INTERCOMMUNICATIONS SYSTEM

GENERAL

The intercommunications system (interphone) provides voice communication facilities between aircrew members, aircrew and ground crew members and provides transmission, reception and monitoring of selected radio communication system. Monitoring of radio navigation systems is also provided. The interphone may be used in conjunction with the Public Address (PA) system for loud speaker announcements to passengers in the cargo area.

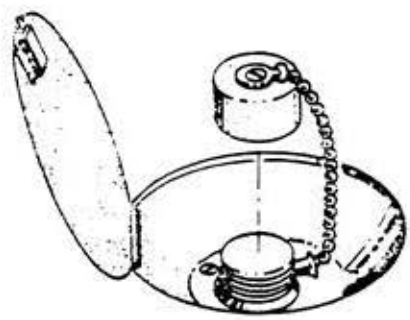
Pilot's audio signals, as well as a warning tone in case of aircraft engine fire or overspeed, may be heard through the flight station loudspeaker.

AIRCRAFT INSTALLATION

There are ten interphone stations located in the aircraft.

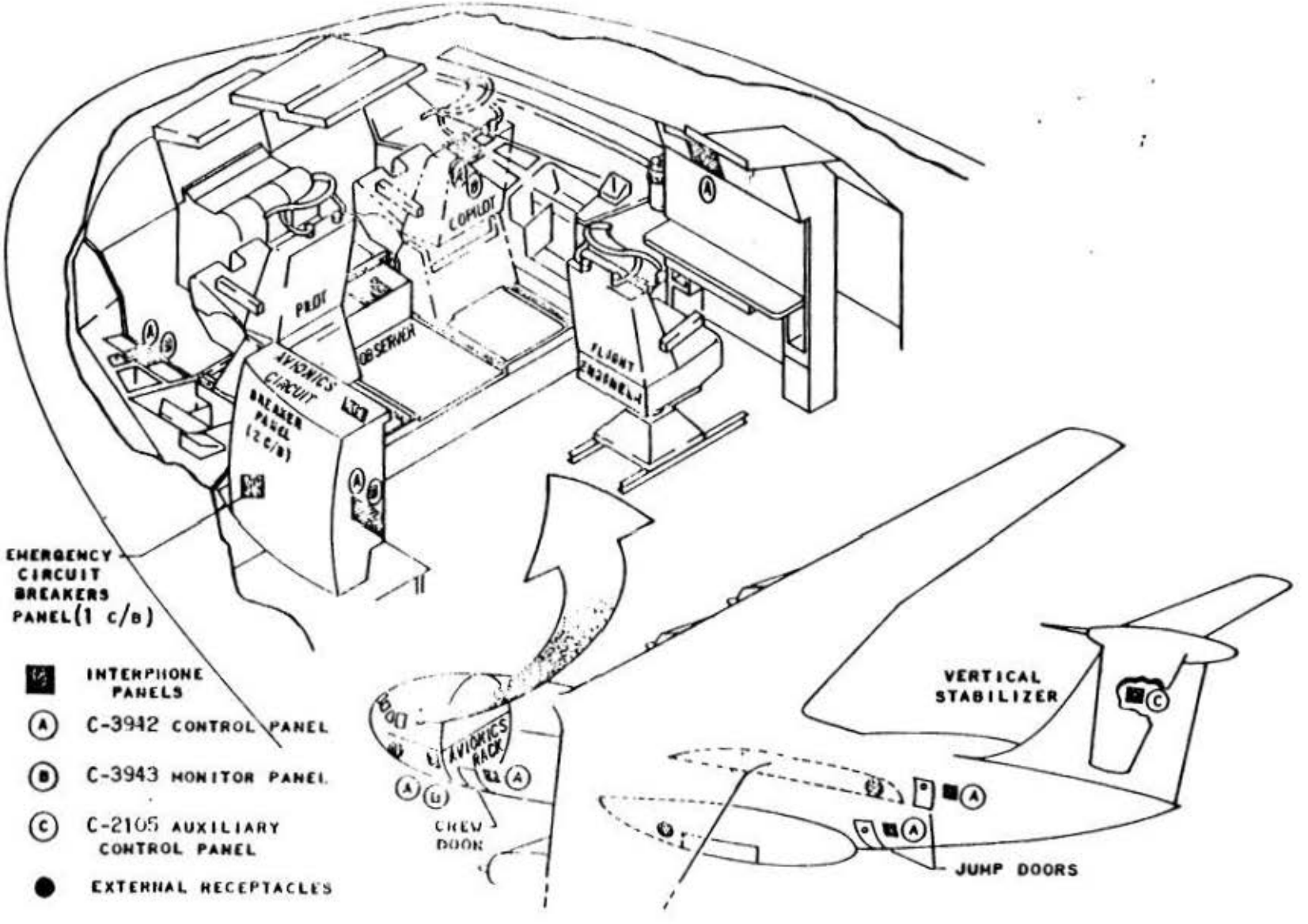
The panel locations drawing shows the five crew member interphone stations in the flight station, the avionics rack station, the three cargo area stations, and the vertical stabilizer station.

The drawing also shows the external interphone receptacle locations. However, receptacle locations may vary depending on aircraft number and modifications. The forward fuselage receptacle is electrically connected to the avionics rack control panel. The wheel well area receptacles are connected to the jump door control panels.

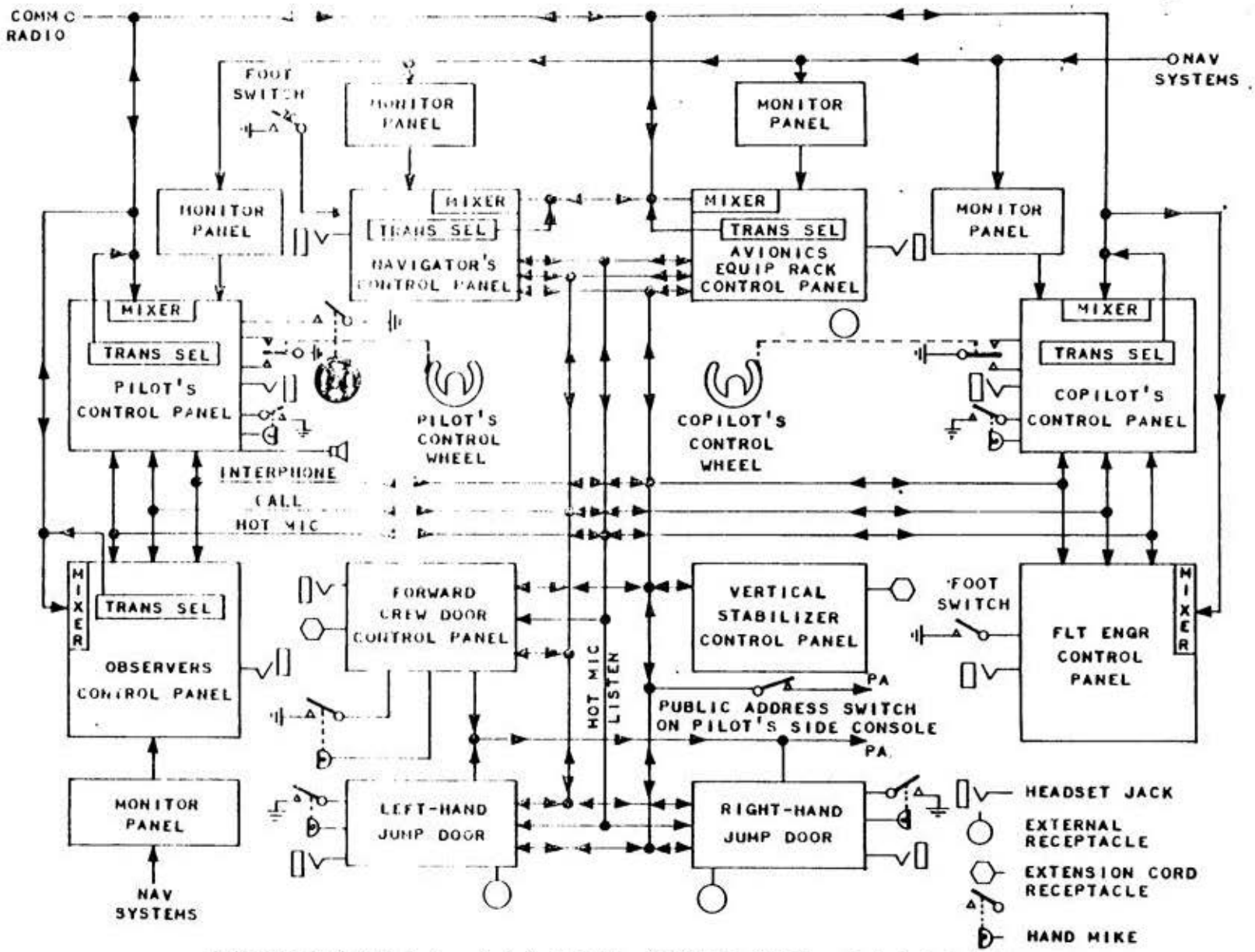


EXTERNAL INTERCOMMUNICATION RECEPTACLE

The interphone system overall diagram shows general interconnection of the interphone stations. Notice that the "INTER" (INTERPHONE), "CALL" and "HOT MIC" wires interconnect



PANEL LOCATIONS



INTERPHONE SYSTEM OVERALL DIAGRAM

all control panels except the vertical stabilizer panel.

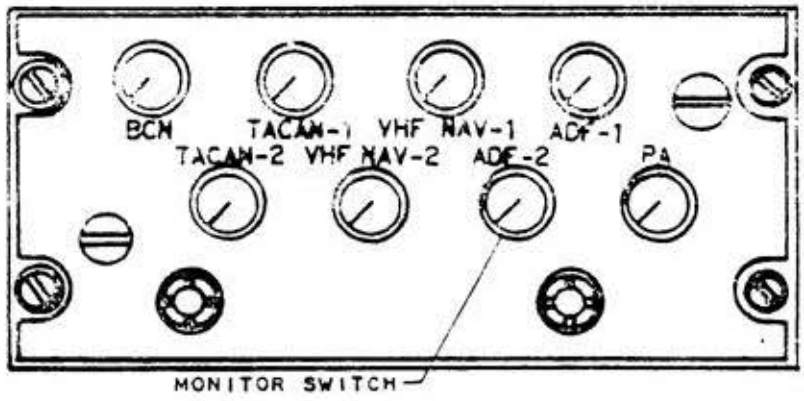
Three circuit breakers supply 28-volt D-C power. The pilot's and flight engineer's stations are supplied from the emergency D-C bus through a circuit breaker located aft of the pilot's side console. The remaining stations are supplied through circuit breakers on the avionics circuit breaker panel at the navigator's position. The main D-C bus No. 1 supplies the observer, avionics equipment rack, left jump door, and vertical stabilizer stations. The main D-C bus No. 2 supplies the copilot's, navigator's, forward crew door, and right hand jump door stations. The interphone system does not have an ON-OFF switch. The system operates when the buses are energized and the circuit breakers are closed.

Microphone switches are located at each interphone station to provide keying of the selected system. The pilot and copilot switches are located on the control wheels. These switches are three-position switches springloaded to the center ("OFF") position. The other two positions are "MIC" position for transmitting by a selected radio and "INTER" for transmitting over the interphone system. All other positions have mic switches in the extension cord adapters that connect to the headsets. The pilot and copilot headset cords do not have mic switches. The navigator and flight engineer also have a foot switch in parallel with the headset cord mic switch.

a 75 foot extension cord is provided for use with external receptacles. This cord is stored near the forward crew door.

SYSTEM OPERATION

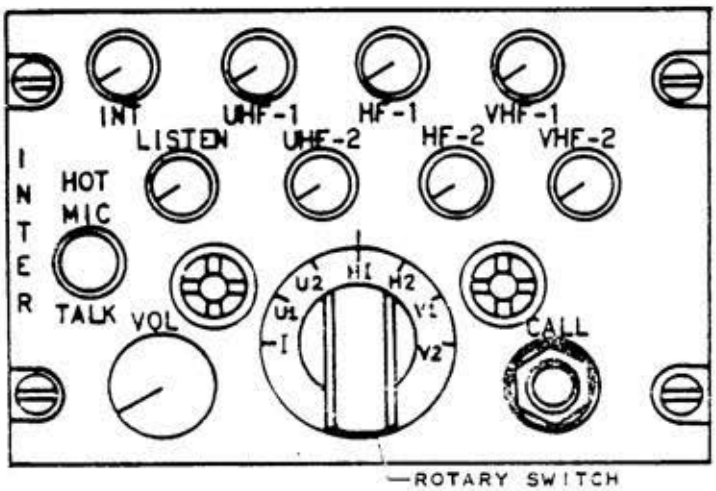
When aircraft power is activated, the interphone system will be operational. For crew members with monitor panels to monitor a navigational radio the



C-3943 MONITOR PANEL

desired navigation system must be operational and the desired system switch on monitor panel must be pulled out and adjusted (volted) for proper volume. The signal will be fed through the control panel headset amplifier to the headset. Up to seven navigational radios and the PA system can be monitored at one time through the monitor panel.

Crew members with control panels can "interphone" or monitor the communications radio by pulling the desired monitor switch on the control panel and adjusting (rotating) the volume. To transmit over interphone or a communications radio, the control panel rotary selector switch is set for the desired system. With the mic button pressed, the mic audio signal will be fed through the interphone system to the selected radio for transmission.

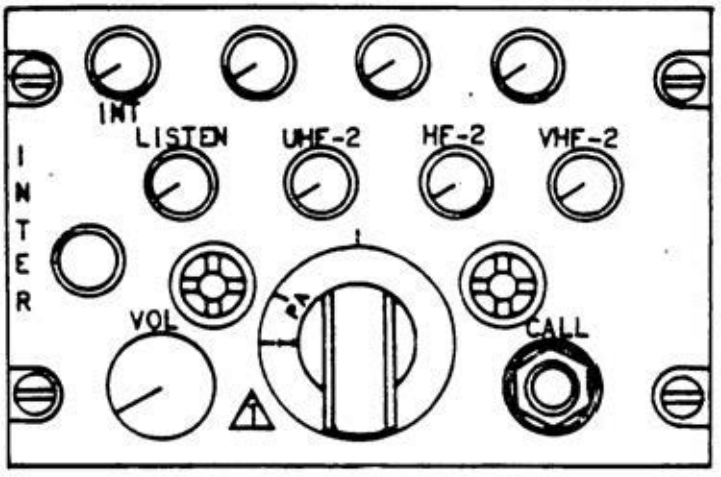


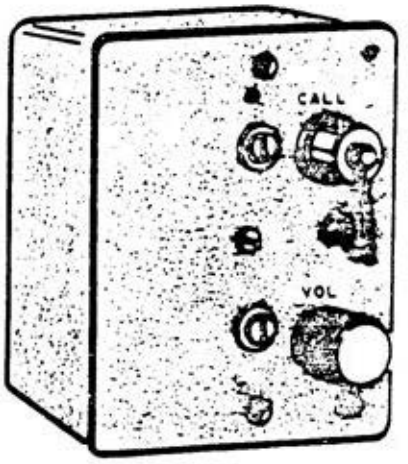
C-3942 CONTROL PANEL

Reception from the same selected system is provided by releasing the mic button. For "HOT MIC" operation the HOT MIC TALK button is pulled. This allows communication over the interphone system without pressing a mix button. The "HOT MIC" talk volume is not adjustable.

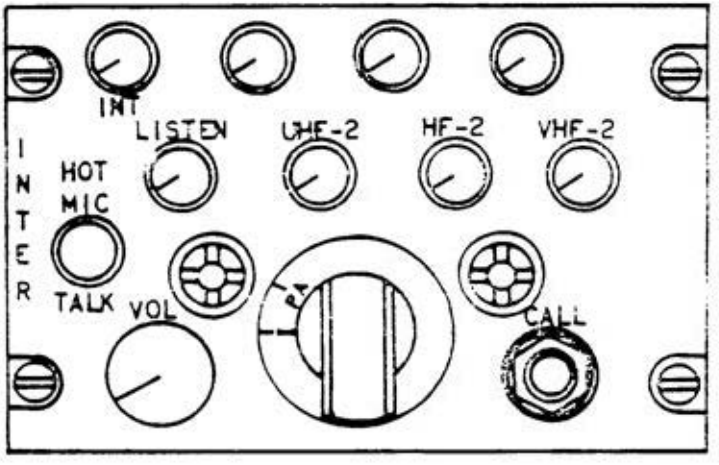
To monitor hot mic talk the HOT MIC LISTEN button must be pulled and rotated for volume. To use the "CALL" (emergency interphone) function, the CALL button is pressed. This is a springloaded button that will return to the "OFF" position when released. To talk over the PA system from the flight station the pilot's INTER-INTER PA switch must be in "INTER PA" position. To use the PA system from the cargo station when the pilot's switch is not in "INTER PA" position, the cargo control panel rotary selector switch has to be in the "PA" position.

Control panels located in the cargo compartment have only two positions, "I" and "PA", on the rotary selector switches and only one monitor switch position, "INT". On modified aircraft the crew door panel will have "HOT MIC





TALK" and "LISTEN". The selector switch at the flight engineer's position has no provisions for radio transmissions.



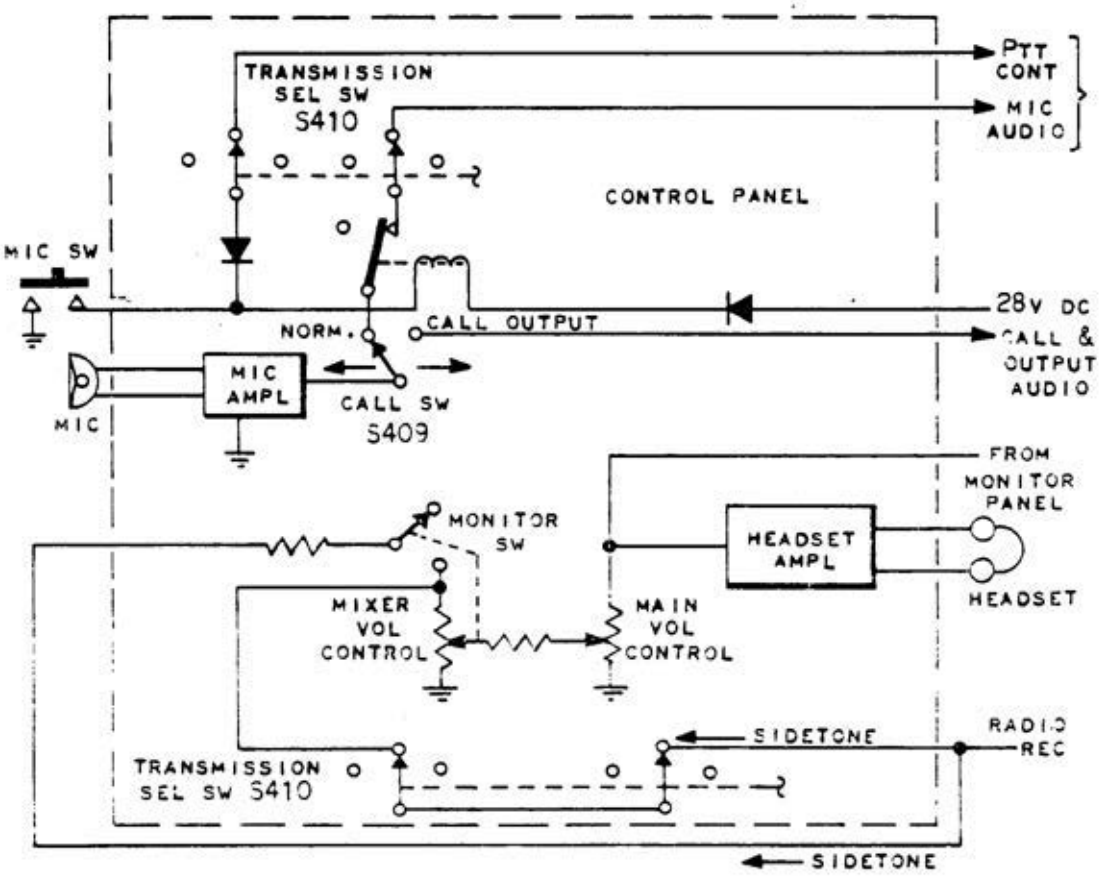
The vertical stabilizer station has only interphone capability.

AIC-18 INTERCOMMUNICATIONS SYSTEM

CHARACTERISTIC	SPECIFICATION
MIC Amplifier AM-1964	
Input source impedance	5 ohms
Output load impedance	150 ohms
Output voltage	2. Ov RMS approximately
HEADSET Amplifier AM-1965	
Input source impedance	150 ohms
Output load impedance	9.5 ohms for headphone
Auxiliary output winding	for loudspeaker(s)
Output Power	1.0-watt, maximum
Call exalt	6 db approximately
Volume Control range	31 db nominal
Monitor volume control ranges	18 db nominal
D-C Power Source: range	24.0 to 30.0 volts, DC
Nominal	27.5 volts, DC
Emergency Operation	12.0 volts, DC
NOTE: Intercommunication Set Control C-3942 and C-3943 panel lamp source: Nominal	6-volt AC or DC
Power requirement Intercommunication Station	
No relays energized	3.6 Watts, nominal
Relays energized	5.3 Watts, nominal
Intercommunication Set Controls	
No relays energized-less lamps	3.6 Watts, nominal
One relay energized-less lamps	5.3 Watts, nominal
Panel lamps-nominal	2.4 Watts, nominal
Monitor Panels	
Panel Lamps-nominal	2.4 Watts, nominal C-3943

BLOCK DIAGRAM THEORY OF OPERATION

When a radio is selected by the rotary switch (S410) the mic amplifier output is coupled by the energized relay (K401) to the selected system. "Mic" ground is applied through CR401 to the selected radio's Push To Talk (PTT) line. Although interphone can be operated similarly through S410 interphone PTT is not wired in the aircraft.

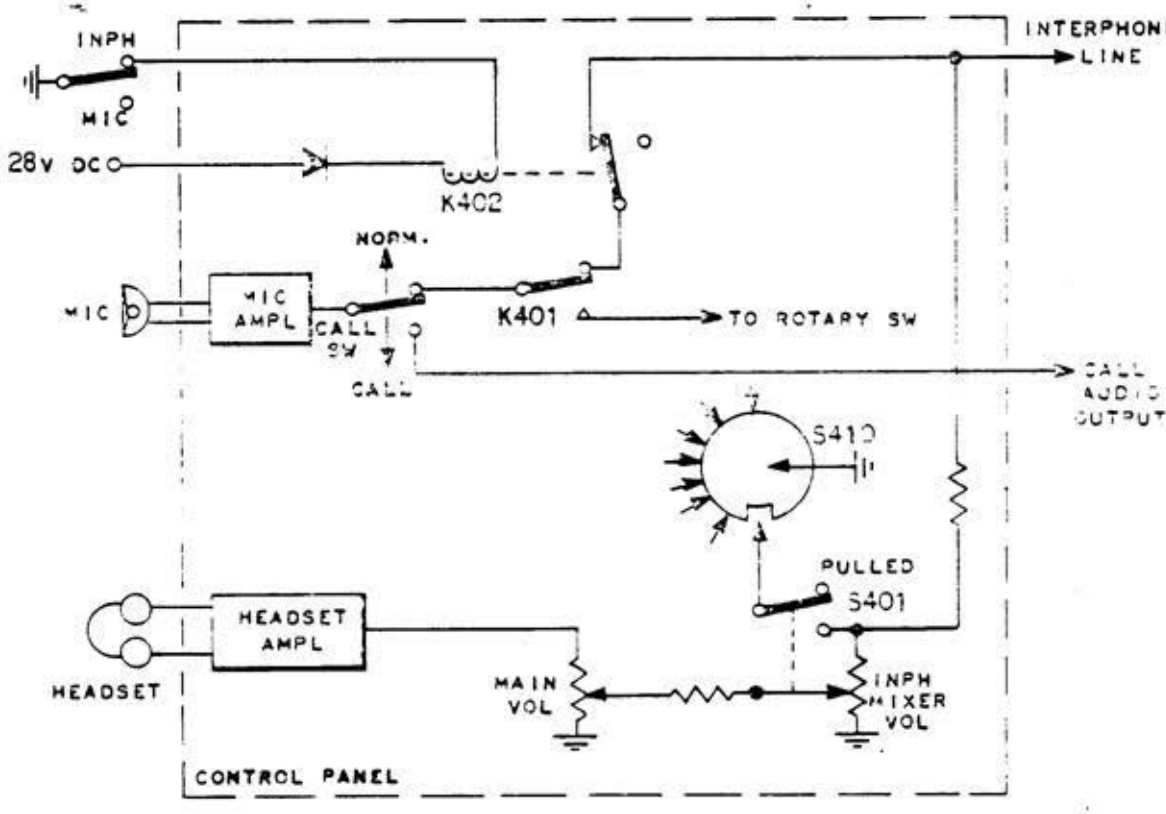


RADIO TRANSMIT

Radio transmission sidetone is returned from the selected radio through S410. The mixer and main volume controls affect the audio level. An alternate sidetone path is through the monitor switch. However with the rotary switch on the selected system the monitor need not be "on."

Radio reception is provided by releasing the mic switch allowing the selected system to switch from transmit to receive. The receive audio follows the same paths as sidetone shown on the radio transmit diagram. Each rotary switch radio position and the interphone position has an independent matching monitor switch circuit as shown on the radio transmit diagram. Therefore, interphone and any number of radios may be listened to simultaneously. Since the monitor panel is an audio mixer for the navigation radio receivers, with a single line to the control panel headset amplifier, any number of navigation systems and PA can be listened to simultaneously.

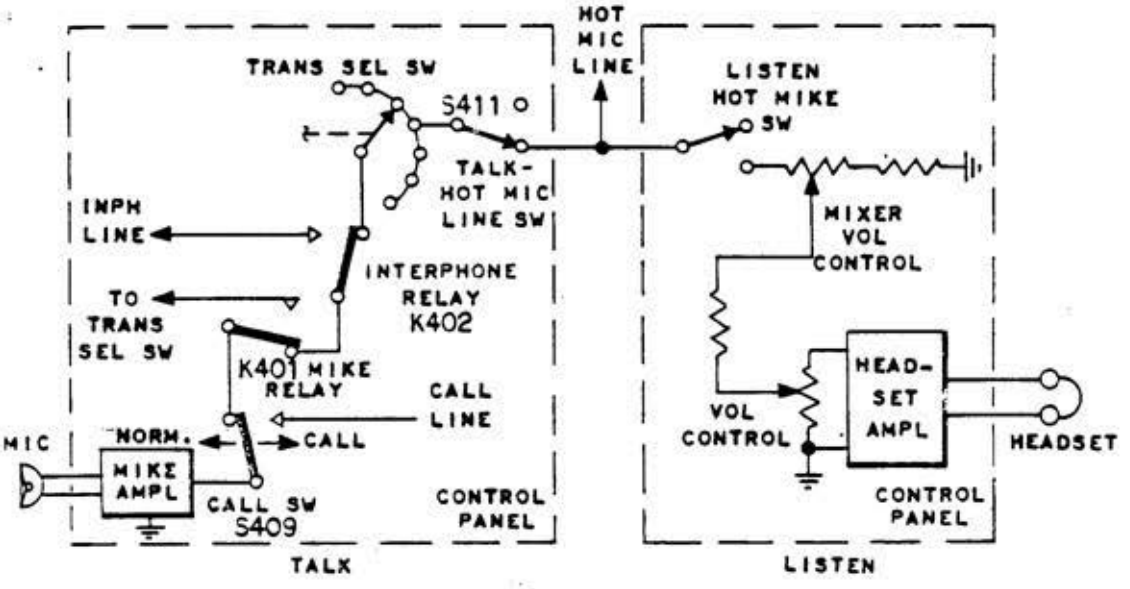
The pilot and copilot can transmit interphone without use of the rotary switch. By pressing their mic buttons to "INPH" their mic audio signals are coupled by



PILOT'S AND COPILOT'S MAIN PANEL

the energized relay (K402) directly to the interphone line. With the interphone monitor (S401) pulled or the rotary switch (S410) set to interphone the shorting ground is removed and the operator can hear his interphone sidetone.

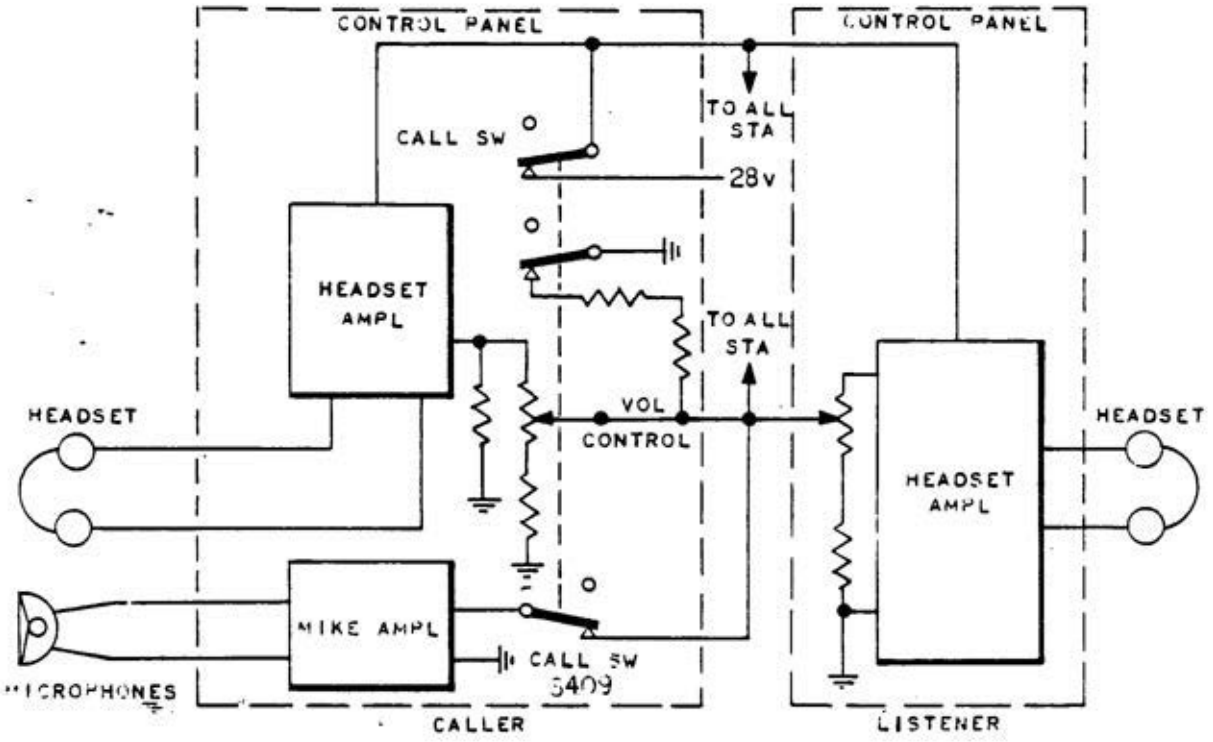
If "CALL," "MIC," or "INTERPHONE" is not activated the operator can talk HOT MIC by pulling S411. He can listen to "HOT MIC" by pulling the HOT MIC LISTEN switch (S405).



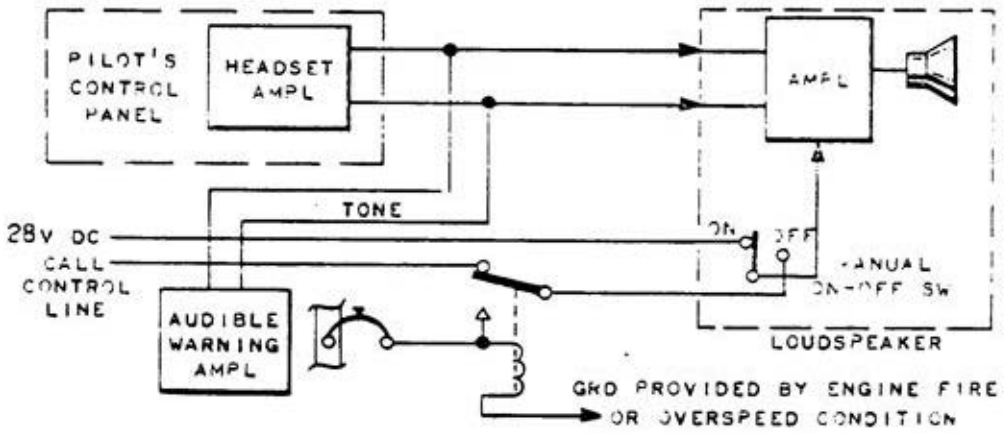
HOT MIC TALK AND LISTEN

When the CALL button (S409) is pressed the mic audio is routed through the call audio line to all call capable stations. The caller hears his sidetone through his volume control. The pressed CALL button also applies 28-volt, DC to all stations activating headset amplifier Automatic Gain Control (AGC) circuits. Since call audio level is greater than the other signals the AGC circuits reduce the gain of the amplifiers resulting in CALL sounding normal with all previously selected signals being lower in volume. S409 also connects a shunt resistor circuit to the headset amplifier input reducing the callers sidetone. This will cause his sidetone to be about the same level that other listeners hear. This compensates wire losses between stations.

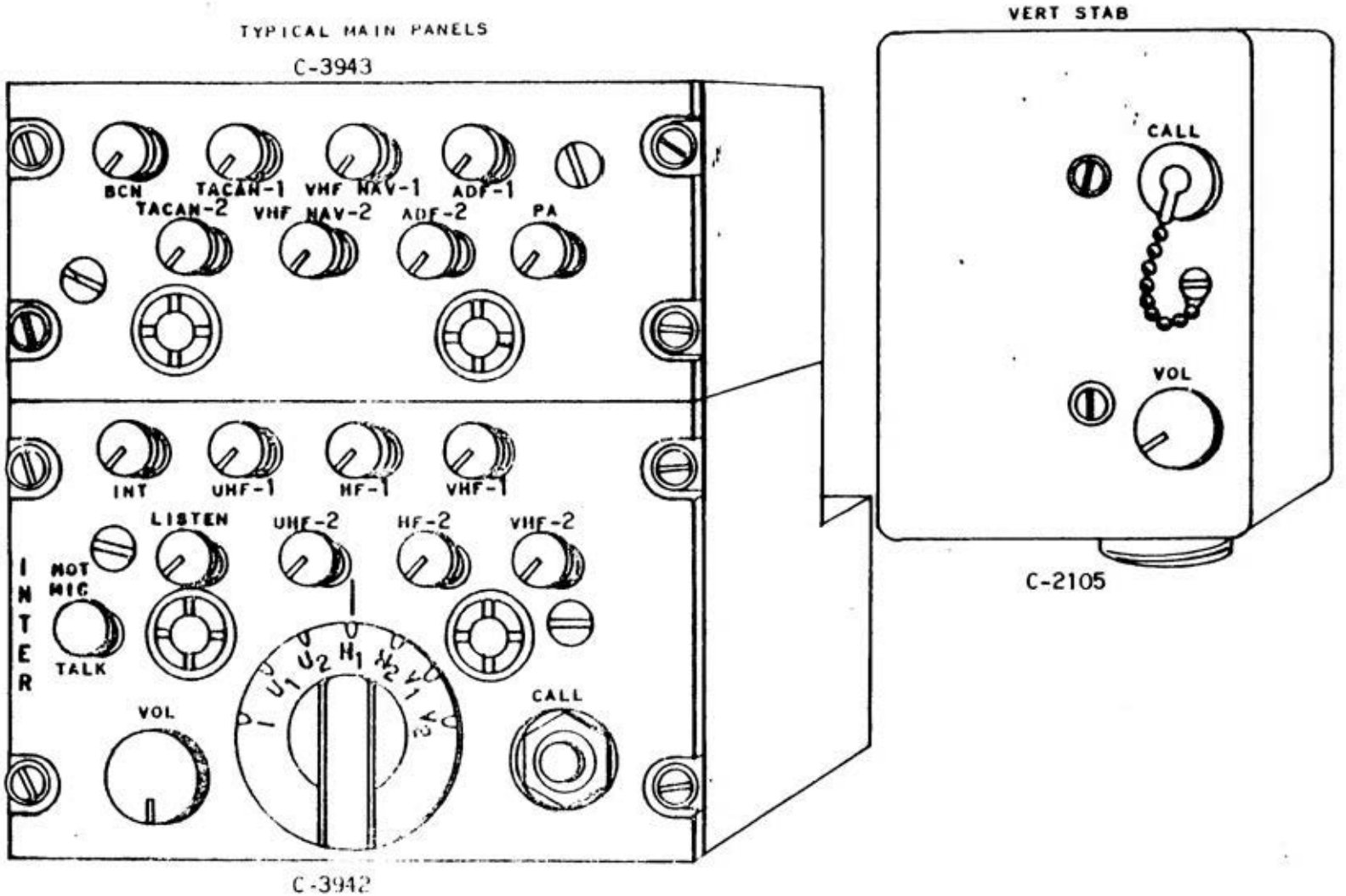
When a CALL button is pressed, 28-volt, DC on the call control line activates the flight station loudspeaker. When the fire or overspeed relay energizes the loudspeaker is also activated. The crew may turn the loudspeaker power switch "ON" for continual operation. When the loudspeaker is "ON" pilot's headset signals may be heard through the speaker. Engine fire or overspeed warning is provided by a tone in the speaker.



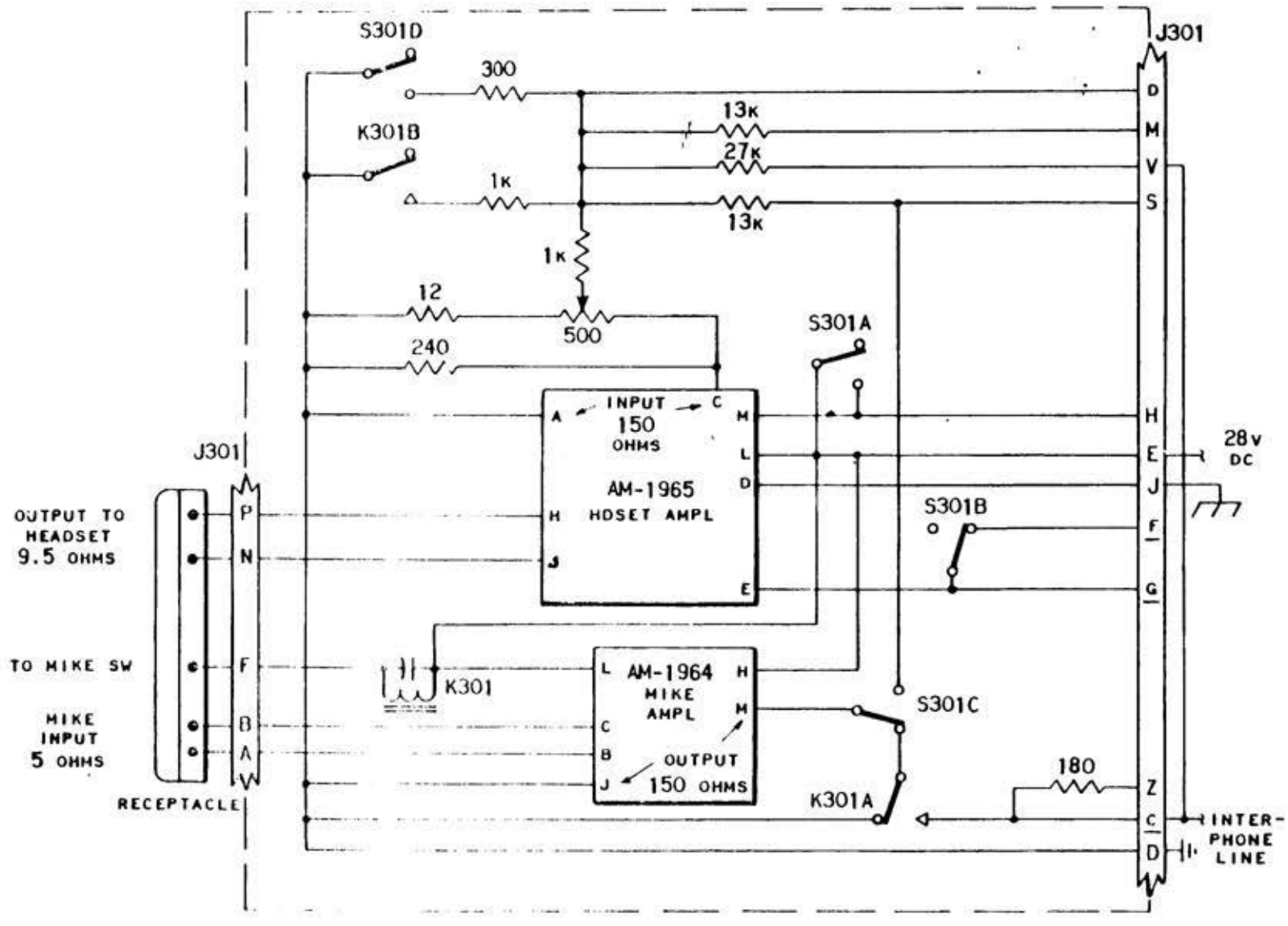
CALL FUNCTION



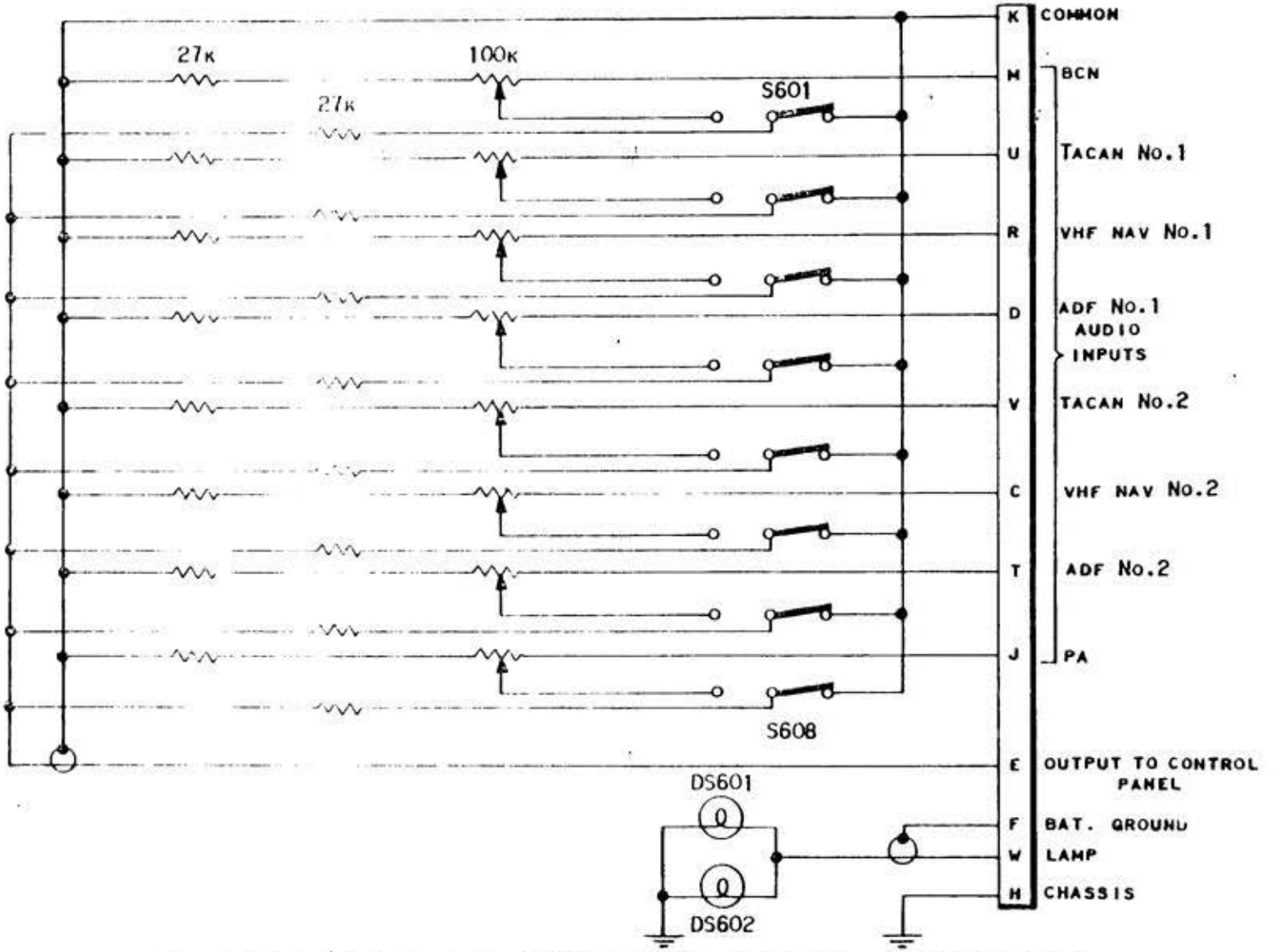
TYPICAL MAIN PANELS



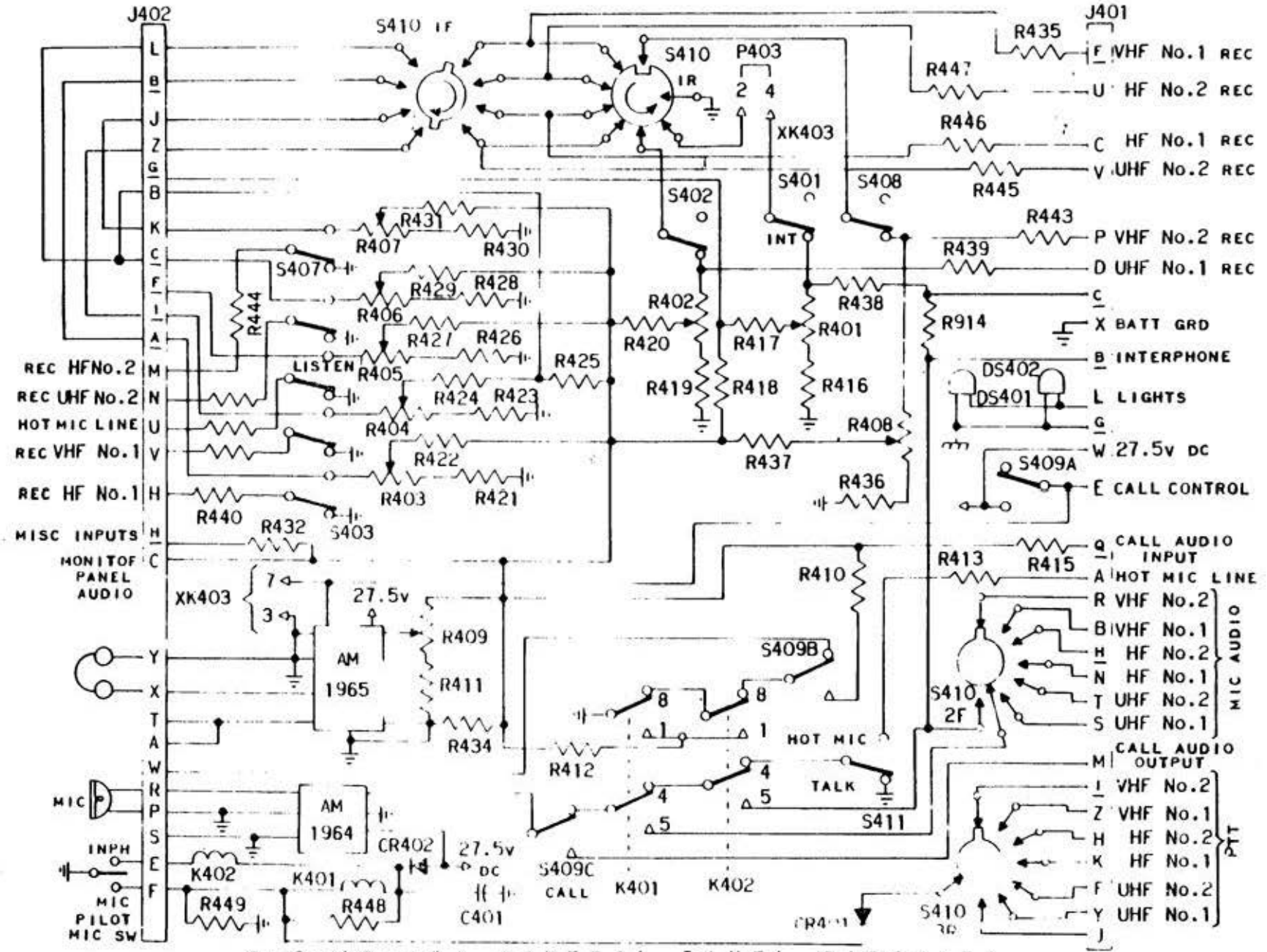
AIC-18A CONTROL PANELS



C-2105/AIC-18A CONTROL PANEL SCHEMATIC



C-3943/AIC-18 MONITOR PANEL CIRCUITS



C-3942-18A CONTROL PANEL CIRCUITS