Mobile Communications Support Test Equipment

BIRD

As this catalog is delivered to you, Bird Electronic Corporation is entering its fourth decade as the innovative leader of the industry.

For that full period of time, Bird Electronic has influenced advancement of the science of broadcast communications through continuous development of precision RF measurement and termination equipment. Virtually all of the Bird inventions quickly became the standard by which imitators are now measured.

The full impact of Bird Electronic Corporation on its field of endeavor can be judged, in part, by the adoption of the company's proprietary designations into the communications professional's language: "The Bird" (our Model 43 Wattmeter), "THRULINE" (for directional wattmeters), "TERMALINE" (reference to loads and absorption wattmeters), "TENULINE" (coaxial attenuators), etc.

Further proof of the reliability of Bird Electronic products' performance is their universal acceptance, world-wide, by governmental agencies and engineers in the private sector.

In this new Mobile Communications Catalog, you will find, as in prior "MobCat" issues, a full line of products with a selection in each category to suit a wide range of requirements:

***Advanced State of the Art!** We call your attention to RF POWER ANALYST® Wattmeters in the 4380 and 4390 Series. These push-button, direct read-out, microprocessor models give you instantaneous, foolproof power readings. They perform with unprecedented ease and speed with improved accuracy in CW, VSWR and P.E.P. measurements.*

***Unbeatable Economy!** Where budgetary limits impose restraints, "Old Faithful" Model 43 Wattmeter continues as the epitome of a rugged, reliable, accurate wattmeter. Model 43 power and frequency ranges are readily adapted to your expanding needs by simply adding a suitable, inexpensive, Plug-in Element.*

***High Power Attenuation!** Overcome the serious deficiencies of using multiple sets of couplers formerly needed to span a 30 to 500 MHz range. Employ a **single** 8300 Series TENULINE® RF Coaxial Attenuator. They have the ability to dissipate 50% to 99.9% of input power uniformly.*

***Great Flexibility & Utility!** An assortment of options and accessories listed in the various product sections of this catalog are designed to expand the coverage and usefulness of your Bird product selections.*

Before you check the products cataloged in this book, permit us to remind you that they are all covered by our commitment to your satisfaction and a strong warranty. Bird Electronic Corporation has an established history of dependability and serviceability. You may order with complete confidence.

Sincerely,
BIRD ELECTRONIC CORPORATION

W. L. Yochum,
Director of Sales

THRULINE® RF Directional Wattmeters

50 ohms nominal

Mini-Monitor® 4111-18

Pocket-Sized Rugged Wattmeters For Service and Maintenance of Communications Transmitters From 2 to 512 MHz

Each wattmeter is made up of a precisely machined section of 50-ohm line, two directional power detectors, and a meter calibrated in watts.

The sensing circuits face in opposite directions and the front-panel switch selects the direction of power flow to be indicated on the meter. With the transmitter connected on the meter side and the load near the switch, the "forward" position is the higher power range, while "reflected" selects the lower power range. In case this lower-power full-scale value is desired for increased resolution in the forward direction, simply reverse the RF cable connections to the wattmeter.

Model	**4111**	**4112**	**4113**	**4114**	**4115**	**4118**
Power Rating						
Forward (FWD)	150W	200W	1000W	50W	50W	150W
Reflected (RFL)	15W	**20W	100W	5W	5W	15W
Freq. Range, MHz	25-175	2-30	2-30	400-512	100-225	400-512

Connectors Model 4111: UHF/F (SO-239)*, All others N/F*
Insertion VSWR 1.1 max.
Finish Light Navy grey baked enamel (MIL-E-15090)
Accuracy ±5% of full scale
Nominal Size incl. conn. 4⅝" x 2" x 2⅞" (117 x 51 x 74 mm)
Weight 1 lb. (½ kg)
**as supplied when no preference is specified. Carrying Case Model CC-2 optional.*
***20W range: ±10%*

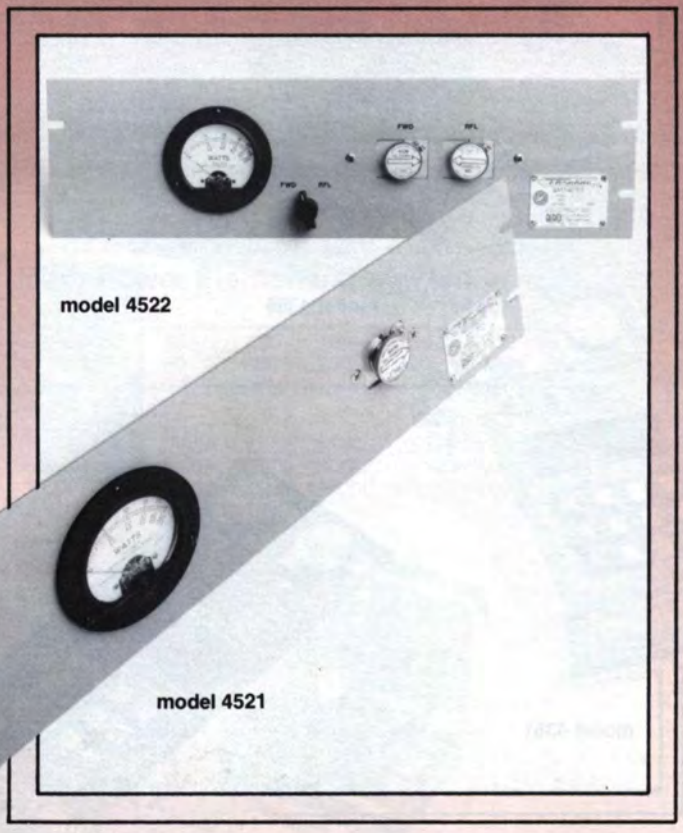
models 4521, 4522

For Permanent Installations

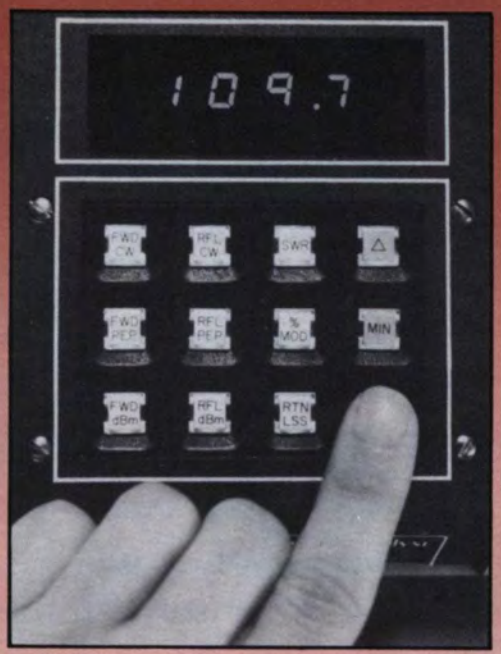
The versatility and accuracy of our portable model 43 Wattmeter is available in a series of rack-mounted THRULINE® Wattmeters tailored to a variety of stationary FM and CW power measurement applications. The Element in single socket/single meter model 4521 is rotated manually in the direction of the desired measurement, while the outputs of two Elements in the double socket/single meter model 4522 are switch selected. This double socket feature allows selection of a more sensitive Element (up to 10:1 ratio) for reflected power measurement and much more accurate VSWR determination. Select Elements from model 43 tables on page 5.

For complete hands-off operation, model 4526 (not shown) features two meters — one for the forward and one for the reflected power Element sockets. Model 4527 adds to this a fixed-level RF sampling output for frequency counting and analysis.

Power Rating See Element Tables p. 5
Insertion VSWR 1.05 max.
Connectors QC Type
(Female N normally supplied)
Accuracy ±5% of full scale
Finish Light Navy grey baked enamel
(MIL-E-15090)
Panel Size 5¼" x 19" (133 x 483 mm)



RF Power Analyst®



A New Generation of Microprocessor-Based THRULINE® RF Directional Wattmeters

0.45-2300 MHz
0.1-10,000 watts

Models for Two-way Communications, Avionics, C³, Radar etc.

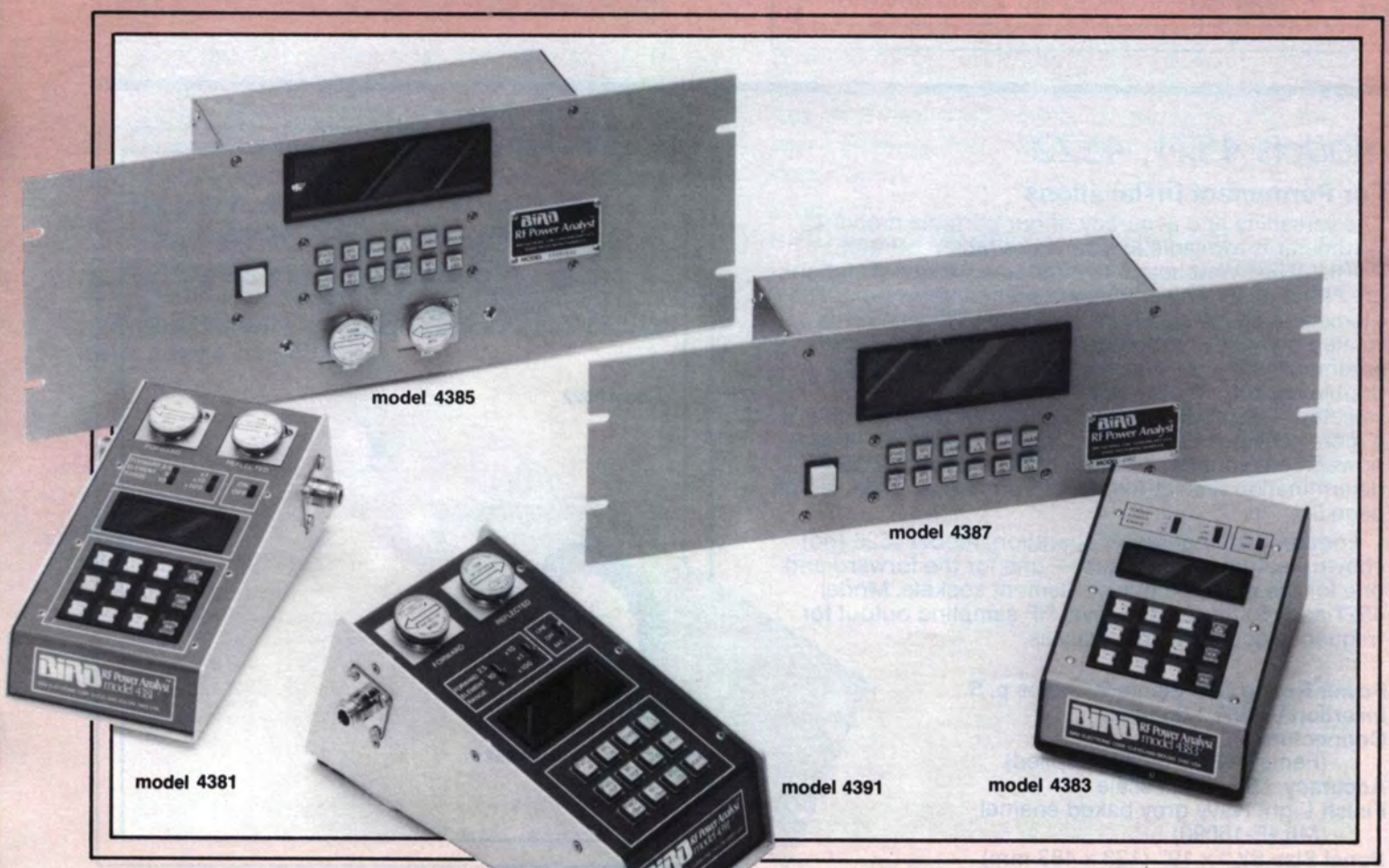
At the push of a button, these new digital RF Wattmeters with nine-mode system versatility

read *incident and reflected CW and FM power in watts or dBm, incident and reflected peak-envelope-power of SSB/DSB and symmetrical AM in watts, incident and reflected peak pulse power as narrow as 0.8µsec in watts (model 4391),*

calculate *SWR, dB return loss, percent modulation,*

remember *your peak and valley readings when you adjust for maximum or minimum signal levels,*

overrange *at least 20% beyond nominal full scale, and will do all this* ***with Plug-in Elements you may already own from other Bird THRULINE Wattmeters.***



Model 4381 is portable with a built-in coax line section, with an 8 hr. battery and separate charger, optional carrying case. **Model 4385** is the stationary, rack-mounted version.

Model 4383 is similar to the model 4381, but without a coax line section. **Model 4387** is the stationary, rack-mounted version. These are intended for use with permanently installed line sections.

Model 4391 is a portable **Peak and CW** Wattmeter with built-in coax line section, battery, international power supply and charger. It is designed for pulsed systems such as avionics surveillance, collision avoidance and navigation, as well as for CW, FM, AM,SSB/DSB transmissions.

RF POWER ANALYST® Digital Directional Wattmeters also calculate parameter products that used to require tracing on a graph or chart, reveal whether AM modulation is present and — if so — how much, measure pulsed transmissions down to 0.8 microseconds (4391), and make min./max. power searches a breeze.

1 To measure forward and reflected power, insert two Elements with a 10:1 power ratio (for better resolution of the lower reflected levels) and set the range switches to match. Push FWD/CW or RFL/CW to read in watts while you make adjustments to your equipment, or push SWR to find the optimum match.

2 A transmitter or signal source — rated to say 10, or 250 or 1000 watts nominally — is always designed with capacity to spare. As a matter of fact, some FCC rules *require* measurement at 110% of rated power. The instrument's 120% of over-range on each Plug-in Element lets you measure there without changing Elements AND does so with "up-scale" accuracy. Think of it: You get to use the same Plug-in Elements you probably already own from one of the more than 100,000 model 43 THRULINE® Wattmeters in the field; you get an additional 20% beyond full-scale power, and at much better accuracy than obtainable if you had to switch to the next higher-power Element and read it downscale.

3 Desired minimum levels (e.g. of reflected power or of SWR) are found easily through the Δ function, which displays a "greater than" or "less than" symbol in place of the last digit, indicating increasing or decreasing levels. Or run through equipment adjustments from one extreme to the other — even with your eyes closed — then push the MIN memory button to display the optimum achievable value, and tune your gear to match it. The same easy procedure is available for desired maximum levels, by use of the MAX memory button. This is even faster than tweaking with an analog display meter, since you need not pass the signal dip (or peak) several times to be certain you have reached the optimum condition: The memory shows exactly what MIN or MAX value to aim for.

4 The new RF POWER ANALYST reads peak envelope power in either forward or reflected direction, all with the same Elements used for CW power. It is so sensitive that you can measure a 1% ripple of hum on a carrier by pushing %MOD, if you notice a difference in the PEP and CW readings. That feature alone is likely to solve signal "mysteries".

5 There is more: By detecting peaks and valleys, AM modulation up to 99.9 percent is displayed with one button. For convenience in the lab or on the production line, three additional keyboard functions furnish CW in dBm — instead of watts — in both directions, and return loss in dB.

IEEE 488 RF POWER ANALYST units equipped with the proper rear panel connector for IEEE-488 as well as RS-232 interface capability require addition of the suffix -832 to the model number (e.g. order model 4391-832). Requires Bird GPIB Interface unit. Ask for Bulletin IE-488-181.

Specifications

Power Range[1] 0.1W to 10kW full scale using Bird Plug-in Elements. Accuracy not guaranteed with components not supplied by Bird.

Usable over-range To 120% of nominal full scale (for compliance with FCC 110% regulations without the need to buy and use higher power Elements)

Frequency Range[1] 0.45 to 2300 MHz
Sampling Rate 2 to 3 readings per second
Display 3½ digit, .8" LED-strobed (4385, 4387)
.3" LED-strobed (4381, 4383, 4391)

Accuracy
Power Readings ±5% of full scale
SWR ±10% of reading
Return Loss ±0.3dB to corresponding SWR value
Modulation Frequency 50-10,000 Hz
A.C. Power 100-130/200-260 VAC 50/60 Hz, 8W
Panel Dimensions 19" x 5 7/32" (483 x 133 mm)

[1] *Frequency band and power range is determined by Plug-in Element selected. Select two Elements in a 10:1 power ratio. (See pages 3, 5).*
[2] *For pulse modulation the minimum parameters are: 50 micro-seconds pulse width,100 pps repetition rate and 1% duty cycle, except that for model 4391 the parameters are:*
Min. duty factor:1 x 10⁻⁴
Min. repetition rate: 25 pps
Min. pulse width: 100-2300 MHz 0.8μsec
25-125 MHz 1.5μsec
2-30 MHz 15 μsec
[3] *4381, 4383: specify voltage at time of order.*
4385, 4387, 4391: voltage is selected by integral switch.
4381, 4385, 4391: QC-Type Connectors (N/F normally supplied)

TABLE 5 *(Also see Tables 1, 2, 3, 4, and 6 on Page 5)*
High Power Elements (Peak Only)

Power Range	Frequency Bands (MHz) 25 - 60	50 - 125	100 - 250	200 - 500	400 - 1000	950 - 1260
500 watts						500J
1000 watts						1000J
2500 watts	2500A	2500B	2500C	2500D	2500E	2500J
5000 watts	5000A	5000B	5000C	5000D	5000E	5000J
10000 watts	10000A	10000B	10000C	10000D	10000E	

CARRYING CASE 4300-080 for portable 4380 series instruments includes space for optional RF Signal Sampler and spare Elements.

THRULINE® RF Directional Wattmeters

50 ohms nominal

The Indispensable Model 43

Range: 100mW to 10,000W

Affectionately referred to by radio engineers around the world as "The Bird," the low-cost Model 43 THRULINE Directional Wattmeter has an unequaled history of reliability, durability and flexibility. Its in-the-field service record spans nearly three decades.

"The Bird" is a thoroughly engineered, portable, insertion-type instrument designed to measure both forward and reflected CW power in coaxial transmission lines. It gives accurate RF power flow readings under any load conditions.

The Model 43 THRULINE Wattmeter is comprised of a line section and a direct-reading 3 scale meter housed in a rugged, corrosion-resistant aluminum case. QC (Quick Change) Type Connectors and a full range of Plug-In measuring elements (ordered separately now or later to meet your existing needs) give "The Bird" amazing flexibility and adaptability. Two extra elements can be stored in the housing, one on each side. The Model 43 is easy to use and simple to service in the field.

Line Section: A very precise 50 ohm coaxial air line is designed for insertion into the transmission line between transmitter and antenna or load. The line section is equipped with a socket into which the Plug-In element with the desired power and frequency range is inserted. It is also equipped with QC Connectors described below:

QC Type Connectors: The Bird Model 43 is normally supplied with two Female N Connectors. However, at the time of ordering, other types of connectors may be specified including: Male or Female BNC, TNC, UHF, C, SC, LC, N, HN, LT, General Radio Type 874 and 7/8" EIA Flanged. All of these QC connectors are interchangeable in the field without affecting the instrument's calibration.

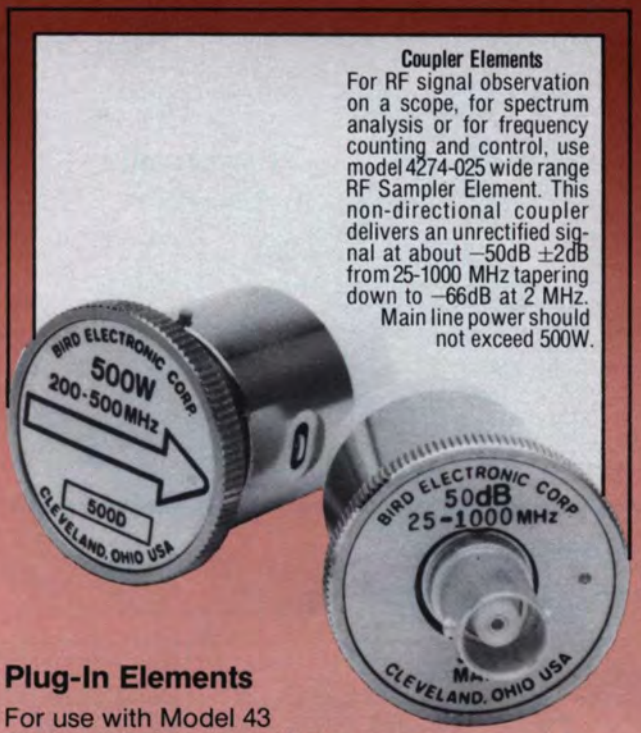
Indicating Meter: A shock-mounted 30 microampere meter with 3 expanded scales of 25, 50, 100 unit calibration to permit full scale direct power reading from 100 milliwatts to 10,000 watts.

Plug-In Elements: These elements read both forward or reflected power as indicated by the direction in which the arrow is pointing. Frequency range and full scale power are marked on each element. Use a lower power element (e.g. 10:1) for increased resolution of reflected power readings.

Remote Installation: When it is more convenient, the RF line section can be easily removed from the Model 43 case and inserted at any desired point in the line. The meter may then be located at another point for optimum visibility. 32" of meter cable is supplied in the instrument housing for this purpose. Additional lengths available as required.

Specifications (model 43)

Power Rating see opposite page
Impedance 50 ohms nominal
Insertion VSWR with N connectors 1.05 max.
Finish Light Navy grey baked enamel (MIL-E-15090)
Nominal Size incl. conn. 6 7/8" x 5 1/8" x 3 5/8" (175 x 130 x 92mm)
Weight 3 lbs. (1.4 kg)
Element Weight 3 oz. (85 g)
Accuracy ±5% of full scale
Optional Cases: *Cowhide Carrying Case CC-1, Plug-In Element Carrying Case EC-1.*



Coupler Elements
For RF signal observation on a scope, for spectrum analysis or for frequency counting and control, use model 4274-025 wide range RF Sampler Element. This non-directional coupler delivers an unrectified signal at about −50dB ±2dB from 25-1000 MHz tapering down to −66dB at 2 MHz. Main line power should not exceed 500W.

Plug-In Elements

For use with Model 43 THRULINE Wattmeter. Select one or more elements to suit your frequency and power ranges. When ordering, specify catalog number and THRULINE Model number.

Also for use with Models 4314, 4430, 4431, 4521, 4522, 4526, 4527 THRULINE Wattmeters; 4381, 4383, 4385, 4387 and 4391 RF POWER ANALYST® Wattmeters; 50-ohm Line Sections equipped with QC-Connectors or 7/8" EIA Flanges; WATTCHER® Monitor/Alarms Models 3128 and 3170; and TERMALINE® Wattmeter Model 6151.

TABLE 1
Standard Elements (Catalog Numbers)

Power Range	Frequency Bands (MHz) 2 - 30	25 - 60	50 - 125	100 - 250	200 - 500	400 - 1000
5 watts	—	5A	5B	5C	5D	5E
10 watts	—	10A	10B	10C	10D	10E
25 watts	—	25A	25B	25C	25D	25E
50 watts	50H	50A	50B	50C	50D	50E
100 watts	100H	100A	100B	100C	100D	100E
250 watts	250H	250A	250B	250C	250D	250E
500 watts	500H	500A	500B	500C	500D	500E
1000 watts	1000H	1000A	1000B	1000C	1000D	1000E
2500 watts	2500H					
5000 watts	5000H					

TABLE 2
Low-Power Elements

1 watt	Cat. No.	2.5 watts	Cat. No.
60-80 MHz	060-1	60-80 MHz	060-2
80-95 MHz	080-1	80-95 MHz	080-2
95-125 MHz	095-1	95-150 MHz	095-2
110-160 MHz	110-1	150-250 MHz	150-2
150-250 MHz	150-1	200-300 MHz	200-2
200-300 MHz	200-1	250-450 MHz	250-2
275-450 MHz	275-1	400-850 MHz	400-2
425-850 MHz	425-1	800-950 MHz	800-2
800-950 MHz	800-1		

TABLE 3
High-Frequency Elements (Catalog Numbers)

Power Range	Frequency Bands (MHz) 950 - 1260	1100 - 1800	1700 - 2200	2200 - 2300
1 watt	1J	1K	1L	1M
2.5 watts	2.5J	2.5K	2.5L	2.5M
5 watts	5J	5K	5L	5M
10 watts	10J	10K	10L	10M
25 watts	25J	25K	25L	25M
50 watts	50J			
100 watts	100J			
250 watts	250J			

TABLE 4
Low-Frequency Elements (Catalog Numbers)

Power Range	Frequency Band .45 to 2.5 MHz
1000 watts	1000P
2500 watts	2500P
5000 watts	5000P
10000 watts	10000P

TABLE 6
Milliwatt Elements

100 mW	Cat. No.	250 mW	Cat. No.	500 mW	Cat. No.
72-76 MHz	430-2	70 MHz	430-34	72-76 MHz	430-33
105-120 MHz	430-6	72-76 MHz	430-22	105-120 MHz	430-26
136 MHz	430-9	108-118 MHz	430-24	240-290 MHz	430-27
174 MHz	430-10	130-150 MHz	430-13	328-336 MHz	430-28
328-336 MHz	430-3	150-180 MHz	430-15	455-470 MHz	430-30
400 MHz	430-7	328-336 MHz	430-16		
470 MHz	430-8	1700-1750 MHz	430-17		

THRULINE® RF Directional Wattmeters

50 ohms nominal

model 4431

■ Provides Model 43 Power Measurement Versatility **Plus . . .**
■ Convenient, Built-in, Variable RF Signal Sampler

The combination Model 4431 THRULINE Wattmeter provides the advantage of an RF signal sample (for use with counters, oscilloscopes, spectrum analyzers, etc.) at the same time a power measurement is made.

Amplitude of the RF sample is readily adjusted by a depth-of-insertion control knob mounted on the front of the Wattmeter case.

Model 4431 uses the same Plug-in Elements as the Model 43 Wattmeter within its frequency and power ratings. When ordering new Plug-ins, make your selections from the charts on page 5 of this catalog.

Power Rating 5000 watts, 2-30 MHz
1000 watts, 30 to 1000 MHz*
(Select elements from appropriate tables on p. 5)
Insertion VSWR 1.07 to 1.0 max.* (with N Connectors)
Connectors QC Type
(Female N normally supplied) (Female BNC RF output)
Insertion Loss 0.1dB Max. (2-512 MHz)
0.2dB Max. (512-1000 MHz)*
RF Coupling −15 to −70dB
Accuracy of Wattmeter ±5% of F.S.
**Specifications above are applicable only if coupling used is less than 30dB.*

all-in-one test set

Now! A Professional Mobile-Service Test Kit!

The outfitted carrying case pictured here (Test Set 4300-064) is equipped to specifically meet the needs of the technician who services mobile communications equipment.

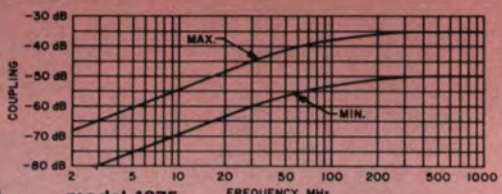
This compact, super-convenient kit is comprised of:
■ One Model 43 THRULINE® Wattmeter (standard QC-N/F connectors)
■ One Model 4275-100 RF Sampler with variable level control and mounting screws
■ Two UHF/F QC Connectors (SO-239)
■ One model 8164 100W "dry load" TERMALINE® Load Resistor (standard QC-N/F connector)

Included FREE of extra charge:
■ Instruction Manual (P/N 920-43)
■ Laminated VSWR chart (P/N 4400-012)
■ Cushion-fit inset equipped, one-piece, hi-density, polyethylene carrying case (P/N 4300-061) with nests for seven Plug-in Elements and all of the other items listed above.

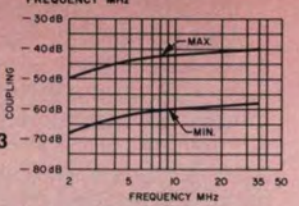
When purchasing Test Set 4300-064, order as many or as few elements as your present needs dictate. They will be added to the price of the kit.

(If you just need a case for your present equipment, order P/N 4300-061).

Variable RF Signal Samplers



model 4275



model 4273

Models 4273 and 4275 are "stand alone," wide-range, THRULINE® RF coupling probes for spectrum analysis, RF signal observation on a scope, or frequency counting and control. They feature a very low VSWR throughout their broad frequency and attenuation range. Insertion loss is a negligible 0.1dB.

For low frequency RF sampling (between 1.5 and 35 MHz), order a Model from the 4273 line. For frequencies between 20 and 1000 MHz, order a 4275 Model. Note that, once it is adjusted, the setting can be locked.

Models 4273-100 and 4275-100 are accessory samplers which fasten directly to the input of QC equipped Bird TERMALINE®, THRULINE® and TENULINE® products. These Accessory Samplers eliminate the need for one connector pair and provide on-the-spot sampling.

Frequency Range 20-1000 MHz 4275
1.5-35 MHz 4273
Max. Power 1000W 4275/5000W 4273
Insertion VSWR 4275/1.1 max 2-512 MHz*
1.25 max. 512-1000 MHz
model 4273 1.07 max.*
Insertion Loss 0.1dB max. 2-512 MHz*
0.2dB max. 512-1000 MHz
Coupling Adjustable as shown ±3dB
Connectors QC Type as specified
Weight 10 oz. (280g)

Model/Part No.		QC-Connectors
4273-020	4275-020	N: Male/Female
4273-025	4275-025	N: Two Female
4273-030	4275-030	UHF: Male/Female
4273-035	4275-035	UHF: Two Female

**with N connectors*

TERMALINE® RF Absorption Wattmeters

50 ohms nominal

Absorption Wattmeters offer the convenience of a combination measuring and termination unit to engineers and technicians in mobile communications and related fields. These TERMALINE models are engineered for servicing 50 ohm-systems and keeping them at peak operation. They consist of a direct-reading meter and an integral liquid dielectric load resistor for dissipation of RF power during measurement.

Their individual frequency coverage is generally wider than that of a directional meter and they give RF readings directly in watts with an accuracy of ±5% of full scale to 512 MHz; ±10% of full scale to 1000 MHz.

Your attention is directed to the new 6730 Series Absorption Wattmeters offered in this catalog. Each of them features a choice of three power ranges selected through a rotary switch. This desirable flexibility expands the utility of the TERMALINE unit and eliminates the need to transfer the crystal diode. It makes measurement easier and frees one hand for equipment fine tuning or trouble-shooting.

Our new 6730 Series of five TERMALINE Absorption Wattmeters offers a selection of top ranges: 250, 500 (the two shown in this catalog) plus 1000, 1200 and 2500 watts (literature on the latter three models is available on request). In this group, the Wattmeters and load sections are joined with the patented Bird Quick-Change (QC) feature which permits easy separation into unlinked parts. This allows use of the resistor as an independent termination with an even lower VSWR and offers a choice of 15 other connector types where desired now or later.

Also on this page, we are introducing four low power wattmeters for servicing signal generators, oscillators, transceivers, solid state amplifiers, etc.

Their three power ranges (200mW/800mW/3W or 3W/10W/30W) are selected by a front-panel switch without the need to transfer crystals. They can further be expanded to higher power levels with TENULINE Attenuators, and all ranges are field-calibratable (e.g. for tighter accuracy at a specific frequency).

All units feature demodulated signal outputs for observation and measurement of AM envelopes. Models 6258 and 6259 also provide an RF signal sample for frequency and spectrum analysis. The wide frequency range accommodates communications measurements, all the way from Maritime Mobile/Maritime Radio Navigation to one gigahertz Aeronautical Radio Navigation, and all services in between.

models 6256, 6257
3 WATTS

Power Rating 3 watts
Power Scales 0.2/0.8/3 watts
VSWR 1.1 max. dc - 512 MHz
1.15 max. 512 - 1000 MHz (6257)
Frequency Range 100 kHz - 512 MHz (6256)
100 kHz - 1000 MHz (6257)
Input Connector Female BNC
Demodulator Output Miniature Phone Jack
Nominal Size excl. conn. 5" x 4" x 3 5/16"
(127 x 102 x 84 mm)
Weight 1 lb. 10 oz. (¾ kg)
Finish Lusterless black enamel (Fed. Spec. TT-E-527))
Accuracy 100 kHz - 512 MHz ±5% of full scale
512 - 1000 MHz ±10% of full scale (6257)

models 6258, 6259
30 WATTS

Power Rating 30 watts
Power Scales 3/10/30 watts
VSWR 1.1 max. dc to 512 MHz
1.15 max. 512 - 1000 MHz (6259)
Frequency Range 100 kHz - 512 MHz (6258)
100 kHz - 1000 MHz (6259)
Input Connector QC Type (Female N normally supplied)
RF Output Female BNC
Demodulator Output Miniature Phone Jack
Nominal Size incl. conn. 5 5/16" x 7 5/8" x 4 19/32"
(135 x 194 x 117 mm)
Weight 3 lbs. (1.4 kg)
Finish Lusterless black enamel (Fed. Spec. TT-E-527))
Accuracy 100 kHz - 512 MHz ±5% of full scale
512 - 1000 MHz ±10% of full scale (6259)

TERMALINE® RF Absorption Wattmeters

50 ohms nominal

model 6104
60 WATTS

Power Rating 60 watts
Power Scales 0-2/0-6/0-20/0-60 watts
VSWR 1.1 max dc to 512 MHz
Frequency Range 25 to 512 MHz
Input Connector Female N
Nominal Size incl. conn. 6⅜" x 3 15/16" x 9⅝" (162 x 100 x 244 mm)
Weight 7 lbs. (3¼ kg)
Finish Light Navy grey baked enamel (MIL-E-15090)
Accuracy ±5% of full scale 25-512 MHz
Meter Housing *can be detached from load for convenient reading with 3' cable.*

model 6154
150 WATTS

Power Rating 150 watts
Power Scales 0-5/0-15/0-50/0-150 watts
VSWR 1.1 max dc to 1000 MHz
Frequency Range 25 to 1000 MHz
Input Connector Female N
Nominal Size incl. conn. 6⅜" x 3 15/16" x 12 3/16" (162 x 100 x 309 mm)
Weight 8 lbs. (3.6 kg)
Finish Light Navy grey baked enamel (MIL-E-15090)
Accuracy ±5% of full scale 25-512 MHz
±10% of full scale 512-1000 MHz
Meter Housing *can be detached from load for convenient reading with 3' cable.*

model 6156
150 WATTS

Power Rating 150 watts
Power Scales 0-5/0-15/0-50/0-150 watts
VSWR 1.1 max dc to 512 MHz
Frequency Range 25 to 512 MHz
Input Connector Female N
Nominal Size incl. conn. 6⅜" x 3 15/16" x 12 3/16" (162 x 100 x 309 mm)
Weight 8 lbs. (3.6 kg)
Finish Light Navy grey baked enamel (MIL-E-15090)
Accuracy ±5% of full scale 25-512 MHz
Meter Housing *can be detached from load for convenient reading with 3' cable.*

model 6732
250 WATTS

Power Rating 250 watts
Power Scales 0-10/0-50/0-250 watts
VSWR 1.15 max dc to 1000 MHz
Frequency Range 25 to 1000 MHz
Input Connector QC Type (Female N normally supplied)
Nominal Size incl. conn. 8½" x 5 15/16" x 12⅝" (216 x 151 x 321 mm)
Weight 16 lbs. (7¼ kg)
Finish Light Navy grey baked enamel (MIL-E-15090)
Accuracy ±5% of full scale 25-512 MHz
±10% of full scale 512-1000 MHz
Meter *4½" meter, shock mounted in aluminum carrying case with 10' (3m) shielded meter cable. Dimensions: (w x h x d) 5 9/16" x 6½" x 3 1/32" (141 x 165 x 85 mm).*

model 6734
500 WATTS

Power Rating 500 watts
Power Scales 0-25/0-100/0-500 watts
VSWR 1.15 max dc to 1000 MHz
Input Connector QC Type (Female N normally supplied)
Nominal Size incl. conn. 8½" x 5 15/16" x 19 15/16" (216 x 151 x 506 mm)
Weight 27 lbs. (12¼ kg)
Finish Light Navy grey baked enamel (MIL-E-15090)

Model 6734
Frequency Range 25 to 1000 MHz
Accuracy ±5% of full scale 25-512 MHz
±10% of full scale 512-1000 MHz
See ACCESSORIES for low-frequency add-on option.

Model 6734-030
Frequency Range 1.5 to 35 MHz
Accuracy (percent of full scale) ±5%: 2-32 MHz
±10%: 1.5-2 MHz & 32-35 MHz
For meter dimensions see 6732.

TERMALINE® RF Coaxial Load Resistors

50 ohms nominal

Bird TERMALINE Load Resistors are used in place of the antenna during testing, adjustment and alignment of 50 ohm coaxial RF transmitters.

Their low VSWR (1.1, or less, at mobile radio frequencies) assures an excellent match and the absorption of at least 99.75% of the RF energy generated.

The TERMALINE Model 8135, shown in this catalog, is to Mobile RF Coaxial Load Resistors what the Bird Model 43 is to Directional Wattmeters — a "best buy". This highly functional resistor is rated for 150W contin-

uous dissipation. However, the rating may be exceeded for short periods (e.g. 250W max. for 5 minutes on, 30 minutes off). This feature eliminates the need to purchase an additional termination where requirement for power up to 250W is sporadic.

Bird Electronic's traditional air cooled, liquid dielectric termination resistors are easily recognized by their light grey finish. These "standards of the industry" have been proven-in-use for nearly four decades. Their power ratings, as listed here, are conservative and may also be exceeded for short periods.

The other Bird terminations in this catalog have air dielectric ("dry load") and are identified by their black finish (10 watt units and higher). Air dielectric resistors offer the advantage of being able to be connected to a line in **any position.**

Most Bird TERMALINE RF Coaxial Load Resistors are supplied with Quick Change (QC) type connectors. This allows use of connectors other than those shown as "normally supplied". Note that, unless a different connector style is requested at time of order, this unit will be shipped with the one shown in the specifications.

model 8135 **150 WATTS**

OIL DIELECTRIC

Power Rating 150 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.2 max. 1000 to 2500 MHz
1.3 max. 2500 to 4000 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector QC Type (Female N normally supplied)
Nominal Size incl. conn. 6⅜" x 3 15/16" x 9½" (162 x 100 x 241 mm)
Weight 6 lbs. (2.7 kg)
Operating Position Horizontal only
Finish Light Navy grey baked enamel (MIL-E-15090)

model 8141 **250 WATTS**

OIL DIELECTRIC

Power Rating 250 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.2 max. 1000 to 2000 MHz
1.3 max. 2000 to 2500 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector QC Type (Female N normally supplied)
Nominal Size incl. conn. 8½" x 5 15/16" x 9 9/16" (216 x 151 x 243 mm)
Weight 10 lbs. (4.5 kg)
Operating Position Horizontal only
Finish Light Navy grey baked enamel (MIL-E-15090)

model 8201 **500 WATTS**

OIL DIELECTRIC

Power Rating 500 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.25 max. 1000 to 2500 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector QC Type (Female N normally supplied)
Nominal Size incl. conn. 8½" x 5 15/16" x 16 13/16" (216 x 151 x 427 mm)
Weight 21 lbs. (9.5 kg)
Operating Position Horizontal only
Finish Light Navy grey baked enamel (MIL-E-15090)

model 8251 **1000 WATTS**

OIL DIELECTRIC

Power Rating 1000 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.25 max. 1000 to 2000 MHz
1.3 max. 2000 to 2400 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector QC Type (Female LC normally supplied)
Nominal Size incl. conn. 8½" x 5 15/16" x 17 15/16" (216 x 151 x 455 mm)
Weight 24 lbs. (11 kg)
Operating Position Horizontal only
Finish Light Navy grey baked enamel (MIL-E-15090)

model 8860 **1500 WATTS**

OIL DIELECTRIC

Power Rating 1500 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector QC Type (Female LC normally supplied)
Nominal Size incl. conn. 13⅛" x 7½" x 17 7/16" (333 x 191 x 443 mm)
Weight 28 lbs. (12.7 kg)
Operating Position Horizontal only
Finish Light Navy grey baked enamel (MIL-E-15090)

TERMALINE® RF Coaxial Load Resistors

50 ohms nominal

series 80 **5 WATTS**

DRY LOADS
Power Rating 5 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.2 max. 1000 to 3500 MHz
1.3 max. 3500 to 4000 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector 80 F: Female N, 80 M: Male N
Nominal Size incl. conn. 1 1/16" Hex x 3 3/8" (17 x 86 mm) (80M)
Weight 4 oz. (113 g)
Operating Position Any
Finish Silver plated

model 8052-53 **10 WATTS**

DRY LOADS
Power Rating 10 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.2 max. 1000 to 3500 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector Female N (8052), Male N (8053)
Nominal Size incl. conn. 1 1/16" Hex x 3 7/16" (17 x 88 mm)
Weight 4 oz. (0.1 kg)
Operating Position Any
Finish Lusterless black enamel (Fed. Spec. TT-E-527)

model 8080 **25 WATTS**

DRY LOAD
Power Rating 25 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.25 max. 1000 to 3500 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector QC Type (Male N normally supplied)
Nominal Size incl. conn. 1 1/4" x 1 1/4" x 5 1/8" (32 x 32 x 131 mm)
Weight 9 oz. (1/4 kg)
Operating Position Any
Finish Lusterless black enamel (Fed. Spec. TT-E-527)

model 8085 **50 WATTS**

DRY LOAD
Power Rating 50 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.25 max. 1000 to 3500 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector QC Type (Male N normally supplied)
Nominal Size incl. conn. 1 3/4" x 1 3/4" x 5 1/8" (44 x 44 x 131 mm)
Weight 15 oz. (0.4 kg)
Operating Position Any
Finish Lusterless black enamel (Fed. Spec. TT-E-527)

model 8164 **100 WATTS**

DRY LOAD
Power Rating 100 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.2 max. 1000 to 2400 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector QC Type (Female N normally supplied)
Nominal Size incl. conn. 2 3/4" x 2 3/4" x 7" (70 x 70 x 178 mm)
Weight 48 oz. (1.4 kg)
Operating Position Any
Finish Lusterless black enamel (Fed. Spec. TT-E-527)

model 8166 **150 WATTS**

DRY LOAD
Power Rating 150 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.2 max. 1000 to 2500 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector QC Type (Female N normally supplied)
Nominal Size incl. conn. 4" x 4" x 7 1/2" (102 x 102 x 190 mm)
Weight 96 oz. (2.7 kg)
Operating Position Any
Finish Lusterless black enamel (Fed. Spec. TT-E-527)

model 8173 **300 WATTS**

DRY LOAD
Power Rating 300 watts continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.25 max. 1000 to 2000 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector QC Type (Female N normally supplied)
Nominal Size incl. conn. 9 9/16" x 5 15/16" x 9 3/4" (243 x 151 x 247 mm)
Weight 6 1/4 lbs. (2.8 kg)
Operating Position Horizontal only
Finish Lusterless black enamel (Fed. Spec. TT-E-527)

model 8431 **600 WATTS**

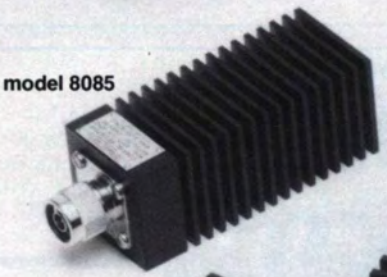
DRY LOAD
Power Rating 600/500 watts* continuous duty
VSWR 1.1 max. dc to 1000 MHz
1.25 max. 1000 to 2500 MHz
Ambient Air Temperature Range −40° to +45° C.
Input Connector SQC Type (Female N normally supplied)
Nominal Size incl. conn. 8 3/8" x 9 1/4" x 13 1/8" (213 x 235 x 333 mm)
Weight 13 lbs. (6 kg)
Operating Position Any*
Finish Lusterless black enamel (Fed. Spec. TT-E-527)

**Continuous Power Rating 600W in Vertical Position; 500W in Horizontal Position.*

SQC type Connectors, as used on models 8431, 8072 and all MINIMONITOR THRULINE Wattmeters, are available in: Male N, Female N, UHF, C, SC, BNC.

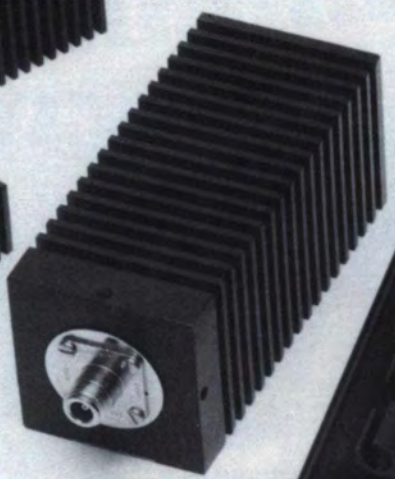
model 8166

model 8173

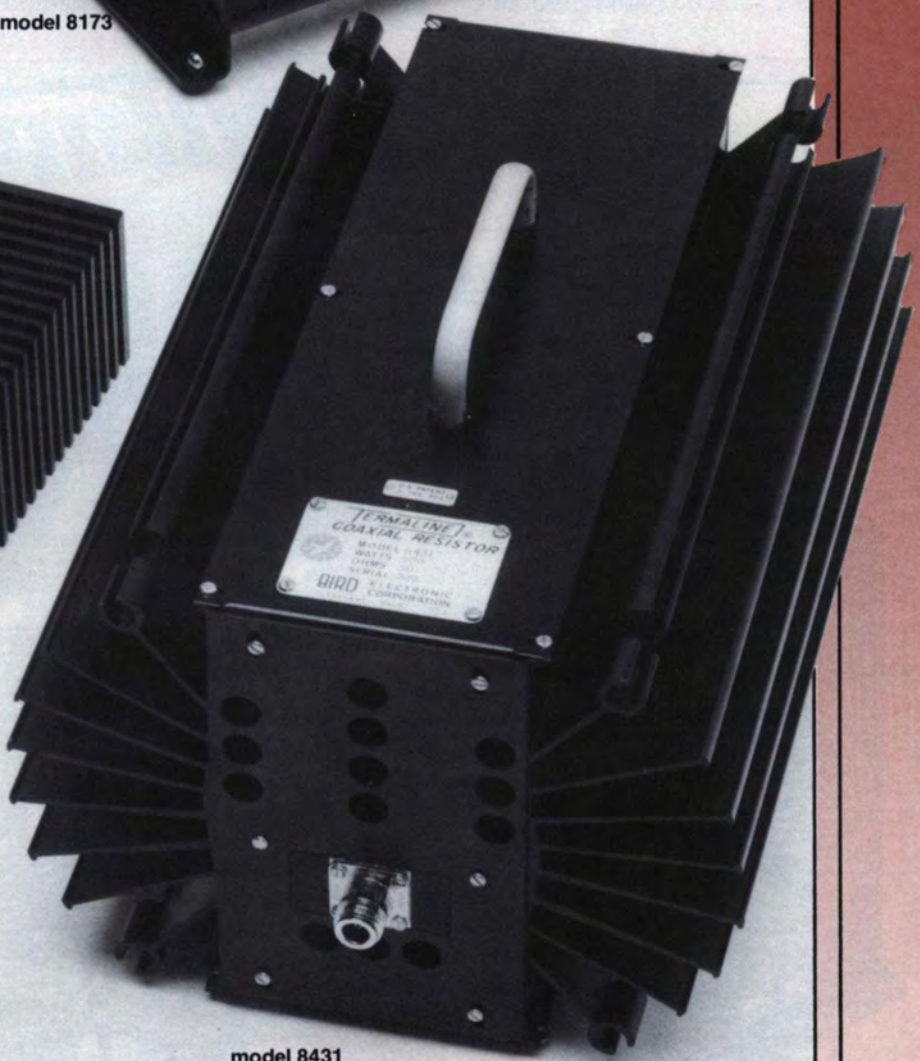


model 8085

model 8080



model 8164



model 8431

model 8052-53

series 80

TENULINE® RF Coaxial Attenuators

50 ohms nominal

TENULINE Attenuators are a valuable tool for the design and maintenance of communications equipment. Applications include isolation from other components in a test set-up, power reduction for measurement and signal analysis with negligible intermodulation and harmonic generation, and as a comparison standard.

Until the introduction of the High-Power Attenuator, directional couplers were used for scope signal observation, frequency checks and broad frequency analyses of transmitter output.

TENULINE® 30dB High-Power RF Attenuators have several advantages over directional couplers in applications such as Radio Frequency Interference, where a transmitter output must be analyzed for the presence and level of undesirable signal components. First of all, the attenuators are the proper termination for the transmitter and 99.9% of the output power is dissipated in them. No additional load resistors are needed when used as an attenuator, and the units are also self-sufficient when used as dummy loads. Where four individual couplers may be needed to span the range from 30 to 500 MHz, the High-Power Attenuator covers the entire range and below. Obviously the attenuation curve of one resistive device is more uniform than that of four resonant reactive devices.

For less than 30dB attenuation, the 8340, 41, 43 series offers 3dB, 6dB, 10dB and 20dB models up to 100 watts. To eliminate the need for performance-degrading adapters, all TENULINE units accept Bird QC (Quick-Change) Connectors at both input and output.

Certainly the most important advantage offered by High-Power TENULINE units as compared to couplers is the fact that the attenuation can be verified at 60Hz or with direct current and Wheatstone bridge measurements. Bird TENULINE Attenuators are laboratory calibrated at six RF frequencies and at DC.

model 8340 **25 WATTS**
model 8341 **40 WATTS**
model 8343 **100 WATTS**

Power Rating (continuous duty) 25 watts (8340) ②
40 watts (8341) ① ②
100 watts (8343) ②
Input VSWR 1.15 max. dc to 500 MHz
1.2 max. 500 to 1000 MHz
Output VSWR 1.15 max. dc to 1000 MHz
Nominal Attenuation
③ 3 dB (8340-030, 8341-030, 8343-030) ②
6 dB (8340-060, 8341-060, 8343-060)
10 dB (8340-100, 8341-100, 8343-100)
20 dB (8340-200, 8341-200, 8343-200)
Max. Frequency Deviation ±½ dB dc to 500 MHz
±¾ dB 500 to 1000 MHz
Ambient Air Temperature Range
−40° C to +45° C
Connectors QC Type (Female N normally supplied)
Operating Position Any
Finish Lusterless black enamel (Fed. Spec. TT-E-527)
Weight 12½ to 15 oz. (0.4 kg) (8340-,8341-)
44 oz. (1¼ kg) (8343-)

① When mounted on an Aluminum panel ⅛" x 400 sq. in. (3 mm x ¼ m²), or equivalent heat sink.
② Add -030, -060, -100, or -200 to the model number for 3, 6, 10 or 20 dB attenuation respectively (e.g. to get a 100 watt/6 dB attenuator, order model 8343-060).
③ 3 dB and 6dB models: Input VSWR 1.15 max. dc to 500 MHz, 1.2 max. 500 to 1000 MHz. Output VSWR 1.2 max. dc to 1000 MHz.

model 8321 **50 WATTS**
model 8323 **100 WATTS**
model 8322 **200 WATTS**

Power Rating (continuous duty) 50 watts (8321)
100 watts (8323)
200 watts (8322)
Input VSWR 1.1 max. dc to 500 MHz
Nominal Attenuation 30 dB
Max. Frequency Deviation ±½ dB dc to 500 MHz
Calibration Frequencies 30, 100, 200, 300, 400, 500 MHz @ ±0.2 dB
Special calibration to 1000 MHz available at time of order
Ambient Air Temperature Range
−40° C to +45° C
Connectors QC Type (Female N input and output normally supplied)
Nom. Size incl. conn. 6⅜" x 3 15/16" x 10¼" (161 x 100 x 260 mm) (8321)
8½" x 5 15/16" x 10⅜" (216 x 151 x 263 mm) (8323)
8½" x 5 15/16" x 17½" (216 x 151 x 445 mm) (8322)
Weight 6.5 lbs. (3 kg) (8321)
11 lbs. (5 kg) (8323)
19 lbs. (9 kg) (8322)
Operating Position Horizontal only
Finish Light Navy grey baked enamel (MIL-E-15090)

COAXWITCH® Coaxial Selector Switches

50 ohms nominal

Description:

BIRD COAXWITCH Coaxial Selector Switches employ a unique, rugged and reliable design which permits positive contact, low insertion VSWR, and negligible cross talk between channels. The switching mechanism is 4½" of RG-87/U Teflon cable which is pulled away from the mating Male N connectors and rotated to the desired switch position.
BIRD Switches may be panel-mounted.

Operation:

BIRD Switches have the valuable advantage that they cannot be operated accidentally, but must be operated by intentional sequential movement. The knob must be grasped, pulled out, rotated, and pushed in to make contact.

Specifications (all models)

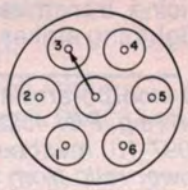
Useful Frequency Range dc to 10 GHz
Maximum RF Voltage 500 volts rms
Attenuation to Unused Channel 75dB (cross talk)
Ambient Temperature Range −60° to +65° C
Weight 2½ lbs. (1 kg) (approx.)

72-2 74

Typical Operating Values

Frequency	VSWR	Insertion Loss	Maximum RF Power Rating at +65° C.
100 MHz	negligible	.02 dB	850 watts
1000 MHz	1.06 max.	.09 dB	200 watts
4000 MHz	1.30 max.	.22 dB	75 watts

two-circuit, two-position
model 72-2

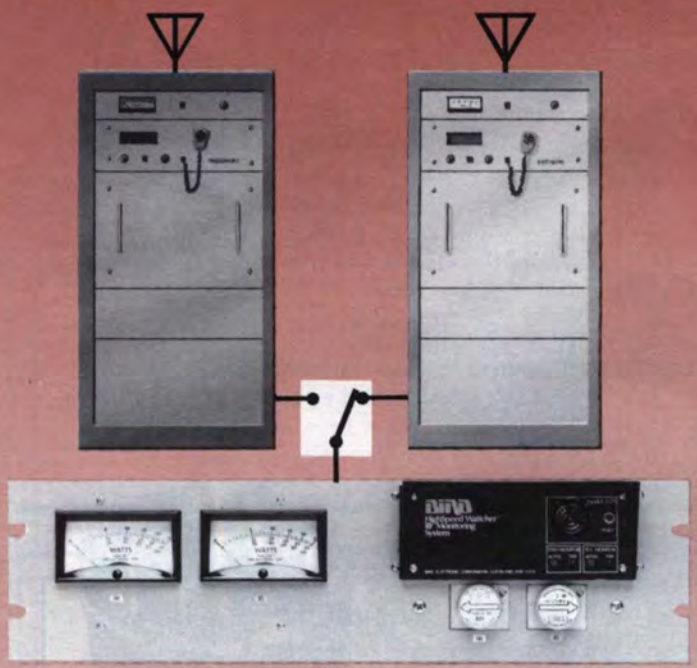


single-circuit, six-position
model 74

TRANSMISSION INSURANCE . . .

High-Speed Wattcher® RF Monitoring System *model 3170*

Initiates Instantaneous Switchover to Remote Standby Transmitter as a Feed-Back of Signal Drop-Off!



Based on the accurate power level measurements of its reliable built-in THRULINE® Directional Wattmeter, the solid-state Wattcher System will . . .

- provide a fast fault-response-time of only 200 micro-seconds for forward and reflected power monitoring
- signal forward power drop-off below a set level (e.g. to conform with FCC part 21.107 specifications)
- activate audible/visual alarms when reflected power increases
- implement stand-by switchover in case of main transmitter malfunction
- allow remote reset in event of false alarm or momentary disturbance which leaves transmission unimpaired

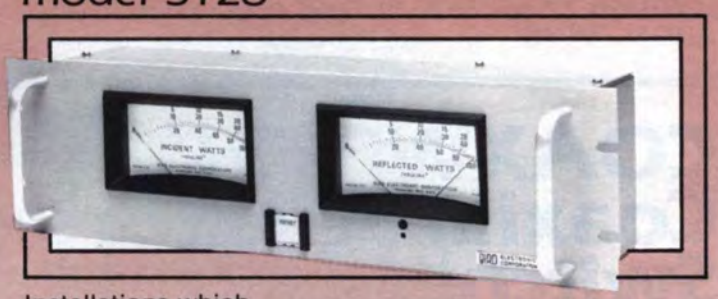
WATTCHER RF Monitoring System warns a remote operator of (1) low power due to detuning, component deterioration, or AC line difficulties (2) high VSWR due to antenna icing, transmission line problems, physical accidents, lightning strikes, etc.

With the addition of extraneous switching hardware, the system can be programmed to activate a back-up transmitter and antenna when primary equipment performance is below predetermined parameters. **Because of the WATTCHER'S high reaction speed (250 times faster than other monitors), switching to standby equipment is inaudible to listeners.**

If the disturbance is not catastrophic and equipment returns to acceptable operating status, the alarm system can be reset from many miles away. An engineer needs to be dispatched to the transmitter site only when the alarm cannot be deactivated by the remote reset.

Power Range 100mW to 10kW full scale*
Accuracy ±5% of full scale
Over-range (Alarms) beyond 200% of scale
Response Time 25μsec. max.
Activate Forward Monitor Adjustable Delay
73μsec. to 50 msec nominal
Inputs and Outputs TTL-compatible
Insertion VSWR
with N Connectors 1.05 max. dc to 1 GHz
AC Power 115/230 VAC, 50/60Hz, 10 watts max.
Nominal Size 19" x 5 7/32" (483 x 133mm)
**Frequency and Power Range determined by Plug-in Elements selected from choices on page 5.*

model 3128



Installations which do not require the fast response time and the forward-power drop-off alarm of model 3170 are protected from high VSWR by WATTCHER model 3128.

Abnormal load conditions quickly cause transmitter shut-down, a buzzer alarm and a change of illumination color of the reset button from green to red. Audible and visual alarms indicating system malfunction may be remoted. Fail-Safe or Non-Fail-Safe Modes are switch-selectable and the Reflected Power meter-relay has a front-adjustable trip-level.

Power Range 100mW to 10kW full scale*
Accuracy ±5% of full scale
Insertion VSWR
with N Connectors 1.05 max. dc to 1 GHz
AC Power 115 VAC, 50/60Hz, 10W (230 VAC optional)
Nominal Size 19" x 5 7/32" (483 x 133mm)
**Frequency and Power Range determined by Plug-in Elements selected from choices on page 5.*

Model 3170 incorporates a Line Section with sockets for two Plug-in Elements. For model 3128, a double-socket Line Section (e.g. P/N 4522-002), two Quick-Change Connectors (e.g. 4240-062 for Female N) and two 25 ft. cables (P/N 4220-097-10) must be ordered to complete the installation. Also select two Plug-in Elements for either model in a 10/1 power ratio from tables on page 5 to suit your power and frequency requirements.

Options & Accessories

Extend the frequency coverage of TERMALINE Wattmeter models 6734, 6736 and 6737 down to 1.5 MHz. Optional Wattmeter Line Section P/N 6734-034 covers measurements from 2-32 MHz at ±5% of full scale and from 1.5-35 MHz at ±10% of full scale. Since Line Section and Meter are calibrated as a unit, P/N 6734-034 must either be ordered at the same time as the complete Wattmeter, or in the case of later acquisition, the original Line Section and Meter must be returned to the plant for matching with P/N 6734-034 (If calibration standards are available to the user, the matching can be done in the field).

Other accessories available are Quick-Change QC Connectors, such as male or female N, UHF, HN, C, SC, BNC, TNC, LC, 7/8", and 1 5/8" EIA Flanges. They can be interchanged in the field without affecting instrument calibration. This feature is available for all products for which a "QC-Type" Connector is listed in the specifications.

An Adapter from N to UHF (SO-239) is available for models 6104, 6154 and 6156 Wattmeters (Adapter No. UG-146A/U Bird P/N 5-793-2).

Replacement meters for models 4521, 4522, 4526, 4527, 4431 and 43 are available. (Indicating Meter Part No. 2080-002, or as a complete Meter Kit including cable — for the portable models — Part No. 8-000).

CC-1 (p. 5) and CC-3 (shown here) are Carrying Cases for THRULINE Wattmeter models 43 and 4431. CC-1 offers space in its lid for 6 spare Plug-in Elements, while CC-3 stores 3 Elements and a 25-watt Load model 8080.

And you thought that your THRULINE® Wattmeter already did everything you needed . . .

NOW: A Field Strength Accessory Plug-in Element for THRULINE® Wattmeters

model 4030

The new model 4030 Relative Field Strength Element expands the usefulness of models 43, 4430 and 4431 Wattmeters to help you optimize the radiated signal of any transmitter from 2-1000 MHz. Increase the reach of business or personal transceivers, extend the range of H.T.s by tuning, adjusting, positioning antennas for maximum meter indication on Bird THRULINE® Wattmeters.

The 4030 Element employs a broad-band non-reactive circuit plus modern RF Solid State Technology. To make measurements is simple, quick and convenient — and you are half-way there with your THRULINE® Wattmeter and its precision sensitive and rugged meter. Just insert the new Element, and read.

Model 4030 Elements are also suitable for other in-line wattmeters equipped with 30 microampere analog meters, such as Bird's rackmounted THRULINE® models 4521, 4522, 4526 and 4527, as well as WATTCHER® Monitor model 3128.

SPECIFICATIONS:

Typical Sensitivity: A one watt CW source at 150MHz through a quarter wave antenna will cause full scale meter deflection at a distance of 8 feet.

Dynamic Range: 30dB minimum

Usable Frequency Range: 1MHz to 1000MHz

Output Characteristics: Compatible with 30 microampere meters

Battery Life: 100 hours minimum

Battery Complement: Three 3 volt lithium-manganese dioxide cells (Duracell DL2032 or equivalent)

Operating Temperature Range: 0° to +50° C

Weight: 3 oz. (including batteries)

BIRD
Electronic Corporation

30303 Aurora Rd., Cleveland (Solon), Ohio 44139
216-248-1200 TLX: 706898 Bird Elec UD
WEST: Ojai, CA 805-646-7255