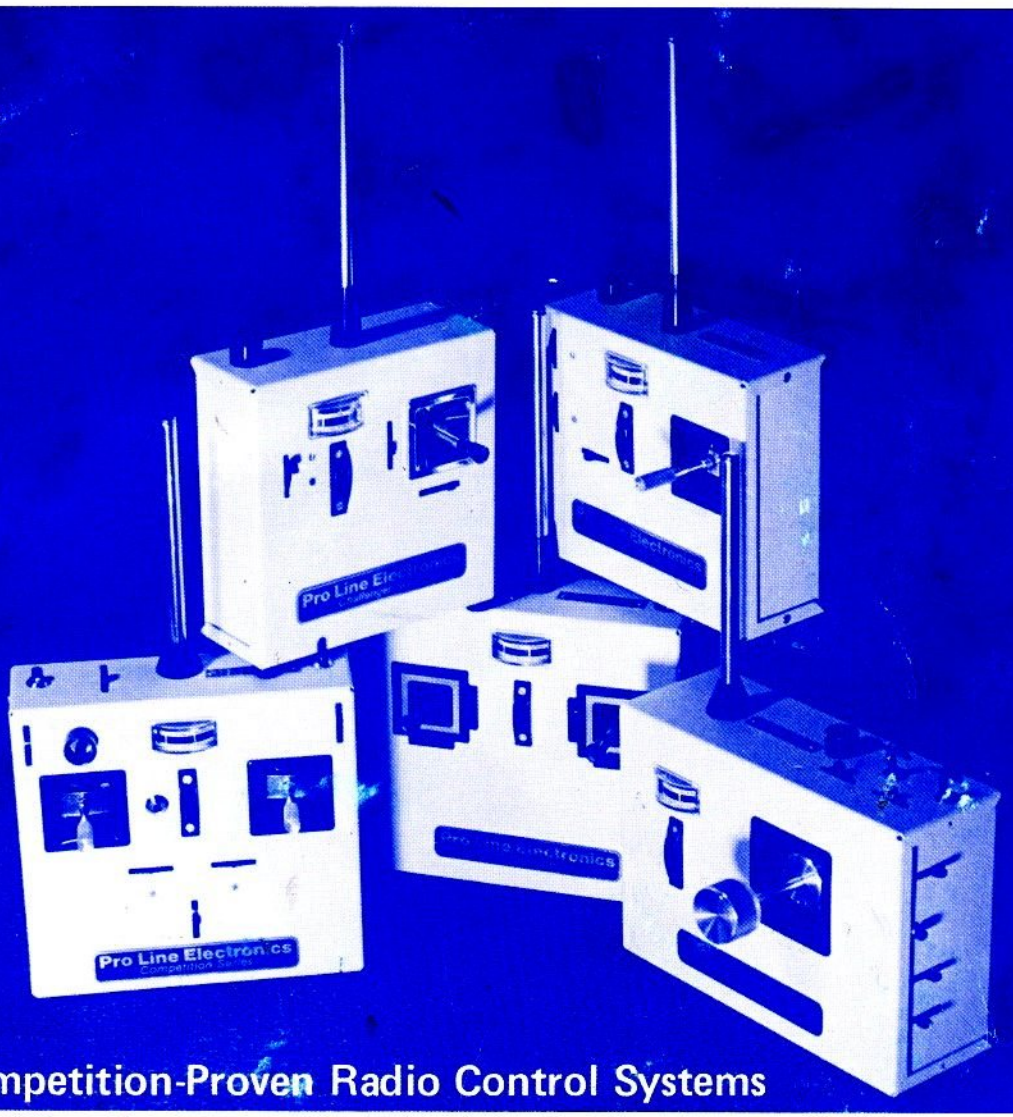
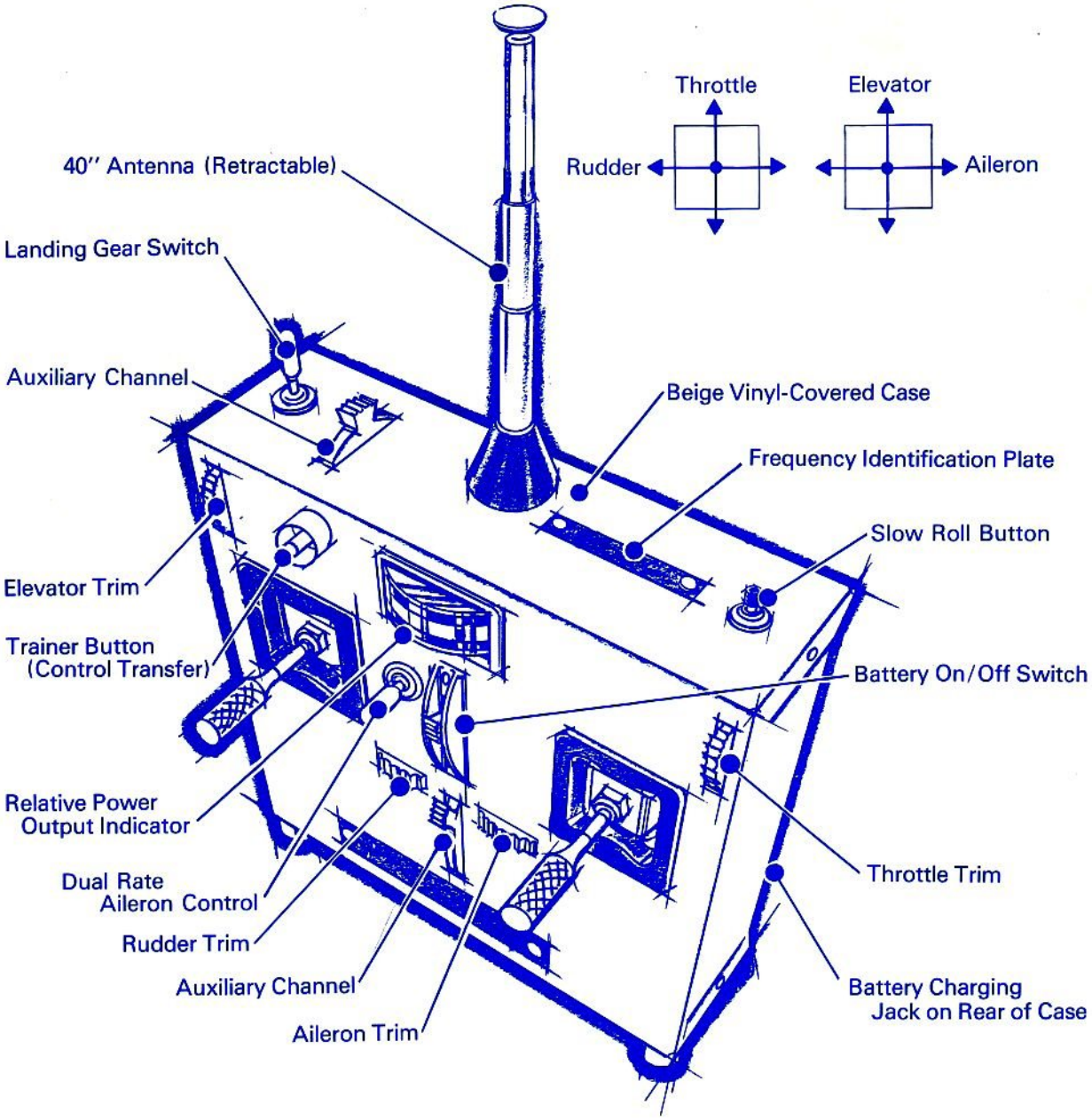
PRO-LINE '76



Competition-Proven Radio Control Systems

PRO LINE '76


Throttle
Elevator
Rudder
Aileron
40" Antenna (Retractable)
Landing Gear Switch
Auxiliary Channel
Beige Vinyl-Covered Case
Frequency Identification Plate
Slow Roll Button
Elevator Trim
Trainer Button
(Control Transfer)
Battery On/Off Switch
Relative Power
Output Indicator
Throttle Trim
Dual Rate
Aileron Control
Rudder Trim
Auxiliary Channel
Aileron Trim
Battery Charging
Jack on Rear of Case

The Systems . . .

Seven basic systems are available:

- Competition Series 7-Channel, 2-Stick[1]
- Competition Series 7-Channel, Single-Stick[1]
- Competition Series 3-Channel, Single-Stick[1]
- Competition Series 5-Channel, 2-Stick[1]
- Competition Series 5-Channel, Single-Stick[1]
- Challenger Series 5-Channel, 2-Stick[2]
- Challenger Series 3-Channel, Single-Stick[3]

Basically, each complete system includes a transmitter; receiver; airborne battery pack; two to four servos; wired switch harness; standard or optional fast charger; servo trays, frequency flags, clips; instruction manual; warranty card, decal, and Pro Line shirt patch.

When ordering, please specify frequency desired; type of servos; battery pack and optional fast-charger if desired. Also specify throttle-left or throttle-right for 2-stick models. See pages 9 & 10 for more information. All complete systems are packaged in a polystyrofoam container with individual storage compartments for each component. All Pro Line systems produced in the past are compatible with the 1976 Line.

Transmitters . . .

All seven systems incorporate a training button control feature. This permits the linking of 2 transmitters with a training cord (optional). The "instructor" holds his button down while the "student" controls; the "instructor" assumes control by simply releasing the button.

Closed gimbal transmitters of the same mode may be used together and the single-stick is compatible with the 2-stick TL mode. All open gimbal transmitters may be used together regardless of modes.

CMOS* integrated circuitry is used in the encoder which has a fixed reset time for the fastest possible frame-rate. All transmitters feature a burn-out proof output stage and all silicon circuitry. Temperature cycling with electronic burn-in and actual run-in tests are performed on each transmitter to assure the utmost in dependability.

All Competition Series transmitters incorporate open gimbal stick assemblies. These precision machined stick systems have bearing supports opposite all control pots that virtually remove all play and friction. The positive "feel" of these open gimbal sticks has made the Competition Series "second-to-none" in smoothness and controllability.

Transmitter Specs — All Systems

- RF INPUT-1.2 watts (27 MHz)
- RF OUTPUT-650 MW (27 MHz)
- Temperature Range -10° to + 160° F
- Modulation — Pulse Position Type
- Voltage Stability — Full Control to 4.0 Volts
- Control Position Drift — Unmeasurable with Temperature & Voltage Variations

Receivers . . .

All receivers feature silicon and low power CMOS integrated circuitry which significantly reduces airborne power requirements and prolongs operating time. The AGC circuit follows very large and rapid changes in signal strength and is impossible to overload even if the transmitter and receiver antennas touch. It also stabilizes receiver sensitivity to compensate for changes in battery voltage. Special second detector circuitry permits low distortion envelope detection of signal waveform with very low noise content. All circuit boards are coated and oven cured to protect against vibration and humidity.

Receiver Specs — All Systems

- I. F. Frequency — 455 KC
- Sensitivity — 1.0 microvolt or less for full control
- Selectivity — 3 db down at less than 3.5 KHz
- Image Rejection — 10 db — 72 MHz band, 18 db — 6 meter band, 34 db — 27 MHz band
- Spurious & Harmonic Rejection — 50 db minimum

1. Open Gimbal
2. Semi-Open Gimbal
3. Closed Gimbal

*Complimentary Metal Oxide Semi-Conductor

COMPETITION SERIES...

The Systems . . .

Few radio control systems have earned the continued reputation for excellence as has Pro Line's Competition Series. This reputation had its beginning in the engineering laboratory over 8 years ago and has been proven at the flying field again and again at major competitive events all over the world. Both contest and sport flyers continue to acclaim the Competition Series as one of the finest radio control systems ever developed. 1976 is no exception as both the single and 2-stick versions of the 7-channel models feature the finest in state-of-the-art electronics markedly superior to the standard of the industry.

Transmitter Specs . . .

- "RF" section packaged on a mini-circuit board permits rapid replacement of frequency (27, 53, & 72 MHz bands).
- Slow-roll button-standard.
- Dual-rate aileron control switch-standard (permits a reduction of 10% — 50% of normal aileron travel)
- Precision thumb trim wheels for the ultimate in trim control (up to 240° travel) for 2-stick Competition systems only.
- Dual stage reset protection encoder circuit.
- Retract landing gear switch — standard.
- Precision New England Instrument conductive plastic control pots.
- Precision open-gimbal stick controls — standard.
- Trim & auxiliary control tension — fully adjustable.
- Gold plated connectors.
- Power — Two 4.8V 500 M. A. H. rechargeable nickel-cadmium battery packs.
- Average current drain — 120 M. A.
- Weight: 2 lb. 7 oz. (2-stick Competition Series).
- Weight: 2 lb. 8 oz. (Single-Stick Competition Series).

Receiver Specs . . .

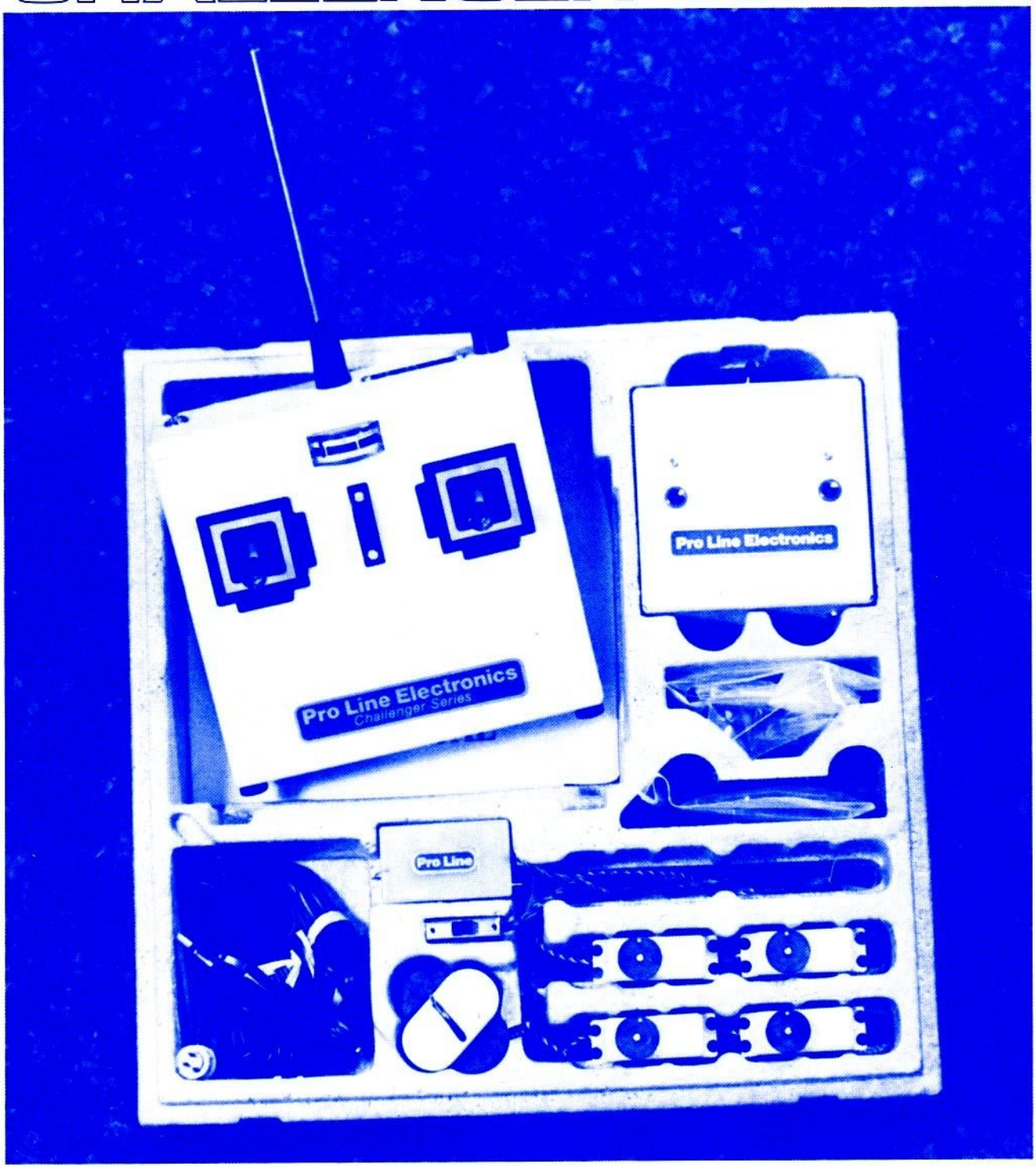
- Four narrow bandpass I. F. stages
- High impedance antenna circuit with F. E. T. to reduce front-end cross modulation under very strong signal conditions.
- Heavy-duty 1/16" epoxy circuit board.
- Low Power CMOS shift register and Quad Op Amp* IC's in decoder section.
- Special low voltage field effect transistors in RF amplifier and mixer stages plus A. G. C. circuit for outstanding cross modulation and overload characteristics.
- Current drain — 16 to 26 M. A. depending on signal strength.
- RF section semiconductors — 12
- Decoder section semiconductors — 3
- Size — 2.31" x 1.38" x .75"
- Receiver weight: 2.4 oz.
- Airborne system weight — 12.8 oz. (4 servos & one 550 MA battery pack)
- Standard Charger.

Options and Accessories . . .

- Battery tester for reading battery voltage under load. Indicates state of charge of airborne battery pack plus tests battery capacity.
- Fast charger.
- Proportional brake amplifier.
- Retractable gear amplifier.

*Four Operational Amplifiers

CHALLENGER SERIES...



The System . . .

In 1975 Pro Line completed the design and development of a 5-channel system introduced as the Challenger II Series. The objective was to offer at reasonable cost a high quality system for the sport flyer that would incorporate all of the advantages of dependability and smoothness of control for which the Competition Series is famous. Further refinement of the Challenger has continued and the 1976 model is without a doubt one of the finest 5-channel R/C systems available.

Transmitter Specs . . .

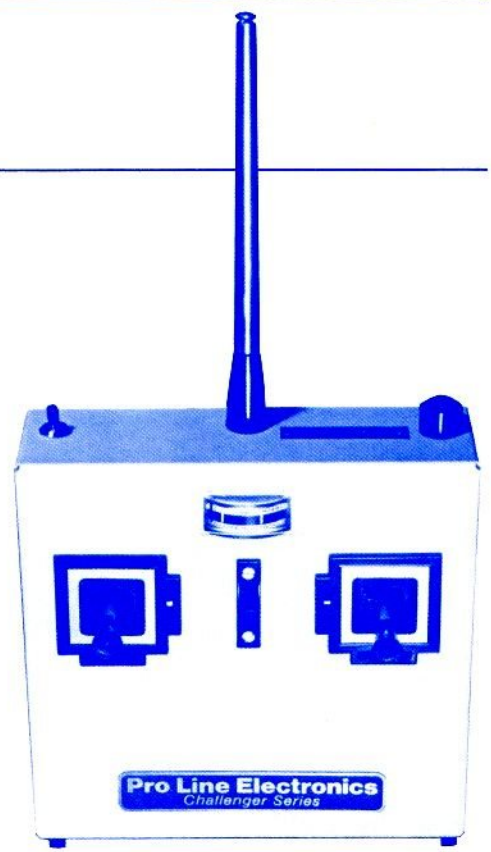
- Retract landing gear switch is standard.
- New semi-open gimbals for high resolution and smooth response.
- CMOS integrated circuitry in encoder.
- Standard L. E. D. indicator charger for simultaneous recharge of both transmitter and receiver battery packs.
- Trim controls immediately adjacent to sticks.
- Two 4.8 V 500 M. A. H. rechargeable nickel-cadmium battery packs.
- Average current drain 120 M. A.
- Weight: 2 lb. 2 oz.

Receiver Specs . . .

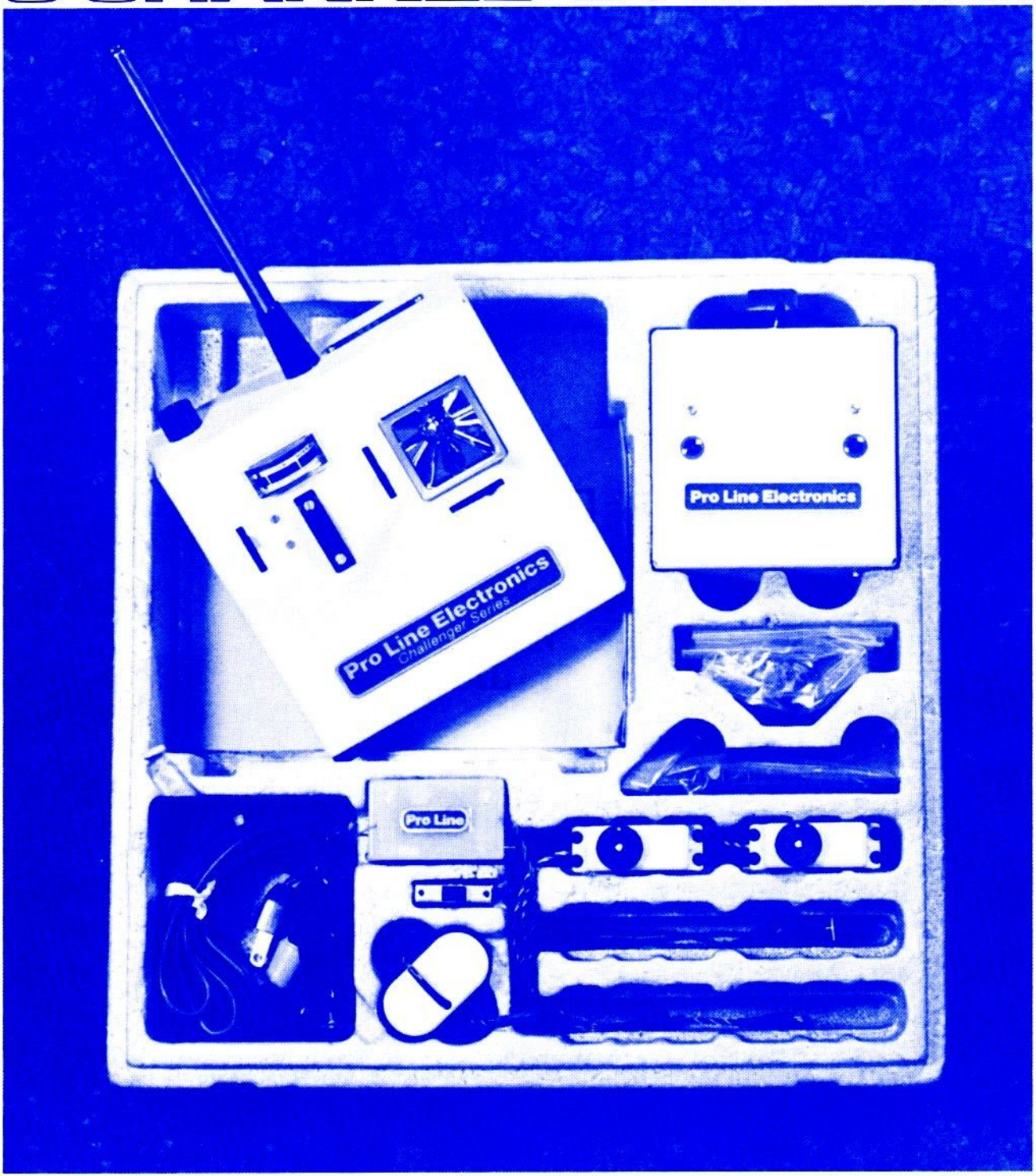
- Connector plug is part of receiver to minimize servo wiring.
- Case is durable nylon with dual sided epoxy circuit board for damage protection and shielding.
- 3 narrow bandpass I. F. stages for superior selectivity.
- Current drain — 15 to 25 M. A. depending on signal strength.
- 10 transistors; 4 diodes & 1 I. C. (CMOS)
- Size: 2.23" x 1.32" x .75".
- Airborne Weight (4 servos & 1 550 M. A. battery pack) — 11.75 oz.

Options and Accessories . . .

- Battery tester
- Fast charger
- Proportional brake amplifier
- Retractable gear amplifier



3 CHANNEL SYSTEMS...



The Systems . . .

3-channel systems continue in the tradition of Pro Line engineering quality to provide a truly professional system for the beginner or sport flyer who wants dependability and needs only 3-channels for Sunday afternoon flying or serious competition. Again, Pro Line no-compromise engineering goes all the way through these systems.

Two basic systems are available — the Challenger Series (closed gimbal) and the Competition Series (open gimbal).

Transmitter Specs . . .

- Training system — standard.
- Compatible with 5-channel Challenger or 7-channel Competition Series.
- Rechargeable nickel-cadmium batteries.
- Average current drain — 125 M. A.
- Challenger weight — 1 lb. 10 oz.
- Competition weight — 1 lb. 12 oz.

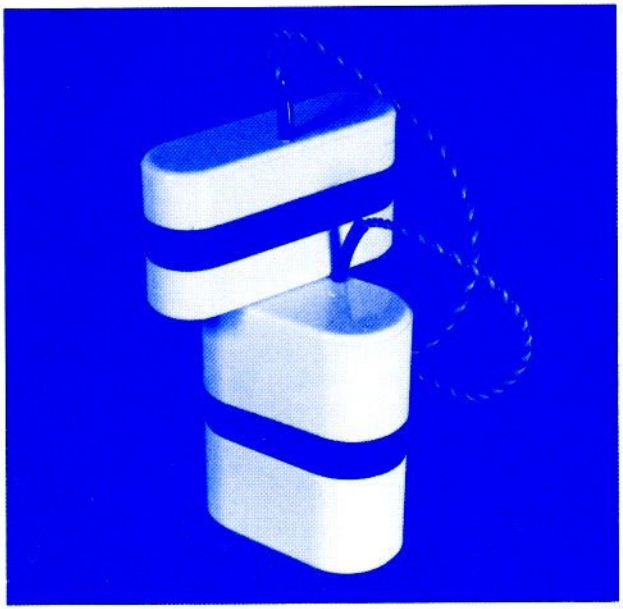
Receiver Specs . . .

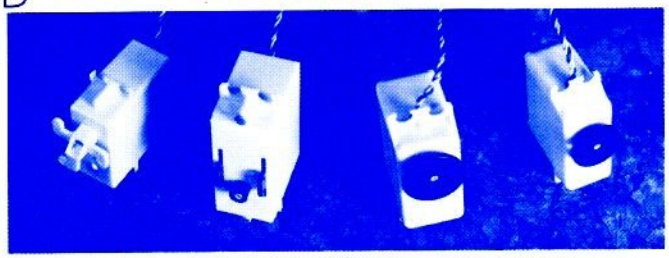
- Airborne weight — 7 oz. (2 servos & 1 225 M. A. battery pack)
- 3 narrow bandpass I. F. stages
- Connector plug integral to receiver to reduce servo wiring.
- Current drain — 7 M. A.
- 10 Transistors
- 5 Diodes
- 1 I. C. CMOS circuit.
- Size — 2.23" x 1.32" x .75"

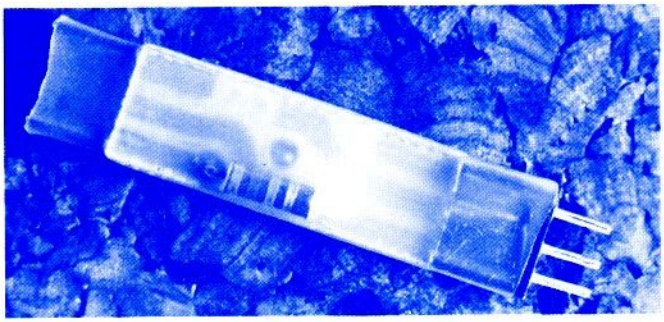
Options and Accessories . . .

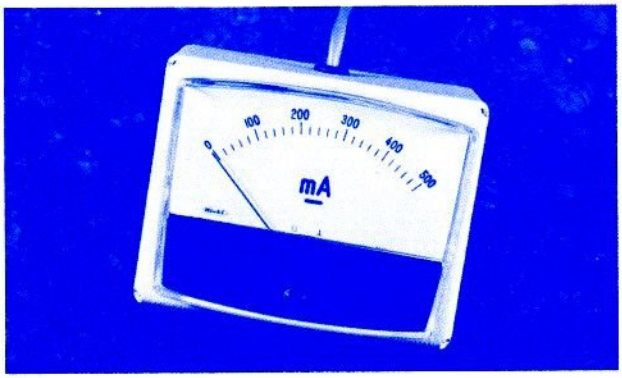
- Fast charger
- Battery tester

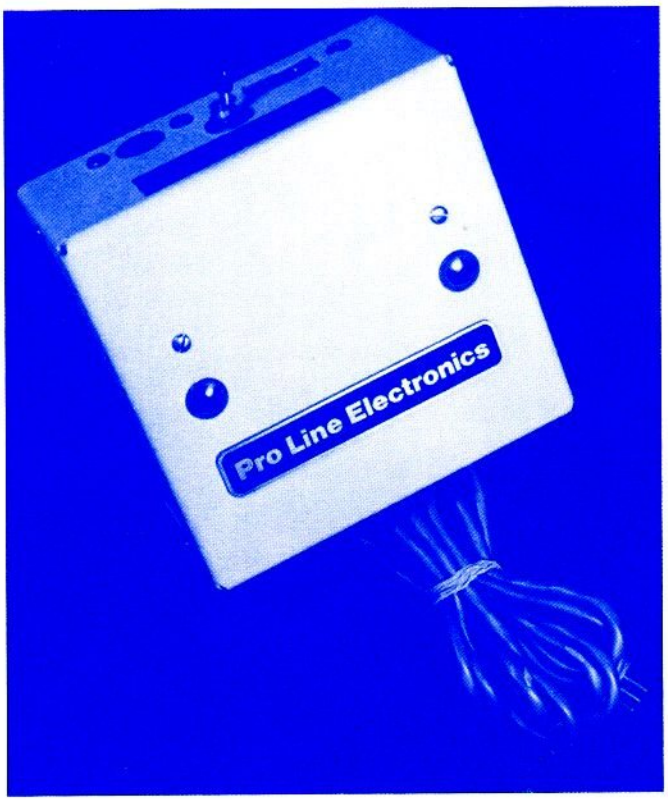
SERVOS-
BATTERIES, ETC...











Servos . . .

Five basic Servo Systems are available:

	PLS-1	PLS-11	PLS-15	PLS-14	PLS 180°
Size:	1.93"x1.47"x.75"	2.38"x1.55"x.89"	2.28"x1.49"x.92"	2.15"x1.49"x.75"	1.93"x1.62"x.73"
Weight:	1.4 oz.	1.8 oz.	1.8 oz.	1.5 oz.	1.5 oz.
Static Thrust:	1.4 in. lb. max.	1.87 in. lb. max.	2.12 in. lb. max.	5.25 in. lb. max.	2.51 in. lb. max.
Travel:	90° rot.	90° rot. (.56" throw)	90° rot.	90° rot.	180° rot.
Transit Time:	.44 sec.	.52 sec.	.56 sec.	.46 sec.	2.5 sec.
Available Outputs:	Rotary Arm or Wheel	1 Rotary Wheel or Arm; 2 Linear Racks	Rotary Arm or Rotary Wheel	Rotary Arm or Rotary Wheel	Rotary Arm

Any high quality R/C system is only as good as the servos it controls. Pro Line servos represent the "last word" in a lightweight, small, positive-action servo. The amplifiers employ custom integrated circuitry for superior smoothness and damping with a centering accuracy of better than ½°! Temperature and voltage drift are almost unmeasurable. Each servo is subjected to a rigorous 2 hour test at the factory where all movements of actual use are duplicated. The use of carbon composition feedback potentiometers and low mass vibration-resistant motors make Pro Line servo systems good for over 1 million operations. Positioning accuracy is ± .25% of total throw.

Receiver Battery Packs . . .

A complete selection of airborne battery packs is available from 225 M. A. to 550 M. A. The 550 M. A. pack has vibration resistant cells and is recommended for operations where high vibration is present. Diodes are connected across each cell to provide a current path in the event of a broken wire or an open cell.

	PL-225	PL-500	PL-550
*Rating	225 M. A. H.	500 M. A. H.	550 M. A. H.
Size	2.42"x72"x1.34"	2.13"x1.27"x1.27"	2.44"x2"x1.30"
Weight	2.8 oz.	4.0 oz.	5.0 oz.

Chargers . . .

Pro Line's newly designed Standard Charger is transformer powered for safety and charges at the rate of 75 M. A. Light emitting diode indicators show which batteries (airborne or transmitter) are under charge. Size is 3.12" x 2.12" x 1.88".

A dual-powered automatic Fast Charger is available as an option. This charger will bring completely discharged cells to 80% full charge in less than 1½ hours. The charger switches from 350 M. A. fast charge to normal charge rate automatically and a switch permits selection of normal or fast charge mode. Power for charging is 117 VAC house current or a 12V automobile cigarette lighter outlet. 220V operation requires a special order. Size: 4" x 4" x 2".

Retractable Landing Gear System . . .

A Ron Chidgey design, this system features a rugged machined main block; ¼" diameter pivot shaft and self-aligning bearing assemblies. All bearing surfaces are metal to nylon. This system operated from one PLS-180° servo. Weight 5¾ oz. per pair and the nose gear weighs 3¼ oz. for a total of 9 oz. per tricycle set including struts.

Amplifiers . . .

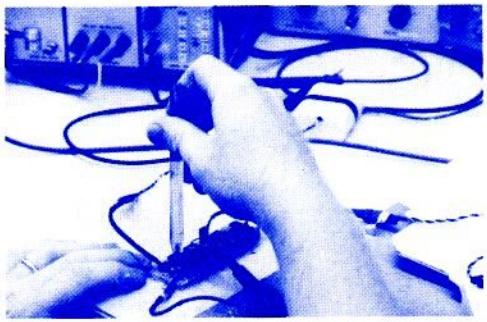
Retractable landing gear — operates an electronic gear assembly direct from a separate battery supply with about 50 flights per pair of Pencell Batteries. Size: 1.81" x .81" x .906". Weight: 1 oz.

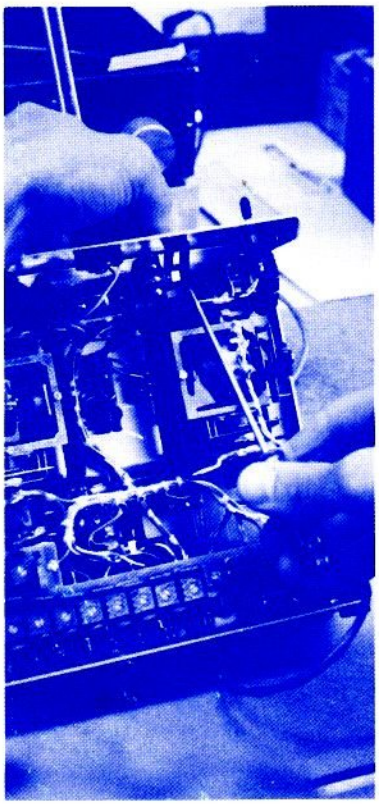
Proportional Brakes — can be powered from airborne battery or separate battery pack to apply brakes electronically. A high power silicon output transistor handles currents of several amps. This amplifier can be wired singularly, in parallel or series.

***Milliampere Hrs. at 10 hr. rate.**

BEGINNER, SPORT FLYER OR PRO...

Pro Line has a radio control system for every skill and experience level. At each step of the production process Pro Line quality is built-in using components that hold up to the tests of aging, interference and de-tuning. This no-compromise approach goes all the way through every Pro Line system from design to final production check-out, and is evident at the flying field where Pro Line's performance and dependability lead the way with a contest record unequaled in the industry. To get the Best of Everything — FLY PRO LINE!





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