



### THE KR 21 MARKER BEACON RECEIVER

KR 21 (shown actual size here) is a complete, self-contained Marker Beacon Receiver. Operating instructions are the same as the "Marker Beacon Receiver" instructions for KMA 20, except there is no MKR toggle switch to route the audio signal to speaker or phones. The audio signal will be heard automatically while the aircraft is within range of the Marker Beacon, unless receiver is wired to some type of audio control unit.

(The faceplate of the KA 40, Remote Light Adapter for the KMA 20, is similar in appearance to the KR 21.)



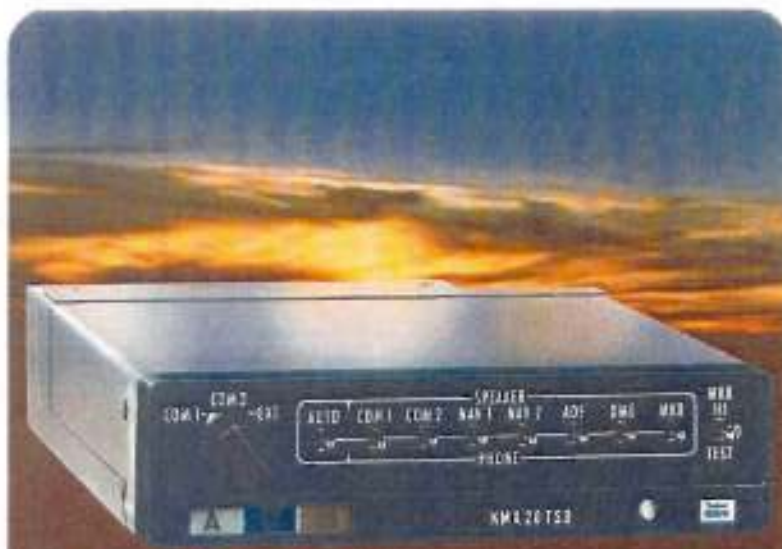
### THE KMA 20 FOR INTERNATIONAL USE

The International version of the KMA 20 has a third COMM function to provide for HF Transceiver operation. Note that the auto switch function has been eliminated to allow for this capability.



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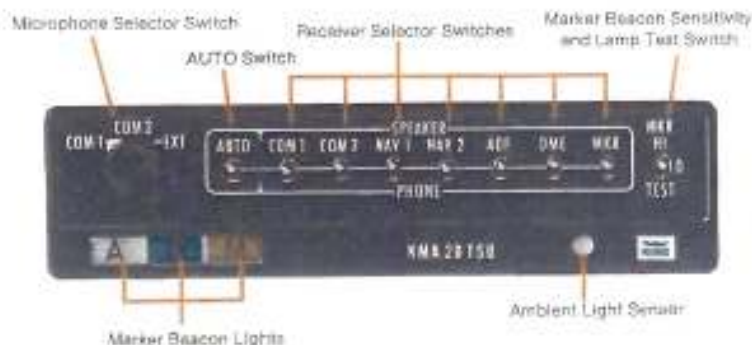


# KING

## KMA 20 Audio Control System and KR 21 Marker Beacon Receiver

### PILOT'S OPERATING MANUAL

## How to get the most from your King KMA 20 Audio Control System



### MICROPHONE TRANSMISSION CONTROL

Rotary switch at left end of faceplate connects microphone to either COMM 1 or COMM 2 VHF transmitter, the external Ramp Hailer, or Cabin Address System. When you press the mike button, the output of all aircraft receivers is electronically muted so there is no cockpit feedback in your transmission.

EXT position of switch allows microphone transmission to Cabin Address System, Ramp Hailer or pilot-copilot intercom. Any one of these systems can be accommodated by the KMA 20. If you are listening to an incoming signal while the microphone selector switch is turned to EXT, the signal

will also be carried to the EXT speaker. However, as soon as you press the mike button to transmit, the received signal is muted and undesirable feedback is eliminated.

### AUDIO RECEPTION CONTROL

You can pre-tune seven aircraft receivers and listen to any of them at will. Simply flip the appropriate toggle switch—COMM 1, COMM 2, NAV 1, NAV 2, ADF, DME or Marker Beacon (MKR).

Middle switch position is OFF. Upper position is SPEAKER and lower position is PHONES. The pilot can be listening to one radio on the speaker while copilot listens to another on the headphones, without confusion.

The Isolation/Speaker Ampli-

fier automatically raises signal strength to the level necessary to drive the speaker. During headphone reception the amplifier is bypassed, and the headphones are connected directly to the selected receiver.

### AUTO SWITCH

Using this switch automatically matches the appropriate COMM receiver to the transmitter selected.

Put both COMM receiver toggle switches on OFF. Set AUTO to either SPEAKER or PHONE, whichever you want to listen to. Now you will automatically hear the receiver of the COMM transmitter selected as you change the rotary COMM 1/COMM 2 transmitter selector switch back and forth. No need to manipulate the COMM receiver toggle switches during these changes.

### MARKER BEACON RECEIVER

A complete Marker Beacon superheterodyne receiver is built into the KMA 20. This radio is crystal-controlled at 75 MHz for stability and selectivity.

When you pass over an airway marker or runway threshold, the lefthand or white lamp on the faceplate (or remote-mounted KA 40 Adapter) will illuminate. This lamp is further identified by "A" (Airway) engraved on the lens. A light sensor automatically regulates intensity of the light to conform to the ambient cockpit lighting conditions. (Brighter during the day, dimmer at night)

A 3,000 Hz tone from an Airway Marker is also received on the Marker Beacon audio, and can be routed to speaker or phones by the MKR toggle switch.

"Outer" markers are identified by flashes on the center or blue lamp (lettered "O"), on and off at the rate of two cycles per second. The audio signal is a series of 400 Hz dashes, also at a rate of two per second. Outer markers are normally positioned on the front localizer course near the point where the glideslope approach path intersects the minimum inbound altitude, at a distance of 4 to 7 miles from the runway.

"Middle" markers are normally located on the front localizer course about 3200 feet from the approach end of the ILS runway. This marker is identified by alternating dots and dashes in a 1300 Hz tone, and flashes from the righthand amber "M" (Middle) lamp.

The HI-LO/TEST toggle switch is the Marker Beacon Sensitivity and lamp test switch. HI sensitivity greatly enlarges the area in which the marker signal can be received.

With the sensitivity control on HI, the aural tone will begin about one mile from the outer marker. At this point the pilot may switch to LO sensitivity which permits more precise detection of the center of the marker. Descent on the glideslope should begin when the lamp indicates actual passage over the outer marker and the glideslope is intersected.

# KING KMA 20 Audio Control System KR 21 Marker Beacon Receiver



This is the TSO'd King KMA 20. It is a complete, self-contained Audio Control Console and isolation amplifier with 3-light Marker Beacon Receiver built-in.

## This King KMA 20 Audio Control System makes the pilot's life a lot easier

Select headphone or speaker output from your choice of 7 receiver channels. Have microphone selection for 2 transmitter channels . . . plus automatic matching of the COMM receiver with the transmitter selected.

It's all at your fingertips.

An audio isolation amplifier maintains constant, controlled volume and eliminates cross-talk between channels. All receivers are automatically muted when the mike button is pressed, so you'll have no cockpit feedback in transmission.

A complete Marker Beacon Receiver and 3-light presentation with automatic dimming are built-in. Lights may be remotely mounted.

It's all solid-state and TSO'd.

This is the King KMA 20 Audio Control System, built into a compact flat-pack that matches the other King Silver Crown avionics in your panel.



The King KR 21 Marker Beacon Receiver is completely self-contained with its own audio output, self-test and automatic light dimming capability. It is all solid-state and TSO'd. The KR 21, shown actual size here, will fit almost anywhere in your panel. It may be installed either vertically or horizontally.

Complete information, specifications and a Pilot's Operating Manual for both the KMA 20 and the KR 21 are on the following pages.

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## KMA 20 AUDIO CONTROL PANEL

Incoming signals from COMM 1, COMM 2, NAV 1, NAV 2, ADF, DME or Marker Beacon receiver are routed to either speaker or headphones by simple, three-position toggle switches. The pilot can listen to one radio on the speaker while the copilot listens to another on the headphones.

A selector switch connects the microphone to either COMM 1 or COMM 2 transmitter. Or a Ramp Halter, Cabin Address System or pilot-copilot intercom may be selected. (The International model of the KMA 20 uses the third COMM selector position to provide for HF transceiver operation.)

A separate "AUTO" switch is provided to automatically match the incoming signal from COMM 1 or COMM 2 receiver with the transmitter selected.

## THE ISOLATION AMPLIFIER

Input power levels of all radio receivers selected are amplified to the level necessary to drive a 4 ohm or an 8 ohm speaker, with 40 db of isolation between each receiver channel, eliminating cross-talk. An electronic muting circuit automatically mutes output of all receivers when the microphone button is pressed, so there is no cockpit feedback in the transmission.

## THE BUILT-IN MARKER BEACON RECEIVER

A crystal-controlled superheterodyne receiver is incorporated in the unit. Its excellent selectivity provides freedom from interference by FM or TV stations. A 3-light presentation with colored lenses is built into the faceplate. Dimming circuitry for the marker lamps automatically adjusts lamp brilliance to the cockpit ambient light level. A HI-LO

sensitivity and lamp test switch is located at the extreme right end of the KMA 20 faceplate.

If the KMA 20 location is not convenient for viewing the Marker Beacon Lights, these lights can be remote-mounted, either horizontally or vertically, by using a King KA 40 Remote Light Adapter, which is wired to the Marker Beacon Receiver in the KMA 20.

## THE KR 21 SELF-CONTAINED MARKER BEACON RECEIVER

If a separate TSO'd 3-light marker receiver is desired, the King KR 21 provides all marker beacon functions of the KMA 20. An audio amplifier provides an audio output for headset operation. The KR 21 can be mounted either vertically or horizontally.

Both KMA 20 and KR 21 are designed to operate on either 13.75v or 27.5v current.

## PERFORMANCE SPECIFICATIONS

## KING KMA 20 Audio Control System

<b>Design:</b>	Self-contained, panel-mounted. All solid-state. No moving parts. TSO'd.
<b>Power Requirements:</b>	Idle, 300 ma @ 13.75v; 100 ma @ 27.5v. Operating, 1.1 amp either voltage.
<b>Size:</b>	6.25" W (15.88 cm) x 1.8" H (4.60 cm) x 6.09" D (15.56 cm)
<b>Weight:</b>	3.3 lbs. (1.04 kg)

### MARKER BEACON RECEIVER

<b>Selectivity:</b>	6 db at ±10 kHz; 80 db at 575 kHz.
<b>Sensitivity:</b>	Low: 2,000 µv for lamp threshold. High: 500 µv for lamp threshold.
<b>Frequency:</b>	75 MHz crystal-controlled.
<b>AGC Characteristics:</b>	Less than 6 db variation in audio output level when the r' level is varied from lamp threshold to 2,000 µv.
<b>Duty Cycle:</b>	Continuous.
<b>Input Impedance:</b>	Designed to match 50 ohm antenna. (KA 23)
<b>Output:</b>	Capable of 10 milliwatts into isolation Amplifier input of 500Ω. Factory adjusted to 1.0 VRMS at isolation Amplifier input.
<b>TSO Compliance:</b>	TSO C35c Env. Cat. DACAAAX.

### AUDIO ISOLATION AMPLIFIER

<b>Inputs:</b>	2 transceivers, 4 external receivers (International Model), 3 transceivers, 4 ext. receivers.
<b>Input Impedance:</b>	500 ohms.
<b>Input Isolation:</b>	40 db between input channels.
<b>Input Muting:</b>	40 db or better when a transmitter is keyed.
<b>Speaker Output:</b>	0.25 watts at either 4 ohms or 8 ohms speaker output, 13.75v, 8 watts capability @ 27.5v.
<b>Distortion:</b>	Less than 10% at rated output.
<b>Frequency Response:</b>	Within 5 db from 250 Hz to 3000 Hz.
<b>TSO Compliance:</b>	TSO C50b Env. Cat. DACAAAX.

### KA 40 REMOTE LIGHT ADAPTER

<b>Size:</b>	0.2" W (6.13 cm) x 1.05" H (2.66 cm) x 2.56" D (6.5 cm), including rear connector.
<b>Weight:</b>	0.25 lbs. (1.13 kg)
<b>Power Requirements:</b>	Derives power from KMA 20, 125 ma. for each lamp.
<b>TSO Compliance:</b>	TSO C35c Env. Cat. DACAAAX.

### KR 21 MARKER BEACON RECEIVER

<b>Design:</b>	Panel-mounted, 3-light, TSO'd Marker Beacon radio receiver. All solid-state. No moving parts. High/Low sensitivity and lamp test switch. Lights automatically adjust to cockpit light levels.
<b>Input Impedance:</b>	Designed to match 50 ohm antenna.
<b>Output:</b>	Capable of 10 milliwatts into isolation Amplifier at 500Ω. Factory adjusted to 1.0 VRMS output.
<b>Frequency:</b>	75 MHz Crystal-controlled.
<b>Selectivity:</b>	6 db at ±10 kHz, 60 db BW 575 kHz.
<b>Sensitivity:</b>	Low: 2,000 µv for lamp threshold. High: 500 µv for lamp threshold.
<b>AGC Characteristics:</b>	Less than 6 db variation in audio output level when the r' level is varied from lamp threshold to 200,000 µv.
<b>Size:</b>	3.2" W (8.13 cm) x 1.05" H (2.66 cm) x 7.13" D (18.11 cm)
<b>Weight:</b>	0.6 lbs. (1.27 kg)
<b>TSO Compliance:</b>	TSO C35c Env. Cat. DACAAAX.

In keeping with King Radio Corporation's policy of continual product improvement, design, color and specifications described herein may be altered without notice.

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