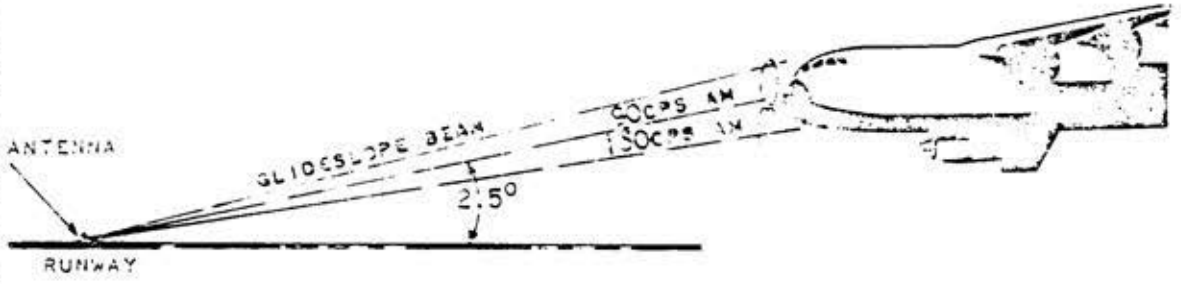
GLIDESLOPE SYSTEM

GENERAL

The glideslope system is used with the VHF navigation system during an instrument approach to the runway. The glideslope system provides vertical guidance information and the VHF navigation system provides the lateral guidance information. A glideslope system will also provide a warning indication if the vertical guidance information is unreliable.

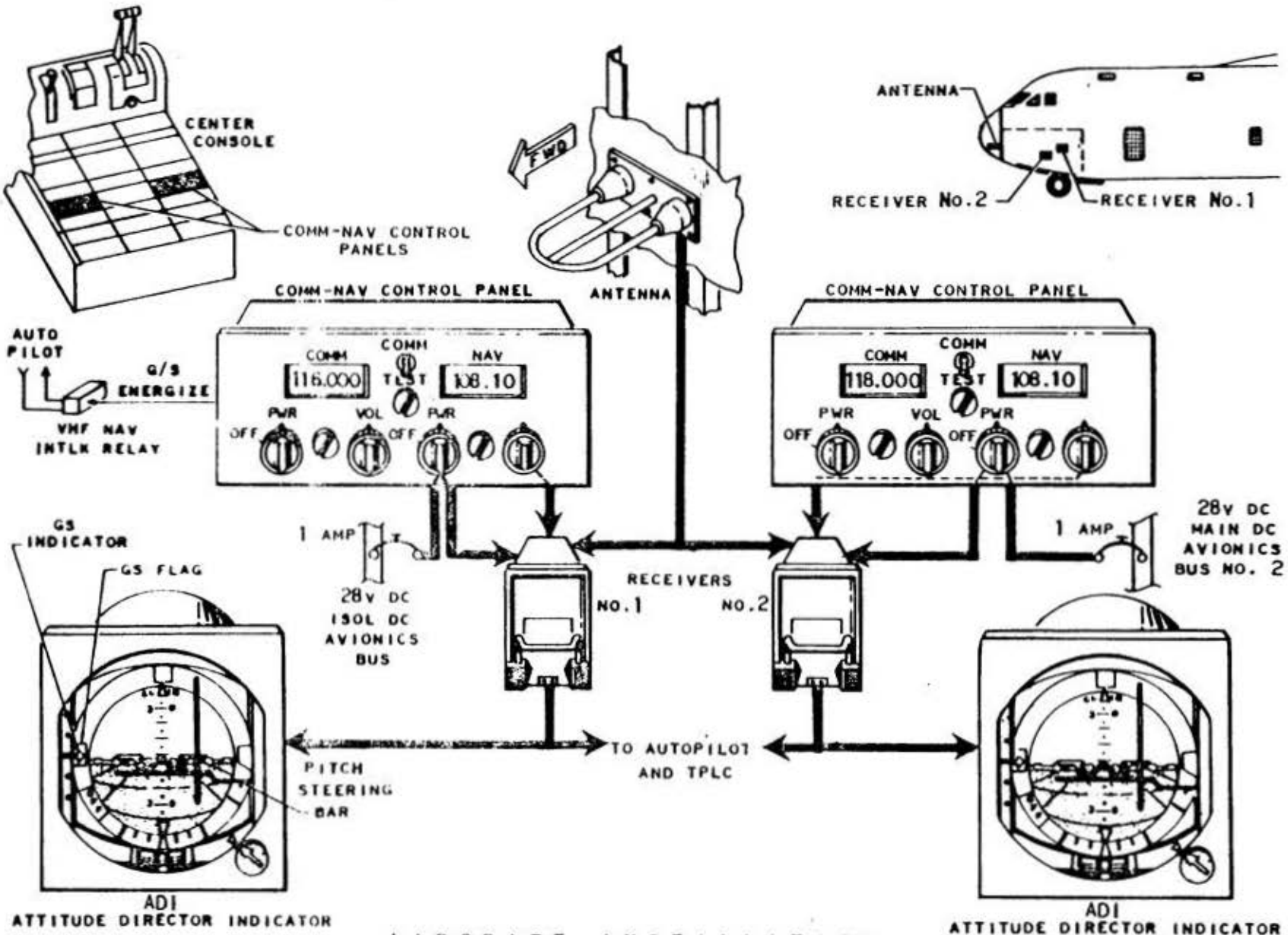
A glideslope ground station transmitter with its antenna located adjacent to and about a 1000 feet from the approach end of a runway transmits a specific frequency which is amplitude modulated with a 90 Hz and a 150 Hz audio tone. This signal is transmitted as dual radiation patterns which are called "beams". The 90 Hz and the 150 Hz beams overlap each other to give an imaginary glide path line in the center of the overlap.



GLIDESLOPE TRANSMITTER
RADIATION PATTERN

AIRCRAFT INSTALLATION

The dual glideslopes are turned "on" and "off" by the VHF nav control panel power switch. Both systems use the same antenna which is located below the radar antenna in the radome. Operating power is supplied by the appropriate D-C bus. Glideslope frequencies are selected by selecting an ILS frequency on the VHF nav control panel.



AIRCRAFT INSTALLATION

SYSTEM OPERATION

The transistorized glideslope receiver provides 20 crystal controlled channels spaced 300 KHz apart. The frequency range is 329.3 to 335.0 MHz and each glideslope frequency is paired "one-for-one" with a localizer frequency.

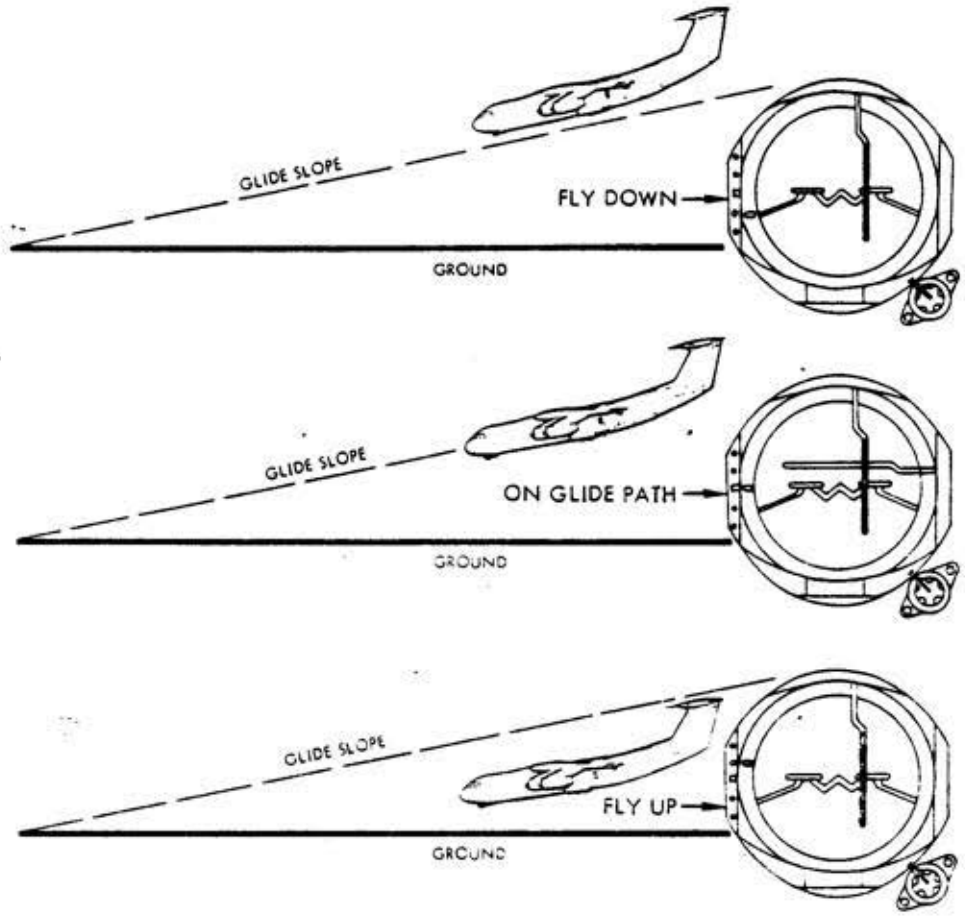
By selecting a given localizer frequency, a matched glideslope channel is selected. When the VHF nav system has VOR frequencies selected, the glideslope is switched to standby by the VHF nav control panel.

When the VHF nav control panel has a localizer frequency selected, the glideslope receiver is "on" and its output is applied to the Attitude Director Indicator (ADI) on the instrument panel.

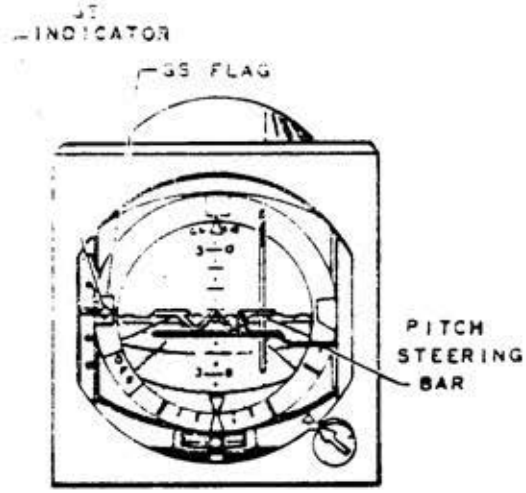
Displacement from the glidepath is displayed as ADI vertical pointer deflection. Deflection of the pointer represents the relative position of the aircraft from beam center. An upward deflection indicates that the aircraft is below beam center and requires "fly up" to the glidepath. A downward deflection indicates that "fly down" is required. Should the glideslope deviation signals become unreliable, a warning flag appears covering the ADI glideslope pointer.

LOC FREQ MHz	GS FREQ MHz
108.1	334.7
108.3	334.1
108.5	329.9
108.7	330.5
108.9	329.3
109.1	331.4
109.3	332.0
109.5	332.6
109.7	333.2
109.9	333.8
110.1	334.4
110.3	335.0
110.5	329.6
110.7	330.2
110.9	330.8
111.1	331.7
111.3	332.3
111.5	332.9
111.7	333.5
111.9	331.1

LOCALIZER GLIDESLOPE FREQUENCY PAIRING CHART



GLIDESLOPE INDICATOR DISPLAY

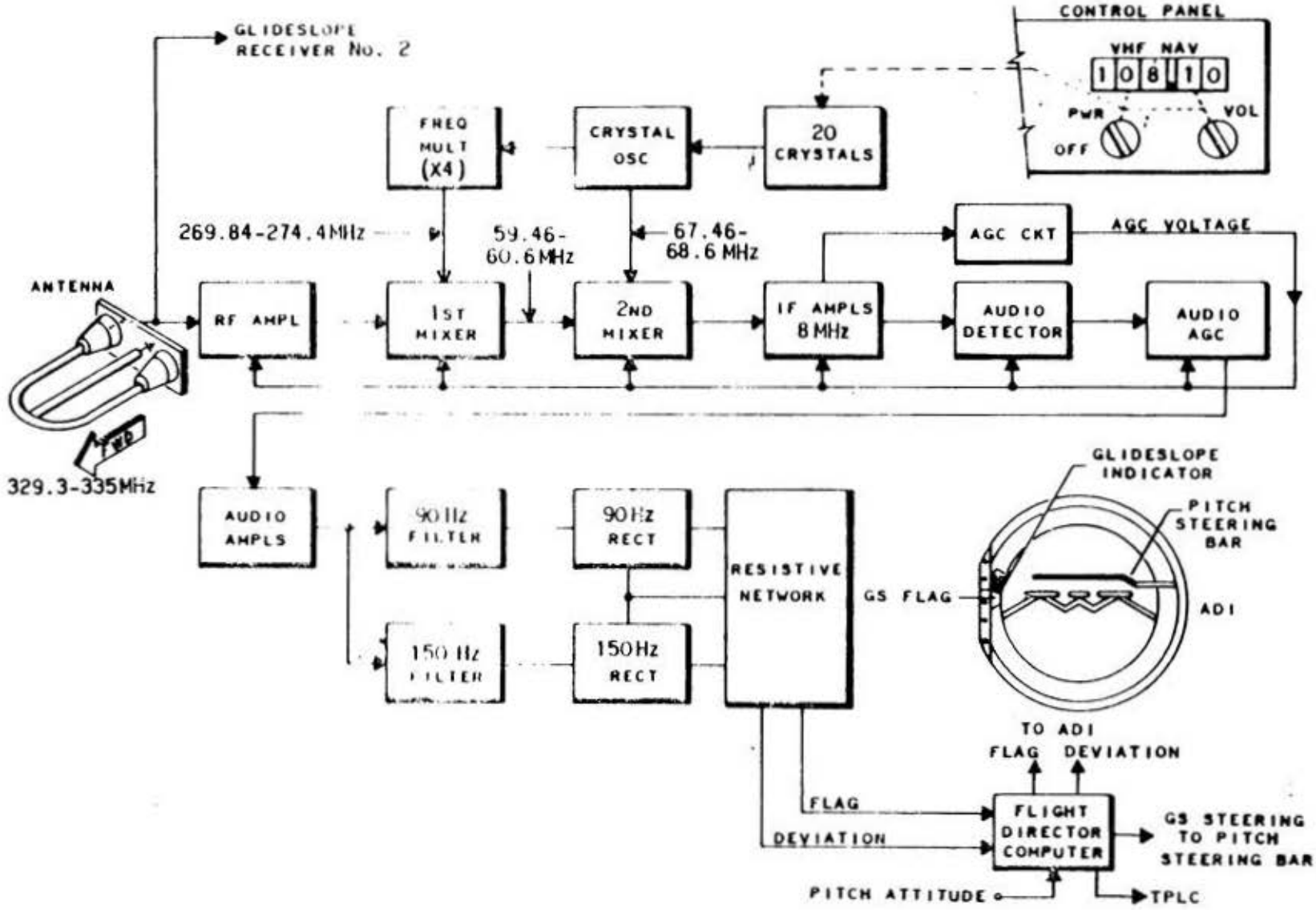


ATTITUDE DIRECTOR INDICATOR (ADI)

SPECIFICATIONS

WILCOX 800 B

CHARACTERISTIC	SPECIFICATION
Power requirements	27.5 volts, DC
Frequency range	329.3 to 335.0 MHz
Number and spacing of channels	20 channels, spaced 300 KHz
Frequency selection	ARINC (2 out of 5 wires)
Input impedance	52 ohms
Type receiver	Dual conversion super-heterodyne crystal controlled.
Indicator circuit	Supply sufficient output for five 1000-ohm indicator loads in parallel.
Alarm signal	Supply sufficient output for four 1000-ohm flag alarm loads in parallel.



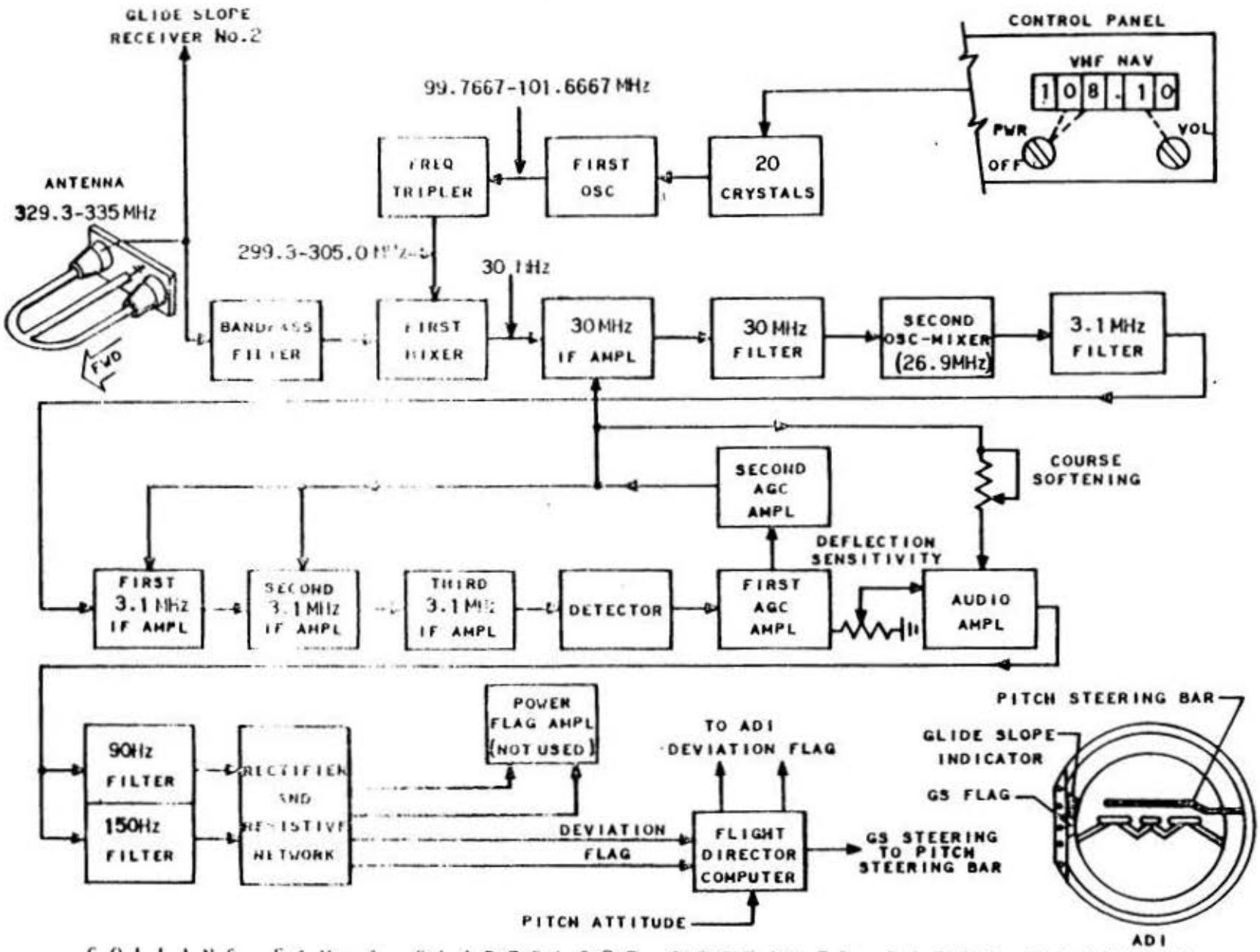
WILCOX 800

GLIDESLOPE RECEIVER BLOCK DIAGRAM

SPECIFICATIONS

COLLINS 51V-4

CHARACTERISTIC	SPECIFICATION
Power requirements	27.5 volts, DC
Frequency range	329.3 to 335.0 MHz
Number and spacing of channels	20 channels, spaced 300 KHz apart
Frequency selection	ARINC (2 out of 5 wires)
Input impedance	52 ohms
Type receiver	Dual conversion, superheterodyne
Indicator circuit	Supply sufficient output for three 1000-ohm deviation indicator loads in parallel
Alarm signal	Supply sufficient output for two 1000-ohm flag alarm loads in parallel



COLLINS 51V-4 GLIDESLOPE RECEIVER BLOCK DIAGRAM

BLOCK DIAGRAM THEORY OF OPERATION

The glideslope receiver is a dual conversion, superheterodyne with crystal-controlled local oscillator.

A signal is received by the antenna. This signal, amplitude modulated at 90 and 150 Hz, is passed to a strip line filter which is designed for a bandpass of 329 to 335 MHz. This output is fed to the RF amplifier. The carrier is amplified by the RF amplifier and applied to the first mixer. The gain of the RF amplifier is controlled by the AGC voltage.

The input to the first mixer is heterodyned with the first injection signal in the range of 269.84 to 274.40 MHz. The first injection signal is the frequency-quadrupled output of the local oscillator. The first mixer output is the first high intermediate frequency (IF) and is in the range of 59.46 to 68.60 MHz.

The local oscillator is crystal controlled, ranging from 67.46 to 68.60 MHz. The output of this oscillator is applied to the second mixer stage and through the frequency quadrupler to the first mixer.

The second mixer heterodynes the first mixer output with the oscillator output to produce an 8 MHz IF. The 8 MHz IF is amplified by the IF amplifiers, then detected by an audio detector. This output is amplified and applied to the 90/150 Hz filter. The 90 Hz and 150 Hz are separated and applied to separate bridge rectifiers. The rectified output from both rectifiers is compared and, if the aircraft is on course, the voltage will be equal in magnitude and opposite in polarity. This will produce a zero output to the deviation indicator which will remain centered. If the 150 Hz signal is greater in magnitude than the 90 Hz, the deviation indicator will deflect upward; and downward if the reverse is true.

SYSTEM PECULIARITIES

The glideslope has a flag warning and deviation indication input to the Test Program Logic Computer (TPLC) for use during (AWLS) operation.