THE *Cambridge* AUDIO DIRECTOR

The Cambridge Audio Director combines in a single, compact package a Speed Director and Full Range Audio. Developed from the successful Speed Director, the Audio Director installs directly into a standard 2.25″ (57mm) panel opening. As an additional feature, remote selection of CLIMB and CRUISE modes can be simply made, enabling the user to install a selector switch anywhere, (for example, on the flap mechanism).

The Cambridge Audio Director adds a new dimension to the Cambridge variometer system, providing the pilot with an audio and visual guide to the optimum speed to fly between thermals.

At the flick of a switch, the Audio Director converts the variometer into an Audio-visual "Zero-Reader" system. Just follow the needle or the sound. If + is indicated, slow up. If − is indicated, speed up. The system will automatically adjust for sink, lift, and the performance of the sailplane.

Thus the Audio Director relieves the pilot of the necessity of constantly monitoring the variometer and air speed for best cruise speed. He can concentrate on the flight rather than the flying, and direct more of his attention to the task in hand.

The Audio Director is compatible with most Cambridge variometers. Simple to use and easy to install, the Cambridge Audio Director represents a major advance in the field of sailplane instrumentation.

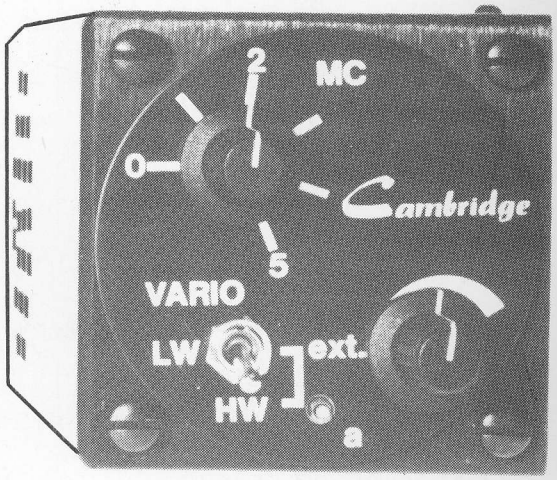
The Audio Director is available in calibrations to suit most current sailplanes. The sailplane type should be specified when ordering.

Installation

The Audio Director is connected into the system as shown in Fig.'s 1 & 2. The cable is plugged into the 7-pin outlet at the back of a Cambridge variometer or Integrator. The only other connections are to the ship's pitot and static via flexible tubing.

It is essential that the variometer be effectively T.E. compensated. Venturis and Brunswick tubes are excellent. We strongly recommend that the sometimes disturbing turbulence and gust sensitivity of T.E. systems be removed, by restrictors or gust filters. This has the added benefit of producing a better variometer system. If remote switching is desired, insert the plug supplied into the jack on the rear of the Director. The two lines can be attached to any single pole switch. When switch is ON, the Director is active, and the system is in the CRUISE mode. With the switch OFF, the system is in the CLIMB (VARIO) mode.

(Installation Diagram on Reverse)



WARRANTY

All Cambridge variometer products are guaranteed against defects for TWO YEARS from date of original purchase, when used in sailplanes only. The warranty is limited to parts and labor, and the unit must be returned to the factory. The warranty is void if the equipment is misused, or if repairs are performed by unauthorized persons.

WARNING

The Cambridge Audio Director is not an Airspeed Indicator, and must not be used as such, it cannot replace the ASI in any way, and does not relieve the pilot of responsibility for maintaining safe operating airspeeds at all times.

CAMBRIDGE AERO INSTRUMENTS INC.
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FIG. 1

WITHOUT INTEGRATOR

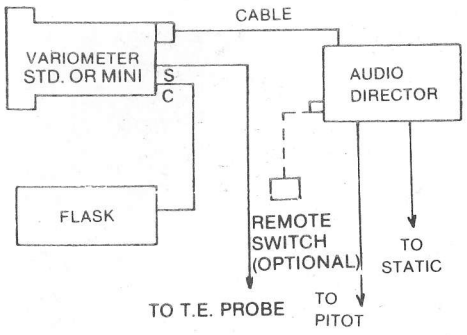
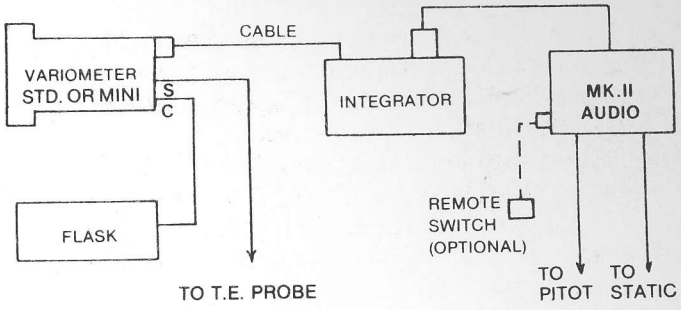


FIG. 2

WITH INTEGRATOR



Operation

Controls are provided as follows: -

3-Position Switch:
- VARIO-Director inactive. Climb mode
- LW-Director active. Use without water ballast.
- HW-Director active. Use when carrying water.

(Cruise mode)

Variable Cruise Control MC.

Fine Tine Control 'a', set in flight test.

Volume Control for Audio.

Polar Adjustment on top of box.

In position VARIO, the Cambridge will function as a variometer system. When using the Audio Director, in position LW & HW, it is important that the variometer sensitivity be set to 10KTS,. 1000 FPM, or 5 M/S as appropriate. Failure to do this will result in erroneous readings.

With LW or HW selected, a sink reading will be observed on the variometer on the ground. Between thermals, however, the system acts like a "Zero-reader". When the variometer reads +, slow up. When it reads −, speed up. At the correct speed, it will approach zero. The Audio sound should be followed for + and − in the same way as the variometer, except that near the correct speed, the Audio will go silent in a "dead-band".

When remote switching is in use, the switch on the Director should be left in either the LW or HW position, depending on whether water is being carried or not. The remote switch will now control the Director between CLIMB and CRUISE modes.

The "CRUISE" Control is used to set the expected achieved climb rate in the **next** thermal. In this respect, the Audio Director is analogous to a Speed-to-fly ring. MC settings of up to 10 KTS or 5 M/S can be dialed in.

As a practical matter, however, the setting is based on achieved climbs in previous thermals, modified by the pilot's own assessment of the conditions ahead, and of the requirements of the task. What the "CRUISE" control setting does is to define a "cruise regime" which best fits the pilot's judgement. The Audio Director then provides a most effective way of combining this "cruise regime" with external factors such as sink, and providing the pilot with the optimum cross-country speed.

Polar Adjustment For Sailplane

With the variometer set to X1 (10KTS or equiv.), Switch Director to LW. Adjust the Polar Adjustment on top of box with a screwdriver to a vario **sink** reading as follows: (MC Knob should be at 0)

Sailplane L/D 30:1	Vario is — 5.1 KTS. or —2.5m/s
Sailplane L/D 33:1	Vario is — 4.3 KTS. or —2.2 m/s
Std. Class L/D 36:1	Vario is — 3.6 KTS. or —1.8 m/s
15 M. Class L/D 40:1	Vario is — 3 KTS. or —1.5 m/s
Open Class L/D 44:1	Vario is — 2.5 KTS. or —1.2 m/s

Estimate settings for other L/D figures.

Flight Test to Set Fine Tune Adjustment 'a'

Perform one test flight in calm, smooth air. A flight in the late evening or early morning is recommended. Trim the ship at between 2000 and 3000 ft. (600-900m.) to fly at the maximum L/D speed (about 50 KTS. or 55 MPH or 90 KPH for most ships).

Set "CRUISE" Control to 0, and switch to LW, in the CRUISE mode. With a screwdriver, adjust the Fine Tune Control a to bring the variometer pointer to zero.

SPECIFICATION

Input:	Power and Variometer signals via 7-pin plug & cable.
	Pitot and Static via hose connectors.
Output:	Bias signals to variometer via same 7-pin plug & cable. Signal is a function of Airspeed, Sink Rate, Ship's polar, and Climb control setting.
	Full Range Audio.
Power Consumption:	approx. 40 m/a, at 11-18 VDC, at full volume.
Dimensions:	2⅜" x 2⅜" x 6"

POLAR CALIBRATION TABLE, AUDIO DIRECTOR,

Table 1

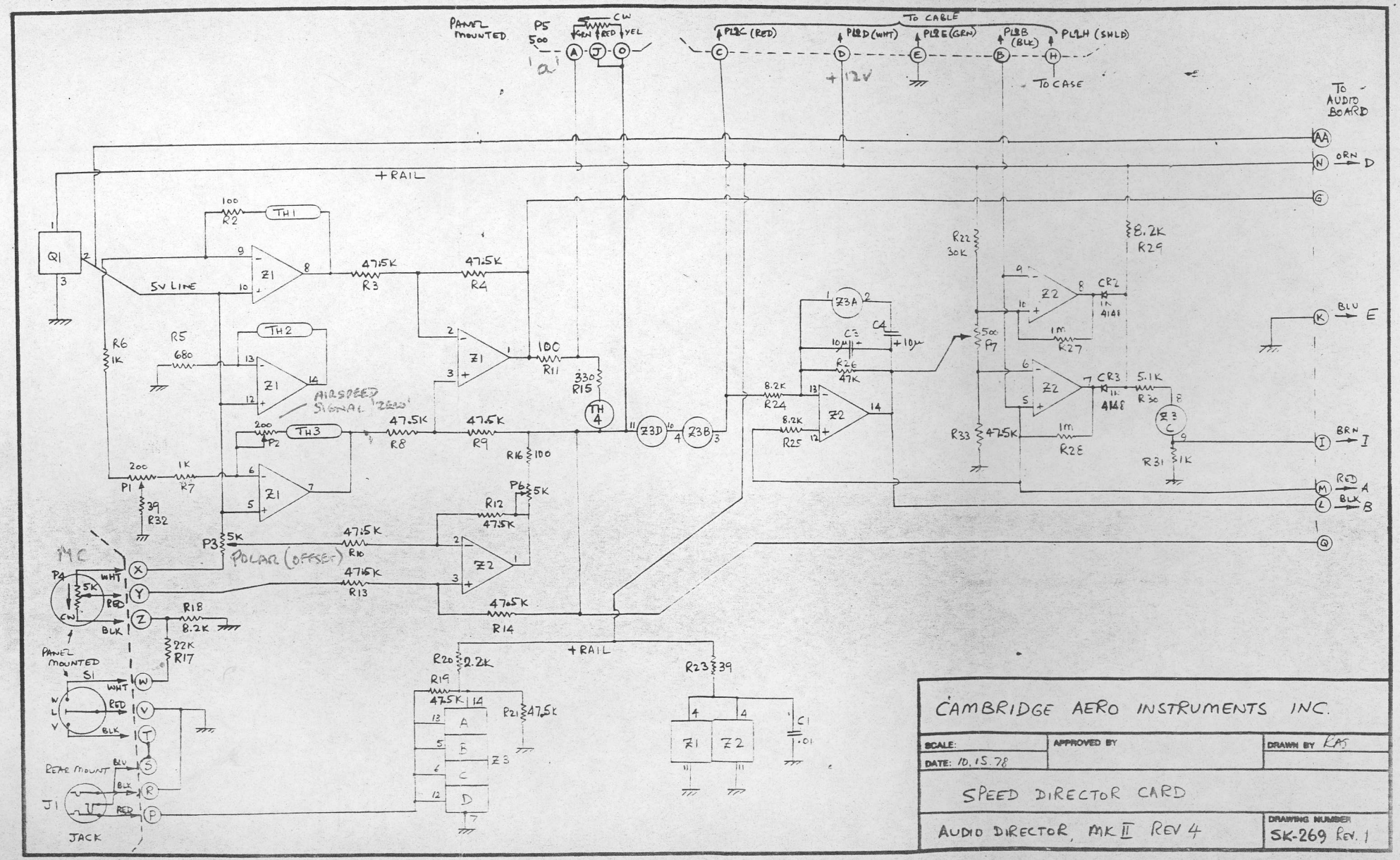
Variometer = X1, zero adjusted to +5kts, +500 FPM, or +2.5m/s
Director = VARIO, to set variometer, and then to LW

Director	AD150		AD150		AD141	
Calibration	knots		FPM		m/s	
MC Knob	0	5	0	5	0	5
L/D	Vario Low	Vario high	Vario Lo	Vario High	Vario Lo	Vario Hig
30:1	-o.1 kts	-5.1 kts	-10FPM	-510 FPM	0 m/s	-5 m/s
33:1	+0.7 kt	-4.3 kt.	+70 FPM	-430FPM	+0.3 m/s	-4.7m/s
36:1	+1 4 kt	-3.6 kt	+140 FPM	-360FPM	+0.7 m/s	-4.3m/s
40:1	+2.0 kt	-3.0 kt	+200 FPM	-300FPM	+1.0 m/s	-4.0m/s
44:1	+2.5 kt	-2.5 kt	+250 FPM	-250FPM	+1.3 m/s	-3.7m/s

Table 2

Variometer = X1, zero adjusted to 0.
Director = VARIO to set Variometer zero, then LW
MC Knob = 0

Director	AD150	AD150	AD141
Calibration	Knots System	FPM	m/s
L/D	Vario Sink Reading	Vario Sink Reading	Vario Sink Reading
30:1	-5.1 kts	-510 FPM	-2.5 m/s
33:1	-4.3 kts	-430 FPM	-2.2 m/s
36:1	-3.6 kts	-360 FPM	-1.8 m/s
40:1	-3.0 kts	-300 FPM	-1.5 m/s
44:1	-2.5 kts.	-250 FPM	-1.2 m/s



CAMBRIDGE AERO INSTRUMENTS INC.

SCALE:	APPROVED BY	DRAWN BY KAS
DATE: 10.15.78		

SPEED DIRECTOR CARD

AUDIO DIRECTOR, MK II REV 4

DRAWING NUMBER SK-269 REV. 1