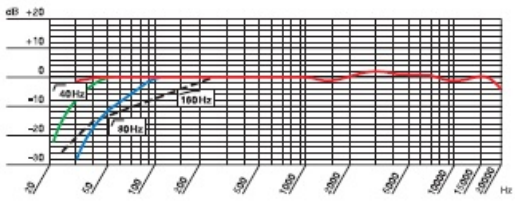
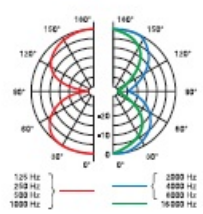
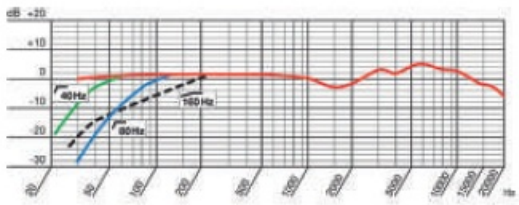
		

Figure 8

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Updates
This manual may be modified without prior notice and does not represent any obligation on the part of AKG Acoustics GmbH.

Version 1.0

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Frequently Asked Questions

- **Q: Can I use the C414 microphone without phantom power?**
  - A: No, the C414 microphone requires 48V phantom power for operation.
- **Q: Which polar pattern is best for recording vocals?**
  - A: For vocals, the cardioid pattern is recommended for focused sound capture.

Documents / Resources

	HARMAN C414 XLII Reference Multipattern Condenser Microphone [pdf] User Manual C414 XLII Reference Multipattern Condenser Microphone, C414 XLII, Reference Multipattern Condenser Microphone, Multipattern Condenser Microphone, Condenser Microphone, Microphone

References