

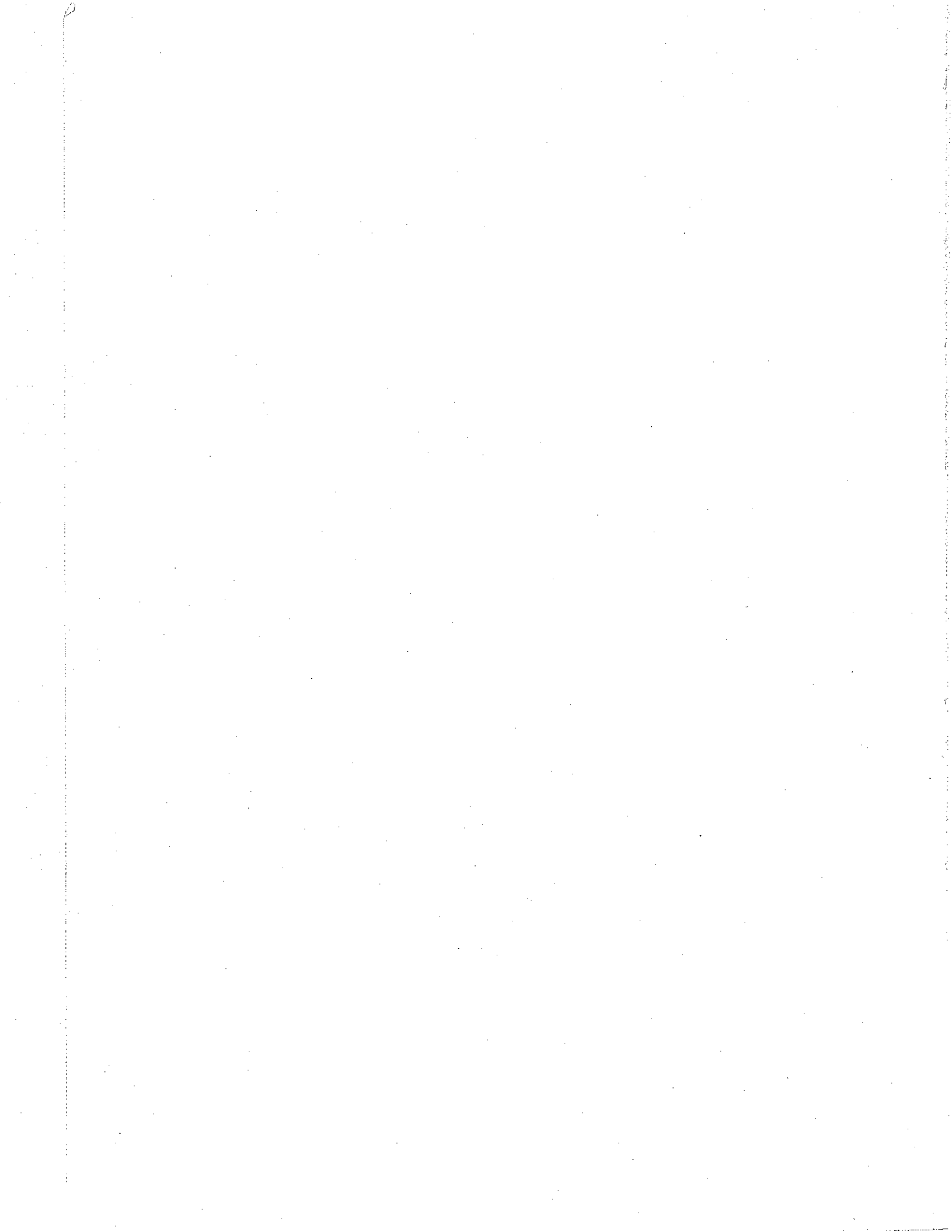
SUPPLEMENTAL



BIRD

**INSTRUCTION
book**

MODELS 6734-030/36-030/37-030



Auxiliary Instruction Book
 applying to
 Model 6730 Series TERMALINE[®] Wattmeters
 (Higher Frequency Group)

Note: This Booklet supplements the Instruction Book for the respective RF Load used with the designated Wattmeters listed below. These Models comprise the Wattmeter Measuring Sections and Meter and Housing Assys. with the Loads as included in the Table below.

Series 6730 (High Frequency) TERMALINE Wattmeter Models:-

<u>Model</u>	<u>RF Load</u>	<u>Wattmeter Section</u>	<u>Meter & Hsg. Assy.</u>
6732	8141	6735-004	6735-002-4
6734	8201	" "	" " -1
6735	8833	" "	" " -2
6736	8251	" "	" " -5
6737	8230	" "	" " -3

SUMMARY SPECIFICATIONS

Power Rating	See table below
Power Reading Scales	" " "
Impedance	50 ohms nominal
VSWR	DC to 1000 MHz - 1.15 max.
Accuracy	25 to 512 MHz - ±5% of F.S. 512 to 1000 MHz - ±10% of F.S.

<u>Model No.</u>	<u>Power Readings (Watts)</u>	<u>RF Load</u>	<u>Input Connector</u>	<u>Power Rating (Watts)</u>
6732	10/50/250	8141	F(N)	250
6734	25/100/500	8201	F(N)	500
6735	120/600/1200	8833*	F(LC)	1000
6736	50/250/1000	8251	F(LC)	1000
6737	100/500/2500	8230**	F(LC)	2500

*Intermittent 1200 watt rating (See Load Instruction Book)

**Water cooling required " " " "

NOTES:-

- (a) Model 6734 replaces Model 67
- (b) Model 6735 replaces Model 6835
- (c) Model 6737 replaces Model 67C
- (d) Input connectors listed are as normally supplied.

Bird Electronic Corp.
 Cleveland (Solon), Ohio 44139

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 311
LECTURE 10
MAY 10, 1961

LECTURE 10: THE QUANTUM THEORY OF LIGHT

Topic	Notes	References	Comments
Wave-Particle Duality	Light as a wave and particle	de Broglie, Compton	Key concept
Photoelectric Effect	Energy of photons	Einstein	Experimental evidence
Compton Scattering	Collision of photons and electrons	Compton	Wave-particle duality
Blackbody Radiation	Planck's law	Planck	Quantization of energy

PROBLEMS

1. A photon of wavelength λ strikes an electron at rest. The photon is scattered at an angle θ with wavelength λ' . Show that the Compton shift is given by $\lambda' - \lambda = \frac{h}{m_0 c} (1 - \cos \theta)$.

2. Calculate the energy of a photon with a wavelength of 10^{-10} m.

3. A photon of energy E strikes a free electron. The electron recoils with velocity v . Find the angle θ between the photon's path and the electron's path.

4. The Compton wavelength of an electron is 2.426×10^{-12} m. Calculate the energy of a photon whose wavelength is equal to the Compton wavelength of an electron.

5. A photon of energy E strikes a free electron. The electron recoils with velocity v . Find the angle θ between the photon's path and the electron's path.

6. A photon of energy E strikes a free electron. The electron recoils with velocity v . Find the angle θ between the photon's path and the electron's path.

7. A photon of energy E strikes a free electron. The electron recoils with velocity v . Find the angle θ between the photon's path and the electron's path.

8. A photon of energy E strikes a free electron. The electron recoils with velocity v . Find the angle θ between the photon's path and the electron's path.

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Auxiliary Instruction Book
 applying to
 Model 6730 Series TERMALINE® Wattmeters
 (Higher Frequency Group)

Note: This Booklet supplements the Instruction Book for the respective RF Load used with the designated Wattmeters listed below. These Models comprise the Wattmeter Measuring Sections and Meter and Housing Assys. with the Loads as included in the Table below.

*tr
v*

Series 6730 (High Frequency) TERMALINE Wattmeter Models:-

<u>Model</u>	<u>RF Load</u>	<u>Wattmeter Section</u>	<u>Meter & Hsg. Assy.</u>
6732✓	8141✓	6735-004 ✓	6735-002-4✓
6734✓	8201✓	" "	" " -1
6735✓	8833✓	" "	" " -2
6736✓	8251✓	" "	" " -5
6737✓	8230✓	" "	" " -3

*ld
rd*

SUMMARY SPECIFICATIONS

Power Rating	See table below
Power Reading Scales	" " "
Impedance	50 ohms nominal
VSWR	DC to 1000 MHz - 1.15 max.✓
Accuracy	25 to 512 MHz - ±5% of F.S.✓ 512 to 1000 MHz - ±10% of F.S.✓

<u>Model No.</u>	<u>Power Readings (Watts)</u>	<u>RF Load</u>	<u>Input Connector</u>	<u>Power Rating (Watts)</u>
6732✓	10/50/250✓	8141✓	F(N)✓	250
6734✓	25/100/500✓	8201	F(N)	500
6735✓	120/600/1200✓	8833*	F(LC)	1000✓
6736✓	50/250/1000✓	8251✓	F(LC)	1000✓
6737✓	100/500/2500✓	8230**	F(LC)	2500✓

*Intermittent 1200 watt rating (See Load Instruction Book)
 **Water cooling required

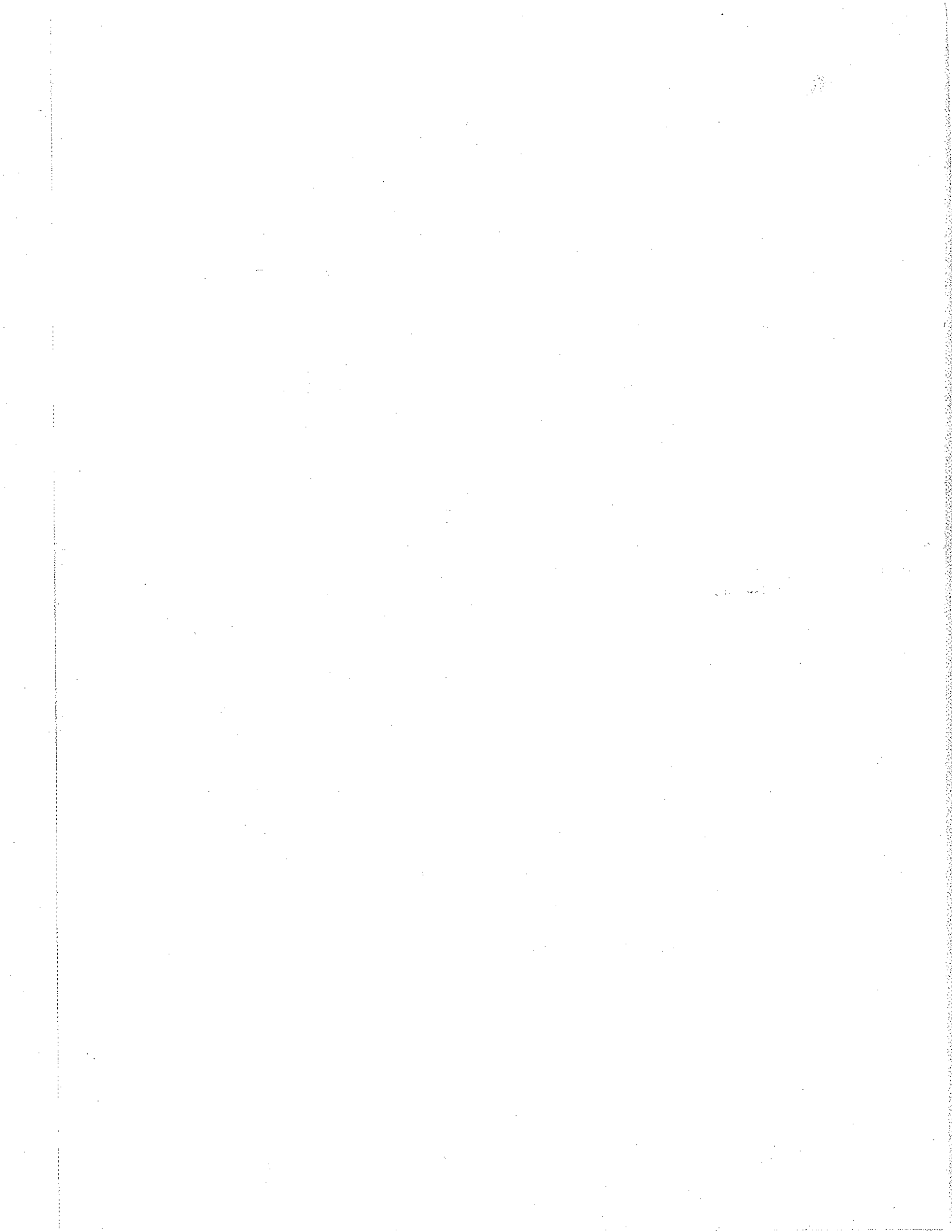
NOTES:-

- (a) Model 6734 replaces Model 67✓
- (b) Model 6735 replaces Model 6835✓
- (c) Model 6737 replaces Model 67C✓
- (d) Input connectors listed are as normally supplied.

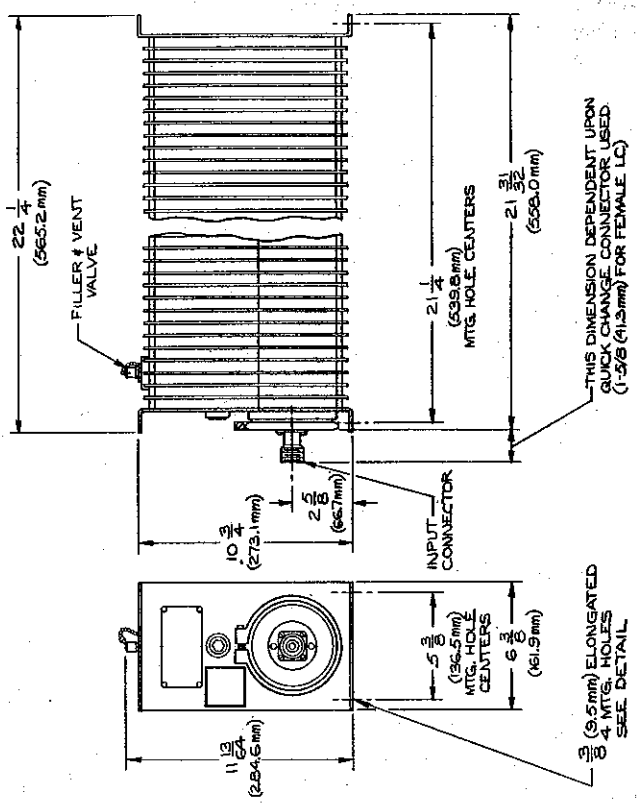
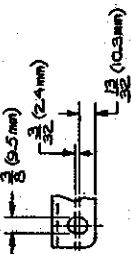
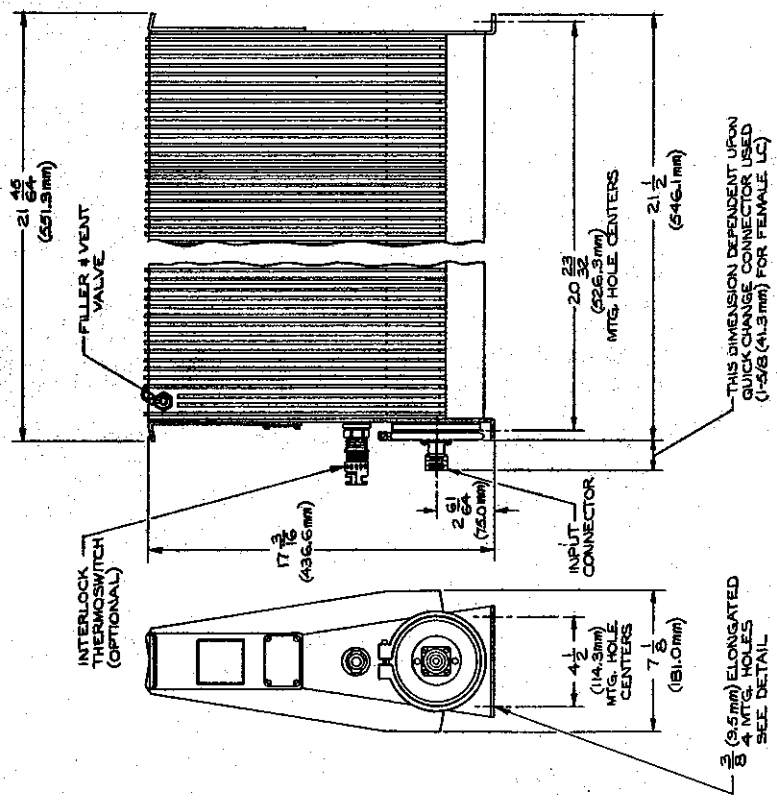
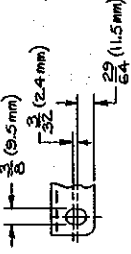
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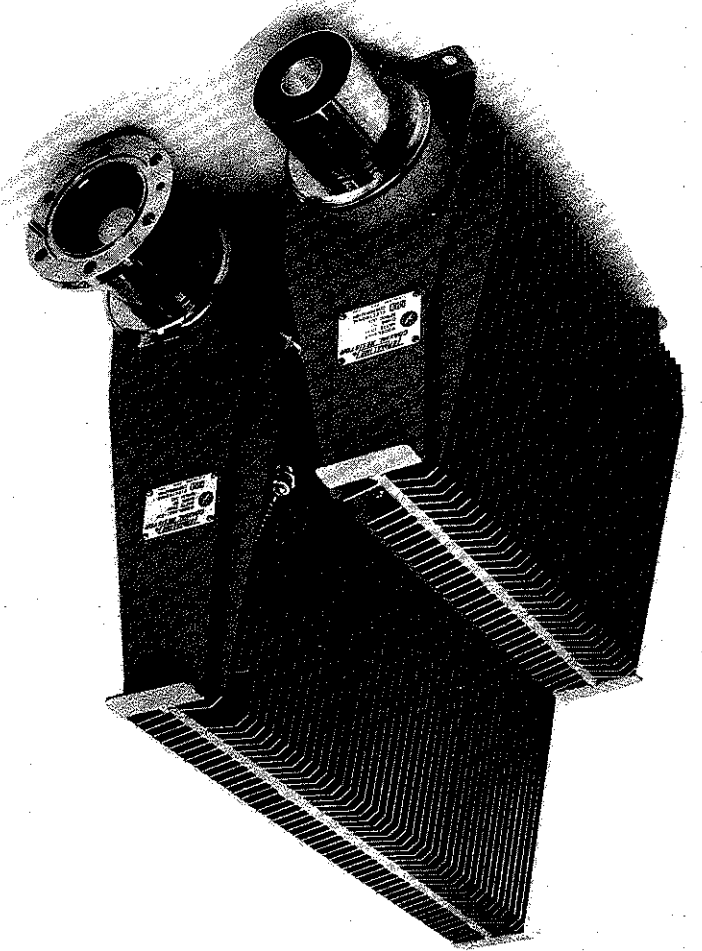


REV. NO.	DESCRIPTION	DATE
1		



10/16 INCHES
FRACTIONAL INCHES : 1/4
DECIMAL INCHES : .005
1 PLACE MILLIMETERS : 4
2 PLACE MILLIMETERS : .12
(UNLESS OTHERWISE SHOWN)

USED ON	ITEM REQ	DRAWING NO.	DESCRIPTION
6890-900 SERIES			BIRD ELECTRONIC CORPORATION CLEVELAND, OHIO
MATERIAL:			TITLE OUTLINE, COMPARISON, INSPIRATION, ETC.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES			MODEL 6890 SERIES 1 6890-900 SERIES
DO NOT SCALE DRAWING			SIZE C
DRAWN G. CHLOJNIEWSKI			DRAWING NO. 8890-090
DATE 3-12-80			
CHECKED G.C. 3-13-80			
APPROVED G.C. 3-13-80			
FINISH NAVY GRAY ENAMEL PER MIL-E-15090			
SCALE 1/4			
CORE IDENT. NO. 70778			



Specifications

Power Rating	1500 watts continuous duty
VSWR & Frequency Range	1.1 max. dc to 1000 MHz 1.25 max. 1000 to 2000 MHz
Ambient Air Temperature Range	-40° to +45°C
Weight (max.)	32-1/4 lbs. (14.7 kg)
Operating Position	Horizontal only
Finish	Light Navy Grey baked enamel (MIL-E-15090)
Dimensions (less connectors)	13-1/8 H x 5-1/2 W x 15-7/8 L 333 x 140 x 403mm
Input Connector	QC-LC Female
	1-5/8" Unflanged
	1-5/8" EIA Flanged
	3-1/8" Unflanged
	3-1/8" EIA Flanged
	Model 8860
	Model 8861
	Model 8862
	Model 8863
	Model 8864

Power Rating	2500 watts continuous duty
VSWR & Frequency Range	1.1 max. dc to 1000MHz 1.25 max. 1000 to 2000 MHz
Ambient Air Temperature Range	-40° to +45°C
Weight (max.)	54-3/4 lbs (25 kg)
Operating Position	Horizontal only
Finish	Light Navy Grey baked enamel (MIL-E-15090)
Dimensions (less connectors)	17-3/16 H x 7-1/8 W x 21-3/4 L 437 x 181 x 552mm
Input Connector	QC-LC Female
	1-5/8" Unflanged
	1-5/8" EIA Flanged
	3-1/8" Unflanged
	3-1/8" EIA Flanged
	Model 8890-300
	Model 8895-300
	Model 8892-300
	Model 8897-300
	Model 8891-300

Series 8860 and 8890-300 are new TERMALINE® RF Load Resistors for use with low power transmitters, designed with a novel, highly efficient thermal structure for which a patent is pending.

Series 8860 will terminate 1500-watt CW or FM transmissions, or can act as a load for 1000 watt AM transmitters under full modulation in high ambient temperature or otherwise hostile environments. Series 8890-300 has a continuous duty power rating of 2500 watts. Overload Thermoswitch Part No. 8890-008 is optional.

The new rhombic shape permits size and material savings which are passed on to the end user. Models in this series are available with 1-5/8" or 3-1/8" flanged or unflanged input or with any of Bird's two dozen Quick-change QC cable connectors. VSWR is a low 1.1 from dc to 1000 MHz.

This 1500 and 2500 watt series joins the Bird TERMALINE 5000 watt models 8921-27 and the 10,000 watt series 8930.

- ⊗ Accurate 50-ohm line termination — replaces antenna during design, test and alignment.
- ⊗ Choice of unflanged or EIA flanged connectors for rigid lines.
- ⊗ Choice of most common RF cable connectors.
- ⊗ Rugged, highly efficient thermal design (patent applied for).

NEW 1500 & 2500 WATT TERMALINE® RF LOAD RESISTORS

8890-300

Instruction Booklet applying to
Model 6730 Series Termaline Wattmeter

This booklet supplements the Instruction Book for the appropriate RF Load used with the input Wattmeter Section and the Meter and Housing Assembly as listed below to make up your Termaline Wattmeter.

<u>Termaline Wattmeter Model No.</u>	<u>RF Load</u>	<u>Wattmeter Section</u>	<u>Meter and Hsv. Assy.</u>
6734-030	8201	6734-034	6735-002-7
6736-030	8251	6734-034	6735-002-8
6737-030	8230	6734-034	6735-002-9

Basic Specifications

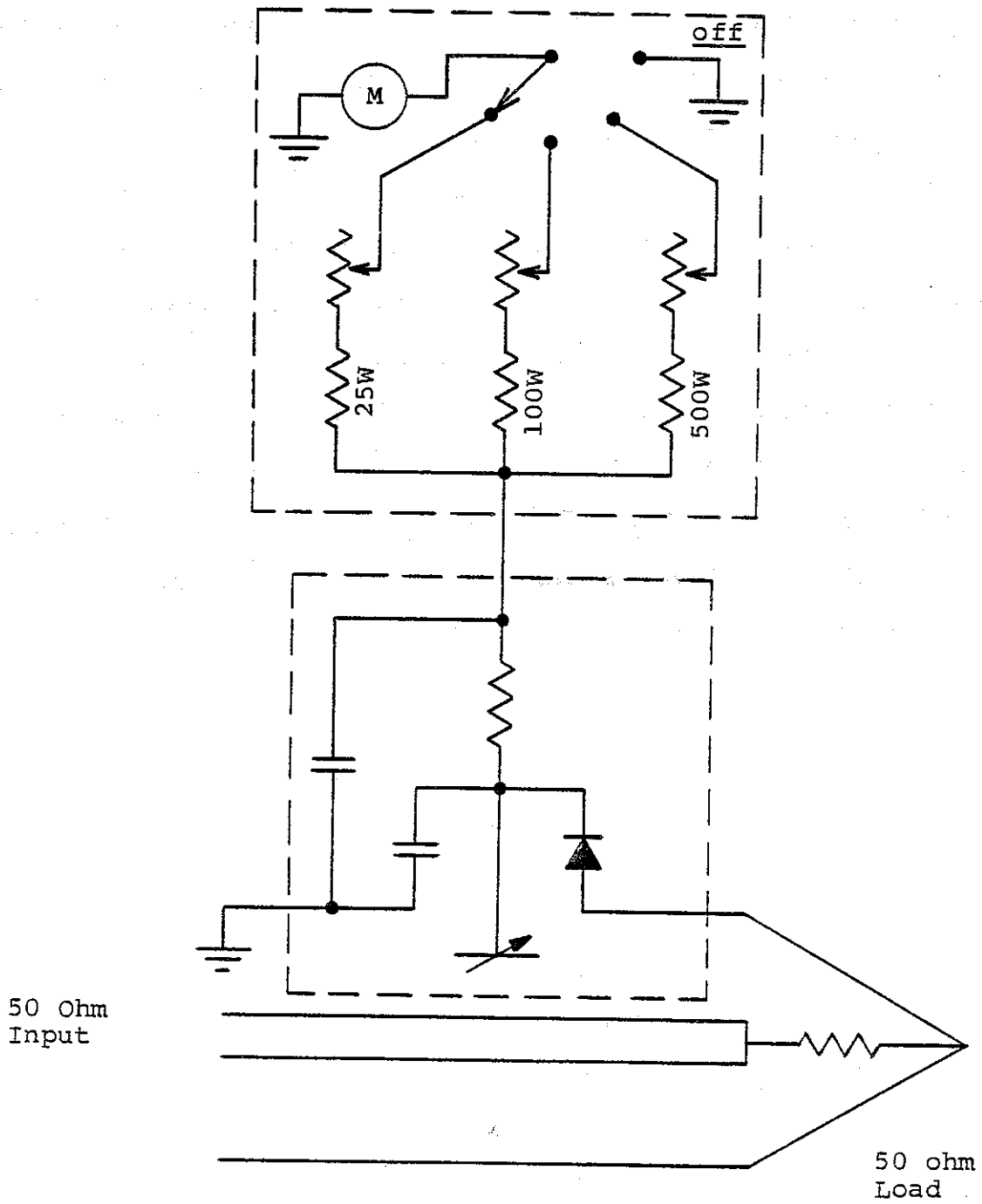
Power Rating See Table Below
Power Ranges See Table Below
Impedance. 50 ohms nominal
VSWR DC to 35 MHz - 1.10 max.
Accuracy 2 to 32 MHz - $\pm 5\%$ of F.S.
1.5 to 35 MHz - $\pm 10\%$ of F.S.

<u>Model No.</u>	<u>Power Ranges (Watts)</u>	<u>RF Load</u>	<u>Power Rating (Watts)</u>
6734-030	25/100/500	8201	500
6736-030	50/250/1000	8251	1000
6737-030	100/500/2500	8230**	2500

**Water cooling required (See Load Instruction Book).

Models 6734-030, 6736-030, 6737-030

Schematic Diagram



NOTE: Power Ranges shown are for Model 6734-030.

Wattmeter Circuit

Basically consists of a voltage capacitive divider with one of the capacitors being an adjustable probe whose value can be changed. The small voltage developed across the fixed capacitor is rectified by a diode. A simple RC filter eliminates any RF present and the rectified DC current is fed to the meter.

The Wattmeter measures three separate power ranges by selectively switching in the various values of resistance in series with the meter. One of the resistors in each range is adjustable and are located on back of the meter. The range switch control knob is located on the front face of the meter housing.

Mechanically the Wattmeter section consists of a 50 ohm line section with the voltmeter block attached to it. The meter cable is screwed directly on top of the voltmeter block to complete the assembly.

Connections

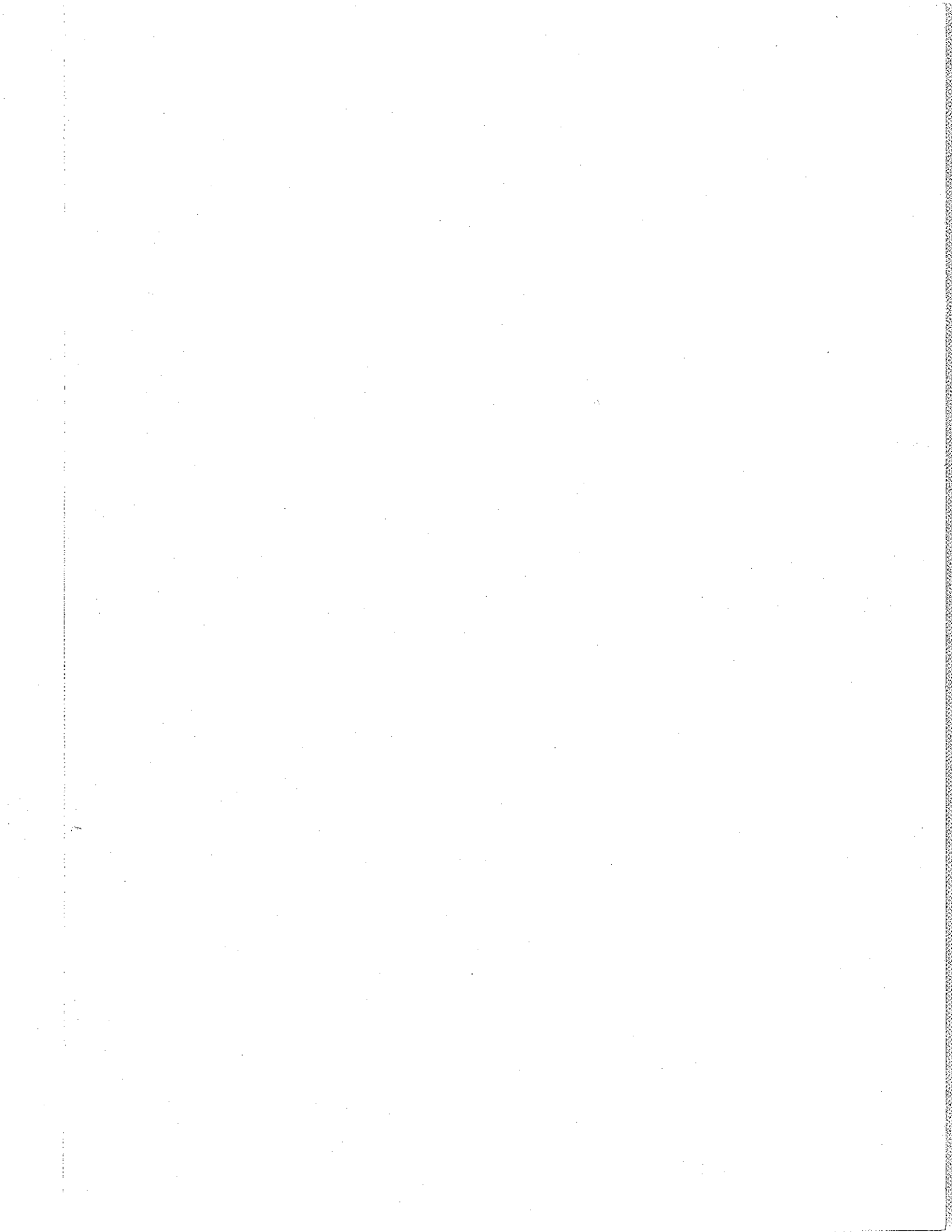
One end of the line section has a protruding center conductor that fits into the load, the other end is the receptacle for attaching the input connector.

The Wattmeter line section can be removed from the load by removing the four 8-32 screws and pulling straight out. The input connector on the other end of the line section can be substituted also by removing the four 8-32 screws and pulling the connector straight out.

This is the Bird "Quick-Change" design, which permits rapid interchange of connector types in the Bird "Q.C." family. The center contact pin should be properly aligned in the socket when inserting. The center contact pin can be damaged by careless handling.

Replacement Parts List

<u>Part No.</u>	<u>Description</u>	<u>Quantity</u>
6734-036	Voltmeter Assembly	1
5-1203	Diode	1
5-595-2	Sensistor	1
2000-064	Meter (Model 6734-030)	1
2000-067	Meter (Model 6736-030)	1
2000-065	Meter (Model 6737-030)	1
6735-008	Switch, Rotary	1
4240-062	Connector (Female N)	1
4240-031	Connector (Female LC)	1
6735-011	Assembly, D.C. Cable	1
2-249	Cable Clamp	1
6733-054	DC Connector Shorting Plug	1
4110-016	Range Switching Knob	1



**QUALITY INSTRUMENTS
FOR RF POWER MEASUREMENT**

**From 2 to 2300 MHz and from 25 milliwatts
to 250 kilowatts in 50-ohm coaxial line systems.**

TERMALINE

**ABSORPTION
WATTMETERS**

LOAD RESISTORS

CALORIMETERS

THRULINE

**DIRECTIONAL
MONITORING
WATTMETERS**

TENULINE

ATTENUATORS

COAXWITCH

**SELECTOR
SWITCHES**

COAXIAL RF FILTERS

SENTRILINE

FILTER-COUPERS



BIRD

Electronic Corporation

30303 Aurora Road, Cleveland (Solon) Ohio 44139