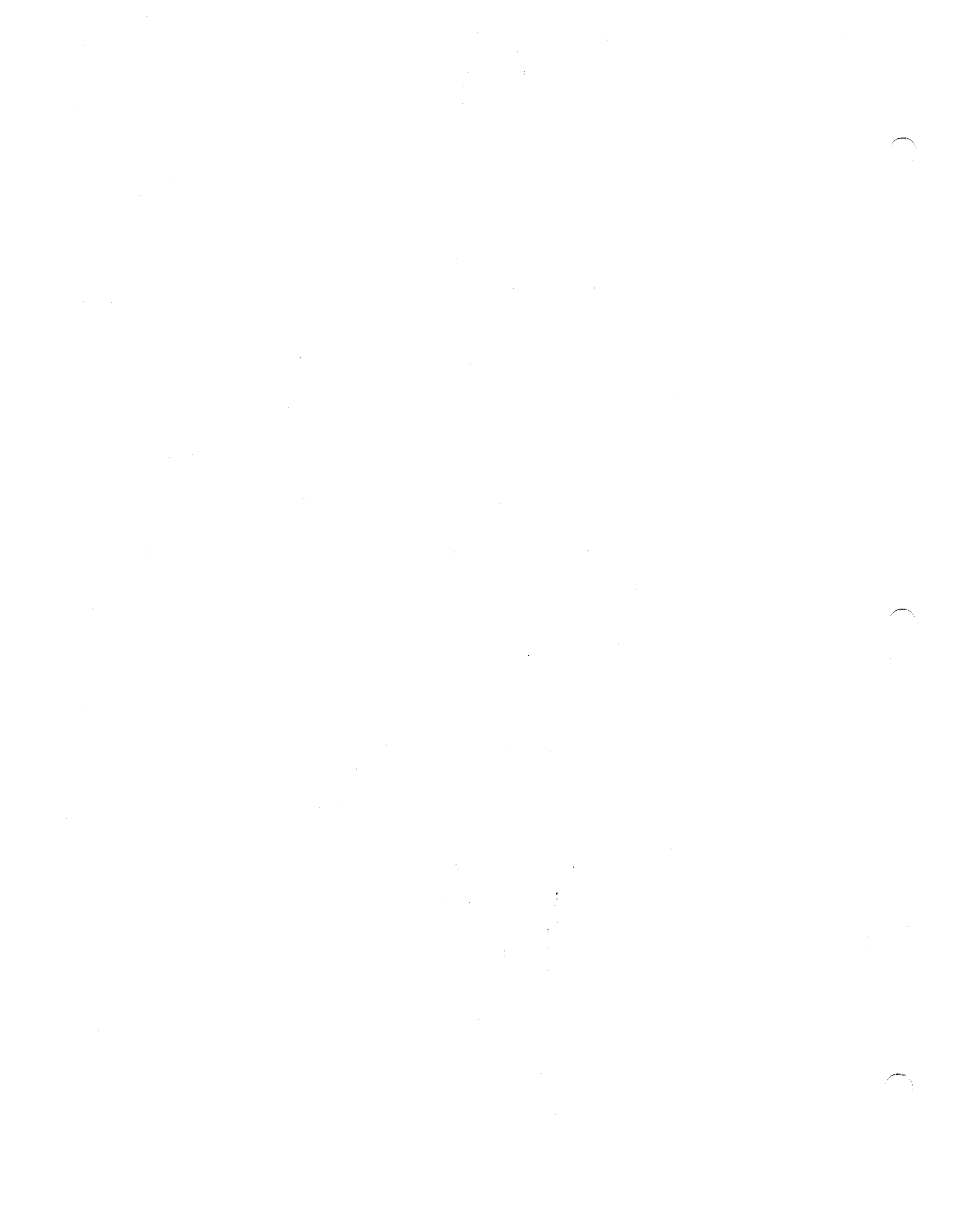


**KMA 20/KR 21  
MARKER BEACON RECEIVER  
ISOLATION AMPLIFIER**

**INSTALLATION MANUAL  
006-0044-02**

REV. 2

JUNE, 1976



**KING**  
KMA 20/KR 21  
MARKER BEACON RECEIVER/  
ISOLATION AMPLIFIER

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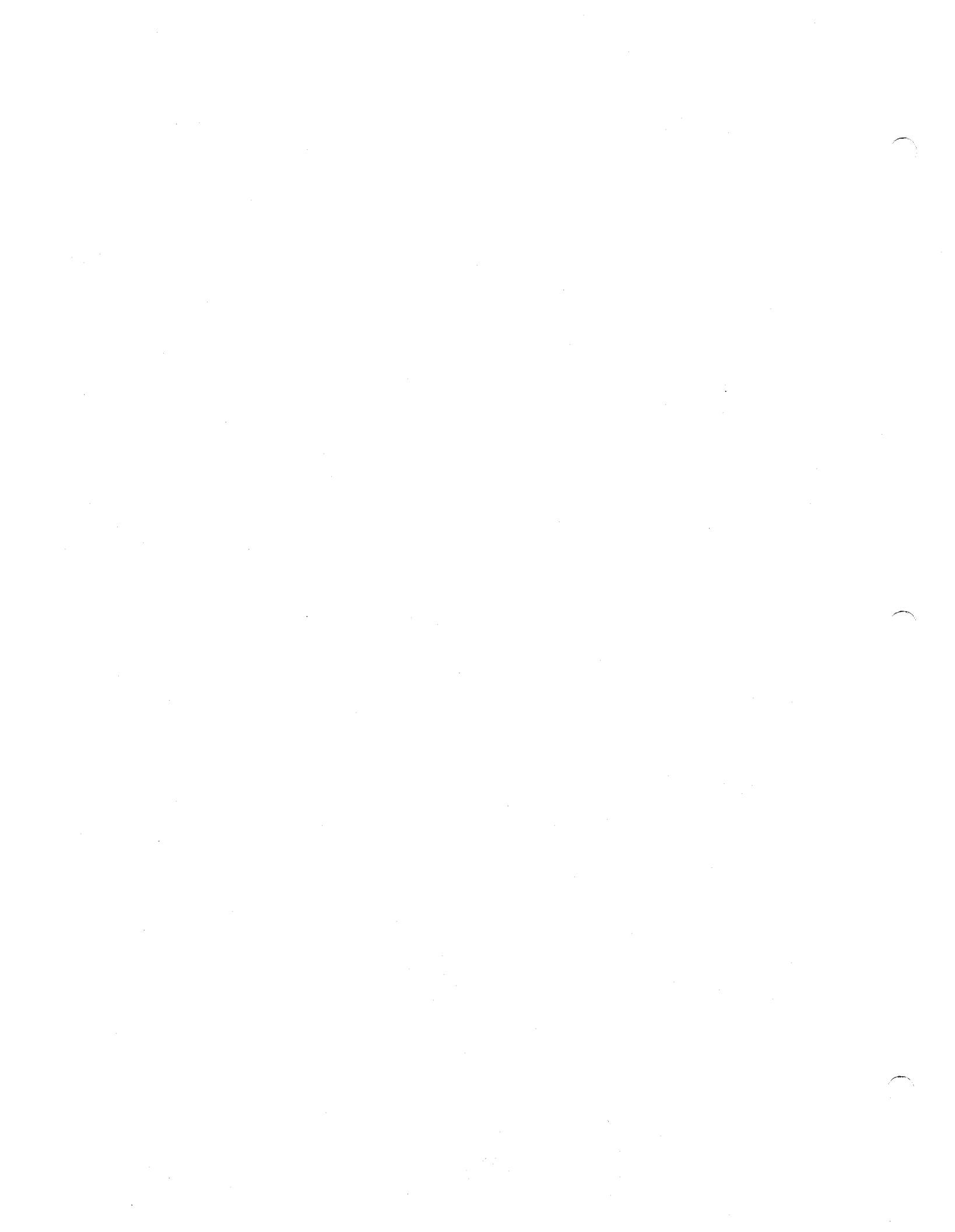


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MARKER BEACON RECEIVER/  
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## HISTORY OF REVISIONS

Revision 1, August 1972

Page	Reason for Change
Title Page	Denotes New Revision
Warranty	New Warranty
Contents	Table of Contents Added
History of Rev.	History Revision Added
1-1	Lamp Test Information Added
1-3	Sensitivity and Selectivity Revised
1-4	Word Misspelled
1-6	Installation Parts List Added
2-1	Warning Note Added
2-2	Paragraph 6 Changed to 7. New Paragraph 6 added.
2-3	Figure Numbers corrected
2-4	New Installation Drawing
2-5	New Installation Drawing
2-6	Drawing Turned on Page
2-7	Interconnect Corrected
2-11	Pins Reversed
2-13	Figure Added
2-15	Figure Added
3-1	Marker Description Changed
3-1	Information Added about HI-LO Switch
3-2	09/11 Information Added





## HISTORY OF REVISIONS

Revision 2, June, 1976

Page	Reasons for Change
Title Page	Denotes New Revision
Warranty	Deleted
Contents	Page Number changes
History of Revision	Added for Revision 2
1-3	Technical Characteristics Updated
2-2	Paragraph 2.3 (5) updated Paragraph 2.3 (7) updated
2-7	Interconnect updated
2-9	Figure 2-6A changed to 2-5 Figure 2-6B changed to 2-6
2-11	Figure 2-8 updated
3-2	Section 3.2 updated





  
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## SECTION I

### GENERAL INFORMATION

#### 1.1 INTRODUCTION

The King KMA 20 is a compact transistorized unit providing the functions of marker beacon receiver, isolation amplifier and audio control panel. The unit has been styled to harmonize with the all new generation of Silver Crown panel mounted equipment. TSO certification of the KMA 20 assures operation under varying environmental conditions.

The KMA 20 is designed to provide a uniformly functioning aircraft radio system when utilized with other units of the new Silver Crown line. Although the equipment is designed primarily for use with the KX 170 NAV/COMM unit, it will also perform effeciently with older Silver Crown transceivers and radios.

Significant new features of the KMA 20 design include its AUTO switch feature: semi-concealed marker light presentation and its ability to control COMM and NAV audio independently. Automatic dimming circuitry for the marker lamps, to compensate for ambient cockpit lighting, is also incorporated in the design.

Within the KMA 20, the marker beacon receiver comprises one section of the unit. The marker receiver of the KMA 20, available without the isolation amplifier and audio panel is the KR 21. The receiver is a crystal controlled superheterodyne receiver and has excellent selectivity and freedom from interference of television and FM stations. Operating controls for the marker receiver consists of two toggle switches on the KMA 20: a HI-LO sensitivity and lamp test control and an audio selector switch. The KR 21 has only the HI-LO sensitivity and lamp test control. A three light presentation is designed into the front panel of the unit with colored lenses to indicate passage over the markers. Besides the colors, the stations are identified by the letters A-O-M engraved on the lenses plus the appropriate frequency audio tone. Should the aircraft user desire a remote location for the marker lights, King Radio Corporation manufacturers an optional remote light assembly designated the KA 40 for use with the KMA 20 only.

The isolation amplifier of the KMA 20 makes possible the combining of all receiver audio inputs into a single cockpit speaker with 40db of isolation between each radio. The input power levels of the signals are amplified to the level necessary to drive a 4 ohm speaker. An electronic muting circuit (diode switch) is provided to automatically isolate the output of all receivers from the isolation amplifier whenever the microphone button





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is pressed. This feature eliminates the possibility of audio feedback in the cockpit. The amplifier design utilizes only one integrated circuit and a push-pull output stage for high reliability.

Audio control functions of the Silver Crown radio system are performed at the front panel of the KMA 20. A microphone selector rotary switch, a series of eight audio selector switches and a marker beacon receiver sensitivity control are the operating controls of the unit. The microphone selector routes audio and keying information to the selected transceiver or to a EXT ramp hail speaker or passenger address system. The AUTO switch control of the standard model is utilized in conjunction with the microphone selector switch. For normal operation of the AUTO switch, COMM 1 and COMM 2 are placed in the center (off) position. With the AUTO switch in the SPEAKER position, the receiver audio selected is automatically controlled by the operation of the microphone selector. Thus if transmitting on COMM 1, receiver audio for COMM 1 will be routed to the cockpit speaker. This feature eliminates the constant manipulation of COMM receiver audio selectors when switching back and forth between transmitters. Speaker, off or mute, and headphone audio control of each of the aircraft radios is accomplished with the remaining three-position toggle switches.

A series type solid state regulator is used to supply the regulated voltage to the marker receiver and audio boards of the unit. Since each aircraft installation is wired for either 13.75 or 27.5V operation of the unit, the KMA 20 and KR 21 are completely interchangeable between aircraft with no internal wiring changes.

**1.2 TECHNICAL CHARACTERISTICS**

MARKER BEACON RECEIVER - KMA 20/KR 21

SPECIFICATION	CHARACTERISTIC
TSO COMPLIANCE:	TSO C35c Env. Category DACAAAX.
CONTROL:	Panel mounted equipment. Sensitivity and audio selector controls on the front panel of the unit.
DUTY CYCLE:	Continuous.
INPUT IMPEDANCE:	Designed to match 50 ohm antenna.
OUTPUT:	Capable of 10 milliwatts into Isolation Amplifier input of 500Ω Capable of 6.25 watts at the 4Ω speaker output.





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SPECIFICATION	CHARACTERISTIC
<p>OUTPUT: (Cont)</p> <p>DESIGN:</p> <p>FREQUENCY:</p> <p>SENSITIVITY:</p> <p>SELECTIVITY:</p> <p>AGC CHARACTERISTICS:</p>	<p>Factory adjusted to 1.0VRMS at the isolation amplifier input.</p> <p>All solid state. No moving parts.</p> <p>Crystal-controlled at 75MHz.</p> <p>Low: 2,000<math>\mu</math>v hard for lamp threshold            High: 500<math>\mu</math>v hard for lamp threshold</p> <p>6db at <math>\pm</math>10KHz Min.            60db at 575KHz Max.</p> <p>Less than 6db variation in audio output level when the rf level is varied from lamp threshold to 200,000<math>\mu</math>v.</p>
<p>ISOLATION AMPLIFIER - KMA 20</p>	
<p>TSO COMPLIANCE:</p> <p>CONTROL:</p> <p>DUTY CYCLE:</p> <p>INPUTS:</p> <p>INPUT IMPEDANCE:</p> <p>INPUT ISOLATION:</p> <p>INPUT SELECTOR SWITCHES:</p> <p>INPUT MUTING:</p>	<p>TSO C50b Env. Category DACAAAX.</p> <p>Panel mounted equipment. All operating controls are on the front panel of the unit.</p> <p>Continuous.</p> <p>Standard model accomodates two transceivers and four external receivers. International model accomodates three transceivers and four external receivers.</p> <p>500 ohms.</p> <p>40db between input channels.</p> <p>Each isolated audio input has three independent terminations: SPEAKER, OFF or PHONE.</p> <p>Audio Muting is 40db or better when a transmitter is keyed.</p>





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SPECIFICATION	CHARACTERISTIC
SPEAKER OUTPUT:      DISTORTION:  FREQUENCY RESPONSE:	4 ohm output: Rated power output is 6.25 watts at the 4 ohms speaker output. With a supply voltage of 27.5vdc, output power capability increases to 8 watts.  8 ohm output: Rated power output is 6.25 watts at the 8 ohm speaker output. With a supply voltage at 27.5 vdc, output power capability increases to 8 watts.  Less than 10% at rated output.  Within 6db from 350Hz to 3000Hz.
KMA 20 GENERAL	
POWER REQUIREMENTS:  Instrument panel lighting: KMA 20 idle current: KMA 20 operating current:  PHYSICAL DIMENSIONS:   WEIGHT:	13.75V    27.5V 300ma    150ma 1.1 amps 1.1 amps  Length: 6.293 inches behind instrument panel. Width: 6.2 inches. Height: 1.6 inches.  2.3 lbs.
KR 21 GENERAL	
POWER REQUIREMENTS:  Idle Current:  Operating Current:  Panel Lighting:	170ma at 13.75V 120ma at 27.5V 300ma at 13.25V 250ma at 27.5 V None





  
 KMA 20/KR 21  
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SPECIFICATION	CHARACTERISTIC
PHYSICAL DIMENSIONS:  WEIGHT:	Length: 5.667 inches Width: 3.20 inches Height: 1.050 inches  0.562 lbs.
KA 40 GENERAL	
POWER REQUIREMENTS:  PHYSICAL DIMENSIONS:  WEIGHT:	Marker lamp power furnished by KMA 20 0.125 amp while the lamp is operating.  Length: 2.5 inches (including connector) Width: 3.2 inches Height: 1.05 inches  0.25 lbs.





KMA 20/KR 21  
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### 1.3 UNITS/ACCESSORIES REQUIRED

- A. Unit: KMA 20 KPN 066-1024-XX (See Figure 2-8)  
KR 21 KPN 066-1021-01
- B. KMA 20 Installation Kit: KPN 050-1167-00  
KR 21 & KA 40 Installation Kit: 030-2016-00 Connector and  
089-6163-05 (4) screws  
Both are included with unit.

Installation Kit 050-1167-00 consists of the following:

QUANTITY	DESCRIPTION	KING PART NO.
1	Solder Lug (Dual)	008-0041-00
2	Cable Half Clamp	030-1019-00
1	32 Pin Connector	
	Amphenol 26-190-32	030-2061-01
1	Mounting Plate Cover	047-1760-00
1	Mounting Plate Connector	047-1762-01
2	#4 Esna Nut	089-2188-22
2	Flathead 4-40 x 5/16 Screw	089-5523-05
4	Pan Head 4-40 x 1/4 Screw	089-5903-04
2	Pan Head 6-32 x 1/4 Screw	089-5907-04
2	Pan Head 4-40 x 5/16 Screw	089-5903-05
2	Flat Washer	089-8025-30

Accessories:

KA 40 Remote Lamp Assembly (071-0003-00)



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## SECTION II

### INSTALLATION

#### 2.1 GENERAL

Installations of the KMA 20, KR 21 and KA 40 will differ according to the number of receivers installed, equipment location and other factors. The cable harness will be fabricated by the installing agency to fit these various requirements. This section contains interconnect diagrams, mounting dimensions and information pertaining to installation.

#### 2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking the equipment. Make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. The claim should be promptly filed with the transportation company. When the equipment has been removed, place in the shipping container all packing, bracing and filler used in the original packing. Save the packing material for use in unit storage or reshipment.

#### 2.3 INSTALLATION NOTES AND PRECAUTIONS

—WARNING—

See Figure 2-3A & B before  
proceeding with cable assembly.

The KMA 20 will conform to the needs of the customer, installing agency and existing conditions as to unit location and type of installation. Customer options will determine the exact wiring details to be utilized in the installation. However, the following suggestions should be considered before proceeding with the actual installation. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

- (1) **Placement.** Select the equipment location. The KMA 20 may be rigid mounted in any location which will accommodate the necessary front panel space requirements and the depth required behind the aircraft instrument panel. Since the unit is shorter than the other radios, it is normally mounted at the top of a vertical stack. When the equipment cover (mounting tray) is installed, a front-operating hold down screw allows easy installation and removal of the unit from the aircraft mounting tray. If possible leave enough space on the sides of the unit face panel to allow grasping the unit during removal. The above applies to the KR 21 and KA 40 and additionally they may be mounted either vertically or horizontally by changing the marker lenses.
- (2) **Cable Routing.** When shipped, the protective cover and connector mounting plate on the rear of the equipment cover are assembled for the cable to emerge from the right side of the unit. If it is desired that the cable emerge from the left side of the unit, the connector mounting plate may be reversed. The only precaution to take is that Pin 1 of the unit connector mate with Pin 1 of the harness connector when the unit is installed.
- (3) **System Grounding.** On all receivers which have separate audio grounds, it is recommended that these grounds be carried to a solder lug on the connector mounting plate of the KMA 20. All audio grounds should be terminated here to minimize the possibility of ground current noises being introduced into the audio system. It is also suggested that the grounding connections from the speaker or speakers be made at the KMA 20 ground terminals.



  
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- (4) Supply Voltage. Since the internal wiring of all KMA 20 units is the same, wiring for different dc supply voltages is not necessary. Wiring information is shown in the installation wiring diagrams. This is also the case in the KR 21.
- (5) Ramp Hailer. (-00/07 Versions) The location and installation procedure for the optional "Ramp hail" speaker, or alternately a PA (passenger address) system, will be developed by the installing agency. When installation information from the airframe manufacturer is available, it should be utilized. A speaker having a power capability of at least 8 to 10 watts and an impedance of 8 ohms is required. If a ramp hail or PA speaker is not utilized, the EXT speaker output must be terminated with a load resistor. This is accomplished by terminating Pin 9 with an external 8 ohm resistive load. KMA 20's previous to S/N 11233 had an internal resistor available at Pin 8. However, care must be made to make certain which resistive load configuration is in the KMA 20 to be installed.
- (6) P. A. (-09/10/11 Versions) The -09/10/11 Versions of the KMA 20 have an extra 4 ohm audio output which is selected by the mic-selector switch can be used for passenger address system. The 09/10/11 versions have both EXT (Ramp Hailer) and P. A. passenger address capability.
- (7) Transceiver Speaker Output Terminations. Nearly all current and recent transceivers have a 4 ohm output connection from the amplifier-modulator to feed a cockpit speaker directly when an isolation amplifier is not used. Since the audio inputs to the KMA 20 use the 500 ohm headphone output connection, the 4 ohm output of such amplifiers is not loaded. To eliminate this undesirable condition, two 8 ohm resistors are provided in the KMA 20 to perform this loading function.

## 2.4 INSTALLATION PROCEDURES

- (a) Study the installation to allow adequate space for installation of the connector and cable.
- (b) After the location is determined, make the panel cutout using the dimensions shown in Figure 2-1 (KMA 20) or Figure 2-2 (KR 21) or Figure 2-3 (KA 40).
- (c) Refer to Figure 2-1 (KMA 20) or Figure 2-2 (KR 21) or Figure 2-3 (KA 40) for the four mounting hole locations. Mark, punch and drill the holes in the aircraft panel mounting bracket.
- (d) Secure the equipment cover (mounting rack) to the instrument panel mounting (KMA 20 only).
- (e) Fabricate the external cable in accordance with the installation wiring diagram taking note of the preceding installation precautions.
- (f) Mount the KR 21 in the panel and connect the wiring harness.

**—CAUTION—**

Do not overtighten the locking screw.

## 2.5 MARKER ANTENNA INSTALLATION

Any standard type Marker Beacon Receiver Antenna meeting TSO requirements may be used with the KMA 20 or KR 21. However, due to the possible variations and sensitivities of the antennas, it is suggested that a flight check be made after installation to determine if the sensitivity setting





  
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in the receiver should be changed to compensate for the sensitivity of the antenna. It is recommended that coaxial cable RG-58/U be used for connecting the antenna to the KMA 20 or KR 21 Marker Receiver Antenna terminals.

### **2.6 KA 40 INSTALLATION (OPTION)**

If the King KA 40 Remote Light Adapter is utilized, consult the outline and dimension drawing, Figure 2-3 for attaching the unit to the instrument panel. Wiring information for the KA 40 is contained in the installation wiring diagram of the KMA 20.





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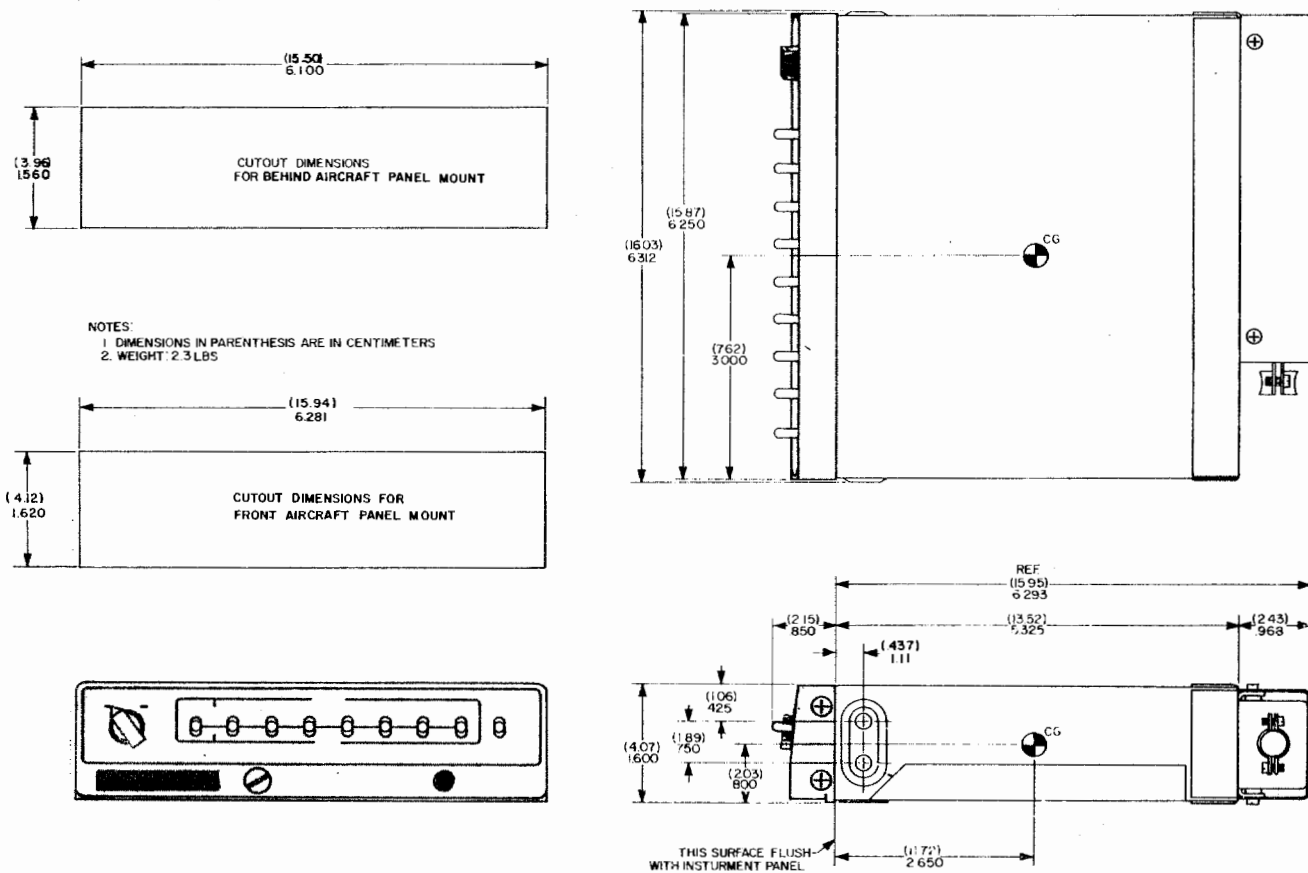
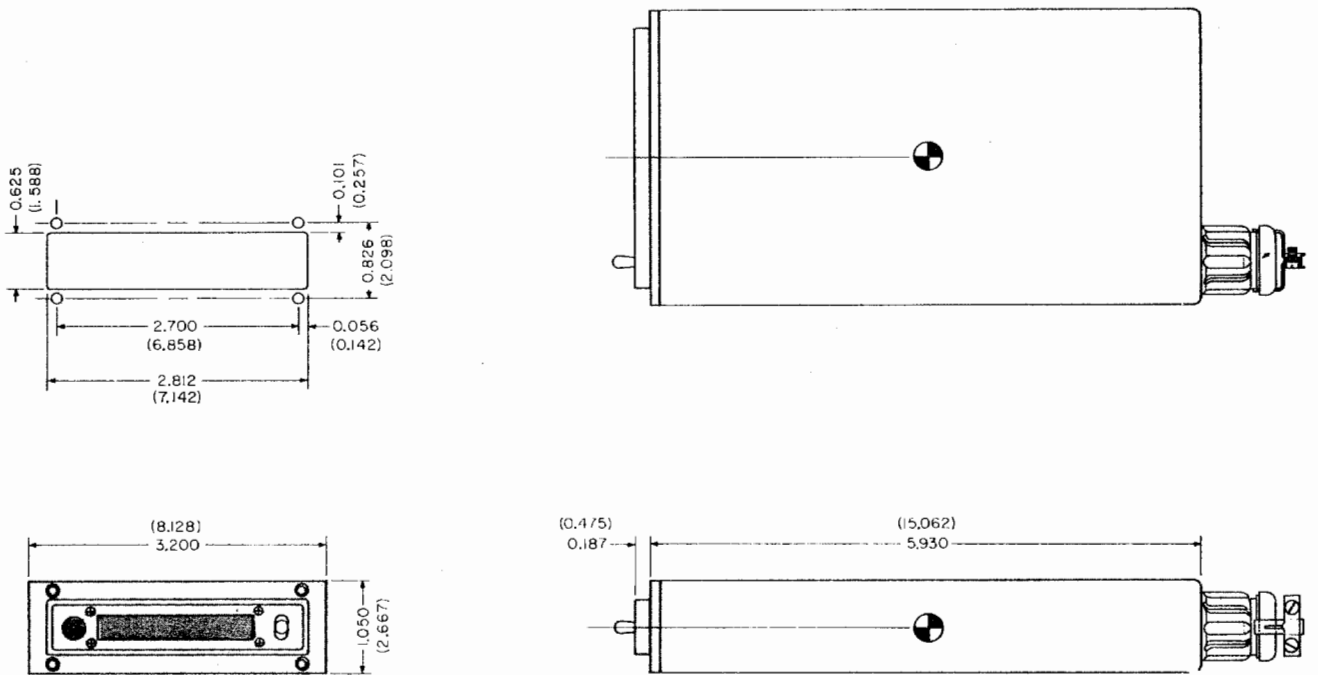


FIGURE 2-1 KMA 20 INSTALLATION DRAWING  
(DWG. NO. 155-5051-00)



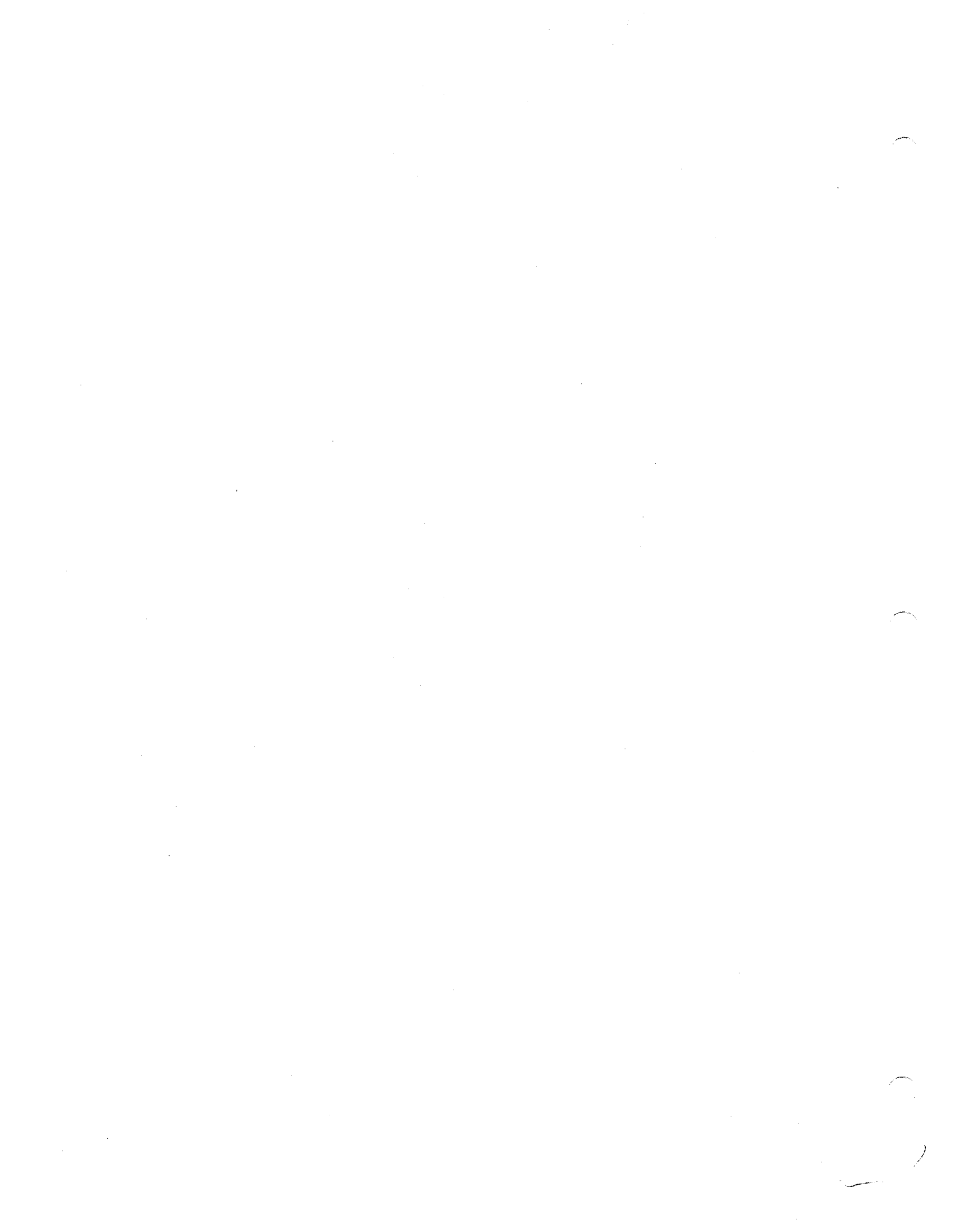


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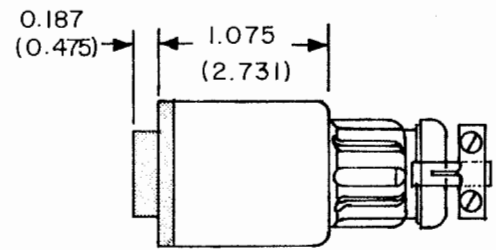
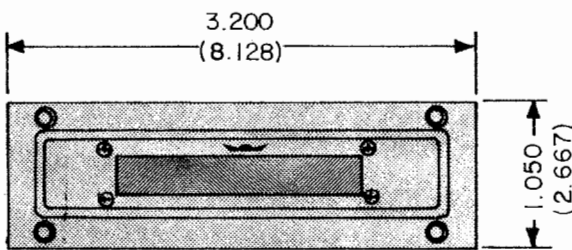
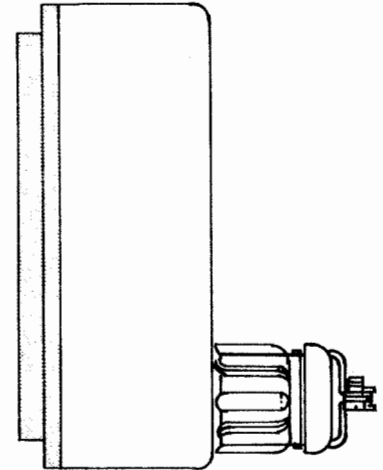
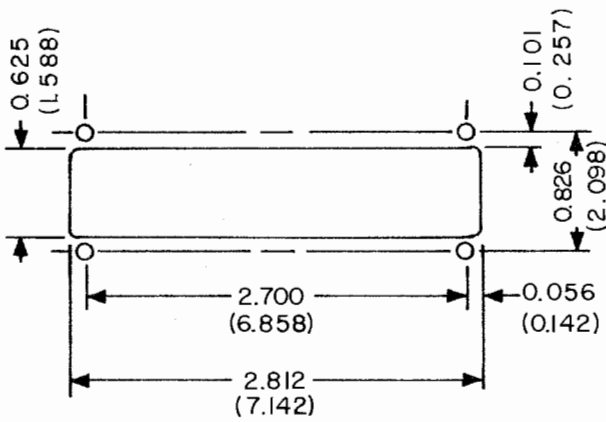
- NOTES  
1. ALL DIMENSIONS IN PARENTHESIS  
ARE IN CENTIMETERS.  
2. WEIGHT 0.562 LBS.

FIGURE 2-2 KR 21 INSTALLATION DRAWING  
(DWG. NO. 155-5052-00)





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NOTES:

1. ALL DIMENSIONS IN PARENTHESIS ARE IN CENTIMETERS.
2. WEIGHT: 0.25 LBS.

FIGURE 2-3 KA 40 INSTALLATION DRAWING  
(DWG. NO. 155-5053-00)







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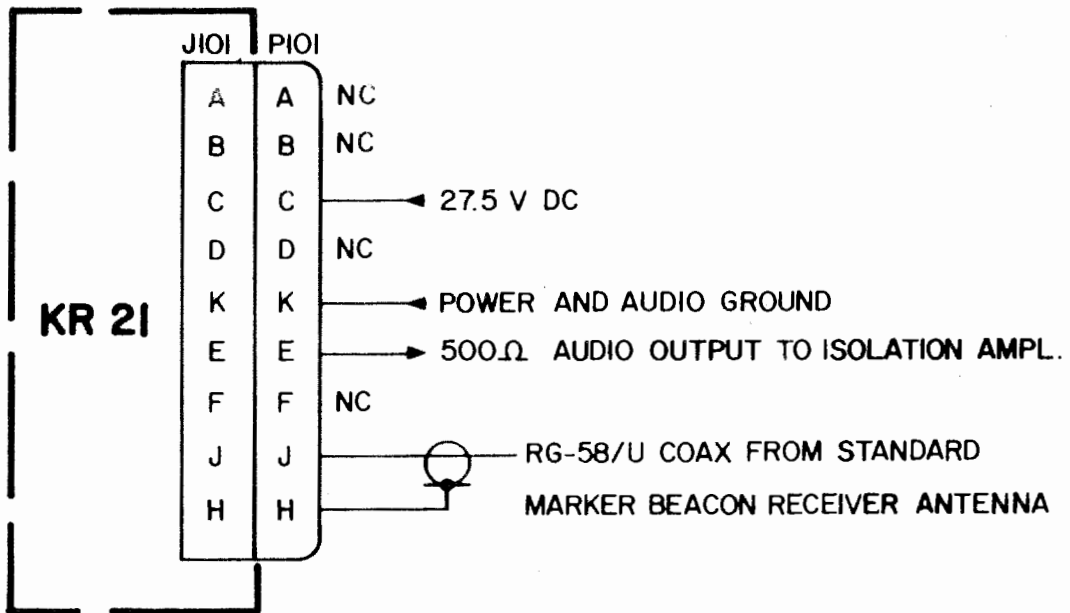


FIGURE 2-5 KR 21 INTERCONNECT DIAGRAM (27.5V)  
(696-1801-01)

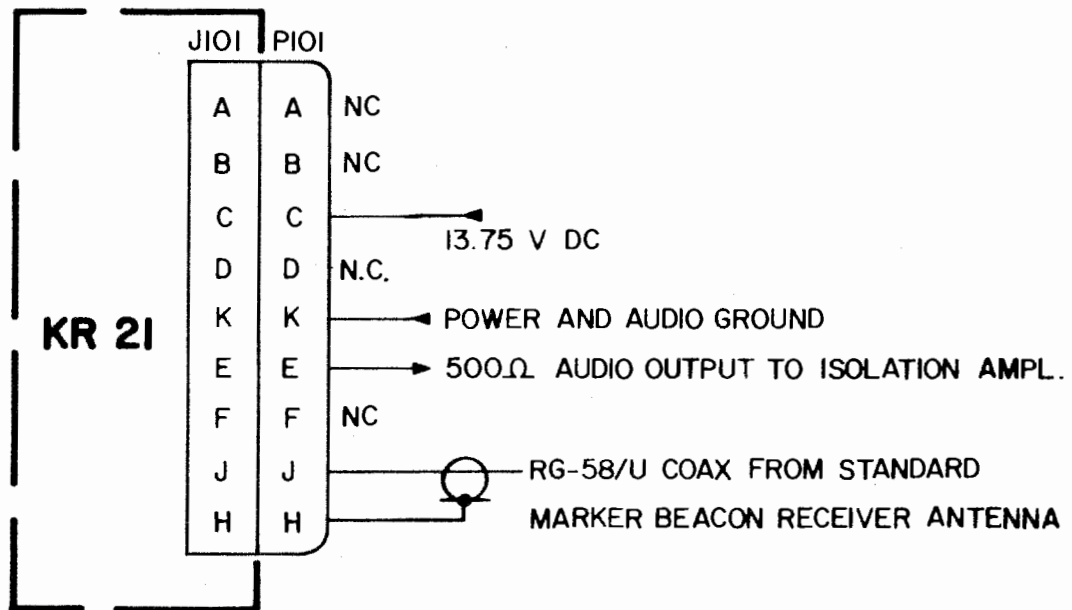


FIGURE 2-6 KR 21 INTERCONNECT DIAGRAM (13.75V)  
(DWG. NO. 696-1801-00)



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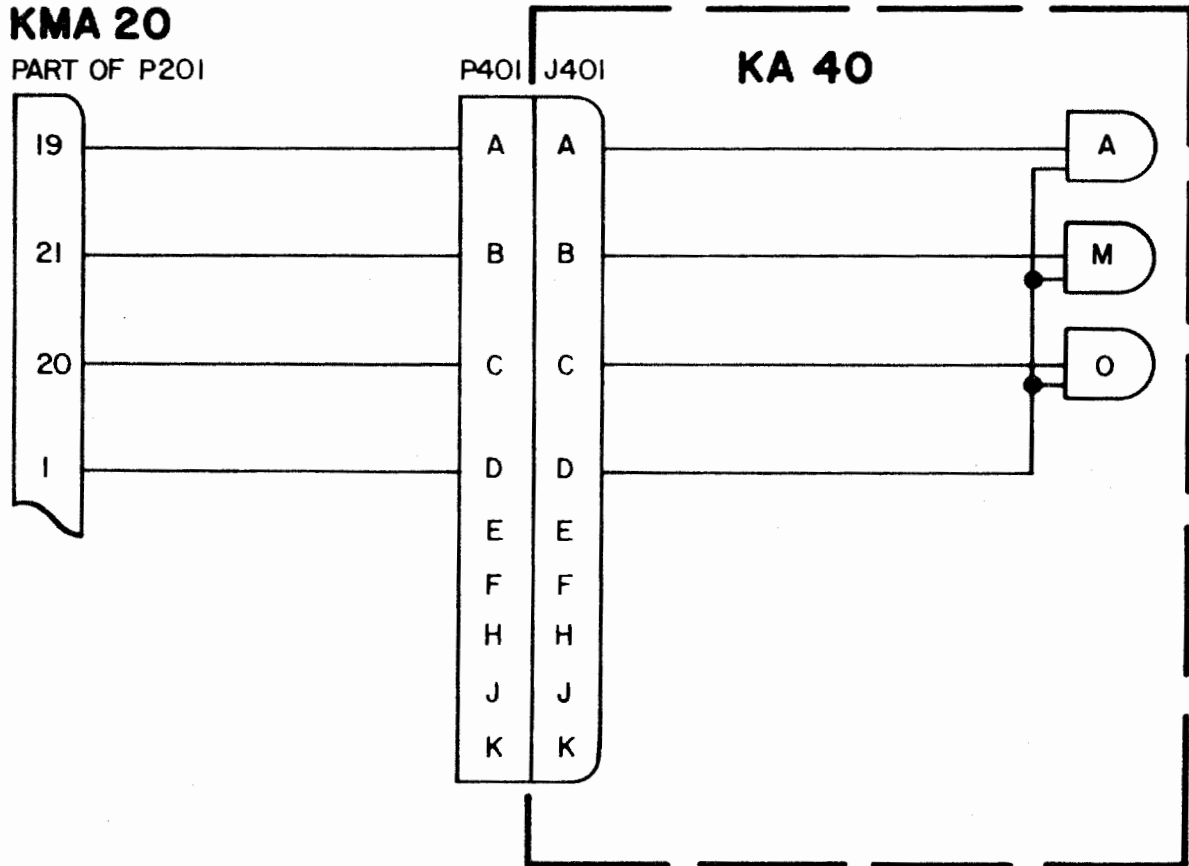


FIGURE 2-7 KA 40 INTERCONNECT DIAGRAM  
(DWG. NO. 696-1802-00)





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PIN	FUNCTION	VERSION
1	A/C Ground	-00 through -16
2	Inst. Light Ground	-00 through -16
3	Inst. Light Dimmer (13.75VDC)	-00 through -16
4	A/C Power	-00 through -16
5	Non-Switching 500 ohm Input	-00 through -16
6	Speaker Output (Comm 1)	-00 through -16
7	Speaker Output (Comm 2)	-00 through -16
8	Speaker Load Common (Comm 1 and 2)	-00 through -16
9	Ramp Hailer 8 ohm	-00 through -16
10	A/C Speaker 4 ohm	-00 through -16
11	Mic Audio In	-00 through -16
12	HF Mic Audio	-00 through -16
13	HF (Radio Tel) 500 ohm Input	No Conn. for versions -00, -03, -06, -08, -09, -13, -14, -15 and -16. HF Audio In for versions -01, -02, -04, -05, -07, -10, -11. Radio Tel Audio in for version -12
14	Comm 1 Audio	-00 through -16
15	Comm 2 Audio	-00 through -16
16	Nav 1 Audio	-00 through -16
17	Marker Ant	-00 through -16
18	Marker Ant. Ground	-00 through -16
19	Wht. Light Out	-00 through -15 Marker Beacon Rcvr Audio In for version -16 - Pin 19
20	Blue Light Out	-00 through -15 No conn. for version -16
21	Amber Light Out	-00 through -15 No conn. for version -16
22	4 ohm PA Speaker	-00 through -16
23	Mic Key In	-00 through -16
24	HF Mic Key	-00 through -16
25	Comm 1 Mic Key	-00 through -16
26	Comm 2 Mic Key	-00 through -16
27	Comm 1 Mic Audio	-00 through -16
28	Comm 2 Mic Audio	-00 through -16
29	Nav 2 Audio	-00 through -16
30	ADF Audio	-00 through -16
31	DME Audio	DME Audio for versions -00, -01, -03, -04, -06, -07, -12, -13, -15 and -16. ADF #2 Audio for versions -02, -05, -11 and -14.
32	Headphone Out	No conn. for versions -08, -09 and -10 -00 through -16

FIGURE 2-8 PIN FUNCTIONS FOR 066-1024-00 THRU -16

10  
11  
12  
13  
14

  
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**SECTION III**  
**OPERATION**

**3.1 MARKER BEACON (KMA 20 AND KR21)**

Marker beacon receivers are used to provide accurate fixes by informing the pilot of his passage over beacon stations located on airways and ILS approach courses. Three types of beacons are used. They are the inner marker, the outer marker and the middle marker.

The outer, middle and inner markers are used in conjunction with the radio instrument landing systems. The outer marker is normally positioned on the front localizer course near the point where the glideslope approach path intersects the minimum inbound altitude after the procedure turn. Distance from the airport will vary from 4 to 7 miles. Radio frequency from the marker is projected vertically in an elliptical cone shaped pattern. The marker signal is modulated at 400Hz and is keyed to emit dashes at a rate of two per second.

When passing the outer marker the blue light will flash "on/off" at a two per second rate and the pilot will hear a series of low tone dashes.

The middle marker is normally located on the front localizer course about 3200 feet from the approach end of the ILS runway. The radiated pattern is similar in shape and power to the outer marker. The middle marker signal is modulated with 1300Hz and the modulation is keyed to identify by alternate dots and dashes. When the KMA 20 (KR 21) equipped aircraft passes the middle marker the pilot hears a medium pitched tone in a series of dots and dashes and the amber light flashes synchronously with the tones.

The inner marker is located close to the end of the runway. The beacon transmitter and antenna are designed to project a cone shaped pattern of 75MHz energy, vertically. The radio frequency output of the transmitter is modulated with an audio tone of 3000Hz. An aircraft equipped with the KMA 20 (KR 21) will receive a 3000Hz tone in headphone or speaker and the white lamp will be lighted while over the station. The inner marker is used to indicate a point approximately 1500 ft. from the runway and if on proper glide path the altitude above the runway should be approximately 100 feet.

The marker beacon function in the KMA 20 provides the pilot with audio switching control and the Hi-Lo Switch in the KR 21 and KMA 20 provide sensitivity switching control. Many marker receivers provide only a "low sensitivity" position. The effect of the high sensitivity position is to greatly enlarge the size of the cone shaped "area of indication" above the station. An aircraft flying at high altitude or slightly off course may fail to receive the signal when in the low sensitivity position. It is suggested that the KMA 20





  
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marker sensitivity switch first be placed in high sensitivity position until aural and/or lamp indication is received. The control switch may be turned to low sensitivity to reduce the duration of the indication and to obtain a more accurate reading of passage since the signal appears to build and fade faster on low sensitivity. The marker audio may now be turned off to obtain the exact time of center passage from the light only, since the imminence of station passage has already been indicated. This suggestion is especially appropriate if he is involved in radio communication with approach control or tower at that moment.

The high sensitivity position may be used to effectively give the pilot an advance indication that he is approaching the outer marker. In order to expedite the ILS approach the pilot may wish to retain higher speed until he is nearby the outer marker inbound. With the KMA 20 (KR 21) marker in high sensitivity position the aural tone will begin about one mile from the outer marker. At this time, the pilot may switch the KMA 20 (KR 21) marker to low sensitivity and reduce engine power for final approach speed, also retrim and perform cockpit checks. He is then prepared to begin descent when the marker indicates actual passage over the outer marker and the glideslope is intercepted.

### 3.2 ISOLATION AMPLIFIER (KMA 20)

Both transmitting and audio distribution functions of the Silver Crown radio system are controlled at the front panel of the KMA 20. Basically the functional controls consist of a microphone selector switch and receiver audio selector switches.

The microphone selector switch performs two tasks. It routes microphone keying and audio information to the appropriate destination and secondly, it switches the output of the isolation amplifier to one of two speakers. In the COMM 1 or COMM 2 positions, microphone information is routed to the appropriate transmitter. In the HF position of the International model, this information is routed to the high frequency transmitter. Likewise, when the TEL. position is selected, the keying and mic audio is routed to KT 96 King phone in the -12 version. In these three positions the isolation amplifier output is fed to the cockpit speaker.

The EXT position on 00/07 provides the pilot with several capabilities depending on the option made at installation. In the EXT position, the output of the amplifier is normally connected to a "ramp hail" speaker or alternately to a passenger address system. Should one of the receivers be selected in this mode, the audio will be heard in the EXT speaker until the microphone is keyed. When the microphone is keyed, the receiver audio is muted and the microphone output is fed to the EXT speaker output.

The EXT position on 09/11 provides the pilot with a "ramp hail" function. And an added 4 ohm output is provided for use as a passenger address system.

A series of toggle switches control the audio inputs to the isolation amplifier. Each of these controls can be switched from the center off position to connect each receiver's audio to the input of the isolation amplifier which then routes the audio to the speaker output in the "up" position or to external headphones in the "down" position. In the PHONE position, receiver audio completely bypasses the amplifier and the KMA 20 performs only a bypass switching function. Since individual control of the receivers is provided, the pilot may listen to one receiver with the speaker while the co-pilot could monitor another receiver utilizing headphones. One non-switched audio input has been provided which can be used for audio signals that are not to be switched, as Radar Altimeter Audio and the ring signal from the King KT 96 King Phone.



**KING**  
**KMA 20/KR 21**  
**MARKER BEACON RECEIVER/  
 ISOLATION AMPLIFIER**

KN-70 LOAD JUMPER				
JUMPER PINS AS INDICATED FOR GIVEN NUMBER OF EXTERNAL LOADS				
EXTERNAL LOADS	GLIDESLOPE		VOR/LOC	
	DEV	FLAG	DEV	FLAG
ONE	M	F	K K	N N
	H	B	P P	T T
	C		U U	X X
TWO	M	NONE	K K	N N
	H		P P	T T
THREE	NONE		NONE	NONE

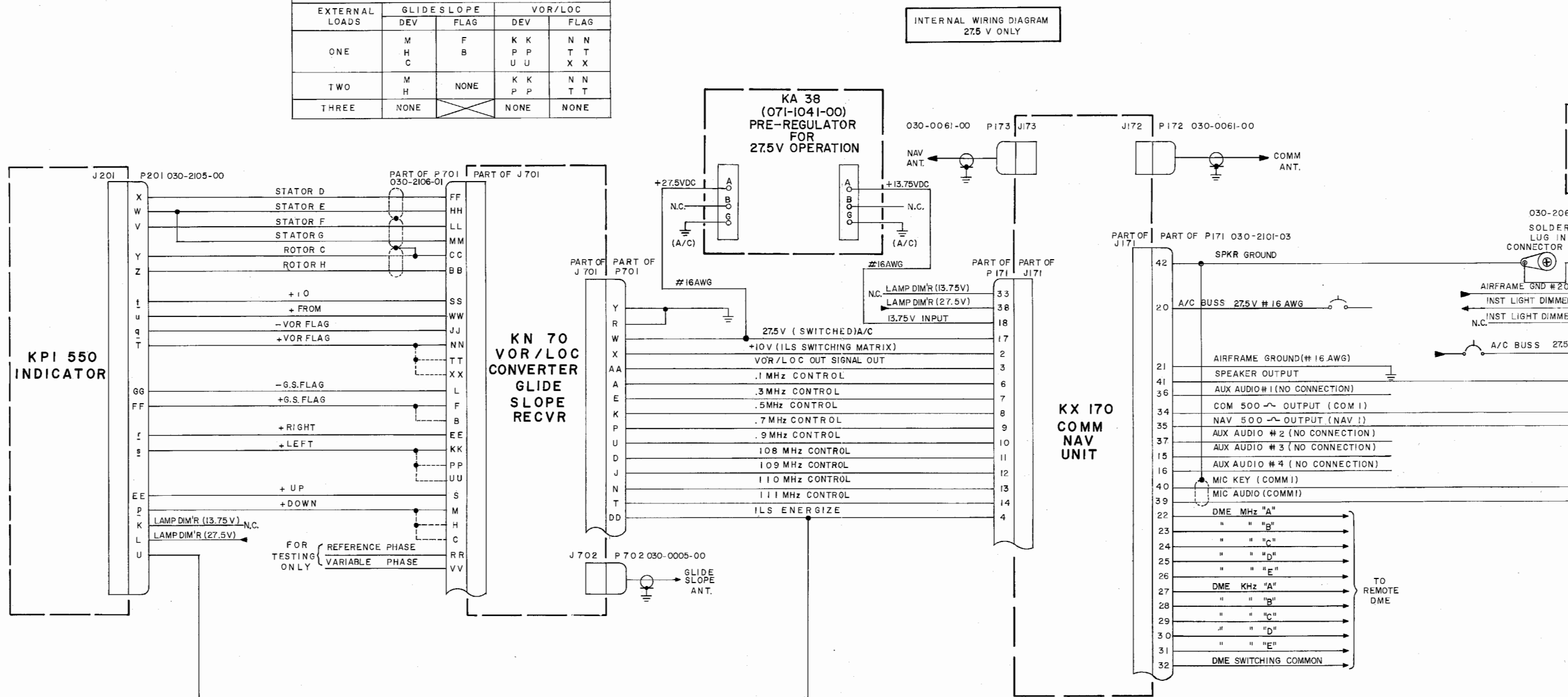
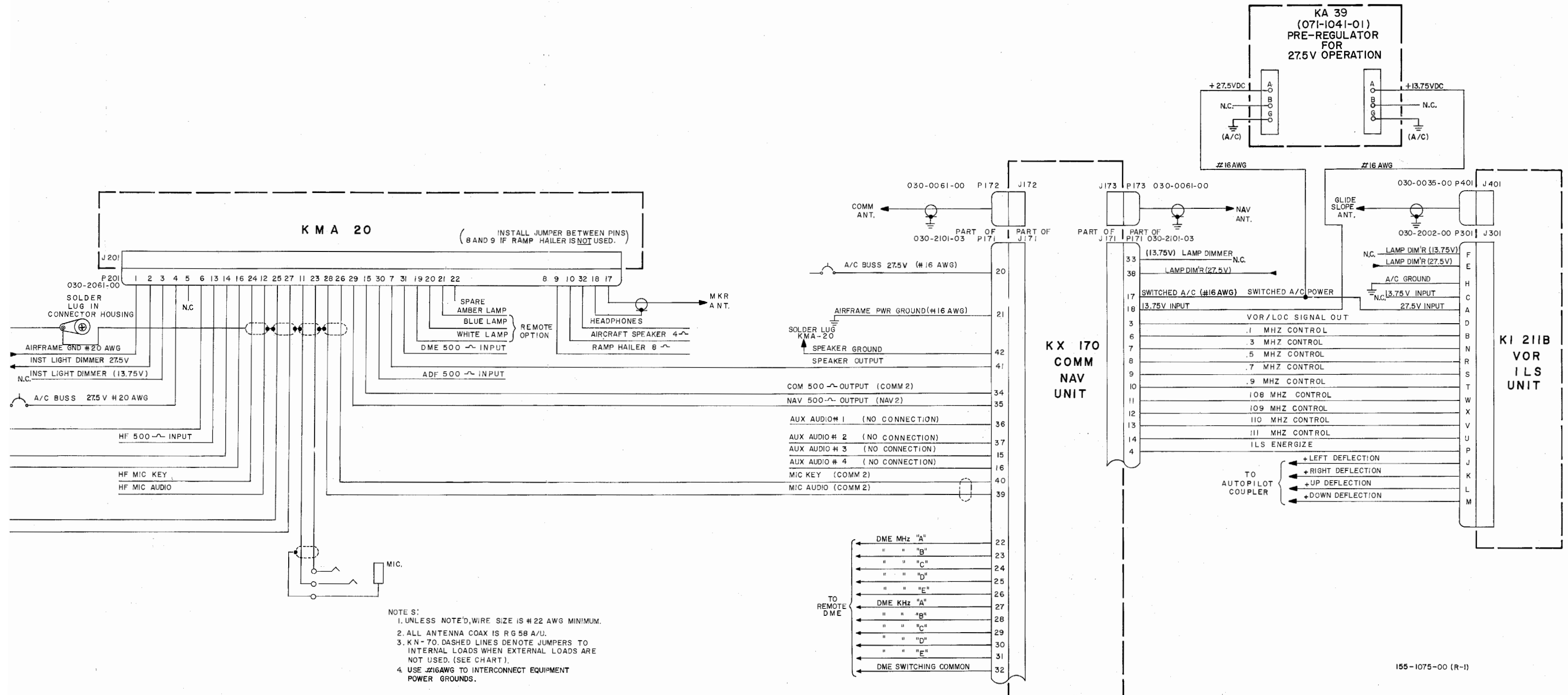


FIGURE 2-5 KMA 20 INTERCONNECT DIAGRAM (27.5V)  
 (DWG. NO. 155-1075-00)



**KING**  
 KMA 20/KR 21  
 MARKER BEACON/RECEIVER  
 ISOLATION AMPLIFIER

KN-70 LOAD JUMPER				
JUMPER PINS AS INDICATED FOR GIVEN NUMBER OF EXTERNAL LOADS				
EXTERNAL LOADS	GLIDE SLOPE		VOR/LOC	
	DEV	FLAG	DEV	FLAG
ONE	M	F	K K	N N
	H	B	P P	T T
	C		U U	X X
TWO	M	NONE	K K	N N
	H		P P	T T
THREE	NONE		NONE	NONE

INTERNAL WIRING DIAGRAM  
13.75 V ONLY

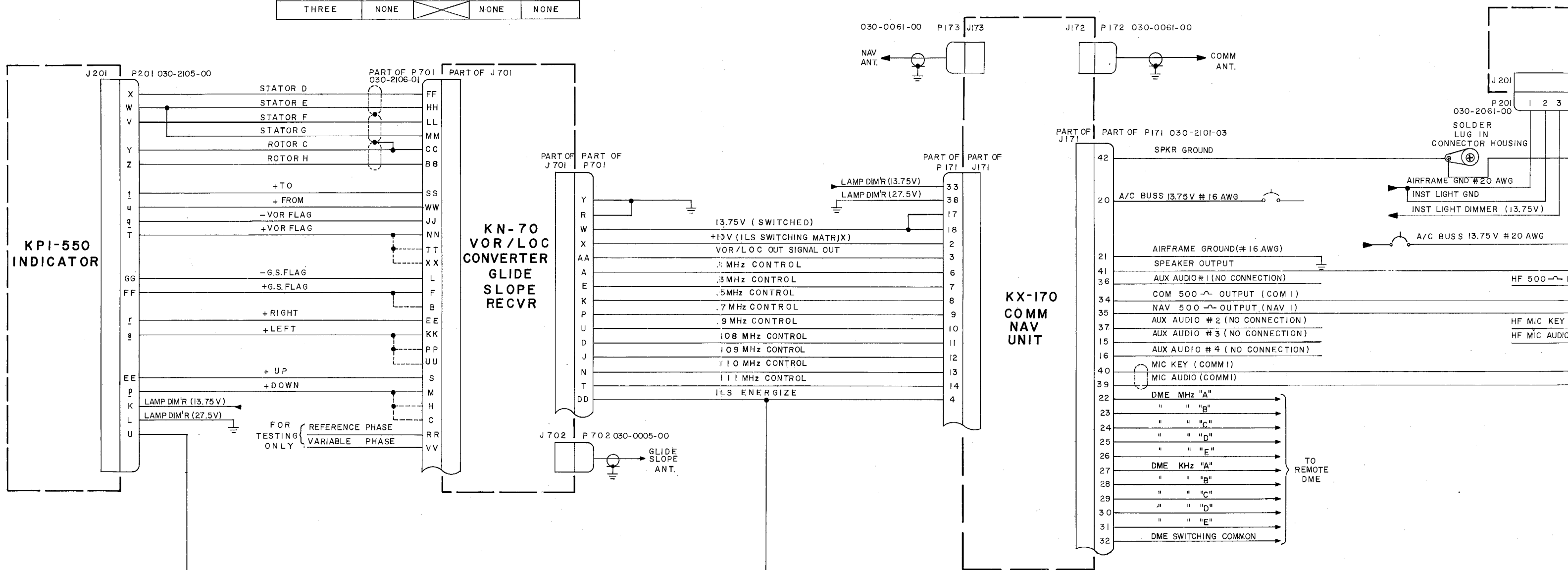
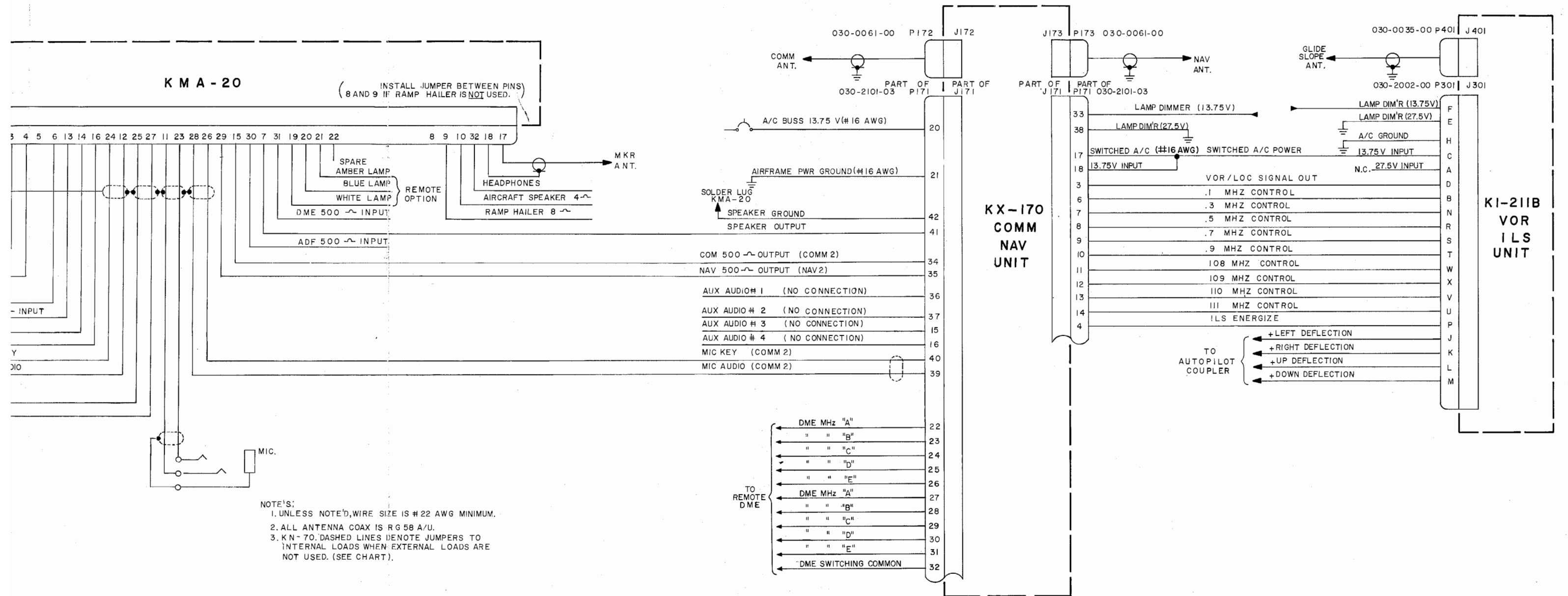


FIGURE 2-4 KMA 20 INTERCONNECT DIAGRAM (13.75V)  
 (DWG. NO. 155-1074-00)



NOTE'S:  
 1. UNLESS NOTE'D, WIRE SIZE IS #22 AWG MINIMUM.  
 2. ALL ANTENNA COAX IS RG 58 A/U.  
 3. KX-70 DASHED LINES DENOTE JUMPERS TO INTERNAL LOADS WHEN EXTERNAL LOADS ARE NOT USED. (SEE CHART).



KMA 20 VERSIONS 066-1024-07 THRU -11					
PIN	FUNCTION	-08	-09	-10	-11
1	A/C GND	SAME	SAME	SAME	SAME
2	INST. LIGHT GND	SAME	SAME	SAME	SAME
3	INST. LIGHT DIM'R., 13.75VDC	SAME	SAME	SAME	SAME
4	A/C PWR	SAME	SAME	SAME	SAME
5	No Conn.	SAME	SAME	SAME	SAME
6	COMM 1 SPKR	SAME	SAME	SAME	SAME
7	COMM 2 SPK	SAME	SAME	SAME	SAME
8	EXT. RAMP HAIL SPKR LD.	SAME	SAME	SAME	SAME
9	RAMP HAIL 8Ω	SAME	SAME	SAME	SAME
10	A/C SPKR 4Ω	SAME	SAME	SAME	SAME
11	MIC AUDIO IN	SAME	SAME	SAME	SAME
12	HF MIC AUDIO	SAME	SAME	SAME	SAME
13	HF AUDIO IN	NO CONN.	NO CONN.	HF AUDIO IN	HF AUDIO IN
14	COM 1 AUDIO	SAME	SAME	SAME	SAME
15	COM 2 AUDIO	SAME	SAME	SAME	SAME
16	NAV 1 AUDIO	SAME	SAME	SAME	SAME
17	MARKER ANT.	SAME	SAME	SAME	SAME
18	MARKER ANT. GND.	SAME	SAME	SAME	SAME
19	WHT LIGHT OUT	SAME	SAME	SAME	SAME
20	BLU LIGHT OUT	SAME	SAME	SAME	SAME
21	AMBER LIGHT OUT	SAME	SAME	SAME	SAME
22	PA 4Ω	SAME	SAME	SAME	SAME
23	MIC KEY IN	SAME	SAME	SAME	SAME
24	HF MIC KEY	SAME	SAME	SAME	SAME
25	COM 1 MIC KEY	SAME	SAME	SAME	SAME
26	COM 2 MIC KEY	SAME	SAME	SAME	SAME
27	COM 1 MIC AUDIO	SAME	SAME	SAME	SAME
28	COM 2 MIC AUDIO	SAME	SAME	SAME	SAME
29	NAV 2 AUDIO	SAME	SAME	SAME	SAME
30	ADF AUDIO	SAME	SAME	SAME	SAME
31	DME AUDIO	NO CONN.	NO CONN.	NO CONN.	ADF 2 AUDIO
32	HEADPHONE OUT	SAME	SAME	SAME	SAME

FIGURE 2-8B PIN FUNCTION FOR 066-1024-08 thru -11  
(DWG. NO. 696-1805-00)



KMA 20 VERSIONS 066-1024-00 THRU -07

PIN	FUNCTION	-00	-01	-02	-03	-04	-05	-06	-07
1	A/C GND' #20 AWG Connector ↗	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
2	INST. LIGHT GND	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
3	INST. LIGHT DIM'R. 13.75VDC	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
4	A/C PWR # plus 20	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
5	NO CONN.	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
6	COM 1 SPKR	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
7	COM 2 SPKR	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
8	EXT. RAMP HAIL SPKR LD. ↗	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
9	RAMP HAIL 8Ω ↗	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
10	A/C SPKR 4Ω	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
11	MIC AUDIO IN	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
12	<del>HF AUDIO IN</del>	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
13	* * * * *	NO CONN.	HF AUDIO IN	HF AUDIO IN	NO CONN.	HF AUDIO IN	HF AUDIO IN	NO CONN.	HF AUDIO IN
14	COM 1 <del>AUDIO</del> phones	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
15	COM 2 <del>AUDIO</del> phone?	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
16	NAV 1 <del>AUDIO</del> phone?	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
17	MARKER ANT.	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
18	MARKER ANT. GND.	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
19	<del>WHT LIGHT OUT</del>	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
20	<del>BLU LIGHT OUT</del>	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
21	<del>AMBER LIGHT OUT</del>	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
22	<del>PA 4Ω</del>	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
23	MIC KEY IN	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
24	<del>HF MIC KEY</del>	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
25	COM 1 MIC KEY	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
26	COM 2 MIC KEY	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
27	COM 1 MIC AUDIO	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
28	COM 2 MIC AUDIO	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
29	NAV 2 AUDIO	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
30	ADF AUDIO	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME
31	* * * * * DME Audio	DME AUDIO	DME AUDIO	ADF 2 AUDIO	DME AUDIO	DME AUDIO	ADF 2 AUDIO	DME AUDIO	DME AUDIO
32	HEADPHONE OUT	SAME	SAME	SAME	SAME	SAME	SAME	SAME	SAME

FIGURE 2-8A PIN FUNCTIONS FOR 066-1024-00 thru -07  
(DWG. NO. 696-1804-00)



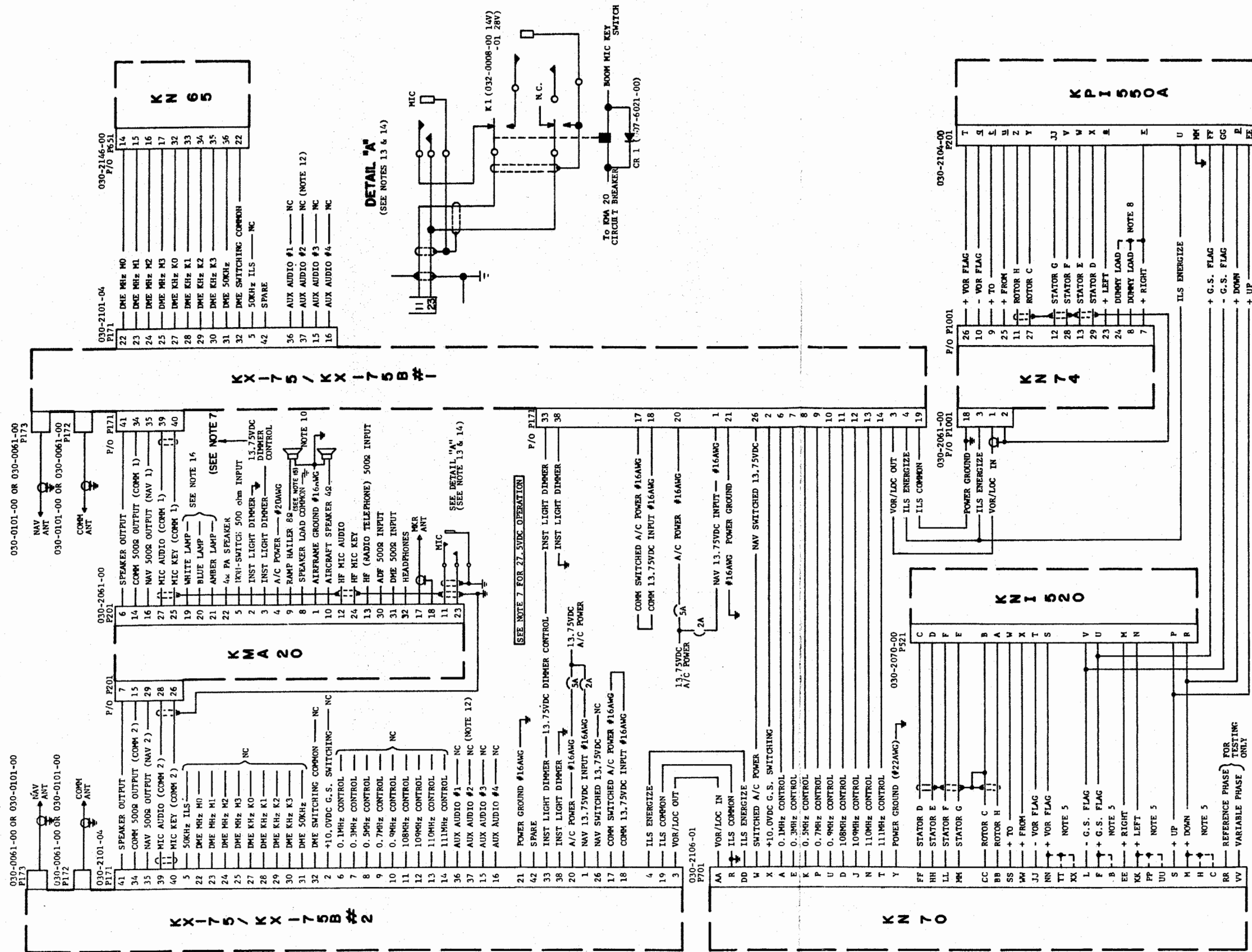


FIGURE 2-4 KMA 20 INTERCONNECT DIAGRAM  
(Dwg. No. 155-1088-00, R-8).

- NOTES:
- UNLESS NOTED, ALL WIRES #24GANG MINIMUM.
  - ALL ANTENNA COAX IS RG58A/U.
  - UNLESS OTHERWISE SPECIFIED, ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
  - THE KA27 MAY BE USED TO CONVERT KA175/KA175B DME SWITCHING OUTPUT TO CHANNEL 2 OUT OF SCOPE DME'S.
  - KN70 JUMPER PINS AS INDICATED FOR REQUIRED NUMBER OF EXTERNAL LOADS.
- | EXTERNAL LOADS | GLIDESLOPE |      | VOR/LOC |      |
|----------------|------------|------|---------|------|
|                | DEV        | FLAG | DEV     | FLAG |
| ONE            | H          | F    | KK      | NN   |
|                | H          | B    | PP      | TT   |
|                | C          |      | UU      | XX   |
| TWO            | H          | NONE | KK      | NN   |
|                | H          |      | PP      | TT   |
| THREE          | NONE       |      | NONE    | NONE |
- POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
  - RAMP HAILER AND AIRCRAFT SPEAKER RETURN LEADS SHOULD BE CONNECTED TO PIN 1 AT KA20. RAMP HAILER OUTPUT (PINS 9) TO BE TERMINATED WITH 7.5Ω 5 WATT LOAD. RESISTOR WHEN RAMP HAILER IS NOT USED.
  - EXTERNAL SWITCHING CAPABILITY: COMM - PIN 17 - NONE  
NAV - PIN 26 - 300MA
  - AUXILIARY AUDIO #2 IS INTERCOM MIC INPUT ON KA175B.
  - OPTIONAL INTERCONNECT FOR BOOM MIC 0' HEADSET INSTALLATION.
  - IF STANDARD 3-WIRE MICROPHONE PLUG IS USED, THE FRAME SHOULD BE INSULATED BY WASHERS TO AVOID INTRODUCING NOISE INTO MIKE AUDIO.
  - KEEP GROUND SEPARATE FROM KMA 20 GROUND.
7. 27.5VDC OPERATION  
KA175/KA 175B  
P/O P171
- |    |   |
|----|---|
| 33 | INST LIGHT DIMMER - NC  |
| 38 | INST LIGHT DIMMER - 27.5VDC DIMMER CONTROL                          |
| 20 | A/C POWER #16ANG  |
| 17 | COMM SWITCHED A/C POWER #16ANG                                      |
| 18 | COMM 13.75VDC INPUT #16ANG (1.5A CONTINUOUS) (5.0A 20% DUTY FACTOR) |
| 1  | NAV 13.75VDC INPUT #16ANG (0.75A CONTINUOUS)                        |
8. KN74 - FOR ONE INDICATOR JUMPER PINS 7, 8, AND 24.  
FOR THREE INDICATORS NO JUMPER REQUIRED.  
FOR KMS DME INDICATOR (K1265) NOT SHOWN.
9. REMOTE OPTION FOR VERSIONS -00/-15 (MARKER LIGHT OUTPUT) FOR -16 VERSION THE LAMP OUTPUTS BECOME:  
PIN 21 Has no connection  
PIN 22 Has no connection  
PIN 19 MARKER RADIO 5008 INPUT
- KA20  
P/O P201
- |   |  |
|---|--|
| 2 | INST LIGHT DIMMER - 27.5VDC DIMMER CONTROL |
| 3 | INST LIGHT DIMMER - NC                     |