

COMMUNICATION

1. **INTRODUCTION TO COMMUNICATION:** Communication is a process of transmission of information from source to destination or from transmitter to receiver. Communication exists everywhere.

Voice fre: 300HZ-3.5KHZ

Audio fre: 20HZ- 20KHZ

Vedio fre: 0- 4.5MHZ

Source transducer converts physical signal to electrical signal, Channel is the medium through which signal is propagated, receiver transducer converts electrical signal into physical signal.

2. **HELICOPTER 1000 HRS /1200 HRS INSPECTION PROCEDURE : RADIO**

- a. **Acceptance flt:** all radio equipment ops check is to be done both on ground and in flt before accept the helicopter
- b. **Equipment removal and inspection :** after preservation run of helicopter . all radio equipment and components are to be removed from helicopter
- c. **Demand and procurement of item:** After inspection ,necessary equipment and spares are to be demanded according to supply procedure and received the same from supply after procurement.
- d. **Consultation of manual :** necessary maintenance manuals are to be consulted before starting the job
- e. **Repair / calibration :** all necessary calibration repair and performance check of radio equipment are to be carried out in radio workshop in according to maintenance manual
- f. **Installation :** all the radio equipment is to be installed in helicopter and quality check is to be carried out. Necessary modification and new items are to be installed as per Radio Engg task of air HQ
- g. **MODIFICATION :** Modification , if any, is to done as per leaflet no AFO 66-12
- h. **QUALITY:** Quality checks are to be carried out by designated quality control inspector authorized by air hq in every steps of work.
- j. **Power on:** after installation of all equipment safety and security of the components are to be ensured. There after power on checks are to be carried out.
- k **Ground run and test flight /fcf:** during G/R and test flt, necessary adjustment / rectification are to be carried out and helicopter is be prepared for final FCF. During FCF all communication navigation and other radio equipment are to corrected / adjust with different ground base station and air field
- l. **Documentation :** documentation of removal repair installation and fault rectification of all works are to be completed ad per existing procedure

3. There are radio avionics equipment's which are used in Bell-212 and 206 helicopter.

01	INTERCOM SYS : A-301-6W	
02	VHF R/T : KTR-908	
03	HF R/T: ASB-850	
04	HF R/T : KHF-950	
05	ADF RXR : KDF-8000	
06	ADF RXR : KDF-806	
07	VOR/NAV RXR : KNR-634	
08	TRANSPONDER : KXP-756	
09	DME : KDM-706	
10	VHF HOMMER : ZG-2	
11	ELT POITER : P-3000	
12	ELT ARTEX 406	
13	RADAR ALTIMETER : KRA-405	
14	WEATHER RADAR : PRIMUS-700	
15	WEATHER RADAR : RDR-2000	
16	GPS : 165 TSO	

4. There are two types of radio avionics equipment's which are used in Bell-212 and 206 helicopter. Such as:

a. **Communication equipment's:**

- (1) Intercom system A301-6W
- (2) VHF RT KTR-908
- (3) HF RT ASB-850.
- (3) KHF-950

b. **Navigation equipment's:**

- (1) ADF RXR KDF-8000
- (2) ADF RR KDF-806
- (3) VOR RXR KNR -634.
- (4) NAV RXR NR2030B
- (5) NAV RXR NR 3320 – (01)/-(02)
- (6) DME KDM -706
- (7) TRANSPONDER KXP-756
- (8) GPS 165 TSO
- (9) WX RADAR PRIMUS- 700.
- (10) WX RADAR RDR -2000
- (11) VHF HOMER ZG-2
- (12) VHF HOMER ZVG-2002
- (13) VHF HOMER CHELTON-2000
- (14) ELT P-3000/10,
- (15) ARTEX-406
- (16) RADAR ALT KRA-405

INTERCOMMUNICATION SYSTEM

1. **INTRODUCTION:** The comm. Control is a panel mounted assembly. All operating controls are mounted on the front panel. The operating controls consist of ten receiver ON-OFF toggle switches; a seven position rotary selector switch and a VOL control.

2. **PURPOSE:** The comm. Control provides an intercommunication capability between two or more crewmembers. All audio communication system control by this Control unit.

a. The ICS consists of audio control unit, headset/microphone, microphone foot switch, microphone cyclic stick switch and impedance pad network assembly.

3. **FUNCTIONAL TEST**

a. Apply electrical power to helicopter electrical system.

b. Warm up equipment for 3 minutes with initial setting of controls and switches at each interphone station as follows:

4. **NOTE:** Complete provisions are installed to accept cabin intercommunication kit consisting of two audio control units, two RHM-157(45) headset/microphones and two hot mike switches available for installation to provide crew/passenger ICS capabilities per Kit S.I. 212-10 Avionics 2 Station ICS Kit. Control Setting Volume Control Mid position Mixing Switches All down Rotary Selector Switch Position 1

a. Switch functions.

b. The audio control unit (figure 97-4) provides four modes of operation: two-way radio communication; receiver monitoring/intercommunication between pilot, copilot, two cabin stations, and hot-mike operation in the PVT position.

c. The audio control units are powered by 28 volt do essential bus and protected by circuit breakers INTER COM PILOT, INTER COM COPLT, and INTERCOM CABIN. All receivers, as applicable, can be monitored, receiver audio signals selected separately and audio level controlled at each audio control unit. All receiver outputs are connected through impedance pad network assembly to receiver selector switches in audio control unit panels (figure 97-5).

d. Radio transmissions can be controlled from each audio control unit panel by selecting desired transmitter. Normal microphone keying is accomplished by cyclic stick switches, foot switches, and cabin hot mike switches, when installed.

(1) The rotary selector switch (figure 97-4) has six positions which are connected at each intercom station as follows:

5. **TECHNICAL DATA :**

Power supply :21.5 to 30 VDC
Microphone : 5 OHM Dynamic
 : 100 OHM Carbon
HEADSET : 8 OHM
 : 600 OHM
Weight : 1.75 lbs.



MCU A301-6W

VHF-R/T KTR-908

1. **INTRODUCTION:** VHF R/T KTR-908 is a transceiver .It is a communication equipment of Bandix King USA. It is used to provide two way voice communications.
2. **PURPOSE:** KTR-908 VHF R/T is used in Bell hell to carry out two way voice communications between air to air and air to ground. It is short range communication equipment within the frequency range of 118.00 to 135.975 Mhz.
3. **CONSISTING UNIT:**
 - (a) Transceiver KTR-908
 - (b) Control Unit KFS-598/598A
 - (c) Antenna VF-210-10.
4. **LOCATION:**
 - a. VHF R/T KTR-908 is located in the nose panel.
 - b. Control unit KFS-598/598A is located in the center pedestal.
 - c. No: 1 VHF antenna is located upper fuselage .and No: 2 antenna located lower fuselage.
 - d. VHF RT KTR-908b. Control unit KFS-598A. c. No: 1, VHF antenna No: 2 antenna.





5. **TECHNICAL DATA:**

- a. The frequency range : 118.00 to 135.975 Mhz
- b. Power supply: 27.5 volt DC.
- c. Number of channel: 720.
- d. Channel spacing: 25 Khz.
- e. Altitude: 55000 Ft.
- f. Txr O/P: not less than 20 watts not more than 26 watts.
- g. Duty cycle : 1:4 (1 min transmit - 4 min receive)
- h. Audio output no less than 100 mw into 500 ohm .
- j. Sensitivity: 2 micro volt for no less than 6db signal plus noise.
- k. Selectivity : 6db bandwidth

HF R/T: ASB-850

1. **INTRODUCTION:** HF R/T: ASB-850 is a high quality single sideband transceiver .It is a communication equipment of Bandix King USA. It is used to provide two way worldwide voice communications.
2. **PURPOSE:** HF R/T: ASB-850 is used in Bell H/C to carry out two way worldwide voice communications. It is long range communications equipment within the frequency range of 02 to 29.9999 Mhz.
3. **CONSISTING UNIT:** HF R/T: ASB-850 consist in four sub units. They are
 - (a)Receiver Exciter (RE-800)
 - (b)Amplifier/Coupler (ACU-810)
 - (c) Remote Control Head (SCU-80)
 - (d) Antenna.
4. **LOCATION:**
 - a. Receiver Exciter and Amplifier Coupler are located in the left console.
 - b. Control unit SCU-80 is located in the center pedestal.
 - c. Antenna is located with the tail boom.



HF RT ASB-850



HF ANTENNA



CONTROL UNIT SCU-80

5. **TECHNICAL DATA:**

- a. The frequency range: 02 to 29.9999 Mhz
- b. Power supply: 27.5 volt DC.
- c. Number of channel: 280000
- d. Channel spacing: 100 Hz.
- f. Altitude: 30000 Ft.
- g. Power O/P:
 - (1) SSB: 100 watts PEP \pm 1db.
 - (2) AM: 40 watts carrier, nominal.
- h. Duty cycle: V0ice, Continuous.
- j. Audio output: 50 mw into 600 ohms and 150 ohms, unbalanced.
- k. Sensitivity:
 - (1) SSB: 0.5 micro volt max into 50ohms for 10db.
 - (2) AM: 3.0 micro volt max into 50ohms for 10db.
- l. Tuning Time: 3 seconds typical, 30 seconds maximum.
- m. Mode of ops: USB, LSB, AM.

HF R/T: KHF-950

1. **INTRODUCTION:** HF R/TKHF-950 is a solid-state transceiver. It is a communication equipment of Bandix King USA. It is used to provide two way worldwide voice communications.
2. **PURPOSE:** HF R/T: KHF-950 is used in Bell H/C to carry out two way worldwide voice communications. It is long range communications equipment within the frequency range of 02 to 29.9999 Mhz.
3. **CONSISTING UNIT:** HF R/T: ASB-850 consist in four sub units. They are
 - a. Receiver Exciter (KTR-953)
 - b. Amplifier/Coupler (KAC-952)
 - c. Control unit (KCU-951)
 - d. Antenna.
4. **LOCATION:**
 - a. Receiver Exciter and Amplifier Coupler are located in the left console.
 - b. Control unit is located in the center pedestal.
 - c. Antenna is located with the tail boom.



HF RT KHF -950 (RECEIVER EXITER , AMP COUPLER AND CONTROL UNIT)



HF ANTENNA

5. **TECHNICAL DATA:**

- a. The frequency range: 02 to 29.9999 Mhz
- b. Power supply: 27.5 volt DC.
- c. Number of channel: 280000
- d. Channel spacing: 100 Hz.
- e. Altitude: 55000 Ft.
- f. Power O/P:
 - (1) SSB: 150 watts PEP.
 - (2) AM: 37.5 watts carrier.
- g. Power capability: 150 watts PEP.
- h. Audio output: 50 mw into 600 ohms and 150 ohms, unbalanced.
- j. Sensitivity:
 - (1) SSB: Not more than 1 micro volt for 10db.
 - (2) AM: Not more than 3.0 micro volts for 6db.
- k. Tuning Time: 3 seconds nominal.
- l. Mode of ops: USB , AM.

ADF RECEIVER : KDF-8000

1. **INTRODUCTION:** ADF stands for Automatic Direction Finder. It is a receiver of bendix king USA. It is navigational equipment. It gives aural and bearing information.
2. **PURPOSE:** The purpose of using ADF receiver KDF -8000 is to guide the pilot by providing the aural and bearing information to station within the frequency range of 190 to 1749 Khz.
3. **CONSISTING UNIT:**ADF receiver KDF -8000 consists in four sub units. They are
 - (a) ADF Receiver KDF -8000
 - (b) Control unit G-5235
 - (c) Sense Antenna
 - (d) Loop Antenna KA-36.
 - (e) Indicator (HIS and RMI)
4. **LOCATION:**
 - a. ADF receiver KDF -8000 is located in the nose panel.
 - b. Control unit G-5235 is located in the center pedestal
 - c. Sense antenna is located under fuselage.
 - d. Loop antenna is located under tail boom.



a. ADF RXR



b. Control Unit



c. Sense ant



d. Loop ant



Indicator HIS

5. **TECHNICAL DATA:**

- (i) The frequency range: 190 to 1749 Khz
- (ii) Power supply: 27.5 volt DC for equipment and 26 volt 400 Hz AC for Loop Antenna.
- (iii) Preset channel: 2
- (iv) Channel spacing: 1 KHz.
- (v) Altitude: 30000 Ft.
- (vi) Audio output: 100 mw maximum into 600 ohms load.
- (vii) Bearing Accuracy: $\pm 2^\circ$
- (viii) Receiver Sensitivity: 50 micro volt for 6db.
- (ix) Receiver Selectivity: 3dbband width: 2.5 KHz minimum
80db band width: 13 KHz maximum

ADF RECEIVER : KDF-806

1. **INTRODUCTION:** ADF stands for Automatic Direction Finder. It is a receiver of bendix king USA. It is navigational equipment. It gives aural and bearing information. It is digital equipment.
2. **PURPOSE:** The purpose of using ADF receiver KDF -806 is to guide the pilot by providing the aural and bearing information to station within the frequency range of 190 to 1799 Khz.
3. **CONSISTING UNIT:** ADF receiver KDF -806 consists in three sub units. They are
 - (a) ADF Receiver KDF -806
 - (b) Control unit KFS-586 /586A
 - (c) Antenna KA-44B.
 - (d) Indicator (HIS AND RMI)
4. **LOCATION:**
 - a. ADF receiver KDF -806is located in the nose panel.
 - b. Control unit KFS-586/586A is located in the center pedestal.
 - c. Antenna KA-44B is located under the fuselage lower
 - d. Indicator HIS is located instrument panel



ADF Receiver KDF -806 and
Control unit KFS-586 /586A



ADF Receiver KDF -806



Indicator HSI

5. **TECHNICAL DATA:**

- (i) The frequency range: 190 to 1799 Khz
- (ii) Power supply: 27.5 volt DC for equipment and 26 volt 400 Hz AC for Antenna.
- (iii) Preset channel: 2
- (iv) Channel spacing: 1 KHz.
- (v) Altitude: 70000 Ft.
- (vi) Audio output: 100 mw into 500 ohms load.
- (vii) Bearing Accuracy: $\pm 3^\circ$
- (viii) Receiver Sensitivity:
 - ADF mode 150 micro volts maximum for 6db.
 - Antenna mode 70 micro volts maximum for 6db.
- (ix) Receiver Selectivity:
 - 3db band width: ± 1.5 KHz minimum.
 - 6db band width: ± 2 KHz maximum
 - 80db band width: ± 7 KHz maximum

NAV RECEIVER : KNR-634/634A

1. **INTRODUCTION:** KNR 634/634A is navigational equipment. It is a receiver of bendix king USA. It gives aural and bearing information. It is digital equipment. It has an option of ILS system.
2. **PURPOSE:** The basic purpose of using NAV receiver KNR– 634/634A is to determine an A/Cs position with the reference of VOR ground station and also to follow a certain path towards or away from the station.
3. **CONSISTING UNIT:** NAV receiver KNR– 634 / 634A consists in four sub units. They are
 - a. NAV Receiver KNR-634/634A
 - b. Control unit KFS-564 /564A
 - c. Antenna
 - d. Navigation indicator (CDI)
4. **LOCATION:**
 - a. NAV receiver KNR-634/634A is located in the nose panel.
 - b. Control unit KFS-564/564A is located in the center pedestal.
 - c. Antenna is located both side of the tail boom
 - d. Navigation indicator is located instrument panel.



NAV Receiver KNR-634/634A AND
Control unit KFS-564 /564A



Antenna KA -60



Navigation indicator (CDI)

5. **TECHNICAL DATA:**

VOR/LOC

- a. The frequency range: 108 to 117.95 Mhz
- b. Power supply: 27.5 volt DC and 26 volt 400 Hz AC.
- c. Total no of channel: 200
- d. Channel spacing: 50 KHz.
- e. Altitude: 55000 Ft.
- f. Bearing Accuracy:
 - (1) KNR 634: Less than 0.5° (1° max).
 - (2) KNR-634A: Less than 0.2° (0.45° max)
- g. Audio output: 100 mw into 500 ohms load
- h. Sensitivity: 2 micro volts for 6db.
- i. Receiver Selectivity:
 - 1) 6db band width: 34.8 KHz minimum
 - 2) 80db band width: 84.0 KHz maximum

GLIDESLOPE

- a. The frequency range: 329.15 to 335.00 Mhz
- b. Accuracy: $\text{NMT} \pm 10 \mu\text{A}$.
- c. Sensitivity: Less than $10 \mu\text{V}$ typical .Not more than $15 \mu\text{V}$ for 60% of standard deflection.
- d. Selectivity:
 - 1) 6db band width: $\text{NLT} \pm 25 \text{ KHz}$
 - 2) 80db band width: $\text{NLT} \pm 125 \text{ KHz}$

MARKER BEACON

1. **Purpose:** marker beacon is an navigation equipment . it is provides to pilot audio tone and visual indication with the frequency range 75 MHZ. There are three marker beacon that is outer marker , middle marker and inner marker. Outer marker distance from the run way 4 to 7 mile and modulated frequency 400 HZ . it gives blue color indication. Middle marker distance from the run way 3200 ft and modulated frequency 1300 HZ . it gives amber color indication. Inner marker distance from the run way 1500 ft and modulated frequency 3000 HZ. It gives white color indication.

2. **Consisting unit :**

- a. Indicator
- b. Antenna

3. **LOCATION :**

- a. Marker beacon transmitters are located ground station
- b. Antenna is located under the belly of the hell
- c. Indicator is located instrument panel.



Marker beacon antenna



marker beacon indicator

4. **TECHNICAL DATA:**

- (i) The frequency range: 75Mhz
- (ii) Audio output: 50 mw into 500 ohms load
- (iii) Sensitivity: 200 μ V in high sense mode and 1000 μ V in Lo sense mode.
- (iv) Selectivity:

6db band width: NLT \pm 10KHz

40db band width: NLT \pm 200 KHz

ATC TRANSPONDER: KXP-756

1. **INTRODUCTION:** The king KXP 756 is an Air Traffic Control (ATC) Transponder designed for use with Air Traffic Control Radar Beacon System.
2. **PURPOSE:** The purpose of using ATC Transponder KXP-756 is to provide facilities to the A/Cs pilot to identify the A/C by code number either it is friend or foe A/Cs. It also determine the altitude of the A/C at which it is operating.
3. **CONSISTING UNIT:** ATC Transponder KXP -756 consists in four sub units. They are
 - (a) ATC Transponder KXP -756
 - (b) Control unit KFS-576 /576A
 - (c) Antenna KA-60.
 - (d) Altitude Encoder
4. **LOCATION:** ATC Transponder KXP -756 and Altitude Encoder are located in the nose panel, control unit KFS-576/576A is located in the center pedestal, and Antenna KA-60 is located under the fuselage lower.



ATC Transponder KXP -756 and
Control unit KFS-576 /576A.



ANTENNA KA-60



Altitude Encoder

5. **TECHNICAL DATA:**

- (i) The frequency range:
 - a. Transmitter: 1090 ± 3 Mhz.
 - b. Receiver: 1030Mhz
- (ii) Power supply: 11 to 33 volt DC
- (iii) Transmitter output: 250 watts.
- (iv) Altitude: 70000 Ft.
- (v) Total no of channel: 252
- (vi) Mode of ops: ABC

6. **PRINCIPAL:** KXP -756 works on Secondary Radar principal.

DISTANCE MEASURING EQUIPMENT KDM-706/706A

1. **INTRODUCTION:** DME is an navigational equipment .It Works on secondary radar principal. It can measure the distance from the A/C to the ground station by determining the amount of time.
2. **PURPOSE:** The purpose of using DME KDM-706/706A is to provide distance, time and speed information facilities to the A/Cs pilot to station. The DME system also provides an audio capability allowing the pilot to identity the DME ground station by listening to the CW tones transmitted by the ground station at 30 second interval. Measuring rang of speed (0-999) K Not, distance (0-389) NM and time (0-99)Minutes.
3. **CONSISTING UNIT:** DME KDM-706/706A consists in three sub units. They are
 - (a) DME: KDM-706
 - (b) Indicator: KDI-572
 - (c) Antenna KA-60.
4. **LOCATION:** DME KDM-706/706A located in the nose panel indicator KDI 572 located in the instrument front panel and Antenna KA-60 is located under the fuselage lower.



DME KDM-706



DME INDICATOR

EMERGENCY LOCATOR TRANSMITTER (ELT)

1. **INTRODUCTION:** The POINTER ELT 3000 is a self-contained emergency locator transmitter capable of manual or automatic operation. The highest quality materials and components have been selected for manufacturing to ensure regged, reliable emergency equipment.
2. **PURPOSE:** The purpose of using the pointer 3000 an A/C lands hard or falls to an accident, crash environmental condition the ELT operates automatically transmits distress frequency so that the S/R A/R can find out the distress spot by receiving the distress signal
3. **CONSISTING UNIT:**POINTER 3000consists in two sub units. They are
 - (a) ELT pointer 3000
 - (b) Antenna : Telescopic ant and whip ant
4. **LOCATION:**
 - a. ELT located at the left side of overhead console
 - b. Telecopy antenna is located on the upper position of overhead console.
 - c. Whippier antenna attached with the body of set.



a. ELT (P-3000)

b. Antenna

5. **TECHNICAL DATA:**

- (i) The frequency range:
 - a. Spot freq:1 21.5 Mhz.
 - b. 243.5Mhz
- (ii) Power supply: 0 to 10 volt DC
- (iii) Power output: 125 m watts.
- (iv) Opereting pressure: 50gm
- (v) ELT sw must be kept in AUTO position during flying.

EMERGENCY LOCATOR TRANSMITTER(ELT)

1. **INTRODUCTION:** The ARTEX 406 is a self-contained emergency locator transmitter capable of manual or automatic operation. The highest quality materials and components have been selected for manufacturing to ensure rugged, reliable emergency equipment.
2. **PURPOSE:** The purpose of using the ARTEX 406 an A/C lands hard or falls to an accident, crash environmental condition the ELT operates automatically transmits a distress frequency so that the S/R A/R can find out the distress spot by receiving the distress signal
3. **CONSISTING UNIT :** ARTEX 406 consists in three sub units. They are
 - (a) ARTEX 406
 - (b) Antenna :Rod ant and whip ant
 - (C) Remote switch
4. **LOCATION:** ELT located at the AFI section .
5. **TECHNICAL DATA:**
 - (i) The frequency range:
 - a. Spot freq: 121.5 Mhz.
 - b. 243Mhz
 - c. 406.028Mh
 - (ii) Power supply28VDC
 - (iii) Power output: 200 m watts.
 - (iv) Opereting pressure: 50gm
 - (v) ELT sw must be kept in ARM/OFF position during fling.

VHF HOMER CHELTON 2000

1. **INTRODUCTION:** VHF HOMER CHELTON 2000 itself is a control unit .
2. **PURPOSE:** The purpose of using the Homer CHELTON 2000 provide the facilities to home the A/C to the station on receiving the CW tone or AM signal transmitted on the frequencies for which the equipment's adjusted
3. **CONSISTING UNIT** VHF HOMER CHELTON 2000 consists in two units. They are
 - (a) VHF HOMER ZG-2
 - (b) Antenna
4. **LOCATION:**
 - a. VHF HOMER CHELTON 2000 located in the instrument panel.
 - b. ANTENNA



VHF HOMMER ANTENNA

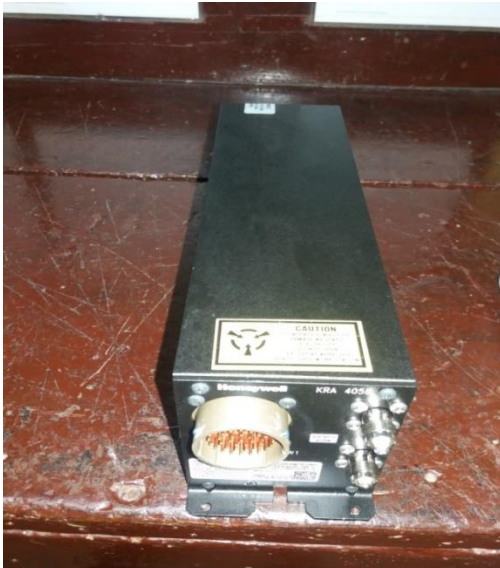


VHF HOMMER CHELTON 2000

5. **TECHNICAL DATA:**
 - (i) The frequency range:
 - a. Spot freq: $1\ 21.5 \pm 2.5$ Mhz.
 - b. &243Mhz
 - (ii) Power supply : 28VDC
 - (iii) Altitude: 1 to 30000 Ft.
 - (iv) Audio output: 200mw
 - (iv) Total no channel: 2.
 - vi) Sensitivity: 1mv

RADAR ALTIMETER(KAR-405)

1. **INTRODUCTION:** Radar altimeter is used in Bell- 212 helicopter .it is bendix king of USA. It can measure the absolute height.
2. **PURPOSE :** The radar altimeter KRA-405 system provides the pilot with dependable, accurate AGL altitude information during the critical approach phase of a flight. The system has the capability of alerting the pilot when a predetermined altitude (decision height) is reached. The system also provides altitude information to the flight control system during the approach.
3. **Consisting unit :**
 - a. TxR /RxR KRA-405
 - b. Indicator
 - c. Antenna
4. **Location:**
 - a. Radar altimeter (KRA-405) in the left console
 - b. Indicator in the instrument panel (right side)
 - c. Antenna is located under tail boom.



TxR /RxR KRA-405



Indicator



Radar altimeter antenna



Radar altimeter antenna

5. **Note** One is Receiver another is Transmitter

6. **TECHNICAL DATA :**

- i. Center frequency : 4300 +- 15 MHZ
- ii. Altitude range : 55,000 ft
- iii. Power supply : 27.5 vdc +- 20%
- iv. Altitude range tracked : - 20 to 2500 ft
- v. Decision height alt ran.: 0 to 2000 ft
- vi. Accuracy : +- 5 ft
- vii. Normal operation : flag hidden from view.
- viii. Over altitude : needle hidden from view.

WEATHER RADAR PRIMUS- 700

1. **INTRODUCTION:** weather radar primus 700 is an navigational equipment .it is used in bell -212 helicopter .it works echo principal.

2. **PURPOSE :** the primus 700 system provides ground / sea mapping and weather detection features. It detect storms along the flight path of the aircraft and give the pilot a visual indication , in color target returns are displayed in one of five colors (video levels 0,1,2,3,or 4) with 0-level represented by a black screen because of weak or no return, and levels 1,2,3,or 4 represented by green, yellow ,red and magenta to show progressively stronger returns.

3. **Consisting unit:**

- a. WR – 700 Receiver Transmitter
- b. WI- 700 Indicator
- c. WA – 700 Antenna
- d. WC – 700 controller(optional to provide radar control when the WI-700 indicator is not used)

4. **LOCATION**

- a. WR – 700 Receiver Transmitter is located nose panel
- b. WI- 700 Indicator is located instrument panel
- c. WA – 700 Antenna is located inside the Radom
- d. WC – 700 controller (optional to provide radar control when the WI-700 indicator is not used)

5. **TECHNICAL DATA:**

- I. Ops freq : 9375 MHZ +- 25 MHZ
- II. Power supply : 27.5 VDC
- III. RF Power output : 10 kw
- IV. Antenna length : 12"
- V. Alt range : 55,000ft
- VI. Max range : 300NM
- VII. Scae angle : 90 or 100 degree
- VIII. Scan angle : 25 degree/sec
- IX. Tilt angle : =-15 degree

WEATHER RADAR RDR 2000

1. **INTRODUCTION:** weather radar primus 700 is an navigational equipment .it is used in bell -212 helicopter .it works echo principal. Weather radar operation depends on three facts:

1. Precipitation scatter r.f energy
2. The speed of propagation of an r.f wave is known
3. R. f energy can be channeled into a highly directional beam.

2. **PURPOSE :** The purpose of the colored weather radar RDR-2000 is to detect hydro-weather formations and hazard for flight. It is also used for ground scan during navigation orientation, weather radar provides air space azimuth sector scanning and vertical sector scanning.

The RDR-2000 system provides ground / sea mapping and weather detection features. It detect storms along the flight path of the aircraft and give the pilot a visual indication , in color target returns are displayed in one of five colors (video levels 0,1,2,3,or 4) with 0-level represented by a black screen because of weak or no return, and levels 1,2,3,or 4 represented by green, yellow, red and magenta to show progressively stronger returns.

3. **CONSISTING UNIT:**

- a. ART 2000 ANTENNA / RECEIVER/ TRANSMITTER
- b. IN 182A COLOR RADAR INDICATOR
- c. AA2010V/H AND AA2012V/H ANTENNA
- d. CM 2000 CONFIGURATION

4. **LOCATION :**

- a. ART 2000 antenna / receiver/ transmitter is located nose panel.
- b. IN 182a color radar indicator is located instrument panel.
- c. AA2010v/h and AA2012v/h antenna is located inside the Radom.
- d. CM 2000 configuration is located instrument panel attach with indicator.

5. **ART 2000 ANTENNA / RECEIVER/ TRANSMITTER** the ART 2000 consists of a radar receiver and a radar transmitter with applicable antenna constructed as a single unit with single mounting facility. The RDR 2000 system provides for radar stabilization input for combined pitch, roll and tilt angles of up to +-30 degree. In the vertical profile mode , the antenna stabilization only responds to pitch inputs. The antenna array is attached to the microwave assembly on the ART 2000 and the two are move together as the radar scans. The base of the ART 2000 contains the receiver and all processing and control circuits. The antenna scan angle can be configuration for a 90 degree or a 100 degree scan .

6. **IN 182A COLOR RADAR INDICATOR** : the IN 182A color radar indicator provides a five color display (black, green ,yellow, red ,and magenta) of weather and a three color display of ground targets within the area scanned by the radar. Internally generated range marks appear as evenly spaced blue segmented concentric circles arcs on the display to assist in determining range of the targets. The indicator mode(Wx, WxA ,VP, NAV OR MAP) is selected by push buttons.

7. **AA2010V/H AND AA2012V/H ANTENNA:** these are aluminum alloy slotted flat plate antennas. The AA 2010 V/H and AA2012 V/H are vertically polarized. The AA 2010 V/H and AA2012 V/H are horizontally polarized.

8. **CM 2000 CONFIGURATION :** the configuration module stores the configuration and calibration data for the RDR 2000 system . the module can be propagated with configuration data in the system if installed in conjunction with EFIS that has software level 09 or higher.

9. **TECHNICAL DATA:**

- I. Ops freq : 9375 MHZ +- 30 MHZ
- II. PRF : 106.5 Hz +-5 Hz
- III. Pulse width: 4 micro sec.
- IV. Power supply : 28 Vdc 2.0 amps
- V. RF Power output : 2.5 kw to 6 kw . 3.3 kw nominal
- VI. Sensitivity: -110 dbm typical
- VII. Antenna length : 12"
- VIII. Alt range : 55,000ft
- IX. Max range : 300NM
- X. Scae angle : 90 or 100 degree
- XI. Scan rate : 25 degree/sec
- XII. Tilt angle : =-15 degree

GPS 165 TSO

1. **INTRODUCTION:** GPS MEANS GLOBAL POSITIONING SYSTEM. It is a satellite based navigational system. It is a major military satellite – based. Radio navigation system developed by the U.S . Department of defense (DoD). When fully deployed (1993) GPS will consists of 24 satellites in 12 – hour orbits. GPS system provides day night , worldwide , 24-hour navigation capability.

2. **Purpose:** GPS provides function such as range, bearing and cross track error. With the receiver we can determine position , navigate and store positions. Positions are store individually (as way points in memory). The receiver holds up to 100 positions in battery back up memory.

3. **Location:**

1. GPS 165 TSO is located in the central pedestal
2. antenna is located on the overhead consol.



GPS 165 TSO



Antenna

4. **TECHNICAL DATA**

- a. Power supply : 10-33 VDC
- b. Alt range : 50,000 ft
- c. Temp range :(-20 to + 55) degree
- d. Accusation time: 2 to 5 mints.
- e. Minimum number of satellite is required : 3
- f. Maximum number of satellite is required : 8