Table 1. Equipment Specifications.

CHARACTERISTIC	SPECIFICATION
Physical and mechanical specifications	
Weight	19.95 kg (44 lb)
Dimensions	
Width	445 mm (17.5 in)
Height	178 mm (7.0 in)
Length	508 mm (20.0 in)
Connectors	
Front panel	
RF OUT	Type N, female
Rear panel	
AUX, DEMOD, COMP, and EXT MOD	Type BNC, female
REMOTE TUNE	37-pin dual-row Cannon type D
IEEE-STD 488/1978 PROGRAM I/O	Chassis connector per IEEE standard 448-1978
Cooling requirements	Internal blower
Environmental specifications	
Temperature	
Operating	+10 to +40 °C (+50 to +104 °F)
Storage	
-001	-20 to +85 °C (-4 to +185 °F)
-002/-003	-20 to +70 °C (-4 to +158 °F)
Humidity	<95%, relative
Electrical specifications	
Power requirements	
Voltage	115/230 V ac, ±10%
Frequency	47 to 63 Hz
Power	300 VA, maximum
Warmup time	30 min, maximum, for specified performance
Rf outputs	
Frequencies	
VOR/LOC	108.00 to 117.95 MHz, selectable in 50-kHz steps

Table 1. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
Glideslope (GS)	329.00 to 335.00 MHz, selectable in 150-kHz steps
Marker beacon	75.0 MHz fixed, 74.6 to 75.4 MHz, selectable in 25-kHz steps
Vhf communication	118.000 to 151.975 MHz, selectable in 25-kHz steps
Frequency vernier	Capable of varying selected output frequency up to ±one channel, all bands
Frequency resolution	Fixed, 1 kHz; vernier, 100 Hz
Frequency accuracy (fixed mode)	< ±2 ppm, (+10 to +40 °C (+50 to +104 °F)), including aging
Output level	
Range	
dB mW	-6 to -120 dB mW, variable in 1-dB increments
Voltage	112 mV to 0.22 μV, variable in 1-dB increments
Accuracy	
Note The following parameters apply to the marker beacon, VOR/LOC, and glideslope bands. Performance over the 118.000- to 151.975-MHz vhf communication band may be somewhat degraded.	
-6 to -60 dB mW	±1.5 dB
-60 to -120 dB mW	±2.0 dB
Vswr	<1.5:1
External attenuation	Not required; microvolt output is "hard microvolts" and eliminates 6-dB external attenuation requirement
Spectral purity	
Note The following parameters apply to the marker beacon, VOR/LOC, and GS bands. Performance over the 118.000- to 151.975-MHz vhf communication band may be somewhat degraded with respect to the VOR/LOC band specifications.	

Table 1. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
Harmonics	
VOR/LOC marker beacon	>30 dB below carrier
Glideslope	>25 dB below carrier
Spurious signals (excluding frequencies within ±15 kHz of carrier)	>80 dB below carrier
Broadband noise (SSB)	
	Note
	Broadband noise is specified in units of "dBc/Hz"; dBc/Hz = dB below carrier level measured in a 1-Hz noise bandwidth.
74.60 to 75.40 MHz (marker beacon)	>115 dBc/Hz >40 kHz from carrier
108.00 to 117.95 MHz (VOR/LOC)	>111 dBc/Hz >15 kHz from carrier >117 dBc/Hz >30 kHz from carrier >122 dBc/Hz >40 kHz from carrier
329.00 to 335.00 MHz (GS)	>112 dBc/Hz >50 kHz from carrier >119 dBc/Hz >80 kHz from carrier >122 dBc/Hz >120 kHz from carrier
VOR mode	
Modulation tones	
Frequencies	
Preset	30-Hz reference, 30-Hz variable, 9960-Hz, and 1020-Hz ident
Variable	
30-Hz variable, 30-Hz reference, 9960 Hz	Tones variable simultaneously +5%. Resolution of the 30-Hz tones is 0.1 Hz. The 9960-Hz signal varies proportionally.
Aux audio	Variable from 30 Hz to 14 kHz (0.1-Hz steps from 30 Hz to 1 kHz, 1.0-Hz steps from 1 kHz to 14 kHz)
Frequency accuracy, preset, and variable	±0.005%
Distortion (audio)	
Preset mode (30% modulation per tone)	
30-Hz reference and 30-Hz variable	<0.25%
9960 Hz and 1020 Hz ident	<0.5%
Aux audio	<1.0%

Table 1. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
Variable mode (5 to 35% modulation per tone)	
30-Hz variable	<1.0%
9960 Hz	<1.5%
Aux audio	<2.0%
9960-Hz FM deviation	480 ±2-Hz peak
Radial range	000.00 to 359.99 degrees (selectable at each 30-degree heading or in 0.01-degree increments, variable in preset steps of +30 degrees, ±10 degrees, and ±0.01 degree)
Radial accuracy	
0°	±0.01 degree (settable to ±0.005 degree)
Tracking (000.00 to 359.99°)	±0.01 degree referenced to 0-degree reading ***Note*** Audio radial accuracy is referenced to accuracy of standard used in calibration.
Amplitude modulation	
Range (per tone)	
1020-Hz ident	30% fixed
30-Hz variable, 9960-Hz	Preset at 30%, variable 5 to 35% in 0.1% increments
Aux audio (30 Hz to 14 kHz)	Preset at 30%, variable 5 to 35% in 0.1% increments
Accuracy	
1020 Hz (fixed at 30%)	±2.5% of indication
30-Hz variable, 9960-Hz	
Preset	±2.5% of modulation
Variable (5 to 35%)	±5% of indication
Aux audio	
Preset	±5% of indication
Variable (5 to 35%)	±7% of indication
Tone distortion (rf)	
Preset (30% modulation)	
30-Hz variable	<1.0%

Table 1. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
1020-Hz ident	<1.0%
9960 Hz	<1.5%
Aux audio (30 Hz to 14 kHz)	<2.0%
Variable (5- to 35-% modulation)	
30-Hz variable	<1.5%
9960 Hz	<2.0%
Aux audio (30 Hz to 14 kHz)	<3.0%
Total VOR demodulated error	<±0.05 degree of selected radial (referenced to accuracy of standard used in calibration)
Localizer mode	
Modulation tones	
Frequencies	
Preset	90-Hz, 150-Hz, and 1020-Hz ident
Variable	
90/150 Hz	Both tones variable simultaneously ±5% in 0.1-Hz increments
Aux audio	Variable from 30 Hz to 4 kHz (0.1-Hz steps from 30 Hz to 1 kHz, 1.0-Hz steps from 1 to 4 kHz)
Frequency accuracy	±0.005%
Distortion (audio)	
Preset mode	
90/150-Hz (20-% modulation per tone)	<0.25%
1020-Hz (30-% modulation)	<0.5%
Aux audio (30-% modulation)	<1.0%
Variable mode	
90/150-Hz (5 to 40-% modulation)	<1.0%
Aux audio (5 to 30-% modulation)	<1.5%
90/150-Hz phase	
Fixed	0.0 ±1 degree
Selectable	60 ±2 degrees

Table 1. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
	Note The 90- and 150-Hz waveforms pass through 0 in the same direction, with 0 or 60 degrees of phase relative to the 150-Hz component, every half-cycle of the combined 90- and 150-Hz waveform.
Amplitude modulation	
Range (per tone)	
90 and 150 Hz	
Preset	20%
Variable	5 to 40% in 0.1-% increments
1020-Hz ident	30% fixed
Aux audio	
Preset	30%
Variable	5 to 30% in 0.1-% increments
Accuracy	
90 and 150 Hz	
Preset	±2.5% of indication
Variable	±5% of indication
1020-Hz ident	±2.5% of indication
Aux audio	
Preset	±5% of indication
Variable	±7% of indication
Tone distortion (rf)	
90 and 150 Hz	
Preset	<1.0%
Variable	<1.5%
1020-Hz ident	<1.0%
Aux audio	
Preset	<1.5%
Variable	<3.0%

Table 1. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
DDM	
Preset	0.000
Selectable settings	0.000, ±0.046, +0.093, ±0.155, and ±0.200
Variable range	±0.400 in 0.001-increments
Audio error	
On course	0.0001 DDM
Off course	0.0002 to 0.200 DDM 0.0002 +0.05% DDM from 0.201 to 0.375 DDM 0.25% DDM maximum from 0.376 to 0.400 DDM
Total system error (audio + modulation)	
On course	0.00056 DDM
Off course	0.00056 DDM + 2.5-% DDM
Glideslope mode	
Modulation tones	
Frequencies	
Preset	90 Hz and 150 Hz
Variable	
90/150 Hz	Both tones variable simultaneously ±5 percent in 0.1-Hz increments.
Aux audio	Variable from 30 Hz to 4 kHz (0.1-Hz steps from 30 Hz to 1 kHz, 1.0-Hz steps from 1 to 4 kHz)
Frequency accuracy	±0.005%
Distortion (audio)	
Preset mode	
90/150 Hz (40-% modulation per tone)	<0.25%
Aux audio (30-% modulation)	<1.0%
Variable mode	
90/150 Hz (10 to 80-% modulation)	<1.0%
Aux audio (10 to 60-% modulation)	<1.5%
90- and 150-Hz phase	
Fixed	0.0 ±1 degree
Selectable	60 ±2 degrees

Table 1. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
	Note The 90- and 150-Hz waveforms pass through 0 in the same direction, with 0 or 60 degrees of phase relative to the 150-Hz component, every half-cycle of the combined 90- and 150-Hz waveform.
Amplitude modulation	
Range (per tone)	
90 and 150 Hz	
Preset	40%
Variable	10 to 80% in 0.1-% increments
Aux audio	
Preset	30%
Variable	10 to 60% in 0.1-% increments
Accuracy	
90 and 150 Hz	
Preset	±2.5% of indication
Variable	±5% of indication
Aux audio	
Preset	±5% of indication
Variable	±7% of indication
Tone distortion (rf)	
90 and 150 Hz	
Preset	< 1.2%
Variable	< 3.0%
Aux audio	
Preset	<2.0%
Variable	<3.0%
DDM	
Preset	0.000
Selectable settings	0.000, ±0.045, ±0.091, ±0.175, and ±0.400
Variable range	±0.800 in 0.001-increments

Table 1. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
Audio error	
On course	0.0001 DDM
Off course	0.0002 DDM to 0.400 DDM 0.0002 DDM +0.05% DDM from 0.401 to 0.750 DDM 0.25 percent DDM maximum from 0.751 to 0.800 DDM
Total system error (audio + modulation)	
On course	0.00102 DDM
Off course	0.00102 DDM + 2.5% DDM
Marker beacon	
Modulation tones	
Frequencies	
Preset	
Outer marker	400 Hz
Middle marker	1300 Hz
Inner marker	3000 Hz
Variable	
Aux audio	Variable from 100 Hz to 4 kHz (0.1-Hz steps from 100 Hz to 1 kHz, 1.0-Hz steps from 1 to 4 kHz)
Frequency accuracy	±0.005%
Distortion (audio)	< 1%, preset and variable frequencies, 15- to 97-% modulation
Amplitude modulation	
Range	
400, 1300, and 3000 Hz	
Preset	95%
Variable	90 to 97% in 0.1-% increments
Aux audio	
Preset	95%
Variable	15 to 97% in 0.1-% increments

Table 1. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
Accuracy	
400, 1300, and 3000 Hz	
Preset	±5% of indication
Variable	±6.5% of indication
Aux audio	
Preset	±5.5% of indication
Variable	±7% of indication
Tone distortion	
Preset 400, 1300, and 3000 Hz	<4%
Aux audio	5% maximum
Vhf COMM	
Modulation tones	
Preset	1020 Hz
Variable	30 Hz to 10 kHz (0.1-Hz steps from 30 Hz to 1 kHz, 1.0-Hz steps from 1 to 10 kHz)
Frequency accuracy	±0.005%
Distortion (audio)	< 2.0%, preset 1020 Hz at 30%, variable frequencies from 5 to 35%
Amplitude modulation	
Range	
Preset 1020 Hz	30%
Variable 10 Hz to 10 kHz	5 to 35% in 0.1-% increments
External modulation	
Input impedance	5 kΩ minimum
Maximum modulation depth	90%
Modulation distortion	4% maximum
Modulation bandwidth	
Marker beacon	DC - 4 kHz
Localizer	DC - 4 kHz
Glideslope	DC - 4 kHz
VOR	DC - 15 kHz
Vhf COMM	DC - 15 kHz
Remote tune	
Tuning format	2-of-5 in accordance with ARINC 410
Selection method, tuning, and mode	Spst relay closure with maximum contact rating of 28 V dc at 100 mA
Timing trigger	TTL level positive pulse, coincident with any keystroke